

Tarakihi (TAR 1, 2, 3, 7)

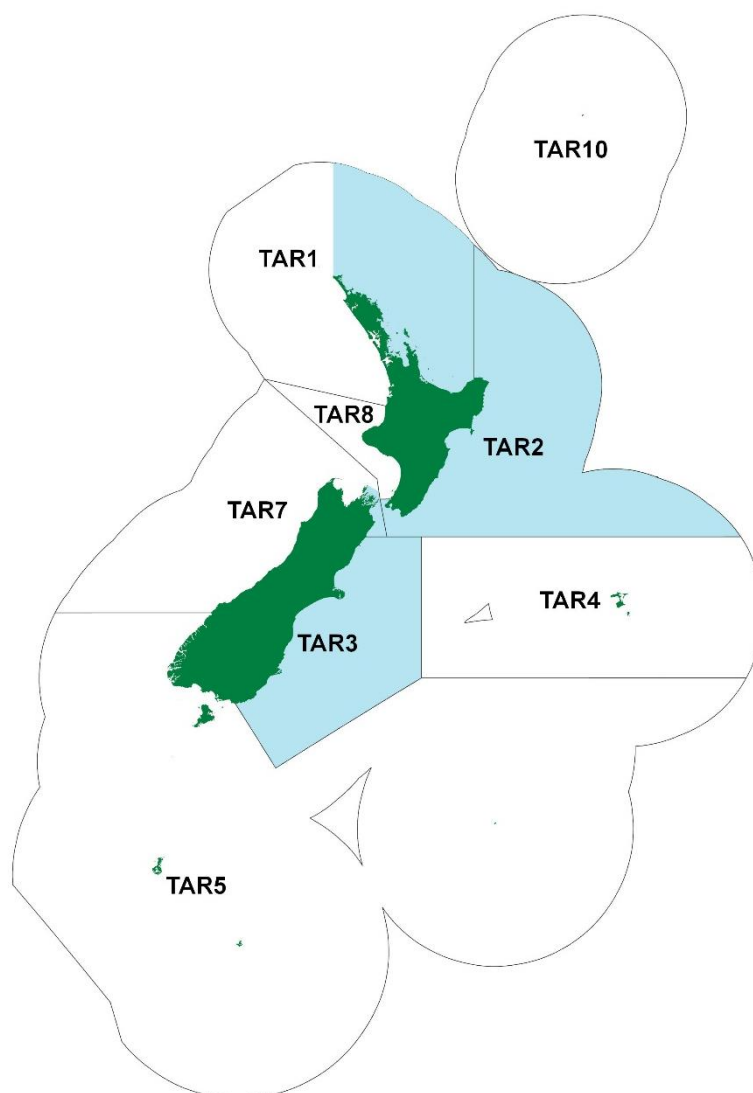


Figure 1: Quota Management Areas (QMAs) for the tarakihi (TAR) fishery, with TAR stocks under review (TAR 1 (east), 2, 3, and 7 (Cook Strait)) highlighted in blue.

1. What is proposed?

950. Fisheries New Zealand is reviewing the total allowable catch (TAC), allowance for Māori customary fishing, allowance for recreational fishing, allowance for all other mortality to the stock caused by fishing, and the total allowable commercial catch (TACC) for tarakihi (*Nemadactylus macropterus*; tiki) in quota management areas TAR 1, 2, 3, and 7, which cover the east coast of the North and South Island and Cook Strait (see Figure 1).
951. Fisheries New Zealand proposes the following initial options, and seeks information and views from tangata whenua and stakeholders (Table 1):

Table 1: Proposed management settings in tonnes for TAR 1, 2, 3, & 7 from 1 October 2018, with the percentage change relative to the current settings in brackets.

Stock	Option	Total Allowable Catch	Total Allowable Commercial Catch	Allowances		
				Customary Māori	Recreational	All other mortality to the stock caused by fishing
TAR 1 ¹	Current settings	2029	1447	73	487	22
	Option 1	1221 ↓ (40%)	983 ↓ (32%)	73	110 ↓ (77%)	55 ↑ (250%)
	Option 2 (year 1)	1466 ↓ (28%)	1205 ↓ (17%)			78 ↑ (355%)
	(year 2)	1307 ↓ (36%)	1061 ↓ (27%)	73	110 ↓ (77%)	63 ↑ (286%)
	(year 3)	1181 ↓ (42%)	946 ↓ (35%)			52 ↑ (236%)
	Option 3	1384 ↓ (32%)	1131 ↓ (22%)	73	110 ↓ (77%)	70 ↑ (318%)
TAR 2	Current settings	2082	1796	100	150	36
	Option 1	1017 ↓ (51%)	735 ↓ (59%)	100	73 ↓ (51%)	109 ↑ (303%)
	Option 2 (year 1)	1556 ↓ (25%)	1225 ↓ (32%)			158 ↑ (439%)
	(year 2)	1206 ↓ (42%)	906 ↓ (50%)	100	73 ↓ (51%)	127 ↑ (353%)
	(year 3)	926 ↓ (56%)	652 ↓ (64%)			101 ↑ (281%)
	Option 3	1376 ↓ (34%)	1061 ↓ (41%)	100	73 ↓ (51%)	142 ↑ (394%)
TAR 3	Current settings	1503	1403	15	15	70
	Option 1	725 ↓ (52%)	579 ↓ (59%)	15	3 ↓ (80%)	128 ↑ (183%)
	Option 2 (year 1)	1150 ↓ (23%)	965 ↓ (31%)			167 ↑ (239%)
	(year 2)	873 ↓ (42%)	714 ↓ (49%)	15	3 ↓ (80%)	141 ↑ (201%)
	(year 3)	653 ↓ (57%)	514 ↓ (63%)			121 ↑ (173%)
	Option 3	998 ↓ (34%)	837 ↓ (40%)	15	3 ↓ (80%)	143 ↑ (204%)
TAR 7 ²	Current settings	1088	1088	-	-	-
	Option 1	986 ↓ (9%)	952 ↓ (13%)	1 ↑	23 ↑	10 ↑
	Option 2 (year 1)	1067 ↓ (2%)	1026 ↓ (6%)			17 ↑
	(year 2)	1014 ↓ (7%)	978 ↓ (10%)	1 ↑	23 ↑	12 ↑
	(year 3)	973 ↓ (11%)	940 ↓ (14%)			9 ↑
	Option 3	1041 ↓ (4%)	1002 ↓ (8%)	1 ↑	23 ↑	15 ↑

952. The proposals are based on the 2017 stock assessment for east coast tarakihi stocks, which assumed a single biological stock of tarakihi along the east coasts of the North and South Islands. In TAR 1 and 7, only the east coast and Cook Strait (respectively) parts of the populations in those quota management areas (QMAs) are included in the assessment.

953. To effectively manage catch, the proposals include catch constraints specific to these areas (referred to as area-based catch constraints; Table 2). The ‘East’ catch constraint for TAR 1, and the ‘Cook Strait’ catch constraint for TAR 7, are the catch levels from each region that will ensure the rebuild under each option. For example, under Option 1 in TAR 1, the TACC is proposed to be set at 983 tonnes of which a maximum of 333 tonnes can be taken in the East sub-area; if there was no catch in the East sub-area all 983 tonnes could be landed from the western area of TAR 1.

¹ Settings for TAR 1 are for the entire QMA, including the sub-area TAR 1 (east) and the rest of TAR 1.

² Settings for TAR 7 are for the entire QMA, including the sub-area TAR 7 (Cook Strait) and the rest of TAR 7.

Table 2: Proposed TAR 1 & 7 TACCs and relevant area-based catch constraints in tonnes.

Stock	Area-based catch constraint/TACC	Option 1	Option 2			Option 3
			Year 1	Year 2	Year 3	
TAR 1	East sub-area	333	555	410	296	481
	TACC	983	1205	1061	946	1131
TAR 7	Cook Strait sub-area	111	185	137	99	161
	TACC	952	1026	978	940	1002

954. In addition, Fisheries New Zealand has received a joint proposal from Fisheries Inshore New Zealand (FINZ) and Southern Inshore Fisheries Management Company Ltd that sets out a Management Strategy for tarakihi (see Appendix 1). Fisheries New Zealand notes initial concerns that the industry proposal relies in part on the shelving of quota. Fisheries New Zealand also seeks information and views from tangata whenua and stakeholders on the industry's proposal.

955. In conjunction with setting tarakihi commercial catch limits, Fisheries New Zealand is proposing that the deemed value rates be adjusted to encourage commercial fishers to constrain catches to within the available annual catch entitlement (ACE) (Table 3).

956. For more information on deemed value rates and schedules proposed for east coast tarakihi, please refer to the deemed value rate section of this discussion document.

Table 3: Current and proposed deemed value rates for TAR 1, 2, 3, and 7.

Stock	Option	Interim deemed value rate	Special Annual differential rates (\$/kg) for excess catch (% of ACE)		
			100-110%	110-120%	>120%
TAR 1	Current	1.50	3.00	4.00	5.50
	Proposed	3.15 ↑	3.50 ↑	4.25 ↑	5.75 ↑
TAR 2	Current	2.48	2.75	4.25	5.75
	Proposed	3.15 ↑	3.50 ↑	4.25	5.75
TAR 7	Current	1.25	2.50	4.00	5.50
	Proposed	3.15 ↑	3.50 ↑	4.25 ↑	5.75 ↑

Stock	Option	Interim deemed value rate	Standard Annual differential rates (\$/kg) for excess catch (% of ACE)					
			100-120%	120-140%	140-160%	160-180%	180-200%	>200%
TAR 3	Current	0.55	1.09	1.31	1.53	1.74	1.96	2.18
	Proposed	Special Annual differential rates (\$/kg) for excess catch (% of ACE)						
				100-110%		110-120%		>120%
		3.15 ↑	3.50		4.25		5.75	

2. Why the need for change?

957. The best available information suggests that there is a sustainability risk associated with current catch levels of tarakihi on the eastern coast of the North and South Islands. The 2018 tarakihi stock assessment indicates that the stock is at 17 percent of unfished levels

(17% SB_0^3), which is below the soft limit as determined by the Harvest Strategy Standard⁴ (HSS). The soft limit is a reference point for fisheries management; for tarakihi this is 20 percent of the unfished biomass levels or 20% SB_0 . When a stock has fallen below this level, the HSS recommends that a formal, time-constrained, rebuilding plan be implemented, aimed to rebuild the stock to at least the target level within an appropriate timeframe. The HSS suggests that a target biomass of 40% of the unfished level (40% SB_0) is appropriate for a low-productivity species such as tarakihi.

958. The TAC, TACC, and allowance options presented in this paper are based on a new stock assessment, which assumed that all the east coast tarakihi along the North and South Islands are a single biological stock. The single biological stock includes the eastern area of TAR 1, the Cook Strait section of TAR 7, and all of TAR 2 and 3.

3. Background

3.1 BIOLOGICAL CHARACTERISTICS OF EAST COAST TARAKIHI

959. Tarakihi is a relatively long-lived species, with a maximum age of 40+ years, reaching sexual maturity, on average, at 6 years of age and 33 cm in length. Tarakihi reach minimum legal size (25 cm fork length) at 3-4 years; the first 8 years is a period of rapid growth. The biological characteristics and natural mortality rate of tarakihi indicate that it is a low productivity species (according to the HSS policy guidelines) which means that it is less resilient to high levels of fishing pressure than high productivity species.
960. Two main spawning grounds have been identified, one from Cape Runaway to East Cape, and the other from Cape Campbell to Pegasus Bay. Limited spawning is likely to occur throughout the distributional range. Tarakihi has a long pelagic phase, where larvae are in the plankton for up to 9 months before settling. Several juvenile nursery areas have been identified in shallower inshore waters, including near Kaikōura, northern Pegasus Bay, Canterbury, and Otago. Juveniles move out to deeper water at about 3-5 years of age, which is when they enter the fishery. The long pelagic phase may have implications for connectivity among subpopulations within the broader east coast biological stock.
961. In TAR 3, a high proportion of the bottom trawl catch is composed of immature fish. In contrast, the seasonal Kaikōura setnet fishery is comprised mainly of mature fish. Tagging studies indicate that adults and juveniles can move significant distances. Results of tagging data, and the analysis of age composition of commercial bottom trawl and survey catches along the east coast of New Zealand, suggest that juvenile tarakihi move progressively northward from the Canterbury Bight to East Northland. The level of connectivity between sub-populations and the differential fishing pressure may have implications for the rebuilding of the stock.

³ B_0 is the virgin biomass or unfished biomass of a stock. This is the theoretical average of the natural biomass of a stock that would be able to be supported by the environment without any fishing pressure.

⁴ Harvest Strategy Standard for New Zealand Fisheries, October 2008, accessible at: <http://fs.fish.govt.nz/Page.aspx?pk=113&dk=16543>
The Harvest Strategy Standard is a policy statement of best practice in relation to the setting of targets and limits for New Zealand fishstocks managed under the quota management system (QMS).

3.2 FISHERY CHARACTERISATION

962. Tarakihi are caught in coastal waters of the North and South Islands in depths from 30m to 250m. Tarakihi is an important species to the recreational and customary fishing sectors, however, more than 80% of the TAC is taken in commercial bottom trawl fisheries and a targeted set net fishery off Kaikōura.
963. Tarakihi in quota management areas (QMAs) TAR 1, 2, 3, and 7 (see Figure 1) are managed under the Quota Management System (QMS). The TACs are set under section 13 of the Act, which requires that TACs are set to move stock biomass towards or above the level that can produce the maximum sustainable yield (MSY).

Customary Māori fishery

964. 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 (refer to section 5.4). In some areas, the regulations providing for customary fishing do not require catch reporting. The levels of customary catch of tarakihi, therefore, are not well known, and Fisheries New Zealand would appreciate further information from tangata whenua on their catch.

Recreational fishery

965. Tarakihi is one of the top five inshore recreational finfish species, however, the recreational harvest accounts for only approximately 5% of the total catch. Recreational fishing of tarakihi is mostly from boats, and is managed through the combined inshore finfish species daily bag limit of 20 (i.e. currently a maximum of 20 tarakihi can be taken; refer to section 4.2) and a minimum legal size of 25 cm fork length.
966. The best available information on the recreational catch of tarakihi is provided by the National Panel Survey (NPS) of Recreational Fishing in 2011/12⁵. A new survey is underway, and results are expected early next year. The available catch estimates are: TAR 1 – 110 tonnes; TAR 2 – 73 tonnes; TAR 3 – 3 tonnes; TAR 7 – 23 tonnes.

Commercial fishery

967. Tarakihi is the third most valuable inshore commercial finfish fishery. Tarakihi is taken as a target species, and as a bycatch. Most tarakihi is sold on the domestic market, while approximately 11% is exported. In the 2016/17 fishing year, the number of vessels targeting tarakihi was 44 in TAR 1 (east), 24 in TAR 2 and 23 in TAR 3.
968. The commercial fishery developed with the introduction of steam trawlers in the 1890's, and by the mid-1930s, annual catches had increased to about 2000 tonnes. For the eastern tarakihi stock, catches peaked from the 1940s to 1980 at around 5000 to 6000 tonnes per annum. Since 1989/90, the total annual catches have been around 3500 to 4000 tonnes per annum, of which 20-30 % was landed in TAR 1 (east), 40-45% in TAR 2, 20-25% in TAR 3, and 5-10 % in TAR 7.

⁵ Wynne-Jones J, Gray A, Hill L, Heinmann A (2014) National Panel Survey of Marine Recreational Fishers 2011-2012: Harvest Estimates. New Zealand Fisheries Assessment Report 2014/67. 139p. Accessible at: <https://www.mpi.govt.nz/dmsdocument/4719/send>

969. In TAR 1 (east), the tarakihi target fishery accounts for about 60% 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 long line methods (<10% collectively). Catches in the Bay of Plenty region are dominated by 4 to 8 year old fish, while further north in East Northland there is a broader age range of fish with a higher proportion of relatively older fish (17 to 22 year old fish) compared to all other QMAs.
970. Based on the last 10 years of commercial catch data, the annual catch from the west coast part of TAR 1 accounts for 33% of the total TAR 1 catch. The west coast catch has increased in the last 4 years to reach 40% of the total TAR 1 catch (average annual catch for last 4 years: 510 tonnes). In 2007, the TACC for TAR 1 (includes east and west coasts) was increased from 1399 to 1447 tonnes (Figure 2). The allowances for Māori customary fishing, recreational fishing, and other sources of mortality were increased to 73 tonnes, 487 tonnes and 22 tonnes respectively. Since the increase, the TACC has only been fully caught once.

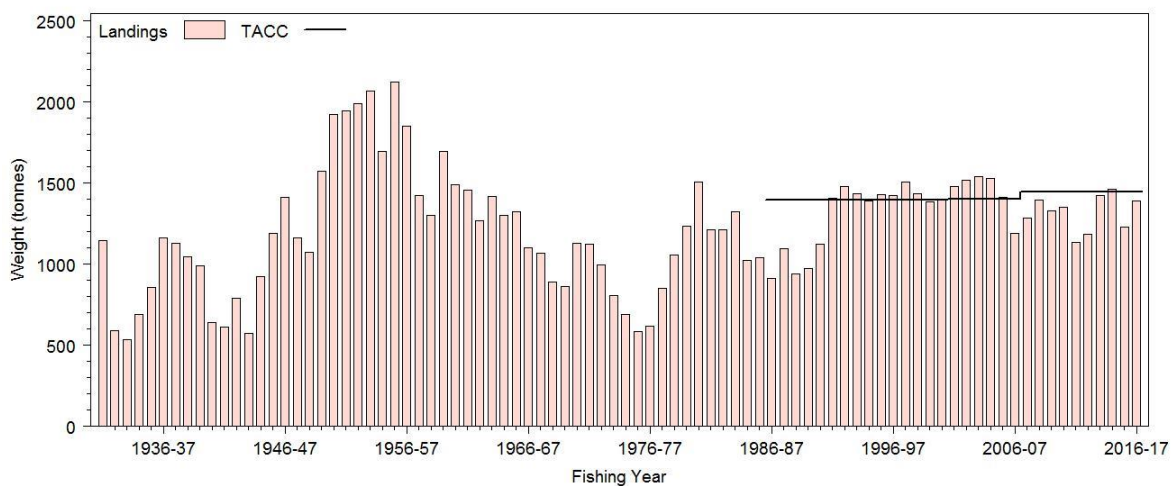


Figure 2: Landings vs TACC for TAR 1 from the 1930's to 2016/17.

971. In TAR 2, the target trawl fishery has consistently accounted for about 84% of the annual catch with a small proportion of the catch taken as bycatch of the red gurnard trawl fishery. TAR 2 catch is taken throughout the QMA although catches are largest from East Cape to Mahia Peninsula. Catches are dominated by 4 to 7 year old fish. In 2004, the TACC for TAR 2 was increased to 1796 tonnes (Figure 3). Since the increase, the TACC has been over-caught by 1-10% in 8 of the 13 years.

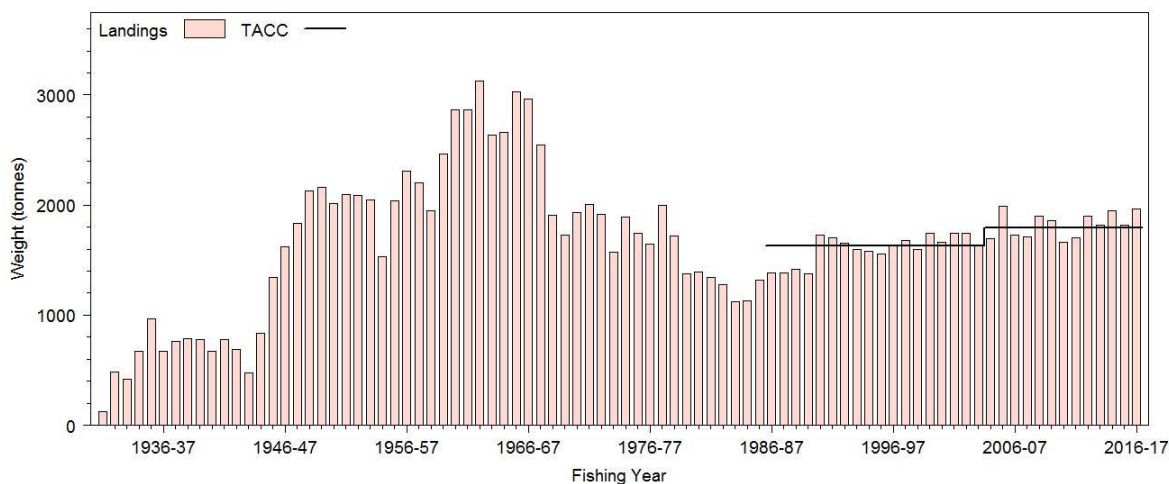


Figure 3: Landings vs TACC for TAR 2 from 1930's to 2016/17.

972. In TAR 3 approximately 55% of the catch is taken by the target trawl fishery; 10-15% is taken by a small target setnet fishery operating off Kaikōura. The setnet fishery is seasonal, with peak catches from December to February and April to May. The remainder of tarakihi is taken by the target barracouta, red cod, and flatfish bottom trawl fisheries. Catches in the bottom trawl fishery are dominated by 4-5 year old fish, compared to larger fish (broader age range of 5 to 8 year old fish) being targeted in the seasonal setnet fishery. In 2004, the TACC for TAR 3 was increased to 1403 tonnes. Since the increase the TACC has been significantly under caught (Figure 4).

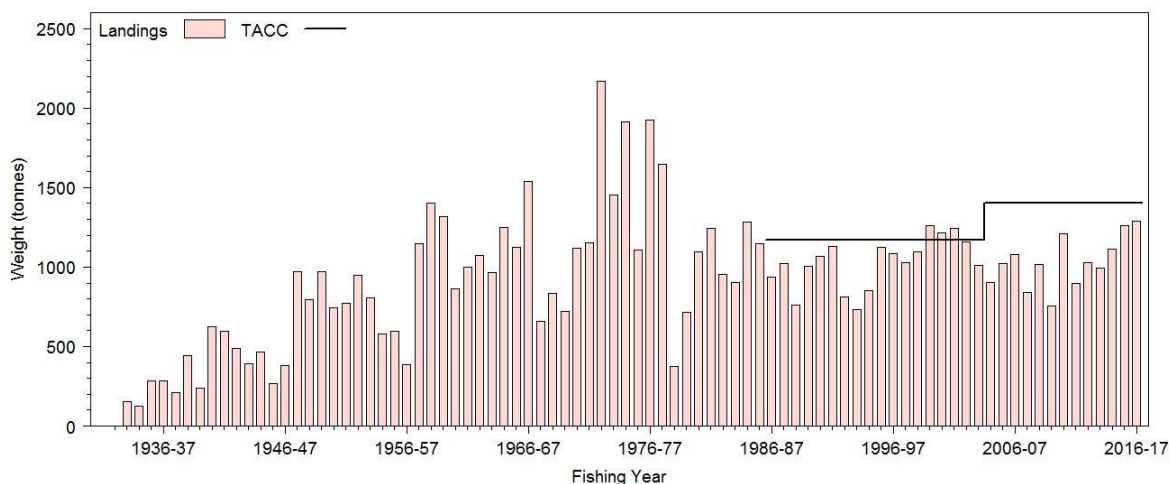


Figure 4: Landings vs TACC for TAR 3 from 1930's to 2016/17.

973. Catches from TAR 7 are mainly from the trawl fisheries targeting tarakihi, blue warehou, red cod, and giant stargazer. Catches in the Cook Strait area of TAR 7 are dominated by 5-7 year old fish. The TACC for TAR 7 is set at 1088 tonnes (Figure 5), and approximately 15% of the total catch in recent years has been taken in the Cook Strait area.

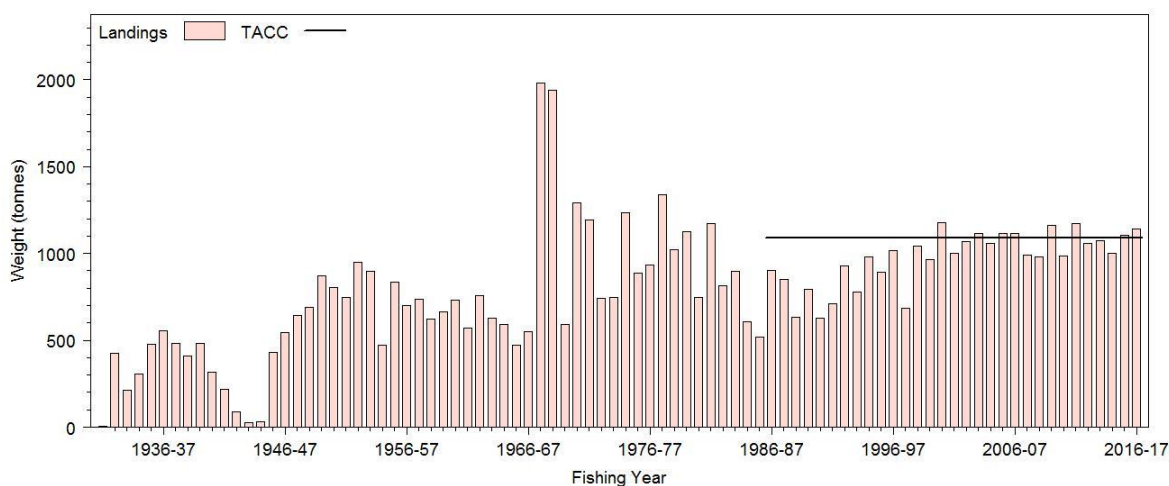


Figure 5. Landings vs TACC for TAR 7⁶ (includes all of TAR 7 - not restricted to Cook Strait) from 1930's to 2016/17.

3.3 STATUS OF THE TARAKIHI STOCKS IN TAR 1, 2, 3, AND 7

Management target

974. 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). Tarakihi is a relatively long-lived, low-productivity stock, and the HSS and policy guidelines recommend that the appropriate default proxy for the biomass that will produce the MSY is 40% of the unfished biomass B_0 (40% SB_0); stocks should be managed to fluctuate around this target with at least a 50% probability. This target represents a real-world biomass level that will produce the MSY, taking into account the species characteristics, the variability in productivity, and environmental variability. Fisheries New Zealand notes that the Minister has the discretion to choose alternative target biomass levels for tarakihi.

975. The best available information suggests that there is a sustainability risk associated with current catch levels of tarakihi on the eastern coast of the North and South Islands. The 2018 tarakihi stock assessment indicates that the stock is at 17 percent of unfished levels (17% SB_0), which is below the soft limit as determined by the HSS. The soft limit is a reference point for fisheries management; for tarakihi this is 20 percent of unfished biomass levels or 20% SB_0 . When a stock has fallen below this level, the HSS outlines the response recommended to ensure that a stock is rebuilt to sustainable levels.

976. Under the HSS, the depleted status of tarakihi triggers the requirement for a formal, time-constrained, rebuilding plan, aimed to rebuild the stock to at least the target level within an appropriate timeframe.

Stock assessment

977. The 2018 stock assessment represents the first fully quantitative stock assessment that has been done for tarakihi. The 2018 tarakihi stock assessment integrates all available commercial catch and catch rates (CPUE), commercial catch-at-age data, recreational

⁶ Note that, on average, the Cook Strait region represents approximately 15% of the total catch from TAR 7.

catch estimates, relative biomass estimates, and relative biomass estimates and catch and age data from fishery-independent surveys from the east coast of the South Island.

978. The stock assessment was completed in late 2017 and then reviewed and accepted by the Fisheries New Zealand Science Working Group and the Fisheries Assessment Plenary⁷. Fisheries Inshore New Zealand (FINZ), in late 2017, commissioned a rapid update of the assessment to include the most recent (2016/17) catch and CPUE data from the commercial fishery. The results were reviewed and accepted by the Science Working Group in April 2018; the biomass trajectories from the 2017 assessment and the updated 2018 assessment were virtually identical.
979. The assessment is based on the assumption of a single biological stock for the east coast of New Zealand including TAR 1 (east of Cape Reinga), TAR 2, TAR 3, and the Cook Strait area of TAR 7. The boundary of the biological stock assumed in the stock assessment was determined through a detailed analysis of all the available data on the distribution of spawning and juvenile fish, patterns in the age composition of sub-populations between QMAs, recent trends in CPUE indices, and movement data from tagging studies. The resulting assumption of a single biological stock (refer Figure 1) was reviewed and accepted by the Fisheries New Zealand Scientific Working Group and November 2017 Fisheries Assessment Plenary. Sub-populations of tarakihi within this area are considered to be part of the one biological stock.

Status of the stock

980. There are some uncertainties around the stock structure and other assumptions in the assessment model. However, based on a comprehensive analysis of the best available fishery-dependent and independent data, there is clear evidence of a sustainability risk (i.e. the stock is below the soft limit of 20% SB_0).
981. The 2018 age-structured stock assessment model indicates that the tarakihi stock is currently depleted and well below the target of 40% SB_0 . Since the early 2000s the assessment has determined that the stock has been below the soft limit of 20% SB_0 , and is currently estimated at 17% SB_0 . There is a low probability (12%) of being above the soft limit (Figure 6). If current catch levels are maintained, the assessment projections suggest that the stock may not recover and may continue to decline.
982. According to the HSS and guidelines, a stock that is below the soft limit of 20% SB_0 , triggers a formal, time-constrained, rebuilding plan, where the stock should be rebuilt back to at least the target level of biomass within a timeframe of between T_{\min} (minimum timeframe to achieve rebuild to target), and $2 * T_{\min}$ (twice the minimum timeframe), with an acceptable level of probability. T_{\min} is the number of years required to rebuild a stock to the target in the absence of fishing. For tarakihi, T_{\min} has been determined by the stock assessment model to be 5 years.

⁷ Fisheries New Zealand (2018). Fisheries Assessment Plenary, May 2018: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand.

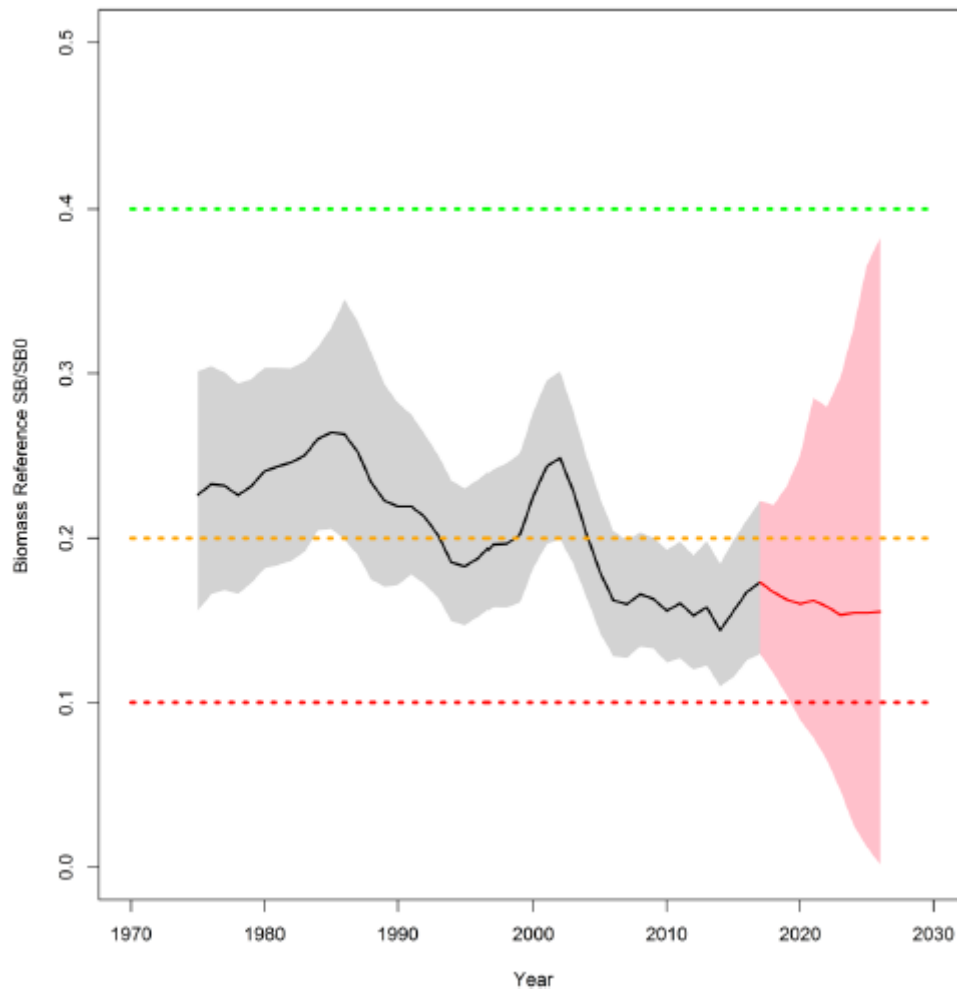


Figure 6: Annual trend (from 1975 to 2017) in spawning biomass relative to 40% SB_0 target biomass level (green dashed line), the 20% SB_0 soft limit (orange dashed line), and the 10% SB_0 hard limit (red dashed line). The uncertainty in the projections from 2017 forward (pink line) are due to uncertainties in recruitment.

3.4 PRE-CONSULTATION

983. Given that tarakihi is the third most valuable inshore finfish species, and the level of public interest in the management of the fishery, Fisheries New Zealand undertook pre-consultation with representatives from the commercial, recreational, customary use, and conservation (i.e. e-NGO) sectors prior to the release of this discussion paper.

Stakeholder views

984. The conservation and recreational sectors accept the outcomes of the stock assessment and strongly support significant reductions in fishing pressure to rebuild the tarakihi stock. There was a general view that a species-specific bag limit for tarakihi was appropriate.

985. The general views of tangata whenua, via the respective North and South Island fisheries forums, are provided in section 4.4.

986. In general, the commercial fishing industry has questioned the defining of a single east coast biological stock and the robustness of the stock assessment. There is a general view that additional data needs to be collected (e.g. age data) and genetic research conducted to re-evaluate the boundaries of the stock and improve the certainty of the stock assessment.
987. There was some concern expressed by fishers operating in TAR 1 that there was a sustainability issue with the tarakihi stock that needed to be addressed. This was based on a number of years of declining catch rates. There has been a general declining trend in CPUE since 2004 in both East Northland and the Bay of Plenty (Figure 7).

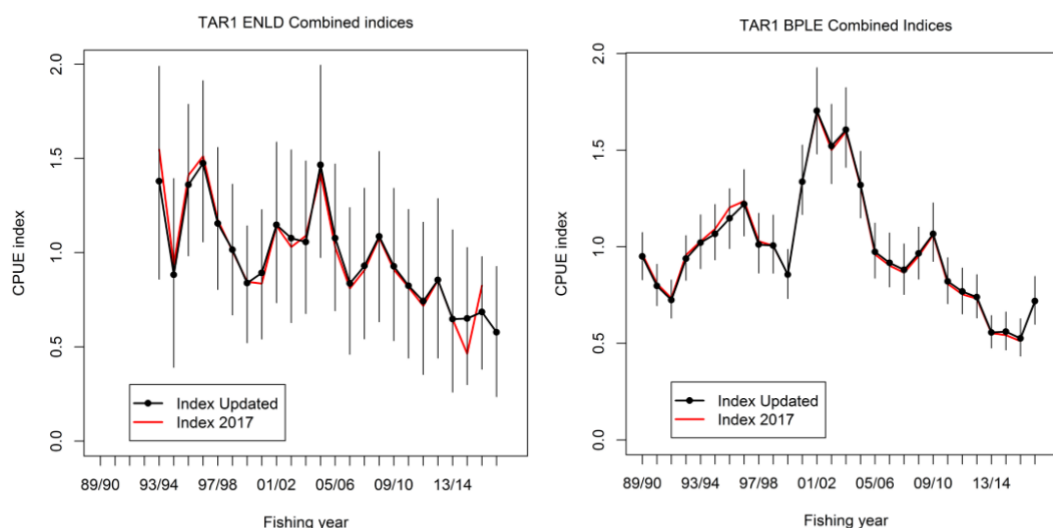


Figure 7: Standardised catch per unit effort (CPUE) for the East Northland and Bay of Plenty areas in TAR 1.

988. Commercial fishers and quota holders operating, or with business interests, in TAR 2 and 3, referenced the increasing catch rates fishers have been experiencing for the last 4 years. The recent increase in CPUE is likely due to several years of good recruitment in 2007, 2011 and 2012 (Langley 2017,⁸ Langley 2018⁹). Prior to this increase, CPUE had declined significantly from 2001/02 to 2006/07 (Figure 8). The good recruitment in 2011-12 was followed by below average recruitment in 2013 and 2014. Given that the fishery in TAR 3 is based on 4-5 year old fish, and in TAR 2, 4-7 year old fish, the availability of fish to the fishery is significantly influenced by recruitment events. The positive effect of higher than average recruitment is currently being experienced by the fishery.
989. The CPUE indices were key inputs (i.e. highly informative) to the integrated age structured population assessment model.

⁸ Langley, A D (2017) Fishery characterisation and Catch-Per-Unit-Effort indices for tarakihi in TAR 1, TAR 2 and TAR 3. *New Zealand Fisheries Assessment Report 2017/44*.

⁹ Langley, A D (2018) Stock assessment of tarakihi off the east coast of mainland New Zealand. *New Zealand Fisheries Assessment Report 2018/05*.

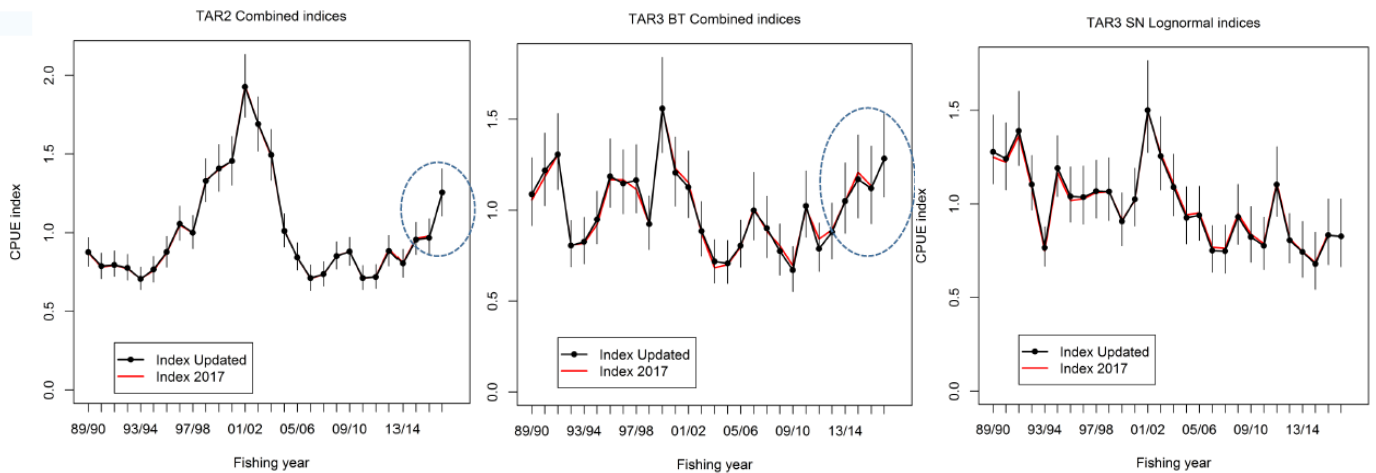


Figure 8. Standardised catch per unit effort (CPUE) for TAR 2 and TAR 3 (bottom trawl and setnet). The CPUE indices were important inputs to the integrated age-structured population model.

990. Fisheries New Zealand has received a joint proposal from Fisheries Inshore New Zealand (FINZ) and Southern Inshore Fisheries Management Company Ltd that sets out industry's proposed Management Strategy for tarakihi (refer to Appendix 1). The strategy aims to increase the biomass of the east coast tarakihi stock to about 20% SB_0 within 3 years, and supports a research program that delivers information that the strategy has identified is necessary in order to address the uncertainties associated with the stock assessment model.

991. It is important to note that the FINZ proposal involves the shelving of quota as an alternative to TACC reductions. Refer to section below outlining Fisheries New Zealand views.

Fisheries New Zealand views

992. Fisheries New Zealand has considered the results of the quantitative stock assessment and the boundaries of the biological stock relative to the boundaries of existing QMAs. Fisheries New Zealand considers that the stock assessment provides the best available information for developing the initial options for consideration as outlined (see sections 3.1 - 3.2), and how these options may be implemented. The options form the basis of a formal, time-bound rebuilding strategy for tarakihi which aims to rebuild the stock to a level that is at or above 40% of unfished levels (40% SB_0) over an appropriate time period.

993. Fisheries New Zealand notes that the FINZ/Southern Inshore (industry) proposal involves the shelving of quota as an alternative to TACC reductions. The Act does not specifically provide for shelving as an alternative to the TAC, for achieving catch reductions to ensure sustainability. However, Fisheries New Zealand considers that shelving can be used as part of a rebuild plan including a TAC adjustment, as a voluntary measure, to change the way and rate a stock moves toward the target level. However, the Minister must be satisfied in the first instance that the TAC he or she sets, meets the requirements of section 13.

994. Fisheries New Zealand proposes the following overall strategy:

- Decrease the TAC and TACC for TAR 1, 2, 3 and 7;
- For each option, apply the same proportional catch reduction to each QMA or area within the QMA (i.e. TAR 1 (east) and TAR 2 (Cook Strait));

- Set new recreational allowances in TAR 1, 2, and 3 at a level that is in line with the best estimates of recreational harvest;
 - Set a recreational allowance for TAR 7 for the first time, in line with the best estimates of recreational harvest;
 - Set an allowance for Māori customary interests in TAR 7 for the first time, in line with the best available information from the reported harvests;
 - Retain the current allowances for Māori customary interests in TAR 1, 2, and 3;
 - Adjust the allowance for ‘Other Mortality’ to account for the 10% mortality relating to unreported catches that was used in the stock assessment model;
 - Determine the appropriate area-based catch constraints as indicated for TAR 1 (east) and TAR 7 (Cook Strait);
 - Evaluate options for implementing the area-based catch reductions in TAR 1 and 7; i.e. via voluntary arrangements and managed by industry.
995. Fisheries New Zealand encourages submissions from stakeholders to consider the relative benefits and impacts of the 3 options that are described in Table 5, and any alternative proposals submitted, such as the proposal from FINZ in Attachment A.
996. In addition, Fisheries New Zealand encourages submissions to consider practical means of monitoring and constraining catch in TAR 1 (east) and 7 (Cook Strait), so as to give effect to the catch reductions (area-based catch constraints) set out in Table 2.
997. Fisheries New Zealand also seeks input from tangata whenua, as well as stakeholder views on setting a recreational fishing bag limit specifically for tarakihi, and removing tarakihi from the combined finfish bag limit of 20.
998. As part of the tarakihi stock rebuilding package, Fisheries New Zealand supports the regular updating of the tarakihi stock assessment and recognises the opportunities this would provide to address any uncertainties and continuously improve the assessment. The next update is planned in 3-4 years and will consider new data from a national catch-at-age data program starting in 2018/19, an additional 3-4 years of CPUE and catch data, 3-4 years of new age data, plus any catch and age data from fishery-independent trawl surveys (South Island).

4. Why are these options proposed?

999. The options proposed for TAR 1, 2, 3, and 7 are summarised in Table 4 and discussed below.

Table 4: Proposed Total Allowable Catch in tonnes for TAR 1, 2, 3, & 7 from 1 October 2018. Combined values for TAR 1 and TAR 7 are for the entire QMA, including the sub-areas TAR 1 (east) and TAR 7 (Cook Strait).

Stock	Option	Total Allowable Catch	Total Allowable Catch reduction and % change ¹⁰	Allowances		
				Customary Māori	Recreational	All other mortality to the stock caused by fishing
TAR 1 ¹¹	Current settings	2029	-	73	487	22
	Option 1	1221 ↓	808 ↓	73	110 ↓	55 ↑
	Option 2 (year 1)	1466 ↓	563 ↓ (28)	73	110 ↓	78 ↑
	(year 2)	1307 ↓	159 ↓ (11)			63 ↑
	(year 3)	1181 ↓	126 ↓ (10)			52 ↑
Option 3	1384 ↓	645 ↓	73	110 ↓	70 ↑	
TAR 2	Current settings	2082	-	100	150	36
	Option 1	1017 ↓	1065 ↓	100	73 ↓	109 ↑
	Option 2 (year 1)	1556 ↓	526 ↓ (25)	100	73 ↓	158 ↑
	(year 2)	1206 ↓	350 ↓ (22)			127 ↑
	(year 3)	926 ↓	280 ↓ (23)			101 ↑
Option 3	1376 ↓	706 ↓	100	73 ↓	142 ↑	
TAR 3	Current settings	1503	-	15	15	70
	Option 1	725 ↓	778 ↓	15	3 ↓	128 ↑
	Option 2 (year 1)	1150 ↓	353 ↓ (23)	15	3 ↓	167 ↑
	(year 2)	873 ↓	277 ↓ (23)			141 ↑
	(year 3)	653 ↓	220 ↓ (25)			121 ↑
Option 3	998 ↓	505 ↓	15	3 ↓	143 ↑	
TAR 7 ¹²	Current settings	1088	-	-	-	-
	Option 1	986 ↓	102 ↓	1 ↑	23 ↑	10 ↑
	Option 2 (year 1)	1067 ↓	21 ↓ (2)	1 ↑	23 ↑	17 ↑
	(year 2)	1014 ↓	53 ↓ (5)			12 ↑
	(year 3)	973 ↓	41 ↓ (4)			9 ↑
Option 3	1041 ↓	47 ↓	1 ↑	23 ↑	15 ↑	

4.1 SETTING OR VARYING THE TAC

1000. Fisheries New Zealand proposes the TAC options shown in Table 4. Options 1 and 2 propose to rebuild the tarakihi stock to the target of 40% SB0 in 10 years; Option 2 is designed to deliver the rebuild through a 3-year phased reduction in the TAC; Option 3 proposes to achieve the rebuild over 20 years (refer to Table 3 for an outline of options).

1001. The rebuilding objectives under the different options are summarised in Table 5. In developing these options for rebuilding the stock, Fisheries New Zealand has considered the status of the stock, the biological characteristics of tarakihi, and the obligations under the Act.

¹⁰ For Option 2, the percent change in red is the reduction in that year (year 1, 2, or 3) based on the TAC of the previous year.

¹¹ Settings for TAR 1 are for the entire QMA, including the sub-area TAR 1 (east) and the rest of TAR 1.

¹² Settings for TAR 7 are for the entire QMA, including the sub-area TAR 7 (Cook Strait) and the rest of TAR 7.

Table 5. A description of the 3 rebuilding options aimed to rebuild the tarakihi stock in TAR 1 (east), 2, 3, and 7 (Cook Strait) to 40% SB_0 (i.e. rebuild the stock to at least 40% of unfished levels).

	Option 1	Option 2	Option 3
Rebuild rate (years)	10 years or $2 \cdot T_{min}$	10 years or $2 \cdot T_{min}$	20 years or $4 \cdot T_{min}$
Catch Reduction	55% reduction in catch; implemented in 2018/19	Equivalent level of catch reduction as in Option 1 but applied over the first 3 consecutive years (i.e. a 3-year phased reduction: 25% year 1; 26% year 2; and 28% year 3)	35% reduction in catch; implemented in 2018/19

1002. TAR 1, 2, 3, and 7 stocks are managed under Section 13 of the Act. Section 13(2) of the Act specifies requirements for setting or varying a TAC where a reliable estimate of the current biomass of the stock and the level of biomass that can produce the maximum sustainable yield (MSY) are known. In considering the way and rate at which a stock is moved towards or above a level that can produce the MSY, regard should be given to relevant social, cultural and economic factors (Section 13(3) of the Act). Based on the results of the stock assessment and following the HSS and guidelines, a formal, time-constrained rebuilding plan for tarakihi is required. While the HSS and guidelines provide guidance, the Minister has discretion regarding the choice of target biomass and the way and rate of change towards the target.

1003. The objective of the proposed rebuilding plan for TAR 1, 2, 3, and 7 is to move the stocks towards the target within an appropriate time frame. The HSS deems a stock to have reached its target when there is at least a 70% probability the stock is at or above the target. The stock assessment will be updated regularly (next update planned in 3-4 years; subsequent updates are scheduled for every 5 years) to evaluate and monitor the performance of the rebuild strategy. In view of this progressive approach to the rebuilding strategy, with regular assessment updates and reviews as planned, the acceptable level of probability that has been adopted to measure progress towards achieving the rebuild target is 50%.

1004. The stock biomass projections from the current stock assessment indicate that significant reductions in current catch (as per the options outlined in this paper) are required in order to have certainty in rebuilding the stock to above the soft limit of 20% SB_0 by the next assessment. Figure 9 provides a comparison of the rebuilding options with respect to the rate of rebuild.

1005. Alternative TACs and rebuilding timeframes may be chosen by the Minister in consideration of the relevant factors. For example, extending the rebuilding timeframe is one approach to reducing the social and economic impacts of a TAC reduction. Fisheries New Zealand notes also that for the phased reduction described in Option 2, the Minister may consider alternative amounts and time frames for applying the reductions.

1006. Fisheries New Zealand considers that any initial TAC reduction should provide a high level of confidence that it will at the very least ensure the start of the rebuilding of the stock. In addition, Fisheries New Zealand considers that the phase-in period should be no longer than three years to ensure that the rebuild is achieved over a reasonable time period; given that tarakihi is a low-productivity stock, is well below the target, and has been at a low biomass level for a considerable period. Refer to section 4.4 below for an evaluation of the rebuild options.

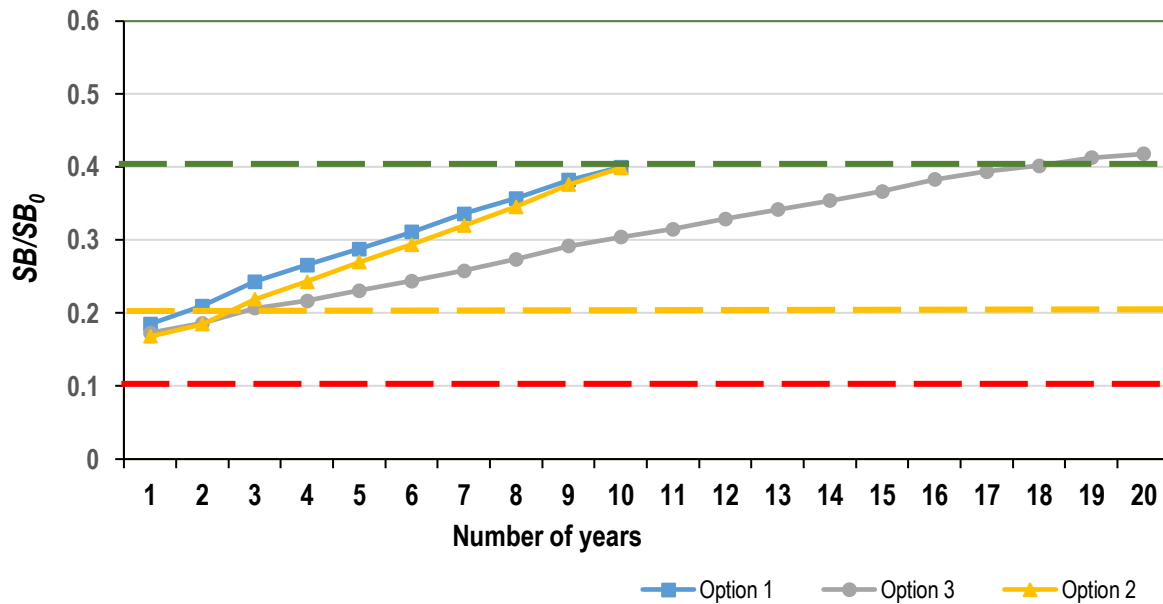


Figure 9: A comparison of the rate at which the options are projected to rebuild the stock to target (40% SB_0 ; green dashed line) with 50% probability. Orange dashed line is the soft limit of 20% SB_0 . Red dashed line is the hard limit of 10% SB_0 . Rebuild time frame: 10 years ($2 \cdot T_{min}$) for Options 1 and 2; and 20 years ($4 \cdot T_{min}$) for Option 3.

4.2 SETTING OR VARYING THE ALLOWANCES

1007. 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 & 21 of the Act).

1008. The commercial fishing sector harvests over 80% of the tarakihi landed, with recreational fishing accounting for less than 5 % of the total harvest. The rebuilding options are based on reducing the commercial catch only. The rebuild projections from the stock assessment assume constant catch from the recreational sector, at levels allowed for in the rebuilding options. Given the small level of recreational harvest relative to commercial catch, the rebuilding options presented are robust to this assumption.

1009. There are no proposals to reduce the current levels of non-commercial catch. Fisheries New Zealand notes that recreational catch in the fishery makes up only a small component of total removals. Nonetheless, it is open to the Minister to choose an option which results in a reduction to the recreational allowance on the basis that all sectors should share in the rebuild of a fishery to target levels in the same way they will share in the benefits of from the fishery of a rebuilt stock. Changes to other management controls (bag limits) are discussed later in this paper (refer section on allowance for recreational fishing, below).

Allowance for Māori customary fishing

1010. There is no proposal to change the customary allowance for TAR 1, 2, or 3. The best available information suggests that current settings will provide for both current levels of catch and increased customary harvest of tarakihi. The proposed allowance for each QMA is the same for each option.
1011. There has been limited take of tarakihi under customary fishing permits. Records indicate that in TAR 1, approximately 1.123 tonnes were landed since 2005; for TAR 2, approximately 282 kg were landed since 2003; for TAR 3, approximately 101 kg were landed since 2001. These catches are well within the annual allowances for these stocks, so Fisheries New Zealand proposes no change to the current allowances (see Table 1).
1012. There is currently no customary allowance set for TAR 7. Fisheries New Zealand has some harvest information from customary permits in TAR 7. Since 1999 there has been a total reported harvest of approximately 700 kg; the maximum annual catch since 1999 was 350 kg in 2010. Based on these harvest estimates, Fisheries New Zealand proposes to set the annual customary Māori allowance for TAR 7 at 1 tonne.
1013. Fisheries New Zealand encourages submissions to consider the annual allowance for customary Māori harvest proposed for TAR 7; clear rationale must be provided for any alternative allowances that are proposed.

Allowance for recreational fishing

1014. Current allowances for recreational fishing were set based on estimates of harvest using telephone/diary based surveys that are now almost 20 years out of date, and are no longer considered reliable. The proposed allowances are based on the 2011/12 NPS (Table 1). The methodology used is considered to have provided more accurate estimates of recreational harvest.
1015. Fisheries New Zealand considers it reasonable to adjust the recreational allowances for TAR 1, 2, and 3 to better reflect the recent estimates of harvest. For TAR 7, no recreational allowance was set previously, so Fisheries New Zealand proposes to set an allowance at 23 tonnes to reflect the harvest estimated from the 2011/12 NPS. The proposed allowances are the same for each of the rebuild options. As these are the best available estimates of recreational harvest, Fisheries New Zealand does not expect that they will constrain recreational harvest of tarakihi in these stocks in any way.
1016. Updated harvest estimates from the 2017/18 NPS currently underway will be available in early 2019. The updated recreational harvest data will be incorporated into the next tarakihi stock assessment.

Management controls for recreational fishers

1017. Fisheries New Zealand encourages submissions to consider the setting of an appropriate species-specific bag limit for tarakihi, and therefore to remove tarakihi from the combined-species bag limit of 20.
1018. The 2011/12 NPS provides information that is helpful for considering an appropriate bag limit. The proportion of trips and the number of tarakihi landed (per trip or fishing event)

is summarised in Table 6. On more than 90% of the trips (or harvest events), 10 fish or fewer were taken, and on more than 50% of the trips, 4 or fewer fish were landed.

1019. Fisheries New Zealand seeks stakeholder views on options for a species-specific daily bag limit that would provide for the majority of fishers' daily bags as reported in 2011/12.

1020. Table 6 shows that a bag limit of 10 tarakihi would provide for more than 90% of trips. Changes to the bag limit, should the Minister decide to implement them, will not be implemented as part of the October sustainability round, but will be considered for inclusion in amendments to the Regulation in 2019. Fisheries New Zealand also seeks views on changes to other management controls, such as the minimum legal size, that might support the rebuilding of the stocks.

Table 6: Summary of the number of tarakihi landed (bag size) per harvest event or trip (percentage of trips) in each of the QMAs. Data is from the National Panel Survey of Marine Recreational Fishers 2011-12: Harvest Estimates.

QMA	Frequency of bag size (% of trips)											
	<1	1	2	3	4	5	6	7	8	9	10	11+
TAR 1	0.2	27.2	18.3	9.7	8.3	6.9	8.7	3.3	3.6	2.9	3	8.0
TAR 2	0.9	20.7	18.2	9.3	10.7	9.0	8.1	3.0	3.5	1.8	7.2	7.5
TAR 3	0.0	83.4	12.3	2.5	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0
TAR 7	0.0	37.8	22.8	9.7	10.5	8.4	2.1	3.4	2.6	0.0	1.7	1.2

Allowance for all other mortality to the stock caused by fishing

1021. Fisheries New Zealand proposes that the 10% for unreported commercial catch used in the stock assessment is added to the current allowance made for other sources of mortality. The proposed allowances account for the likely cryptic mortality from fishing (i.e. extrusion from trawl nets) as well as unreported or discarded catch. The allowances for each stock are shown in Tables 1 and 4.

TACC

1022. Options 1 and 2 propose that the TACC is reduced to rebuild the stock to the target level over 10 years ($2 \times T_{min}$). Option 1 proposes that the TACC is reduced once. Option 2 proposes that the TACC is reduced by a similar amount but over a period of three years (the first 3-years of the 10 year rebuild plan). The phased reduction approach (Option 2) provides some opportunity for the commercial fishing industry to adjust their business operations.

1023. Option 3 proposes a slower rate of rebuild (20 years) as a further means of reducing the social and economic impacts of TACC reductions, and acknowledges the importance of ongoing access to tarakihi as part of the inshore mixed-species fishery.

1024. The TACCs that would apply under the 3 options are summarised in Table 7.

1025. The TACCs and the percent change in TACC for each year, as a result of the phased reduction, are summarised in Table 7. Although the phased reduction provides some opportunity for the commercial fishing industry to adjust their business operations, it results in a TACC (all QMAs combined) that is 197 tonnes less than Option 1. This is a result of the small reduction in fishing pressure that occurred in the first year compared to Option 1, which causes a small delay in the rebuild of the stock. Therefore, if a staged

reduction is to deliver a rebuild in the same time frame as a single cut, the total reduction needs to be greater.

Table 7: Proposed Total Allowable Commercial Catch (TACC) in tonnes for TAR 1, 2, 3, & 7 from 1 October 2018.

Stock	Option	Total Allowable Commercial Catch	TACC change and annual % change	Area-based Catch Constraints
TAR 1 ¹³	Current settings	1447	-	-
	Option 1	983 ↓	464 t ↓ (32%)	333 t
	Option 2 (year 1) (year 2) (year 3)	1205 ↓	242 t ↓ (17%)	555 t
		1061 ↓	144 t ↓ (12%)	410 t
		946 ↓	115 t ↓ (11%)	296 t
	Option 3	1131 ↓	316 t ↓ (22%)	481 t
TAR 2	Current settings	1796	-	
	Option 1	735 ↓	1061 t ↓ (59%)	
	Option 2 (year 1) (year 2) (year 3)	1225 ↓	571 t ↓ (32%)	
		906 ↓	318 t ↓ (26%)	
		652 ↓	254 t ↓ (28%)	
	Option 3	1061 ↓	735 t ↓ (41%)	
TAR 3	Current settings	1403	-	
	Option 1	579 ↓	824 t ↓ (59%)	
	Option 2 (year 1) (year 2) (year 3)	965 ↓	438 t ↓ (31%)	
		714 ↓	251 t ↓ (26%)	
		514 ↓	200 t ↓ (28%)	
	Option 3	837 ↓	566 t ↓ (40%)	
TAR 7 ¹⁴	Current settings	1088	-	-
	Option 1	952 ↓	136 t ↓ (13%)	111 t
	Option 2 (year 1) (year 2) (year 3)	1026 ↓	62 t ↓ (6%)	185 t
		978 ↓	48 t ↓ (5%)	137 t
		940 ↓	38 t ↓ (4%)	99 t
	Option 3	1002 ↓	86 t ↓ (8%)	161 t

Area-based Catch Constraints

1026. To ensure the effective implementation of the rebuilding strategy in TAR 1 and TAR 7, the catch reductions need to be implemented in specific areas of the QMAs. This results in catch constraints within a QMA. These are referred to as area-based catch constraints. The area-based catch constraints apply to TAR 1 (east) and TAR 7 (Cook Strait).

1027. The purpose of the area-based catch constraint is to minimise the risk of localised depletion and to ensure that the fishing pressure is reduced to the level needed to allow the sub-populations of tarakihi in TAR 1 and TAR 7 to rebuild. The proposed area-based catch constraints under each of the options are shown in Table 7.

1028. Catch constraints within TAR 1 (east) and TAR 7 (Cook Strait) provide a mechanism for reducing the fishing pressure in the specific areas of the QMA where it is needed.

1029. Fisheries New Zealand invites submissions to consider options for implementing the catch constraints within TAR 1 (east) and TAR 7 (Cook Strait). Options may include voluntary arrangements such as are used in the management of some deepwater stocks

¹³ Settings for TAR 1 are for the entire QMA, including the sub-area TAR 1 (east) and the rest of TAR 1.

¹⁴ Settings for TAR 7 are for the entire QMA, including the sub-area TAR 7 (Cook Strait) and the rest of TAR 7.

(e.g. the Deepwater Group Ltd agreement to adhere to orange roughy (Chatham Rise) sub-area catch limits); legislative instruments (s 11 of Act) such as closing an area in response to risks of localised depletion; changing the boundary of the QMA to reflect the boundary of the biological stock. The approaches listed here are not exclusive and submissions are invited to comment on these and propose alternative strategies.

1030. The total catch landed for 2016/17 across all QMAs used in the stock assessment projections (including recreational harvest) was 4 709 t, of which 247 t was landed in TAR 7 (Cook Strait); this represents 5.2% of the total catch. Given the small percentage of catch and the likely complexities of managing a catch constraint within a QMA, consideration may be given to not applying any catch reductions to TAR 7. Fisheries New Zealand encourages submissions to consider the benefits and risks of this approach.

4.3 DEEMED VALUE RATES

1031. For TAR 1, 2, 3, and 7, changes to deemed values are proposed to support the rebuilding strategy (see Table 2). For more information on deemed value rates and schedules proposed for tarakihi, refer to the Deemed Value Rates chapter of this discussion document.

4.4 EVALUATION OF OPTIONS

1032. There is no proposal to change the existing allowances for Māori customary fishing. The proposal to set a new customary allowance for TAR 7 is based on the catch taken under customary fishing permits, which is the best available information on customary catch of TAR in TAR 7. Fisheries New Zealand seeks information and views from tangata whenua to assist setting appropriate allowances.

1033. There is no initial proposal to reduce the recreational harvest of tarakihi. However, Fisheries New Zealand does propose to adjust the recreational allowances to ensure that they reflect the best available estimates of harvest from the National Panel Survey in 2011/12.

1034. Small adjustments to the allowances for all other sources of mortality to the stock caused by fishing (other mortality) are required, to include the 10% of unreported catch that was accounted for in the stock assessment.

1035. The primary impacts of the proposed TAC changes relate to the commercial fishing industry. Tarakihi is the third most valuable inshore finfish species. It is taken as a target species and as bycatch, and is primarily caught for commercial sale on the domestic market; approximately 11% is exported.

1036. All options are based on rebuilding the stock to a target of 40% SB0, with consideration to the different way and rate of change in terms of the reductions in commercial catch. The options for rebuilding tarakihi have been evaluated based on the predicted relative losses calculated using the net reduction in TACC and the best estimate of port price per kg.

Economic evaluation

1037. The economic assessment discussed below is based on port prices. The relative loss in revenue under the 3 rebuild options is summarised in Table 8. The expected effect on revenue ranges between \$4.635 million and \$7.280 million.

Table 8: Current TACCs for TAR 1, 2, 3, and 7, proposed TACC reductions, and predicted revenue change based on reported port prices¹⁵

Option	Stock	TACC	Change from status quo (t)	Predicted revenue change (\$ p.a.)
Current settings	TAR 1	1447		
	TAR 2	1796		
	TAR 3	1403		
	TAR 7	1088		
Option 1	TAR 1	983	464 ↓	\$1,115,326 ↓
	TAR 2	735	1061 ↓	\$3,712,763 ↓
	TAR 3	579	824 ↓	\$1,643,721 ↓
	TAR 7	952	136 ↓	\$276,060 ↓
	TOTAL			\$6,747,870 ↓
Option 2 ¹⁶	TAR 1	946	501 ↓	\$1,204,975 ↓
	TAR 2	652	1144 ↓	\$4,000,645 ↓
	TAR 3	514	889 ↓	\$1,773,184 ↓
	TAR 7	940	148 ↓	\$301,358 ↓
	TOTAL			\$7,280,163 ↓
Option 3	TAR 1	1131	316 ↓	\$759,575 ↓
	TAR 2	1061	735 ↓	\$2,570,374 ↓
	TAR 3	837	566 ↓	\$1,129,979 ↓
	TAR 7	1002	86 ↓	\$175,675 ↓
	TOTAL			\$4,635,604 ↓

1038. 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 identification of ports, regions or markets that may be disproportionately impacted by management changes.

1039. Industry has raised concerns about the risk of tarakihi becoming a choke species; i.e. there may be a risk of the catch of other co-caught species being constrained due to the reduction in availability of tarakihi ACE, increasing the overall economic impact on the fishing industry.

1040. The results of the detailed economic assessment and the information that stakeholders provide in submissions, will be evaluated in developing the final advice to the Minister.

1041. The economic evaluation of options below is based on the estimated impacts on tarakihi landings. Fisheries New Zealand acknowledges that additional impacts are likely through

¹⁵ Reported port prices: TAR 1 \$2.40; TAR 2 \$3.50; TAR 3 \$2.00; TAR 7 \$2.03.

¹⁶ Option 2: the predicted revenue change is the total revenue change that results from the 3-year phased reduction.

the potential for reductions in ACE for tarakihi stocks impacting fishers' ability to target other species caught in association with tarakihi. This matter is discussed below in the section on the dependence on other stocks.

Option 1

1042. Option 1 proposes a TAC and TACC based on an approximately 55% reduction in the recent catch in each QMA (TAR 1, 2, 3, and 7). The projections from the stock assessment indicate that the tarakihi stock would rebuild to the target over 10 years ($2 \times T_{min}$) at the reduced level of catch. This option provides greater certainty that the stock would reach the target, and in a timeframe that is consistent with the HSS and policy guidelines. The benefits of the rebuild, which may include increased CPUE (with associated economic benefits) and an increase in the availability of tarakihi to recreational fishers, would be realised sooner compared to rebuilding strategies that are based on longer timeframes.

1043. Implementing a 55% reduction in commercial catch would result in a combined loss in revenue of \$6.75 million for TAR 1, 2, 3, and 7. More than 50% of the total loss in revenue (\$3.7 million) would come from TAR 2 due to the higher current TACC. In 6 of the last 8 years, the TACC in TAR 2 has been over-caught by up to 10 percent. Therefore, the effects of any significant TACC reduction may be felt more in TAR 2 as there is already a tendency for vessels to land more fish than what can be covered by quota.

Option 2

1044. Option 2 proposes a TACC based on a 3-year phased reduction in the commercial catch. The projections from the stock assessment show that, under this phased option, the tarakihi stock would rebuild to the target over 10 years, as per option 1. The TAC and TACC reduction for the first year (2018/19) would be implemented as part of the October 2018 sustainability round, however, the reductions in year 2 and year 3 of the rebuilding plan would be implemented as part of the 2019 and 2020 sustainability round processes, respectively (and would be subject to best available information, consultation and decision making by the Minister at that time).

1045. The benefit of a phased reduction is that it provides opportunity for some level of adjustment by businesses and fishing operations, over a 3-year period. As per Option 1, this option provides greater certainty that the stock would reach target (compared to a rebuilding strategy based on a lower catch reduction), and in a timeframe that is consistent with the HSS and policy guidelines. The benefits of the rebuild are the same as under Option 1.

1046. Implementing a 3-year phased reduction in catch would result in a total loss in revenue of \$7,280,163 (TAR 1, 2, 3, and 7 combined). To achieve the equivalent rebuild in the stock as per option 1, but phased in over 3 years requires a slightly higher total catch reduction (see Table 5). This equates to an additional \$530,000 loss in revenue to the industry, based on port price.

Option 3

1047. Option 3 proposes a TAC and TACC based on an approximately 35% reduction in the recent catch in each QMA (TAR 1, 2, 3, and 7).

1048. The projections from the stock assessment indicate that, under this option, the tarakihi stock would rebuild to the target over 20 years ($4 \times T_{min}$). This option provides less certainty that the stock would reach target, and in a timeframe that is inconsistent with the HSS and policy guidelines. The benefits of any rebuild, such as increased CPUE (with associated economic benefits) and an increase in the availability of tarakihi to recreational fishers, would be significantly delayed compared to rebuilding strategies that were based on shorter timeframes (e.g. Option 1 and Option 2).
1049. The CPUE in the commercial fishery is significantly influenced by recruitment success (see Section 2.3). Delaying the rebuild may increase the risk of below average recruitment negatively impacting on the rebuild and CPUE, resulting in lower economic returns from the fishery.
1050. Implementing a 35% reduction in catch would result in a combined loss in revenue of \$4,635,604 for TAR 1, 2, 3, and 7. Option 3 is an alternative rebuilding strategy that reduces the economic impact on the commercial fishing industry, compared to Options 1 and 2. The economic benefit, based on port price, of extending the rebuild time from 10 to 20 years is estimated at \$2.1 million.
1051. Fisheries New Zealand will be undertaking an update of the stock assessment in 3-4 years. Based on the outcomes of the updated assessment, further changes to the TACs, allowances and TACCs may be considered. The rebuilding times may also be reviewed as part of this process.
1052. In responding to the options and evaluating potential impacts on individual business operations, Fisheries New Zealand encourages stakeholders to provide detailed, verifiable, information and rationale to support their views and any alternative rebuilding proposals.

Dependence of fishery on other stocks

1053. Tarakihi is taken as a target and as a bycatch in a number of fisheries. In TAR 1, approximately 40% of tarakihi is landed in the snapper, John dory, and gemfish targeted bottom trawl fisheries. Significantly reducing the availability of ACE in TAR 1 and implementing an area-based catch constraint for the east of TAR 1 may increase the risk of tarakihi becoming a 'choke species', where the availability of ACE for TAR would impact on fishers' ability to take other species. Industry has expressed concern that significant reductions in the tarakihi TACC (i.e. ACE) may negatively impact fishers' ability to continue to target other species in the mixed inshore finfish fishery, for which they have quota. It is a legislative requirement that all QMS species caught are landed and accounted for with ACE (i.e. insure they acquire sufficient ACE to cover their catch); or pay deemed values. As a result, the reduction in tarakihi ACE may risk discarding of tarakihi, whilst fishers continue to target the other species.
1054. In TAR 2, more than 80% of the catch is taken in the target trawl fishery. In 6 of the last 8 years, the TACC has been exceeded by up to 10%. Any reduction in the TACC is going to significantly impact the availability of ACE and potentially increase fishing effort on other inshore finfish species such as red gurnard, snapper and trevally, particularly if tarakihi can be avoided when targeting those other species.

1055. In TAR 3, approximately 30% of tarakihi landed is taken in the trawl fisheries targeting barracouta, red cod, and flatfish. As in TAR 1, there is a potential risk of tarakihi becoming a choke species.
1056. In TAR 7 (Cook Strait), tarakihi is primarily taken in the target trawl fishery. Implementing an area-based catch constraint for the area might increase the risk of misreporting catch location or shifting fishing effort to red cod, barracouta, and flatfish.
1057. Fisheries New Zealand encourages submissions to consider the potential risk of misreporting of catch location in TAR 1 (east) and TAR 7 (Cook Strait) with respect to the implementation of area-based catch constraints.

5. Other Relevant Matters

5.1 REVIEW OF QMA BOUNDARIES

1058. Fisheries New Zealand notes that the 2017 stock assessment assumed a single biological stock of tarakihi along the east coast of North and South Islands, suggesting that the current QMA boundaries do not align well with the biological stocks. The boundary of the single east coast biological stock was determined through a comprehensive analysis of all the available biological, commercial fishery, and fishery-independent data. Sub-populations of tarakihi within this area are considered to be part of the one biological stock.
1059. Fisheries New Zealand seeks input from tangata whenua and stakeholders on considerations for a future review of QMA boundaries for tarakihi to better align with biological stocks.

5.2 PREFERENTIAL ALLOCATION (28N) RIGHTS

1060. There are 1,915 tonnes of preferential allocation rights (28N rights) in TAR 2 (see Part A section 1.10 – Statutory Considerations). These rights would be discharged only on a future increase to the TACC of the TAR 2 stock, so have no effect under the options proposed in this discussion paper.

5.3 SUSTAINABILITY MEASURES

1061. The proposals are not expected to significantly change the environmental impacts and interactions of the TAR 1, 2, 3, or 7 fishery (s 9 of the Act). The proposals will reduce fishing effort on tarakihi, which may result in an overall reduction in trawl effort in some areas of the target bottom trawl fishery. Therefore, additional impacts on bycatch species, protected species, and the benthic environment are unlikely. The proposals are also considered to adequately address the requirements of section 11 of the Act.
1062. Tarakihi are principally caught by trawl, and set net, specifically in TAR 3 off Kaikōura. Set netting is considered unlikely to impact on seabed habitat, however, there have been instances on the east coast of the South Island where penguins and endangered 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).

5.4 INPUT AND PARTICIPATION OF TANGATA WHENUA

1063. The review of the management arrangements for tarakihi TAR 1, 2, 3, and 7 stocks was presented to the appropriate Iwi Fisheries Forums relating to the North and South Islands.
1064. South Island (Te Waka a Māui me Ōna Toka) Fisheries Forum: this forum represents the nine iwi of the South Island, each holding mana moana and significant interests (both commercial and non-commercial) in South Island fisheries. The forum supported a review of the TAR 3 and TAR 7 fisheries. Fisheries New Zealand will be taking the proposed options to the Te Waka a Māui me Ōna Toka Iwi Forum again in July to seek further input, and will incorporate the Forum's views into the final advice to the Minister.
1065. Far North (Te Hiku o te Ika) Fisheries Forum: there was no quorum at the meeting held in May. As a result the information relating to the review of tarakihi was presented but no positions or views were recorded. Fisheries New Zealand will continue engagement with this Forum during the formal consultation period and will incorporate the Forum's views into the final advice to the Minister.
1066. Waikato/Tainui (Nga Hapu o Te Uru) acknowledged the research and evidence supporting the status of tarakihi stock and supported the highest reduction in TACC. The forum expressed support for a species-specific bag limit for tarakihi, however did not support any reduction in customary allowance.
1067. The Bay of Plenty/ East Coast (Mai I Ngā Kuri a Whārei ki Tihirau) support a species-specific bag limit for tarakihi. Any further advice received from the Waikato/Tainui (Nga Hapu o Te Uru) and Bay of Plenty/ East Coast (Mai I Ngā Kuri a Whārei ki Tihirau) will be incorporated into the final advice to the Minister.

Kaitiakitanga

1068. Under Section 12(1)(b), the Minister must also have particular regard to kaitiakitanga before setting or varying any sustainability measure. Under the Act, kaitiakitanga is the exercise of guardianship, and in relation to any fisheries resources, includes the ethic of stewardship based on the nature of the resources, as exercised by the appropriate tangata whenua in accordance with tikanga Māori.
1069. Relevant Iwi or Forum Fish Plans provide a view of the objectives and outcomes iwi seek from the management of the fishery, and can provide an indication of how iwi exercise kaitiakitanga over fisheries resources. Iwi views from Forum meetings and submissions received from iwi can also provide an indication.
1070. Tarakihi (tiki) is identified as a taonga species for Te Waka a Māui me Ōna Toka, Mai I Ngā Kuri a Whārei ki Tihirau, Nga Hapu o Te Uru, and Te Hiku o te Ika.
1071. The Te Waka a Māui me Ōna Toka Iwi Fisheries Plan contains objectives to support and provide for the interests of South Island iwi. The Forum Fisheries Plan contains three objectives which are relevant to the management options proposed for TAR 3 and TAR 7:

- a) Management objective 1: to create thriving customary non-commercial fisheries that support the cultural wellbeing of South Island iwi and our whānau;
- b) Management objective 3: to develop environmentally responsible, productive, sustainable and culturally appropriate commercial fisheries that create long-term commercial benefits and economic development opportunities for South Island iwi; and
- c) Management objective 5: to restore, maintain and enhance the mauri and wairua of fisheries throughout the South Island.

1072. The Mai I Ngā Kuri a Whārei ki Tihirau Iwi Fisheries Plan contains three objectives which are relevant to the management options proposed for tarakihi (i.e. in TAR 1):

- a) Management objective 1: Iwi fisheries management activities support the growth and wellbeing of our people;
- b) Iwi are actively engaged with others to increase their potential within environmental limits; and
- c) The fisheries environment is healthy and supports a sustainable fishery.

1073. The Nga Hapu o Te Uru o Tainui Iwi Fisheries Plan contains objectives to support and provide for the interests of iwi. The management options proposed for tarakihi support and help deliver the fisheries plan's vision to 'preserve, sustain and enhance the fisheries me ona tikanga', and deliver a key outcome/objective which is to ensure that the 'Fishery and its environment is healthy and sustainable'.

1074. The Te Hiku o te Ika Iwi Fisheries Plan contains objectives to support and provide for the interests of iwi in the far north. The management options proposed for tarakihi support and help deliver the fisheries plan's objectives.

1075. Fisheries New Zealand considers that the management options presented in this advice paper will contribute towards the achievement of the objectives of the iwi fisheries forums in ensuring that appropriate allowances are made for customary non-commercial fishing, the fishery remains sustainable, and that environmental impacts are minimised.

1076. 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, Nga Hapu o Te Uru o Tainui, and Mai I Ngā Kuri a Whārei ki Tihirau.

6. Further Information

Should you require further information, please see:

Fisheries Act (1996)

<http://www.legislation.govt.nz/act/public/1996/0088/latest/DLM394192.html>

Fisheries New Zealand Plenary document

Fisheries New Zealand (2018). Fisheries Assessment Plenary, May 2018: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand.

Langley. A D (2017) Fishery characterisation and Catch-Per-Unit-Effort indices for tarakihi in TAR 1, TAR 2 and TAR 3. New Zealand Fisheries Assessment Report 2017/44.

Langley. A D (2018) Stock assessment of tarakihi off the east coast of mainland New Zealand. New Zealand Fisheries Assessment Report 2018/05.

Fisheries New Zealand recreational fisheries species pages

<https://fs.fish.govt.nz/Page.aspx?pk=8&tk=31&stock=TAR1>

<https://fs.fish.govt.nz/Page.aspx?pk=8&tk=31&stock=TAR2>

<https://fs.fish.govt.nz/Page.aspx?pk=8&tk=31&stock=TAR3>

<https://fs.fish.govt.nz/Page.aspx?pk=8&tk=31&stock=TAR7>

Appendix 1

TARAKIHI MANAGEMENT STRATEGY 2018–2021. Prepared by Fisheries Inshore New Zealand and Southern Inshore Fisheries Management Company Ltd.

See the Fisheries New Zealand consultation page on the 2018 October measures to download the appendix:

<http://www.fisheries.govt.nz/news-and-resources/consultations/?opened=1&cat=8>