



Review of Sustainability Measures for East Coast Tarakihi for 2021/22

**Includes: TAR 2, TAR 3 and the East Coast portions of
TAR 1 & TAR 7.**

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East Coast Tarakihi (TAR 1 (East), TAR 2, TAR 3 and TAR 7 (East))
Includes all of the East Coast from Northland to Otago

Nemadactylus macropterus,

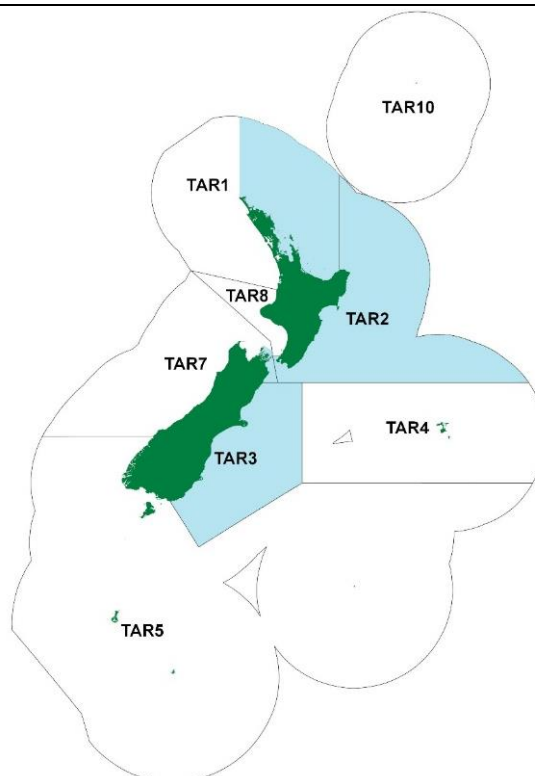


Figure 1: Quota Management Areas (QMAs) for East Coast tarakihi, with the TAR 2, TAR 3 and the East Coast portions of TAR 1 and 7 highlighted. A tarakihi is pictured on the left.

Table 1: Summary of options proposed for East Coast tarakihi from 1 October 2021. Numbers are all in tonnes.

Stock	Option	TAC	TACC	Allowances		
				Customary Māori	Recreational	All other mortality caused by fishing
Combined	Current Settings	5205	4355	193	221	436
	Option 1	4104 ↓ (1101)	3355 ↓ (1000)	193	221	335 ↓ (101)
	Option 2	4710 ↓ (495)	3906 ↓ (449)	193	221	390 ↓ (46)
	Option 3	4409 ↓ (796)	3632 ↓ (723)	193	221	363 ↓ (73)
TAR 1*	Current Settings	1333	1045	73	110	105
	Option 1	1185 ↓ (148)	911 ↓ (134)	73	110	91 ↓ (14)
	Option 2	1283 ↓ (50)	1000 ↓ (45)	73	110	100 ↓ (5)
	Option 3	1235 ↓ (98)	956 ↓ (89)	73	110	96 ↓ (9)
TAR 2	Current Settings	1658	1350	100	73	135
	Option 1	1173 ↓ (485)	909 ↓ (441)	100	73	91 ↓ (44)
	Option 2	1458 ↓ (200)	1168 ↓ (182)	100	73	117 ↓ (18)
	Option 3	1316 ↓ (342)	1039 ↓ (311)	100	73	104 ↓ (31)

TAR 3	Current Settings	1060	936	15	15	94
	Option 1	658 ↓ (402)	571 ↓ (365)	15	15	57 ↓ (37)
	Option 2	837 ↓ (223)	734 ↓ (202)	15	15	73 ↓ (21)
	Option 3	748 ↓ (312)	653 ↓ (283)	15	15	65 ↓ (29)
TAR 7*	Current Settings	1154	1024	5	23	102
	Option 1	1088 ↓ (66)	964 ↓ (60)	5	23	96 ↓ (6)
	Option 2	1132 ↓ (22)	1004 ↓ (20)	5	23	100 ↓ (2)
	Option 3	1110 ↓ (44)	984 ↓ (40)	5	23	98 ↓ (4)

* Catch limit reductions are proposed to come exclusively from the East Coast portions of the TAR 1 and TAR 7 stocks, the proposed reductions for these areas are outlined in the Table below:

Stock	Option	TAC	TACC	QMA Split [^]	
				East	West
TAR 1	Current Settings	1333	1045	466	579
	Option 1	1185 ↓ (148)	911 ↓ (134)	332 ↓ (134)	579
	Option 2	1283 ↓ (50)	1000 ↓ (45)	421 ↓ (45)	579
	Option 3	1235 ↓ (98)	956 ↓ (89)	377 ↓ (89)	579
TAR 7	Current Settings	1154	1024	161	863
	Option 1	1088 ↓ (66)	964 ↓ (60)	101 ↓ (60)	863
	Option 2	1132 ↓ (22)	1004 ↓ (20)	141 ↓ (20)	863
	Option 3	1110 ↓ (44)	984 ↓ (40)	121 ↓ (40)	863

[^] The proportions by which the east and west zones are split have been calculated based on historical catch.

1 Why are we proposing a review?

1. Fisheries New Zealand is proposing a review of the sustainability measures for the East Coast tarakihi stock for the 1 October 2021 fishing year.
2. East Coast tarakihi is a shared fishery, caught by customary Māori, recreational, and commercial fishers. In 2018, abundance of the stock was estimated at 17% of the unfished spawning biomass (SB_0), below the level that would support the maximum sustainable yield (MSY), which for tarakihi is 40% of the unfished biomass (40% SB_0). The update in 2019 provided an estimate of 15.9% SB_0 .
3. The difference between 15.9% SB_0 in 2019¹ and 17% SB_0 in 2018² does not necessarily represent a reduction in abundance given uncertainties in assessments, but more likely indicates a more accurate estimation of abundance as a result of refinements to the modelling.
4. As a part of the 2018 sustainability round, the Minister at the time decided to initiate a two-staged plan to rebuild tarakihi abundance back to a target level of 40% SB_0 . This approach was to provide the commercial fishing industry an opportunity to plan and adjust their operations before any additional changes.

¹ The 2019 stock assessment estimated the spawning biomass of the stock in the 2017/18 fishing year.

² The 2018 stock assessment estimated the spawning biomass of the stock in the 2016/17 fishing year.

5. This two-staged plan included a 20% cut to the Total Allowable Commercial Catch (TACC) and a direction to the industry to develop a package of measures to support the rebuild, which could be considered as part of the 2019 sustainability round. The Minister indicated that a further 35% reduction would be required in 2019.
6. In 2019, the Minister implemented the second stage of the plan, which included a further 10% reduction to the TACC. It is too soon to track any changes in abundance that have resulted from the 2018 and 2019 decisions. However, based solely on these reductions, the stock is predicted to rebuild to the target in 25 years.
7. During the 2019 review, the Minister also agreed to the implementation of the Eastern Tarakihi Management Strategy & Rebuild Plan 2019 (the Industry Rebuild Plan)³. The Industry Rebuild Plan consisted of a series of voluntary measures aimed at reducing the rebuild timeframe, and committed to a shorter rebuild period of 20 years with an interim target of 35% SB_0 .
8. To provide a higher level of confidence in the Industry Rebuild Plan, the Minister also requested that industry deploy on-board cameras to monitor a significant majority of the catch in the areas with the highest level of juvenile tarakihi (TAR 2 and TAR 3).
9. In December 2019, Forest and Bird filed proceedings seeking a judicial review of the Minister's 2019 decision, arguing that the catch limit reductions were not sufficient to allow East Coast tarakihi to rebuild within a "period appropriate to the stock".
10. In June 2021, the Court ruled in favour of Forest and Bird and directed the Minister to have regard to the Court's findings in making a decision in 2021 as to the Total Allowable Catch (TAC) and TACC for East Coast tarakihi. This paper follows on from that ruling and proposes three options for consideration.
11. In undertaking this review, Fisheries New Zealand is proposing further reductions to the TACCs for East Coast tarakihi to ensure the stock rebuilds within a period appropriate to the stock.
12. Fisheries New Zealand welcomes feedback and submissions on the options proposed, or any other alternatives.

2 Legal basis for managing fisheries in New Zealand

13. The Fisheries Act 1996 (the Act) 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* at <https://www.mpi.govt.nz/dmsdocument/45235> for more information.

3 About the stock

3.1 Fishery characteristics

14. Tarakihi are caught in coastal waters off the North and South Island in depths from 50 metres (m) to 250 m. Due to inshore habitat preferences, and the relative ease of harvest, tarakihi is an important species to recreational and customary fishers. However, more than 80% of the combined TAC is caught by the commercial sector.
15. Spatial analysis of the age composition of commercial and research tarakihi catches have revealed that tarakihi off the east coasts of both the North and South Islands exist as a combined biological stock, which is separate from tarakihi occurring on the west coasts.

³ The Industry Rebuild Plan can be found here: <https://www.mpi.govt.nz/dmsdocument/37200/direct>

16. Target commercial fishing for tarakihi is mainly confined to the inshore domestic trawl, as well as a targeted setnet fishery off Kaikōura. Commercial catch effort data indicates these fleets catch roughly 99% of all commercial tarakihi landings, with 92% of this attributed to bottom trawl.
17. Recreational catch is predominantly caught via rod and line from boats. Customary take of tarakihi is largely unknown, however, tarakihi are considered an important taonga species to many iwi.

3.2 Biology

18. Tarakihi is a relatively long-lived species, with a maximum age of 40+ years. The first 8 years is a period of rapid growth, with tarakihi reaching minimum legal size (MLS) (25 cm fork length) at 4 years and sexual maturity, on average, at 6 years of age and 33 cm in length.
19. Under the Harvest Strategy Standard (HSS) the biological characteristics and natural mortality rate of tarakihi indicate that it is a low productivity species, meaning it is less resilient to high levels of fishing pressure than high productivity species.
20. Science information indicates that East Coast tarakihi comprises a single biological stock and as a result TAR 2, TAR 3 and the East Coast portions of TAR 1 and TAR 7 are managed together.
21. Two main spawning grounds have been identified, one from Cape Runaway to East Cape (North Island), and the other from Cape Campbell to Pegasus Bay (South Island). However, some spawning is likely to occur throughout the distributional range. Tarakihi have a long pelagic phase, where larvae and juveniles are pelagic for up to 9 months before settling. Primary nursery areas for the east coast tarakihi stock are found in the Canterbury Bight and Pegasus Bay. Juveniles move out to deeper water at about 3-5 years of age, which is when they enter the fishery.
22. In the East Coast South Island (TAR 3), a high proportion of the bottom trawl catch is composed of immature fish. In contrast, the seasonal Kaikōura setnet fishery is composed 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 rebuilding the stock.
23. There is considerable variation in the relative abundance of individual age classes amongst trawl surveys, indicating high inter-annual variability in recruitment. Recruitment is considered to be most strongly influenced by prevailing oceanographic conditions during the long pelagic phase of larval and post-larval tarakihi.

3.3 Status of the stock

24. The abundance of East Coast tarakihi was most recently estimated at 15.9% SB_0 , which is below the soft limit of 20% SB_0 and the management target of 40% SB_0 . The most recent full assessment in 2018 indicated that the stock has been below the soft limit since the early 2000s, and had an overall downward trend for approximately 30 years, reaching its lowest point around 2014. Over the same time period, fishing mortality has been rapidly increasing and in 2018, overfishing was assessed as being virtually certain to be occurring.
25. Projections from 2018, based on 2017/18 fishing year catch levels, suggest the stock is rebuilding and the biomass will have a 50% probability of meeting a target of 40% SB_0 in

approximately 35 years (refer Figure 2). This projection does not account for the TAC/TACC cuts made as a part of the October 2019 sustainability round. Fisheries New Zealand notes the cuts in 2019 are likely to have improved the stock status, though the extent to which they have done so is not yet known.

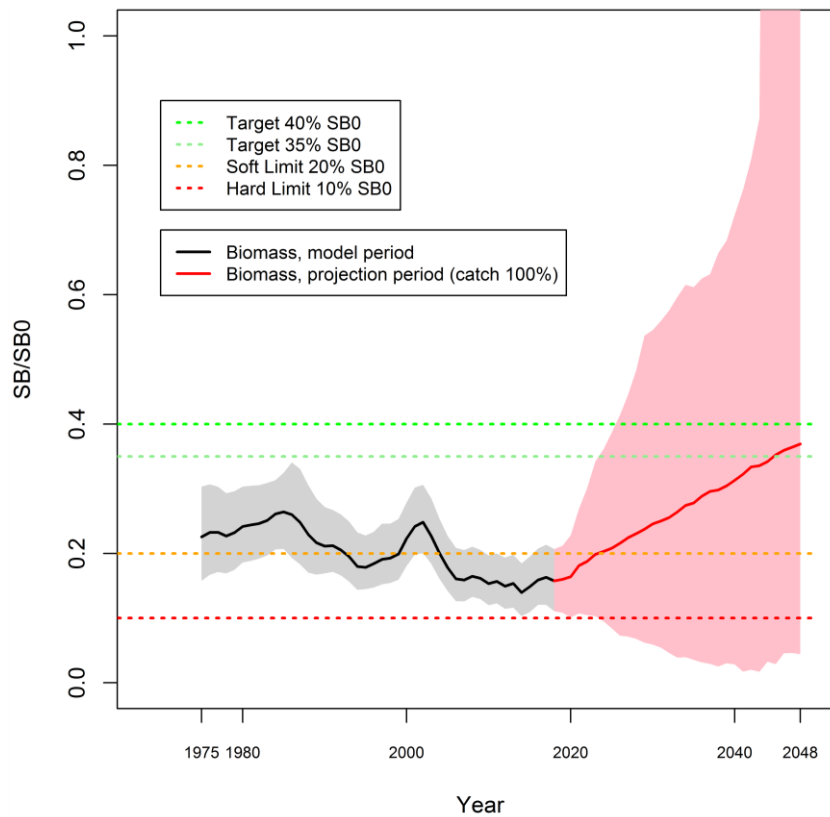


Figure 2: Spawning biomass levels. The projection, from 2018 forward is based on 2018/19 fishing year catch and the confidence intervals (red shading) reflect uncertainty in recent and future spawning success and subsequent recruitment.

26. The stock assessment provides the basis for the abundance estimate for East Coast tarakihi. The assessment model has been thoroughly peer reviewed and accepted by the Fisheries New Zealand Inshore Fisheries Assessment Working Group, as well as the stock assessment Plenary. The assessment model provided the basis for the 2018 and 2019 decisions, and is considered to represent the best available information.
27. As with any fish stock assessment, there are uncertainties around the estimated stock structure and other assumptions in the assessment model. These lead to uncertainty in estimates of stock status, demonstrated by the grey shading in Figure 2 above. There is greater uncertainty around projections of future stock status based on alternative TACC options, unpredictable fluctuations in recruitment and environmental factors (red shading in Figure 2).
28. The next stock assessment for East Coast tarakihi is due for completion in November 2021.

3.4 Rebuild Strategy

3.4.1 Target

29. The general objective of section 13(2) of the Act is that stocks are maintained at or above a level that can produce the maximum sustainable yield (MSY), or moved towards that level within a period appropriate to the stock. Where MSY is not known, the HSS recommends a default target of 40% of the unfished biomass (40% SB_0) for long-lived stocks such as tarakihi, in the absence of a robust peer reviewed alternative.
30. Fisheries New Zealand considers a biomass target of 40% SB_0 robust and constitutes best available information, noting that an alternative species-specific target may be considered if supported by scientifically robust and peer-reviewed information to agree an MSY compatible reference point for the stock.

3.4.2 Appropriate period

31. When a stock is below the level that can produce the maximum sustainable yield, the Act identifies the need to consider a time period for rebuilding that is appropriate to the stock, having regard to the biological characteristics of the stock and any environmental conditions affecting the stock.
32. The High Court in June 2021 stated that a “period appropriate to the stock” should be assessed before deciding the way and rate a fish stock is rebuilt to its management target. Social, cultural, and economic factors are only relevant when considering the way and rate of rebuild. They are not relevant factors when determining the period appropriate to the stock.
33. The HSS provides further guidance in relation to rebuilding stocks that are below MSY and below the soft limit.
34. East Coast tarakihi is below MSY (based on the default target of 40% SB_0) and below the soft limit (20% SB_0). For stocks that have fallen below the soft limit, the HSS recommends that a formal, time-constrained rebuilding plan is adopted, which should aim to restore the stock to, at least, the target level of biomass within a timeframe of between T_{min} (minimum time to achieve rebuild to target in the absence of fishing) and $2 * T_{min}$ (twice the minimum time).
35. T_{min} reflects the extent to which a stock has fallen below the target, the biological characteristics of the stock that limit the rate of rebuild, and the prevailing environmental conditions that also affect the rate of rebuilding.
36. Tarakihi are long-lived but grow relatively rapidly in their first eight years. Due to the rapid growth of tarakihi, there is a potential, from a biological and environmental perspective, to rebuild the stock in a shorter timeframe than some other species. Projections suggest the East Coast tarakihi stock could reach 40% SB_0 within five years in the absence of fishing (T_{min}). Applying the default approach of the HSS would suggest a rebuilding period of between five to ten years.
37. When considering a rebuilding strategy for a stock as depleted as East Coast tarakihi, the main objective should be to take decisive action to move the stock sufficiently far above both the hard and soft limits as soon as possible and, in particular, to minimise the risk of the stock declining further. Once the stock has a high probability of being above these limits, it would be reasonable from a stock and sustainability perspective to then proceed more slowly towards the target.
38. A review of international best practice for rebuilding timeframes for stocks that have fallen below biomass limits in developed countries with strong fisheries management systems

indicates that a mixture of multiples of T_{min} and generation times (the average time taken for an individual to replace itself within a stock or population), is used. For example:

- The United States (US) has used the maximum period of rebuilding of T_{min} plus one generation time extensively since it was approved in 1998 as part of the US National Standard 1 Guidelines.
 - Canada have used 1.5-2 generation times as rebuilding timeframes, but a recent report from a Canadian Department of Fisheries and Oceans workshop on rebuilding plans suggested use of $2-3 * T_{min}$ where this could be calculated and 1.5 to 2 generation times otherwise.
 - The European International Commission for the Exploration of the Sea (ICES), which provides scientific advice to European countries, suggests a maximum rebuilding period of $x * T_{min}$, where $x > 1$.
 - For both the US and ICES, the rebuilding timeframe is the time to reach the management target from a level below a biomass limit that is equivalent to the soft limit, whereas for Canada, the rebuilding timeframe is the time to simply exceed that biomass limit.
39. For East Coast tarakihi, Fisheries New Zealand considers the generation time to be of relevance when determining an appropriate period as it provides a measure of the potential growth rate of a population.
40. The generation time for East Coast tarakihi has been calculated as 14.7 years. Use of T_{min} plus one generation time gives a maximum rebuilding period of 19.7 years. Use of 1.5 generation times gives a maximum rebuilding period of 22 years. Use of 2 generation times gives a maximum rebuilding period of 29.4 years. Use of $2-3 * T_{min}$ gives a maximum rebuilding time of 10-15 years.
41. Taking this information into consideration, along with the low productivity of tarakihi and the high inter-annual variability in recruitment (refer to section 3.2) Fisheries New Zealand considers that the use of T_{min} plus one generation time is appropriate as the upper limit to the rebuild period, and that any period in the range of 5-19.7 years would be appropriate for rebuilding the East Coast tarakihi stock.

3.4.3 Probability

42. The HSS recommends that stocks that have fallen below the soft limit should be rebuilt back to at least the target level, in a timeframe between T_{min} and $2 * T_{min}$, with an acceptable probability, and states that: *"Stocks will be considered to have been fully rebuilt when it can be demonstrated that there is at least 70% probability that the target has been achieved and there is at least 50% probability that the stock is above the soft limit."*
43. Fisheries New Zealand notes that a stock that has a probability of 70% of having achieved the target must have more than a 50% probability of being above the soft limit, and understands that this is an error and that the 50% should have been a higher number, such as 80% or 90%.
44. The operational guidelines for the HSS state that the minimum standard for a rebuilding plan is that 70% of the projected trajectories will result in the achievement of a target based on MSY-compatible reference points or better within the rebuild timeframe.
45. Fisheries New Zealand suggests that a probability of 50% of having achieved the target may be considered reasonable for East Coast tarakihi given the current status of the stock, the size of the rebuild required and due to natural variation caused by fluctuations in recruitment and environmental conditions.

46. At the outset, projections over the extent of a rebuild period become less certain the further out in time they are made. Generally, projections out 1-5 years are reasonably reliable with anything beyond that becoming significantly less certain. An example of this is shown in Figure 2 whereby the confidence intervals for projections of East Coast tarakihi abundance increase markedly in later years.
47. Fisheries New Zealand suggest that a lower probability of 50% at the outset of a rebuild may be justified while looking to increase this probability to 70% in the later years of the rebuild.
48. When referring to the probability of rebuild, a 50% probability does not mean a 50% chance of rebuild versus a 50% chance of not rebuilding at all. Rather, the 50% probability level should be thought of as the median of a distribution around the target. In other words, there will be a 49% probability of being somewhat above the target and a 49% chance of being somewhat below. There will also be a 20% probability of being well above and a 20% chance of being well below.
49. When calculating T_{min} itself this also uses a 50% probability, while the use of a 50% probability level for reaching the target within the specified timeframe is also consistent with international best practice and is widely recognised in other management jurisdictions. For example:
 - The US: The US National Standard 1 Guidelines state that the minimum time for rebuilding a stock means the amount of time the stock or stock complex is expected to take to rebuild to its MSY biomass level in the absence of any fishing mortality. The guidelines state that in this context, the term “expected” means to have at least a 50 percent probability of attaining MSY, where such probabilities can be calculated.

3.4.4 Way and rate

50. The Act identifies the need to consider the way in which and rate at which a stock is moved towards or above a level that can produce maximum sustainable yield, having regard to the interdependence of stocks. In considering the way and rate the Minister must have regard to such social, cultural and economic factors as he or she considers relevant.
51. Approaches to the way in which and rate at which a stock is moved towards the target include, but are not limited to, different rates of reductions to TACs and TACCs (e.g. immediate or gradual/phased), gear modifications/restrictions (e.g. to increase selectivity), and closed areas (e.g. spawning or nursing grounds).
52. Fisheries New Zealand expects that restoring the East Coast tarakihi stock will bring the following potential longer-term benefits:
 - Increase the resilience of tarakihi to years of poor or below average recruitment and to the negative effects of climate change, potentially resulting in a more stable fishery;
 - Improve catch rates in the long term for all sectors;
 - Provide higher revenues for the fishing industry through a fully rebuilt stock which will enable higher catches due to the stock being approximately 250% higher than the current level⁴.
 - Result in tarakihi becoming more widespread in key commercial fishing grounds and areas accessible to customary and recreational fishers.
53. While there will be social, cultural, and economic benefits from a rebuilt stock, catch reductions will also have immediate, substantial impacts. These impacts are likely to be felt by commercial fishers and quota holders who are engaged in fisheries targeting East Coast tarakihi and where it is taken as bycatch.

⁴ Analyses based on the current stock assessment model project that the rebuilt stock will be able to support catches of the order of 4,000 tonnes (4,175 tonnes, according to Table 13 in the Fisheries Assessment Plenary report for 2021)

54. Approximately 98 inshore trawl vessels reported tarakihi as one of their top three species caught while fishing on the East Coast in 2019/20. Many of these vessels target tarakihi as their primary catch. The ability for industry to adapt to catch limit reductions in East Coast tarakihi is unknown and varies in severity depending on the size of the reduction chosen. Fishers will need to modify their operations, although the level of individual impact would vary depending on how important tarakihi is within the mix of catch, access to Annual Catch Entitlement (ACE), and the ability to adjust to other target species.
55. Tarakihi is taken as a target species and as bycatch in a number of fisheries. Any decrease in the TACCs for tarakihi will have impacts on other bycatch and target species. Industry has raised concerns about the risk of tarakihi becoming a choke species. This is likely to result in catch of species caught in combination with tarakihi becoming constrained, unless ways to avoid tarakihi can be found. Subsequent flow-on economic impacts associated with other species are also anticipated.
56. It is a legislative requirement that all QMS species caught, unless specifically listed in Schedule 6 of the Act or below MLS, are landed and accounted for with ACE (or a deemed value cost paid). There is a risk that reductions in tarakihi ACE may create incentives to discard tarakihi, while fishers continue to target other species.
57. Science information indicates that East Coast tarakihi comprises a single biological stock and as a result Fisheries New Zealand seeks to manage TAR 2, TAR 3 and the East Coast portions of TAR 1 and TAR 7 together.
58. To ensure catch reductions directly support the rebuild, it is important that they are targeted to the East Coast portions of TAR 1 and TAR 7, while not affecting the West Coast portions which the rebuild objectives do not apply to.
59. Managing catch at a level that is smaller than the quota management area can be difficult if voluntary arrangements with industry are not in place. Since 2018 a voluntary catch splitting arrangement with industry has been operated (Table 2). providing a mechanism for the commercial catch reductions for TAR 1 and TAR 7 to be taken exclusively from the east coast portion of these stocks.

Table 2: Current catch splitting arrangements

Stock	Total TACC (tonnes)	East (tonnes)	West (tonnes)
TAR 1	1,045	466	579
TAR 7	1,024	161	863

60. Adherence to the catch split arrangement is also monitored using electronic catch and position reporting. This arrangement has been successfully monitored and implemented, and for the last complete fishing year (2019/20):
 - TAR 1 (East) sub-area catch limit was 3% under caught; and
 - TAR 7 (East) sub-area catch limit was 1.6% under caught.
61. Fisheries New Zealand notes that precedence exists for voluntary catch-spreading agreements, including in the hoki and orange roughy fisheries, which have been operated successfully for a number of years. When implemented successfully, voluntary catch splitting arrangements

provide a responsive mechanism for achieving catch reductions at sub-Quota Management Area (sub-QMA) level⁵.

Voluntary Additional Measures

62. The Industry Rebuild Plan was developed by Fisheries Inshore New Zealand, Te Ohu Kaimoana and Southern Inshore Fisheries. It represents the industry's commitment to the sustainable management of the East Coast tarakihi fishery, and desire to work with Fisheries New Zealand to provide for the rebuild of the fishery, while also maintaining a viable inshore fishing industry.
63. The Industry Rebuild Plan comprises a series of voluntary measures aimed at improving the management of the fishery, while also adopting alternative approaches to contribute to the rebuild beyond simply reducing catch limits. These measures offer alternative ways of rebuilding the stock that could improve the rate of the rebuild. The core elements include:
- Commitment to a time constrained rebuild: commitment to a rebuild of 20 years from the base year 2017/18, with an interim target of 35% SB_0 .
 - Catch Splitting – West/East Split: The aim of this measure is to achieve catch reductions at the sub-Quota Management Area (sub-QMA) level, e.g. the East Coast portion of TAR 1 and TAR 7. This is proposed to ensure the catch reductions are in line with the rebuild objectives for East Coast tarakihi and do not affect the West Coast portion of these QMAs.
 - Reporting sub Minimum Legal Size: Understanding the level of sub-MLS tarakihi caught, and its distribution, is important information that can assist fishers, fisheries management, and scientific understanding as we rebuild the East Coast tarakihi stock. Reducing catch of sub-MLS tarakihi will also ensure that a greater number of juveniles will remain in the water to recruit into the wider fishery.
 - Selectivity Research: Industry modelling indicates that improved selectivity from commercial gear to increase the average size of fish caught could potentially increase the rate of rebuild. The industry has undertaken trials to improve the selectivity of trawl nets through modifications to fishing gear. Results from these trials were presented to the Statistics, Assessments and Methods Working Group in June 2021. In addition, industry has received funding to undertake an innovative research project that looks at using engineering, camera technology and artificial intelligence to automatically detect and record length frequency information of sub-MLS catch.
 - Move on Rule: To avoid catch of juvenile sub-MLS tarakihi, the industry committed to the use of a 'move on rule'. When triggered, a fisher is required to move more than one nautical mile from all parts of the line where small fish are encountered, or move so that the net is at a depth of at least 10 metres more along all points of the line.
 - Voluntary Closed Areas: Voluntary closed areas (VCAs) provide a tool for avoiding areas where small tarakihi are abundant year-round. VCAs have been identified by industry in the TAR 2 Regional Management and Monitoring Plan and provide an additional measure to the move on rule for avoiding juvenile fish.
 - Development of a species-specific target: The industry committed to working with Fisheries New Zealand to develop a species-specific management target for East Coast tarakihi as part of the 2020/21 stock assessment.
 - Enhancing Science: Industry has committed to enhancing science relating to East Coast tarakihi to increase our understanding of the fishery, reduce key uncertainties, and assess the effectiveness of the Industry Rebuild Plan.

⁵ The alternative option would be to consider a regulatory alteration to quota management areas, under either section 25A or 25B of the Act.

- On-board cameras: Industry has committed to deploying cameras onboard a number of trawl vessels in TAR 2 and TAR 3. The scope of the camera project is to ensure fishers are accurately reporting sub-MLS tarakihi whenever it is present in their catch.
64. As these measures have only been in place since the 2019/20 fishing year, their efficacy remains uncertain at present. As more information becomes available it may be possible to quantify the effect these measures have on the rate of rebuild.
65. While the Industry Rebuild Plan is not a relevant consideration for the Minister in determining the rebuild period appropriate to the stock, Fisheries New Zealand considers it important to highlight the additional measures that have been undertaken in recent years, to support the rebuild of East Coast tarakihi to a sustainable level.

3.5 Catch information and current settings within the TAC

3.5.1 Customary Māori

66. Tarakihi is an important species for customary fishing and is identified as a taonga (treasured) species in several Iwi Fisheries Plans that apply to the East Coast of the North and South Islands⁶. Customary non-commercial catch in the East Coast tarakihi fishery makes up only a small amount of total removals (<5%). Based on the best available information, the current settings are considered to meet the needs of tangata whenua. There are no proposals to change the current allowances for customary non-commercial catch.
67. Best available information shows only 33 customary authorisations for tarakihi have been reported over the last 10 years and based on this information alone customary catch would be less than one tonne annually.
68. Fisheries New Zealand considers that current information on customary catch may not accurately reflect the true take of tarakihi for customary purposes.
69. Fisheries New Zealand seeks further information from tangata whenua to inform final advice to the Minister on setting the customary allowance.

3.5.2 Recreational

70. Tarakihi is one of the top five inshore recreational finfish species throughout New Zealand. However, recreational allowances in the East Coast tarakihi fishery make up only a small part of the TAC (<5%).
71. 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 MLS of 25 cm (fork length) and a minimum net mesh size of 100 mm.
72. Fisheries New Zealand notes that in 2018 the allowances for recreational fishers were reduced in TAR 1 and TAR 2 from 487 to 110 tonnes, and 150 to 73 tonnes respectively. The TAR 3 allowance of 15 tonnes was retained, while the TAR 7 allowance was set for the first time. No further adjustments were made in 2019.
73. The National Panel Survey of Marine Recreational Fishers (NPS) represents the best available information on recreational harvest providing a snapshot of fishing activity over a fishing year. Fisheries New Zealand notes that recreational catch is also likely to vary from year to year due

⁶ Te Waka a Māui me Ōna Toka, Mai I Ngā Kuri a Whārei ki Tihirau, Ngā Hapū ō Te Uru, and Te Hiku ō te Ika Iwi Fisheries Plans

to factors such as weather and availability, in addition to being influenced by the overall level of biomass. The results of the 2017-18 survey show that the combined recreational harvest across the four relevant tarakihi stocks is approximately 198 tonnes.

74. The survey also shows that, 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 76% of recreational fishing trips across East Coast tarakihi.
75. Table 3 shows the 2017-18 NPS estimate of recreational harvest compared against the current recreational allowance for each relevant tarakihi stock. For TAR 1, TAR 3 and TAR 7 recreational harvest is below the current allowance, and quite significantly in TAR 1. Whereas, the survey estimate of 110 tonnes for TAR 2 is above the allowance 73 tonnes.

Table 3: Estimates of recreational catch from the 2017-18 National Panel Survey of Marine Recreational Fishers compared to the current recreational allowances. Numbers are in tonnes unless specified.

Stock	Current Allowance	National Panel Survey	Difference (%)
TAR 1	110	62.23 (\pm 8.71)	- 43.43
TAR 2	73	110.23 (\pm 24.25)	+51.00
TAR 3	15	5.18 (\pm 1.66)	-65.47
TAR 7	23	20.57 (\pm 3.70)	-10.57
Combined	221	198.21	-10.31

76. Fisheries New Zealand notes that the combined recreational harvest of East Coast tarakihi is lower than that of the combined recreational allowance, being 90% of the allowance. Given the uncertainties associated with harvest estimates and that recreational harvest varies year to year Fisheries New Zealand is not proposing to change the current allowances for recreational catch at this time. There may however be a case for redistributing the allowances across the quota management areas to reflect current take more accurately.
77. Fisheries New Zealand suggests revisiting these allowances at the time of the next review, however we welcome feedback on this matter. Ongoing monitoring of recreational catch will be important as the stock rebuilds to ensure its success. This is because, it is likely that recreational catch will increase as tarakihi abundance grows. This is discussed in section 7.1.

3.5.3 Commercial

78. Nationally, tarakihi is the third most valuable inshore commercial finfish fishery, following snapper and blue cod. More than 80% of the TAC is taken in commercial fisheries, both as a target and bycatch species. Most tarakihi is sold on the domestic market, while approximately 11% is exported.
79. The commercial fishery developed with the introduction of steam trawlers in the 1890s, and by the mid-1930s, annual catches had increased to about 2,000 tonnes. For the eastern tarakihi stock, catches peaked from the 1940s to 1980 at around 5,000 to 6,000 tonnes per annum. Since 1989/90, the total annual catches from the East Coast stock have been around 3,500 to 4,000 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 (Cook Strait).
80. In the 2019/20 fishing year, the number of vessels targeting tarakihi was 24 in TAR 1 (east), 20 in TAR 2, 28 in TAR 3 and 12 in TAR 7 (east). Of the inshore vessels active in the East Coast area in 2019/20, approximately 98 reported tarakihi as one of their top three species caught and 86 reported tarakihi as their highest catch of any species.

81. The MLS for commercial caught tarakihi is 25 cm. Any tarakihi below MLS must be returned to the sea and, since the introduction of electronic reporting in 2019, fishers must record an estimate of the quantity of undersize tarakihi returned for each fishing event where undersize tarakihi is caught.

3.5.4 All other mortality caused by fishing

82. The allowance for all other mortality caused by fishing is intended to provide for unrecorded mortality of fish associated with fishing, including incidental mortality from fishing methods or illegal fishing. This is naturally difficult to quantify when you consider the range of contributing sources and as a result there is uncertainty in the estimates used to set this allowance for tarakihi.
83. The previous Minister indicated a preference for standardising the other sources of mortality allowance for inshore trawl fish stocks at an amount that equates to 10% of the TACC, unless there is evidence to suggest otherwise. The other mortality allowances for all East Coast tarakihi stocks align with this approach, and there is no new evidence to suggest that different levels would be more appropriate.

4 Treaty of Waitangi Obligations

4.1 Input and participation of tangata whenua

84. Input and participation into the sustainability decision-making process is provided through Iwi Fisheries Forums, which have been established for that purpose.
85. Each Iwi Fisheries Forum can develop an Iwi Fisheries Forum Plan that describes how the iwi in the Forum exercise kaitiakitanga over the fisheries of importance to them, and their objectives for the management of their interest in fisheries⁷. Particular regard will be given to kaitiakitanga when making sustainability decisions. Iwi Fisheries Forums may also be used as entities to consult iwi with an interest in fisheries.
86. The Mai I Ngā Kuri a Whārei ki Tihirau forum (Bay of Plenty) expressed concerns around iwi quota holders potentially not being aware of the situation, and the uncertainty around what the Minister's decisions may look like. This forum also raised questions around the science that led to the initial review and the need for a better understanding of important inshore stocks, and requested further information on the review for the next forum meeting (beginning of August).
87. The Te Waka a Māui me Ōna Toka forum (South Island) expressed a preference for a cautious approach. Te Waka A Maui also expressed interest in the court's decision and the future implications this may have on management.
88. The Mai Paritu tae atu ki Turakirae forum (Mahia to South Wairarapa) noted the importance of having better recreational catch data to inform tarakihi management, noting that introducing some form of reporting would be more favourable than the infrequent surveys currently conducted. Forum members shared views on how the tarakihi fishery was performing, with some noting good catchability.
89. Fisheries New Zealand acknowledges that the condensed timeframe, dictated by the recent High Court ruling, has impacted the time available to allow for input and participation. Further discussions on tarakihi will be had at forums scheduled during consultation.

⁷ Not all Iwi Fisheries Forums have developed plans at this stage, though work in this area is ongoing.

4.2 Kaitiakitanga

90. Under section 12(1)(b), the Minister must 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.

Iwi Fisheries Forum Plans

91. Information provided by Iwi Fisheries Forums and iwi views on the management of fisheries resources and fish stocks, as set out in Iwi Fisheries Plans, are the way that tangata whenua exercise kaitiakitanga in respect to fish stocks.
92. Relevant Iwi or Forum Fisheries Plans provide a view of the objectives and outcomes iwi seek from the management of the tarakihi fishery. They can also provide an indication of how iwi exercise kaitiakitanga over fisheries resources, as can iwi views from Forum meetings and submissions received from iwi.
93. Fisheries New Zealand considers that the management options presented in this consultation paper contribute towards the objectives of relevant Iwi Fisheries Plans which generally relate to the maintenance of healthy and sustainable fisheries. This is further illustrated in Table 4 below.

Table 4: Objectives and outcomes iwi seek from the management of the tarakihi fishery from Iwi or Forum Fish Plans.

Iwi Fisheries Forum	Relevant Management Objectives contained in Iwi Fisheries Forum Plan
Te Waka a Māui me Ōna Toka	<ul style="list-style-type: none"> • Create thriving customary non-commercial fisheries that support the cultural wellbeing of South Island iwi and our whānau; • 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 • Restore, maintain and enhance the mauri and wairua of fisheries throughout the South Island.
Mai I Ngā Kuri a Whārei ki Tihirau	<ul style="list-style-type: none"> • Iwi fisheries management activities support the growth and wellbeing of our people; • Iwi are actively engaged with others to increase their potential within environmental limits; and • The fisheries environment is healthy and supports a sustainable fishery.
Nga Hapu o Te Uru	<ul style="list-style-type: none"> • 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'.
Te Hiku o te Ika	<ul style="list-style-type: none"> • 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.

Customary fisheries areas

94. Mātaaitai reserves, taiāpure and temporary closures are customary management tools that also provide for kaitiakitanga. The Minister is required to take these into account when making allowances for customary non-commercial fishing interests.
95. There are 30 mātaaitai reserves and eight taiāpure within the East Coast tarakihi (Table 5). Outside of the broad prohibition on commercial fishing activity within mātaaitai reserves, none of these customary management areas have any specific restrictions on the taking of tarakihi. The overall aim of the proposed options is to ensure sustainability and promote the ongoing availability of tarakihi throughout the QMA, including within these areas.

Table 5: Customary fisheries areas within East Coast TAR.

Name		Management Type
Te Puna Mātaaitai	Whakaraupō Mātaaitai	Mātaaitai Reserve <i>Commercial fishing is not permitted within mātaaitai reserves unless regulations state otherwise.</i>
Te Maunga o Mauao Mātaaitai	Rapaki Bay Mātaaitai	
Te Rae o Kohi Mātaaitai	Koukourārata Mātaaitai	
Raukokere Mātaaitai	Wairewa Mātaaitai	
Te Kopa o Rongokānapa Mātaaitai	Te Kaio Mātaaitai	
Te Tapui Mātaaitai O Hakihea	Ōpihi Mātaaitai	
Horokaka Mātaaitai	Waitarakao Mātaaitai	
Toka Tāmure Mātaaitai	Te Ahi Tarakihi Mātaaitai	
Te Hoe Mātaaitai	Tuhawaiki Mātaaitai	
Moremore Mātaaitai	Waihao Mātaaitai	
Te Waha o te Marangai Mātaaitai	Moeraki Mātaaitai	
Mangamaunu Mātaaitai	Waikouaiti Mātaaitai	
Kahutara Mātaaitai	Ōtāhou Mātaaitai	
Oaro Mātaaitai	Puna-wai-Tōriki Mātaaitai	
Tūtaeputaputa Mātaaitai	Waikawa Harbour Mātaaitai	
Waikare Inlet Taiāpure	Te Taumanu o Te Waka a Māui Taiāpure	Taiāpure <i>All types of fishing are permitted within a Taiāpure. The management committee can recommend that regulations be set for commercial, recreational and customary fishing.</i>
Maketu Taiāpure	Oaro-Haumuri Taiāpure	
Porangahau Taiāpure	Akaroa Harbour Taiāpure	
Palliser Bay Taiāpure	East Otago Taiāpure	

5 Environmental and Sustainability Considerations

5.1 Environmental principles (section 9 of the Act)

96. The key environmental interactions within this fishery, which must be accounted for when considering sustainability measures, concern marine mammals, seabirds, fish and invertebrate bycatch, and benthic impacts.
97. Fisheries New Zealand notes that environmental factors, such as a decline in water quality (through temperature changes, reduced oxygen levels and sediment deposition from runoff) in enclosed bays and sheltered harbours, may be affecting tarakihi recruitment. Fisheries New Zealand does not have a direct role in managing these environmental impacts. Nonetheless, Fisheries New Zealand monitors these activities and where necessary advocates for approaches and practices that mitigate impacts on fish species and the habitats they depend on.

Marine mammals

98. The proposed changes to the TACs and TACCs for tarakihi may result in an overall reduction in trawl effort in some areas, therefore, impacts on marine mammals may be reduced.
99. East Coast tarakihi encompasses areas associated with multiple marine mammal species, including the Hector's dolphin (on the East Coast of the South Island). Marine mammal interactions are reported by fishers or on-board observers and are closely monitored by Fisheries New Zealand. In the 2019/20 fishing year there were five captures of marine mammals reported by vessels targeting tarakihi on the East Coast of New Zealand. The options proposed in this paper are unlikely to result in increased captures.
100. The Hector's and Māui dolphin Threat Management Plan (TMP) guides management approaches for addressing both non-fishing and fishing-related impacts on Hector's and Māui dolphins. The residual risk to the Hector's dolphin from trawling and setnetting in East Coast tarakihi is considered low and is largely managed under trawl and setnet restrictions along the East Coast South Island.
101. In 2021, Fisheries New Zealand will be consulting on additional measures to manage the risk of fishing-related mortality to Hector's dolphins in the South Island. This includes a new management approach in areas not closed to set net or trawl fishing that aims to encourage fishers to avoid all Hector's dolphin bycatch.

Seabirds

102. Management of seabird interactions with New Zealand's commercial fisheries is guided by the National Plan of Action – Seabirds 2020 (NPOA-Seabirds). The NPOA-Seabirds sets out the New Zealand government's commitment to reducing fishing-related captures and associated mortality of seabirds. The vision of the NPOA-Seabirds is that New Zealanders work towards zero fishing-related seabird mortalities.
103. Management actions and research under the NPOA-Seabirds are guided and prioritised based on the seabird risk assessment that breaks down the risks to seabird populations by fishery groups. The most recent seabird risk assessment was published in 2020.⁸
104. The inshore trawl fishery, including tarakihi target fishing, is responsible for a substantial portion of risk, particularly to black petrels and flesh-footed shearwaters.
105. There are a range of initiatives in place to reduce the risk of seabird captures in inshore trawl fisheries. This includes work done by the black petrel working group and the development of Mitigation Standards to support fishers to identify the most effective mitigation techniques for their operations.
106. The proposed changes to the TAC and TACC for tarakihi are unlikely to result in any increase to seabird interactions with vessels.

Fish bycatch

107. Tarakihi are 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). However, catch of these species is sustainably managed through the TAC and TACC set for these individual stocks.

⁸ Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006–07 to 2016–17
<https://www.mpi.govt.nz/dmsdocument/39407/direct>

108. A shift in fishing behaviour to other species is of particular importance for SNA 1, as it is currently under rebuild due to low abundance. Snapper has a wide depth profile and is caught in combination with several other species, including tarakihi. While this is a relevant consideration, Fisheries New Zealand's view is that this does not prevent sustainability measures being put in place to ensure the sustainability of the East Coast tarakihi fishery. Active monitoring of SNA 1 is also occurring and will ensure any unintended consequences for this associated stock are managed.

Benthic impacts

109. Tarakihi are principally caught by bottom trawl, which can directly impact on the biological diversity of the benthic environment. However, the proposed changes are unlikely to increase trawl effort. Bottom trawling in this fishery is also typically confined to areas that have been consistently fished over time (rather than areas of relatively undisturbed biodiversity). It is important to note that inshore trawl effort may shift to other areas in an effort to avoid tarakihi, Fisheries New Zealand will continue to monitor trawl activity including any shifts in behaviour.
110. Research has characterised both New Zealand's benthic environment and the level of benthic impact from fishing activity (Aquatic Environment and Biodiversity Annual Review 2019/2020). The environmental impacts of fishing are summarised annually by Fisheries New Zealand and we will continue to monitor the bottom trawl footprint of fisheries.
111. Tarakihi are also targeted in a small setnet fishery, specifically in TAR 3 off Kaikōura. Setnetting is unlikely to impact on seabed habitat.

Habitats of significance for Fisheries Management

112. Habitats used by tarakihi and of particular significance for fisheries management are likely to include spawning and nursery areas, as these habitats and their attributes might be critical for successful recruitment and maintaining stock productivity. However, the specific spawning behaviours and habitat attributes important for supporting recruitment are not well understood.
113. Female tarakihi mature at 6 years, after which they produce large numbers of pelagic (floating) eggs several times during each protracted summer/autumn spawning season. Three main spawning grounds have been identified: Cape Runaway to East Cape, Cape Campbell to Pegasus Bay, and the west coast of the South Island near Jackson Bay. Spawning fish have also been sampled from the Bay of Plenty and east Northland and limited spawning probably occurs throughout the distributional range of tarakihi around New Zealand.
114. Following a 7-12 month pelagic phase, where the fertilised eggs, larvae and juvenile fish tend to remain in surface waters, East Coast tarakihi mainly settle in nursery grounds (generally in shallower inshore waters) off the East Coast of the South Island, primarily the Canterbury Bight and Pegasus Bay. As they grow older, they move progressively further northward, with the highest proportions of older fish found off east Northland
115. Fishing activity is likely to have some impact on the nursery grounds highlighted above which are also likely to be subjected to land-based stressors such as pollution and sedimentation. This may impact the survival of juvenile tarakihi and hence recruitment to the East Coast tarakihi stocks. It is however important to note, that the entire East Coast South Island is subject to commercial setnet closures out to 4 nautical miles (nm) from shore. Additional setnet restrictions (extended to 12 nm) were implemented at Pegasus Bay and the Canterbury Bight to Timaru in 2020.
116. Fisheries New Zealand considers that the options proposed are unlikely to pose a threat to the areas identified as potential habitats of significance. Table 6 summarises the identified habitats of significance, the threats faced, and the existing protection in place.

Table 6: Summary of information on habitats of particular significance for East Coast tarakihi (TAR 1, 2, 3, 7).

Fish Stock	TAR 1, 2, 3, 7
Habitat	<ul style="list-style-type: none"> • Shallower inshore waters.
Attributes of habitat	<ul style="list-style-type: none"> • Not known, but likely to provide shelter, refuge from predation, and access to food for juveniles.
Reasons for particular significance	<ul style="list-style-type: none"> • Successful spawning and growth/survival of juveniles is critical to maintaining the productivity of the stocks.
Risks/Threats	<ul style="list-style-type: none"> • Mobile bottom-contact fishing methods can impact benthic habitats, but the specific habitat attributes important for tarakihi are not known. • Inputs of pollutants and sediments from land-based sources. • Changes in ocean conditions, including circulation patterns, could disrupt transfer of larvae from spawning sites to nursery grounds.
Protections in place	<ul style="list-style-type: none"> • Several areas within the shallower inshore waters are closed to mobile bottom-contacting fishing methods⁹. • Setnet restrictions are in place along the entire East Coast of the South Island. Including additional restrictions in Pegasus Bay and the Canterbury Bight to Timaru. • The new National Policy Statement on Freshwater Management and the National Environmental Standards for Freshwater, which came into effect on 3 September 2020, should lead to improved water quality in shallow harbours and estuaries and other shallower inshore waters. • Under the industry rebuild plan, four areas on the East Coast North Island were identified as locations where juvenile tarakihi are prevalent in the catch. The industry rebuild plan has implemented voluntary closures to commercial tarakihi fish in these areas as an additional measure towards sustainability.

117. While not directly implemented to protect tarakihi habitats, there are 17 marine reserves that fall within the East Coast tarakihi area. Commercial and recreational take from these areas is prohibited. A map of marine reserves can be viewed on the Department of Conservation's website at:

<https://www.doc.govt.nz/map/index.html?layers=Public%20conservation%20areas.Fisheries>.

5.2 Sustainability measures (section 11 of the Act)

118. Section 11 of the Act sets out various matters that the Minister must take into account or have regard to when setting or varying any sustainability measures (such as a TAC). These include any effects of fishing on the stock and the aquatic environment, the natural variability of the stock concerned, and any relevant fisheries plans. A number of these matters are discussed in other sections of this document, but other relevant matters are discussed below.

National Inshore Finfish Fisheries Plan

119. The National Inshore Finfish Fisheries Plan (the Plan), currently being finalised, provides guidance on management objectives and strategies for finfish species including tarakihi. The Plan will guide the operational management of inshore finfish fisheries for the next five years and is aimed at progressing New Zealand towards more ecosystem-based fisheries management.

⁹ Link to South Island fishing restrictions in place due to the TMP can be found here: <https://www.mpi.govt.nz/dmsdocument/40886-MPI-Dolphin-TMP-Factsheet-South-Island-June-2020>

120. Stocks are grouped within the Plan, with management approaches and objectives tailored accordingly for each group.
121. TAR 1, 2 and 3 all fall under Group 1, which recognises stocks that provide the greatest benefit and are highly desirable to all sectors. They are managed to provide for utilisation, while mitigating the increased risk to their sustainability as a consequence of high levels of fishing pressure. The status of Group 1 stocks is determined using fully quantitative stock assessments to provide high levels of information.
122. TAR 7 falls under Group 2, which recognises that Fisheries New Zealand intend to manage these stocks to provide for moderate levels of use with moderate levels of information to monitor its stock status (e.g. a partial quantitative assessment compared against trends over time).

5.3 Regional policy documents and the Hauraki Gulf Marine Park Act 2000

123. The boundaries of the Hauraki Gulf Marine Park also intersect with TAR 1, however, there is little commercial fishing for tarakihi within the park area. Fisheries New Zealand considers that the proposals to rebuild the biomass of the East Coast tarakihi stock are consistent with the objectives of the Hauraki Gulf Marine Park Act.

Regional Plans

124. There are eight Regional Councils that have coastline within the boundaries of East Coast tarakihi. Each of these regions has multiple plans¹⁰ to manage the coastal and freshwater environments, including terrestrial and coastal linkages, ecosystems and habitats.
125. Fisheries New Zealand notes that the Marlborough District Council has included in its Coastal Plan measures to exclude trawling and dredging from specified areas within the Marlborough Sounds, which is within TAR 7. Similarly, the Bay of Plenty Regional Council has included measures to exclude some types of fishing from inshore areas, which includes TAR 1.
126. Fisheries New Zealand considers that the proposed management options presented are consistent with the objectives of relevant regional plans, which generally relate to the maintenance of healthy and sustainable ecosystems to provide for the needs of current and future generations.

6 Options and analysis

127. Fisheries New Zealand is proposing three options to rebuild East Coast tarakihi to the target stock size, within a period appropriate to the stock. Option 1 and Option 3 propose a single cut to the combined TACs and TACCs, and Option 2 proposes phased reductions to the TACs and TACCs (Table 7). The detailed aspects of these options in terms of how they relate to the TAC, TACC and allowances are shown in Table 1.

¹⁰ The eight relevant regional councils have plans that include: Northland Regional Coastal Plan, Bay of Plenty Regional Coastal Environment Plan, Gisborne Region Tairāwhiti Resource Management Plan, Hawke's Bay Regional Coastal Environment Plan, Hawke's Bay Marine and Coastal Group Roadmap Wellington Region Coastal Plan, Marlborough District Council Coastal Monitoring Strategy, Marlborough District Council Ecologically Significant Marine Habitats, Environment Canterbury Regional Coastal Environment Plan and Otago Regional Council Coast for Otago Plan.

Table 7: Summary of proposed target, rebuild timeframe, and the associated way and rate of meeting those targets under proposed options.

	Option 1	Option 2	Option 3
Target biomass	40% SB_0 by 2031	40% SB_0 by 2031	40% SB_0 by 2036
Rebuild timeframe (years)	10 years or $2 * T_{min}$	10 years or $2 * T_{min}$	15 years or $3 * T_{min}$
Rebuild way and rate	Single cut catch reductions: 30 percent in TAR 2 and TAR 3, and the East Coast portions of TAR 1 and TAR 7, implemented in 2021/22.	Phased cut catch reductions: 10 percent in TAR 2 and TAR 3, and the East Coast portions of TAR 1 and TAR 7, implemented in 2021/22, and approximately 25 percent implemented in 2022/23.	Single cut catch reductions: 20 percent in TAR 2 and TAR 3, and the East Coast portions of TAR 1 and TAR 7, implemented in 2021/22.
Probability of achieving target	52%	54%	67%

128. Projection analysis based on current and alternative catch levels, undertaken in July 2021, was used to determine the catch levels required under each option to achieve a rebuild to target stock size (40% SB_0) within the period appropriate to the stock with an acceptable probability. These projections were also used to determine the time predicted to reach the soft limit of 20% SB_0 .
129. Based on the analysis of period appropriate and probability above, Fisheries New Zealand consider that each of the options would rebuild the stock within a period appropriate to the stock and with an acceptable probability.
130. Fisheries New Zealand is interested in stakeholder feedback pertaining to which approach is most appropriate for the rebuild of East Coast tarakihi, or whether other approaches are preferred.
131. 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 the continued rebuild of the stock.

6.1 Rebuild strategy objectives

132. Section 13 of the Act gives the Minister the power to set or vary a TAC and defines the relevant considerations that the Minister must take into account when making decisions. Furthermore, section 20 provides guidance on the setting or varying of any TACC.
133. The HSS provides further guidance in relation to rebuilding stocks that are below MSY and below the soft limit. Although not legally binding, the High Court has recently held that the HSS is a mandatory relevant consideration for the Minister when setting a TAC under section 13 of the Act¹¹.
134. The following sections outline the key rebuild objectives, and the associated relevant considerations.

¹¹ Royal Forest and Bird Protection Society of New Zealand Incorporated v Minister of Fisheries [2021] NZHC 1354 at [153].

Target

135. Fisheries New Zealand considers a biomass target of 40% SB_0 robust and that it constitutes best available information, noting that an alternative, species-specific target maybe considered if supported by scientifically robust and peer-reviewed information to agree an MSY compatible reference point for the stock. The target of 40% SB_0 is reflected in all options proposed.

Acceptable Probability

136. The HSS Operational Guidelines provide that “the minimum standard for a rebuilding plan is that 70% of the projected trajectories will result in the achievement of a target based on MSY-compatible reference points or better within the timeframe of T_{min} to $2 * T_{min}$.”
137. Fisheries New Zealand considers a lower probably of 50% also acceptable to measure progress towards achieving the rebuild target at the outset. This approach recognises the current status of the East Coast tarakihi stock, the size of the rebuild required, natural variation caused by fluctuations in recruitment and environmental conditions, and associated uncertainties. It may however be appropriate to look to increase this probability to 70% in the later years of the rebuild.

Rebuild period

138. Section 13(2)(b)(ii) of the Act requires the Minister to set a TAC that enables the level of any stock, whose current level is below that which can produce MSY, to be altered within a period appropriate to the stock, having regard to the biological characteristics of the stock and any environmental conditions affecting the stock.
139. The HSS recommends that a rebuilding plan should aim to restore the stock to, at least, the target level of biomass within a timeframe of between T_{min} (minimum time to achieve rebuild to target in the absence of fishing) and $2 * T_{min}$ (twice the minimum time). For East Coast tarakihi, the estimate given the current level of depletion and recent recruitment is a T_{min} of five years. Applying the default approach of the HSS would suggest a rebuilding period of between five and ten years.
140. Taking into consideration the low productivity of tarakihi and the high inter-annual variability in recruitment, Fisheries New Zealand considers that the use of T_{min} plus one generation time is appropriate as the upper limit to the rebuild period, and that any period in the range of 5-19.7 years would be appropriate for rebuilding the East Coast tarakihi stock (refer to section 3.4.4).
141. Option 1 and Option 2 propose a rebuild period of 10 years. Fisheries New Zealand considers this timeframe to be more appropriate than a shorter period as it applies the default approach of $2 * T_{min}$ as recommended by the HSS. A shorter rebuild time closer to five years (T_{min}) would be more appropriate for a stock which is below the hard limit. Fisheries New Zealand does not think this is necessary as the stock is above the hard limit and projected to increase under current catch levels.
142. Option 3 proposes an alternative rebuild period of 15 years. Fisheries New Zealand notes that 19.7 years is almost double that of $2 * T_{min}$ and considers a shorter period of 15 years to be more appropriate. It is more precautionary than the upper range of the appropriate periods identified and will result in the benefits of a fully rebuilt stock accruing sooner.
143. Fisheries New Zealand notes that under current commercial catches, the stock is expected to be above the soft limit with a greater than 50% probability in 2022, and greater than 90% probability in 2033. Fisheries New Zealand therefore considers that there is very low risk of the stock declining further, and the options proposed will ensure the stock increases above the soft limit more quickly and with greater certainty.

Way and rate

144. To ensure catch reductions directly support the rebuild, it is important they are targeted to the East Coast portions of TAR 1 and TAR 7, while not affecting the West Coast portions which the rebuild objectives do not apply to. This approach is reflected in all options proposed.
145. Without voluntary catch splitting arrangements, alternative solutions may need to be found for achieving this objective. This could include taking catch greater reductions across the entire QMA to ensure a corresponding reduction in the east coast portion; or consideration for altering QMAs under other mechanisms within the Act.

6.2 Option 1

Target	40% SB_0 by 2031
Rebuild timeframe (years)	10 years or $2 * T_{min}$
Way and rate	<p>30 percent catch reductions in TAR 2 and TAR 3, and the East Coast portions of TAR 1 and TAR 7 implemented in 2021/22;</p> <p>In practice, this amounts to 21 and 23 percent reduction in the combined East Coast tarakihi TACs and TACCs, respectively, implemented in 2021/22.</p>

146. Option 1 proposes to reduce the combined TACs, TACCs and allowances for other sources of mortality caused by fishing, as follows:
 - A reduction in the combined TACs by 21% from 5,205 tonnes to 4,104 tonnes;
 - A reduction in the combined TACCs by 23% from 4,355 tonnes to 3,355 tonnes; and
 - A reduction in the combined allowances for other sources of mortality caused by fishing from 436 tonnes to 335 tonnes (equal to 10% of the TACC of each QMA).
147. The allowances for customary fishing are proposed to remain at current levels, recognising that customary catch data for East Coast tarakihi is incomplete. The proposed allowances are considered likely to provide for current and aspirational use by customary fishers.
148. Recreational allowances make up less than 5% of the East Coast Tarakihi TAC. Fisheries New Zealand notes that while estimates of TAR 2 recreational harvest are greater than the allowance, the combined harvest of East Coast tarakihi is lower than that of the combined allowance (being 90%).
149. Given the uncertainties associated with harvest estimates, and that recreational harvest varies year to year, Fisheries New Zealand is not proposing to change the current allowances for recreational catch. Instead, Fisheries New Zealand suggests revisiting these allowances at the time of the next review.
150. Information to set the allowance for all other mortality caused by fishing is limited. The previous Minister had a preference that this be set at 10% of TACC for inshore stocks that are predominantly taken by trawl. Additionally, a 2018 Science Working Group also used 10% of the commercial catch for estimating other mortality in the tarakihi assessment. As such Fisheries New Zealand is proposing the allowances for all other sources of mortality caused by fishing reflect this.

151. Option 1 proposes a single cut based on the maximum commercial catch predicted that would allow the stocks to rebuild to 40% SB_0 within 10 years, which is $2 * T_{min}$, with a probability of 52%. Under this option, the stock is expected to be above the soft limit by 2022 with a probability of 66%, and with a probability of 91% by 2025.
152. Fisheries New Zealand considers Option 1 has the following benefits:
- Stock rebuild likely to be initiated sooner.
 - Stock will be rebuilt in the fastest time (as with Option 2).
 - Further reductions in catch during the rebuild are not anticipated.
 - Higher probability of stock increasing above soft limit in a shorter period of time.
153. Fisheries New Zealand considers Option 1 has the lowest sustainability risk of the three options. However, the way and rate proposed in this option poses higher immediate social, cultural and economic impacts and does not allow further time for fishers to adjust to lower catch limits.

6.3 Option 2

Target	40% SB_0 by 2031
Rebuild timeframe (years)	10 years or $2 * T_{min}$
Way and rate	<p>10 percent catch reductions in TAR 2 and TAR 3, and the East Coast portions of TAR 1 and TAR 7 implemented in 2021/22; and</p> <p>Approximately 25 percent catch reduction implemented in 2022/23</p> <p>In practice, this amounts to a 10 percent reduction to the combined East Coast tarakihi TACs and TACCs implemented in 2021/22, and a further 16 and 18 percent reduction to the combined TACs and TACCs implemented in 2022/23.</p>

154. Option 2 proposes a phased reduction to the combined TACs, TACCs and allowances for other sources of mortality caused by fishing, as follows:
- A reduction in the combined TACs by 10% from 5,205 tonnes to 4,710 tonnes in 2021;
 - A reduction in the combined TACCs by 10% from 4,355 tonnes to 3,906 tonnes in 2021;
 - A reduction in the combined allowances for other sources of mortality caused by fishing from 436 tonnes to 390 tonnes.
155. As with other proposed options, no changes are proposed to the allowances for customary and recreational fishing under Option 2. The proposed allowance for other sources of mortality caused by fishing applies the same approach for all options (equal to 10% of the TACC of each QMA).
156. Option 2 proposes to rebuild the stock to the same target and within the same timeframe as Option 1, but proposes an alternative way and rate which seeks to reduce short-term social, cultural and economic impacts on the commercial sector.
157. Option 2 proposes a two-phased reduction with an initial decrease of 10 percent to the TACC of TAR 2 and TAR 3, and the East Coast portion of TAR 1 and the Cook Strait portion of TAR 7 in 2021/22. Further catch reductions in 2022/23 are necessary (approximately 25 percent), however, a new decision from the Minister to implement this cut will be required.

158. Fisheries New Zealand notes that the Minister can only at this time make a decision about the TACs, TACCs and allowances for the 2021/22 fishing year. A separate decision will be made about future year reductions and consideration of any new information available between now and the time of the next review will need to be taken into account to ensure future decisions allow the stock to rebuild and meet the target within the appropriate rebuild period.
159. This option is projected to achieve the rebuild with a 54% probability within the period of time proposed, with the stock expected to be above the soft limit by 2022 with a probability of 59%, and with a probability of 91% in 2025.
160. A phased reduction in TACs and TACCs across 10 years, as a part of a formal rebuilding plan, provides industry time to plan for the change by adjusting their budgets and operations, including their ACE distribution or harvesting plans. A trade-off for the phased reductions is that the combined TACs and TACCs during the later stages of the rebuild need to be set slightly lower to allow the stock to rebuild within the proposed timeframe.
161. This option reduces the TACs and TACCs less than Option 1 in the first year, and thus has less immediate socio-economic impacts. The costs associated with the overall phased reductions to the TACCs are higher than for Option 1 but are staggered across two years.
162. Fisheries New Zealand considers Option 2 has the following benefits:
- Stock will be rebuilt in the fastest time (as with Option 1).
 - Provides an opportunity for industry to manage the immediate flow-on effects (social and financial) of reduced TACCs.
163. Fisheries New Zealand considers that the way and rate proposed in Option 2 result in lower immediate social, cultural and economic impacts, while ensuring the sustainability of the stock within a period appropriate to the stock.

6.4 Option 3

Target	40% SB_0 by 2036
Rebuild timeframe (years)	15 years or $3 * T_{min}$
Way and rate	<p>20 percent catch reductions in TAR 2 and TAR 3, and the East Coast portions of TAR 1 and TAR 7 implemented in 2021/22;</p> <p>In practice, this amounts to 15 and 17 percent reduction in the combined East Coast tarakihi TACs and TACCs, respectively, implemented in 2021/22.</p>

164. Option 3 proposes to reduce the combined TACs, TACCs and allowances for other sources of mortality caused by fishing, as follows:
- A reduction in the combined TACs by 15% from 5,205 tonnes to 4,409 tonnes in 2021;
 - A reduction in the combined TACCs by 17% from 4,355 tonnes to 3,632 tonnes in 2021; and
 - A reduction in the combined allowances for other sources of mortality caused by fishing from 436 tonnes to 363 tonnes.
165. As with other proposed options, no changes are proposed to the allowances for customary and recreational fishing under Option 3. The proposed allowance for other sources of mortality

caused by fishing applies the same approach for all options (equal to 10% of the TACC of each QMA).

166. Under this option the TACC is proposed to be reduced to 3,632 tonnes, a level consistent with a 20 percent reduction to the combined TACC of TAR 2 and TAR 3, and the East Coast portion of TAR 1 and the Cook Strait portion of TAR 7.
167. Option 3 proposes a single cut based on the maximum commercial catch predicted that would allow the stock to rebuild to 40% SB_0 within 15 years, which is $3 \times T_{min}$, with a probability of 67%. Under this option, the stock is expected to be above the soft limit by 2022 with a probability of 63%, and with a probability of 90% by 2026.
168. Fisheries New Zealand considers that the rebuild period proposed under Option 3 is appropriate for the stock as it is within the upper range of what we consider to be a period appropriate (with T_{min} plus one generation time equalling 19.7 years). The proposal of a shorter 15 year time period with a probability greater than 50% is more precautionary than the upper range of the appropriate periods identified and will result in the benefits of a fully rebuilt stock accruing sooner (refer to section 3.4.2).
169. Option 3 reduces the TACCs less than Option 1, and thus has lower annual economic costs, noting that the costs associated with the overall rebuild period are also spread out over a longer timeframe.
170. Fisheries New Zealand considers Option 3 has the following benefits:
 - Provides the best opportunity for industry to manage the flow-on effects (social and financial) of reduced TACCs.
 - Accounts for unpredictable fluctuations in recruitment and environmental conditions, while ensuring the stock is rebuilt to the target within an appropriate timeframe.
171. Fisheries New Zealand considers that the way and rate proposed in Option 3 result in lower social, cultural and economic impacts, while ensuring the sustainability of the stock within a period appropriate to the stock.

6.5 Economic considerations

172. Assessment of national and regional economic impacts associated with proposed options relating to the 2019 review of sustainability measures for the East Coast tarakihi stock can be found on the MPI website at: <https://www.mpi.govt.nz/dmsdocument/37197-NZIER-Economic-Assessment-of-Tarakihi>.
173. The relative short-term loss in commercial revenue under the three rebuild options is summarised in Table 8. The potential impacts range between \$1.32 million and \$2.982 million per annum, noting that under Option 2 the level of future cuts will determine ongoing revenue loss.
174. It is important to note that the indicative costs are a very basic analysis of potential economic impacts and does not take into account regional or flow on impacts. Additionally, there is the possibility that impacts will reduce over time as fishers adapt their behaviour, respond to fishing technology and strive for greater fishing precision. In addition, it does not take account of the potential longer-term benefits from rebuilding the stock to a level that is approximately 250% of the current level (refer to section 3.4.4).

Table 8: indicative revenue loss of options from the 2020 TACCs.

Option	Stock	TACC	Change from 2020 (t)	Indicative revenue change (\$ p.a.)
Option 1	TAR 1	911	134	367,160
	TAR 2	909	441	1,578,780
	TAR 3	571	365	890,600
	TAR 7	964	60	145,200
	TOTAL	3355	1000	2,981,740
Option 2	TAR 1	1000	45	123,300
	TAR 2	1168	182	651,560
	TAR 3	734	202	492,880
	TAR 7	1004	20	48,400
	TOTAL	3906	449	1,316,140¹²
Option 3	TAR 1	956	89	243,860
	TAR 2	1039	311	1,113,380
	TAR 3	653	283	690,520
	TAR 7	984	40	96,800
	TOTAL	3632	723	2,144,560

6.6 Deemed values

175. Deemed values are the financial penalty paid by fishers for each kilogram of unprocessed fish landed in excess of a fisher's ACE holdings. The current deemed value rates of East Coast tarakihi are shown below in Table 9.

176. The Deemed Value Guidelines set out the operational policy Fisheries New Zealand uses to inform the development of advice to the Minister on the setting of deemed values.

Table 9: Deemed value rates for East Coast tarakihi.

Stock	Interim	Differential rates (\$/kg) for excess catch (% of ACE)		
		100-110%	110-120%	200%+
TAR 1	3.1500	3.5000	4.2500	5.7500
TAR 2	3.1500	3.5000	4.2500	5.7500
TAR 3	2.2500	2.5000	4.0000	5.5000
TAR 7	2.2500	2.5000	4.0000	5.5000

177. Fisheries New Zealand considers the deemed values are set at a level consistent with a rebuilding stock and do not propose any changes.

178. According to data from 2019/20, the current annual deemed value rates¹³ of East Coast tarakihi are either near to or exceed both the average ACE prices (TAR 1 \$1.19/kg, TAR 2 \$1.45/kg, TAR 3 \$0.53/kg and TAR 7 \$0.90/kg) and the average port prices (TAR 1 \$2.74/kg, TAR 2 \$3.58/kg, TAR 3 \$2.44/kg and TAR 7 \$2.42/kg) for East Coast tarakihi stocks. These stocks

¹² Note that the total indicative revenue changes for Option 2 only account for the proposed TACC cuts implemented in 2021/22. Based on projected cuts to be considered for implementation in 2022/23, an additional indicative annual revenue loss is estimated to be approximately \$2,048,920

¹³ The annual deemed value rate being the \$/kg paid for excess catch at 100-110% of ACE.

also have stringent differential deemed values applied which provide greater incentives to fishers to ensure they fish within their individual entitlements.

179. Fisheries New Zealand acknowledges that if the TACC is reduced, subsequent changes in fishing behaviour and the ACE market may result in the need for the deemed value to be re-evaluated in the future.

7 Other Considerations

7.1 Recreational controls

180. As the East Coast tarakihi rebuild progresses, the recreational sector is likely to experience the benefits of increasing abundance in the fishery. This could result in increasing recreational catch, particularly when current bag limits are not being fully utilised by the sector. Significant increases in recreational catch has the potential to jeopardise the rebuild of East Coast tarakihi.
181. With the proposal to not adjust the recreational allowances, particularly in TAR 2, Fisheries New Zealand is suggesting that recreational allowances and associated management controls are reviewed at the time of the next review.

7.2 Preferential allocation rights (28N rights)

182. There are 1.915 tonnes of preferential allocation rights (28N rights) in TAR 2. Preferential allocation rights were granted to permit holders under section 28N of the Fisheries Act 1983 who elected to take administrative rather than compensated reductions to their catch allocations.
183. When the TACC is increased for a stock that has 28N rights associated with it, the quota shares of owners who do not have 28N rights are reduced and redistributed to the holders of 28N rights. As the options in this paper suggest reducing the TACC, 28N rights for TAR 2 are not expected to be triggered by this sustainability round.

7.3 Future Sustainability Reviews of East Coast tarakihi

184. All proposed options allow for continued monitoring East Coast tarakihi over the course of the rebuild period and provide opportunities for additional research to be undertaken with the aim of reducing uncertainty in the stock assessment.
185. Fisheries New Zealand highlights that the next stock assessment for East Coast tarakihi is due to be completed in the November 2021 Plenary. Based on the outcome of this assessment, Fisheries New Zealand would evaluate the need for a review in 2022.

8 Questions for submitters on options for varying TACs, TACCs and allowances

- Do you think the periods appropriate to the stock outlined in the options are suitable? Why?
- Do you think the different approaches to way and rate in the three options are appropriate? Why?
- Which option do you support for revising the TAC and allowances? Why?
- If you do not support any of the options listed, what alternative(s) should be considered? Why?

- Are the allowances for customary Māori, recreational and other sources of mortality appropriate? Why?
- Do you think the proposals recognise and provide for the exercise of kaitiakitanga by tangata whenua? Are there any changes that could better reflect kaitiakitanga?
- Do you think these options adequately provide for social, economic, and cultural wellbeing?
- Do you have any concerns about potential impacts of the proposed options on the aquatic environment?

186. We welcome your views on these proposals. Please provide detailed information and sources to support your views where possible.

9 How to get more information and have your say

187. Fisheries New Zealand invites you to make a submission on the proposals set out in this discussion document. Consultation closes at 5pm on 9 August 2021.

188. Please see the Fisheries New Zealand sustainability consultation webpage (<https://www.mpi.govt.nz/consultations/review-of-east-coast-tarakihi-sustainability-measures-for-1-october-2021/>) for related information, a helpful submissions template, and information on how to submit your feedback. If you cannot access to the webpage or require hard copies of documents or any other information, please email FMSubmissions@mpi.govt.nz.

10 Referenced reports

Department of Conservation and Fisheries New Zealand (2019). Hector's and Māui Dolphin Threat Management Plan. Latest review accessible at: <https://www.mpi.govt.nz/consultations/hectorsand-maui-dolphins-threat-management-plan-review/>

Department of Conservation and Fisheries New Zealand (2020). National Plan of Action — Seabirds 2020. Accessible at: <https://www.mpi.govt.nz/dmsdocument/40652-National-Plan-Of-ActionSeabirds-2020-Report>

Eastern Tarakihi Management Strategy and Rebuild Plan 2019. Accessible at: <https://www.mpi.govt.nz/dmsdocument/37200/direct>

Fisheries New Zealand (2008) Harvest Strategy Standard for New Zealand Fisheries. Accessible at: <https://www.mpi.govt.nz/dmsdocument/728/direct>

Fisheries New Zealand (2011). Operational Guidelines for New Zealand's Harvest Strategy Standard. Accessible at: <https://www.mpi.govt.nz/dmsdocument/19706-operational-guidelines-for-newzealands-harvest-strategy-standard>

Fisheries New Zealand (2020). Aquatic Environment and Biodiversity Annual Review 2019–20. Compiled by the Aquatic Environment Team, Fisheries Science and Information, Fisheries New Zealand, Wellington New Zealand. 765 p. Accessible at: <https://www.mpi.govt.nz/dmsdocument/40980-Aquatic-Environment-and-Biodiversity-Annual-Review201920>

Fisheries New Zealand (2020). Guidelines for the review of deemed value rates for stocks managed under the Quota Management System. Accessible at:
<https://www.mpi.govt.nz/dmsdocument/40250/direct>

Fisheries New Zealand (2019). Draft National Inshore Finfish Fisheries Plan. Accessible at:
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Fisheries New Zealand (2021). Fisheries Assessment Plenary, May 2021: stock assessments and stock status. Compiled by the Fisheries Science and Information Group, Fisheries New Zealand, Wellington, New Zealand. Accessible at:
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Wynne-Jones, J.; Gray, A.; Heinemann, A.; Hill, L.; Walton, L. (2019). National Panel Survey of Marine Recreational Fishers 2017-2018. New Zealand Fisheries Assessment Report 2019/24. 104p. Accessible at: <https://www.mpi.govt.nz/dmsdocument/36792-far-201924-national-panel-survey-ofmarine-recreational-fishers-201718>