Marlborough Sounds Blue Cod Review
Fisheries New Zealand
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SUBMITTER DETAILS

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Introduction

1. This submission provides feedback on proposals in the Fisheries New Zealand Marlborough Sounds Blue Cod Review Discussion Paper (**Discussion Paper**).[1]

2. The Environmental Defence Society (**EDS**) is an independent not-for-profit organisation conducting interdisciplinary policy research and litigation. It was established in 1971 with the purpose of improving environmental outcomes in Aotearoa New Zealand.

3. EDS has a special interest in the marine environment. In May 2022, EDS completed the first phase of a multiyear project looking at issues with the national oceans management system and options for future reform. This included, among other things, fisheries management.[2]

4. EDS is currently undertaking Phase 2 of the project which focuses on developing recommendations for oceans reform. This includes a series of in-depth case-studies. As part of this work, EDS recently undertook a case-study looking at opportunities for marine restoration in the Marlborough Sounds.[3] This involved an extensive literature review and discussions with 40 people who have strong associations with the area.

[1] Fisheries New Zealand "*Marlborough Sounds Blue Cod Review: Potential measures to reduce fishing pressure and improve the health of the fishery*" (FNZ, Discussion Paper No: 2024/29, October 2024) [**Discussion Paper**], available here.
[2] Greg Severinsen and others "*The Breaking Wave: Oceans Reform in Aotearoa New Zealand*" (EDS, Auckland, June 2022), available here.
[3] Raewyn Peart "*Restoring the Marlborough Sounds: An oceans reform case study*" (EDS, Auckland, December 2024), [in prep].

5. EDS has sought to improve environmental outcomes in the Sounds for many years through participation in local planning and resource consent processes and in-depth research on fisheries[4] and aquaculture[5] management. Our submission draws on this knowledge and experience.

Summary of submission

6. The latest surveys of blue cod in the Marlborough Sounds show the stock is in a state of widespread depletion with low abundance and few large female fish. The current seasonal closure (1 September to 19 December) needs to be extended to reduce fishing pressure, rebuild spawning capacity and enable recovery.

7. **EDS supports an extended closure until the end of January (i.e. 31 January).** This option was not included in the Discussion Paper. However, current data shows intense recreational fishing effort occurs from 20 December to 31 January each year. Given the depleted state of the fishery, an extended closure over the peak recreational fishing season is needed to support recovery of the fishery. In the alternative, EDS prefers the longest extension proposed in the Discussion Paper (i.e. to 15 January or 'Option 4').

8. **An extended closure is unlikely to be sufficient, on its own, to rebuild the Marlborough Sounds blue cod stock.** This is because there is strong evidence that bottom-contact fishing activities (e.g. trawling and dredging) have damaged important cod spawning and nursery habitats in the Sounds with implications for settlement and recruitment.[6]

9. Bryozoan patch reef habitat has been identified as a habitat of significance for spawning and juvenile blue cod. However, there are few remaining areas of intact bryozoan reefs in the Sounds and multiple stressors, including sedimentation and ocean warming, put these at risk of further decline. **It is important that bryozoan reef and other habitats of particular significance for blue cod are protected as required by section 9(c) of the Fisheries Act 1996.**

10. **EDS supports further consideration of additional regulatory measures** such as a reduced combined daily bag limit of five finfish in the Marlborough Sounds Area (**MSA**), move-on and/or stop-fishing rules for blue cod, and a minimum hook size for recreational fishers. Additional measures are necessary to reduce significant fishing mortality associated with release of undersized cod.

[4] Raewyn Peart (2018) "*Voices from the sea: Managing New Zealand's fisheries"*, (EDS, Auckland), available here.
[5] Raewyn Peart (2019) "*Farming the sea: Marine aquaculture within resource management system reform",* (EDS, Auckland), available here.
[6] Tara Anderson (2020) "*Life on the seafloor in Queen Charlotte Sound, Tory Channel and adjacent Cook Strait*" (NIWA, Prepared for Marlborough District Council, April 2020), pages 262-266, available here.

11. EDS generally supports voluntary actions to reduce release mortality and improve accuracy of recreational catch reporting in addition to stronger regulatory controls.

Fisheries management context

Status of the Marlborough Sounds blue cod stock

12. Blue cod / rāwaru is the iconic finfish species of the Marlborough Sounds. It is an important commercial species, highly prized by recreational fishers and of cultural significance to Māori.[7]

13. The Marlborough Sounds blue cod fishery is managed as part of the BCO 7 Quota Management Area (**BCO 7**), which includes the West Coast of the South Island, Tasman Bay and Golden Bay.

14. The Discussion Paper describes the Marlborough Sounds blue cod population as being in a state of "*poor health*".[8] The latest survey, undertaken in 2021, showed the stock was very likely (>90%) to be overfished; and the sex ratio was strongly skewed in favour of male fish.[9] A healthy population would have roughly equal numbers of males and females but surveys in 2017 and 2021 have shown males at 72%.[10] Almost all harvested fish are males as few females reach harvestable size (at around six years of age) before turning male.[11] The biomass of the stock was predicted to decline under the management settings that were in place.[12]

15. This information resulted in a significant reduction of the commercial harvest limit (**TACC**) for BCO 7 from 70 to 58 tonnes.[13] In 2022, allowances for recreational, customary and other fishing mortality were also set (for the first time) to allow total fishing pressure to be assessed and managed.[14]

16. In 2023, the Marlborough Sounds Blue Cod Technical Group (**Technical Group**) was convened to advise Fisheries New Zealand (**FNZ**) on potential measures to improve the health of the stock. The Technical Group met five times to discuss options and reported

[7] T Brough, E Leunissen, and M Beentjes (2023) "*Habitat use and the impact of multiple stressors on blue cod populations off Canterbury and in the Marlborough Sounds*" (FNZ, November 2023), page 4, available here.
[8] Discussion Paper, above n 1, page 1.
[9] FNZ (2024) "*Fisheries Assessment Plenary, May 2024: Stock assessments and stock status*" (FNZ, Wellington), page 201, available here.
[10] M Beentjes, M Page and J Hamill (2022) "*Relative abundance, size and age structure, and stock status of blue cod from the 2021 survey in Marlborough Sounds*" (FNZ, August 2022), page 13, available here; and M Beentjes, M Page, C Sutton, and L Olsen (2018) "*Relative abundance, size and age structure, and stock status of blue cod from the 2017 survey in Marlborough Sounds, and review of historical surveys.*" (FNZ, July 2018), page 13, available here.
[11] FNZ (2024), above n 9, page 166, available here.
[12] Discussion Paper, above n 1, page 6.
[13] David Parker (2022) "*Changes to fisheries sustainability measures for the 2022 October Round*", page 9, available here.
[14] Ibid.

its advice to FNZ at the end of 2023 (**Technical Group Report**).[15] The proposals in the Discussion Paper are informed (to some extent) by the Technical Group Report.

EDS's comments on the latest stock assessment

17. EDS is concerned about the depleted state of the blue cod population, which follows declining trends in recreational and commercial catch over the past decade. The Technical Group Report indicates that the blue cod population is "*generally in a stable but concerning state*".[16] This is echoed in the Discussion Paper "*while it generally appears stable, the fishery is at a very low level (especially the inner Sounds)*".[17]

18. EDS is concerned that uncertainty surrounding estimates of recreational fishing mortality means the state of the blue cod population could be worse. For instance:

    (a) The latest Plenary Assessment Report describes the predominance of males as "*a major source of uncertainty*" and suggests fishing mortality could be higher than estimated in the Marlborough Sounds cod stock.[18] EDS finds this particularly concerning because fishing mortality already exceeds the sustainable management target by nearly three times.[19]

    (b) The Technical Group Report indicates that information on recreational catch "*continues to be sparse, and in some cases subject to considerable uncertainty, which constrains effective ongoing management of effort*".[20]

19. Given this uncertainty about the magnitude of blue cod fishing mortality in the Marlborough Sounds, EDS considers a cautious management approach is justified in accordance with section 10 of the Fisheries Act 1996.

Current management settings are inadequate

20. Overfishing of blue cod has occurred despite a range of different management tools being deployed over many years. Current measures include:[21]

[15] Marlborough Sounds Blue Cod Technical Group (2023) "*Advice on potential measures to reduce fishing pressure and rebuild blue cod populations in the Marlborough Sounds*" [**Technical Group Report**], available here.
[16] Technical Group Report, above n 15, page 7.
[17] Discussion Paper, above n 1, page 1 at [4] and page 3 at [17].
[18] FNZ (2024), above n 9, page 203, available here.
[19] Technical Group Report, above n 15, page 7.
[20] Technical Group Report, above n 15, page 9.
[21] MPI "*Challenger area fishing rules*" available here.

(a) A seasonal closure to the harvest of blue cod from within the MSA[22] between 1 September and 19 December.[23] This closure has applied to recreational fishers since 2011 and commercial fishers since 2015.[24]
(b) A minimum legal size of 33 cm.
(c) Gear restrictions include a minimum mesh size of 54 mm for pots and maximum of two hooks per line.
(d) A recreational daily bag limit of two blue cod per person and a vessel accumulation limit of four blue cod.
(e) As previously indicated, the TACC limits the annual commercial catch and from October 2022, allowances were set for recreational, customary and other fisheries-related mortality. These limits are subject to review by FNZ.

21. The best available information indicates that several factors have contributed to the depletion of blue cod within the Marlborough Sounds. In summary, these include:

(a) Prolonged high fishing effort and associated mortality. Intense recreational fishing effort over summer coincides with the peak blue cod spawning, with 60% of the annual recreational catch taken between 20 December and 31 January each year (i.e. after the fishery has reopened).[25]

(b) High rate of release mortality. Due to restrictions on recreational fishing activity (i.e. seasonal closure, minimum legal size and daily bag limit of two fish) a significant number of cod are caught and released. As outlined in the Discussion Paper, data from charter vessels shows that five cod are caught for every fish retained.[26] The survival of cod returned to the sea is thought to be low.

(c) Biological characteristics make blue cod vulnerable to overfishing.

(i) Blue cod exhibit complex sex change behaviour. A female can transition to male if triggered by the removal or absence of large male cod.[27] The high proportion of male cod in the Marlborough Sounds population has implications for egg production and recruitment.[28] For example, it is estimated that the reproductive output of the Fiordland blue cod population (where the sex ratio is more in balance and females are larger) is 14.8 times higher than the population in the Sounds.[29]

[22] Discussion Paper, above n 1, page 2. The MSA spans the full extent of the Marlborough Sounds.
[23] Fisheries (Amateur Fishing) Regulations 2013, reg 105.
[24] Fisheries (Challenger Area Commercial Fishing) Regulations 1986, reg 11.
[25] Technical Group Report, above n 15, page 18 (25% in the last weeks of December and a further 35% during January).
[26] Discussion Paper, above n 1, page 4.
[27] FNZ (2024), above n 9, pages 160-161, available here.
[28] Technical Group Report, above n 15, page 10.
[29] S Kolodzey and S R Wing (2022) "*Life history traits vary between geographically distinct populations in a protogynous hermaphrodite*", Ecosphere, 13:e4237, page 12, available here.

(ii) Blue cod remain in the same area for long periods. This makes the species susceptible to localised depletion but also responsive to area-based protection.

(d) Habitat loss. There is strong evidence to indicate that historic trawling and dredging have damaged important biogenic habitat, with implications for blue cod spawning and recruitment.[30] A recent review by Morrison (2024) describes the loss in extent of bryozoan thickets near Chetwode Bank which occurred as a result of commercial trawling during the 1960s.[31] Due to historic and ongoing stressors, there are few remaining areas of healthy bryozoan habitat in the Sounds with low silt conditions that are suitable for juvenile cod.[32]

(e) Cumulative stressors. Studies have shown that seawater warming (both gradual and episodic marine heatwaves) and sedimentation may impact suitable blue cod habitat with implications for spawning success and survival. A recent study commissioned by FNZ found increased turbidity was correlated with low abundance of juvenile (but not adult) blue cod in the Marlborough Sounds.

Ecosystem-based fishery considerations

22. EDS is concerned about the wider implications of declines in blue cod biomass on the marine ecosystem. Blue cod is an aggressive predator and keystone species on reef and gravel habitats within the Marlborough Sounds. Loss of kelp forest has been observed across rocky reefs in the inner Marlborough Sounds and kina barrens have emerged as the predominant habitat type in some parts of Queen Charlotte Sound.[33]

23. The best available information indicates that overfishing of key reef predators is a major contributor to the loss of kelp forest in the Sounds.[34] This is because there are insufficient predators such as large blue cod to keep kina (which graze on kelp) under control. The loss of kelp forest has flow on implications for ecosystem functioning and has been linked to suppressed growth, smaller-size and lower condition of blue cod in the Marlborough Sounds.[35] This works as a positive feedback loop that constrains spawning capacity and impedes recovery of the stock.

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[30] Tara Anderson (2020), above n 6, pages 262-266.
[31] M Morrison (2024). "Bryozoan thickets extent and quality". *In:* D Lohrer et al. "*Information Stocktakes of Fifty-Five Environmental Attributes across Air, Soil, Terrestrial, Freshwater, Estuaries and Coastal Waters Domains"*. (Prepared by NIWA, Manaaki Whenua Landare Research, Cawthron Institute, and Environet Limited for the Ministry for the Environment. NIWA report no. 2024216HN (Project MFE24203, June 2024)), page 568, available here.
[32] See TE Brough, EM Leunissen, and M Beentjes (2023), above n 7.
[33] Tara Anderson (2020), above n 6, pages 127 and 255.
[34] J Udy et al (2019) "*Regional differences in kelp forest interaction chains are influenced by both diffuse and localised stressor''*, *Ecosphere*, 10(10), page 10, available here.
[35] S Kolodzey and S R Wing (2022), above n 29, page 10; and J Udy *et al* (2019) "*Regional differences in supply of organic matter from kelp forests drive trophodynamics of temperate reef fish*" Marine Ecology Progress Series, 621, 19-32, page 29, available here.

24. Given the above, it is important that future management settings address habitat loss and localised depletion to ensure sustainability of the blue cod stock.

EDS's feedback on possible options in the Discussion Paper

25. The Discussion Paper seeks feedback on the following options:[36]

    (a) Proposed extended seasonal closure of the MSA to recreational and commercial harvest of blue cod.

    (b) Potential wider measures, which include:
        (i) Spawning recovery areas;
        (ii) Reduced combined daily bag limit for finfish species in the MSA;
        (iii) Refreshed education campaign on best practices and fishery issues;
        (iv) Approaches to enhance fine-scale recreational fishing data; and
        (v) Tools to mitigate release mortality.

Extended seasonal closure

26. The Discussion Document sets out four extended closure options:

    (a) Option 1: retain the status quo (i.e. closure from 1 September to 19 December);
    (b) Option 2: extend to 31 December (i.e. +12 days);
    (c) Option 3: extend to 5 January (i.e. +17 days); and
    (d) Option 4: extend to 15 January (i.e. +27 days).

27. **EDS does not support Option 1 (i.e. retain the status quo).** There is strong evidence that the current closure is not sufficient to ensure sustainability of the blue cod stock. The seasonal closure has been implemented since 2011 (for recreational fishing) and 2015 (for commercial fishing). However, during this period, the abundance of blue cod in the Sounds has declined and the population is in a poor condition.

28. The best available information shows that overfishing is the key driver of the depleted blue cod stock. This is evident in the skewed (i.e. male-dominant) population structure and the results of potting surveys from within the Long Island Marine Reserve (where cod were more abundant and larger than adjacent fished areas).[37] The 2021 cod survey report states: "*The results are a clear indicator that fishing effort in Queen Charlotte Sound and throughout the Marlborough Sounds has markedly reduced blue cod size and, particularly, abundance*."[38]

[36] Discussion Paper, above n 1, page 1.
[37] M Beentjes, M Page and J Hamill (2022), above n 10, page 19.
[38] M Beentjes, M Page and J Hamill (2022), above n 10, page 19.

29. From 2008-2011 a temporary closure of the fishery was effective at increasing abundance of blue cod while it was in force.[39] However, cod abundance rapidly declined again when the fishery was reopened. This suggests that an extended closure is likely to have a positive impact on blue cod abundance.

30. The Discussion Paper indicates that a significant proportion of the annual recreational catch occurs after the fishery re-opens between 20 December and 31 January each year (60% in 2017/18 and 45% in 2022/23).[40] The current closure, which only applies to 19 December, leaves blue cod vulnerable to intense recreational fishing effort. **EDS supports an extended closure to the end of January (i.e. an alternative option)** to enhance protection of spawning cod for a longer period during the peak recreational fishing season.

31. **If this alternative option is not selected, EDS supports Option 4 in the Discussion Paper (i.e. extend to 15 January).** EDS prefers this option over Option 2 or Option 3 because it provides for the greatest reduction in fishing effort during the peak recreational season when blue cod mortality (direct and incidental) is likely to be highest.

Spawning recovery areas

32. The Discussion Paper seeks feedback on wider measures including potential "*spawning recovery areas*" where all fishing would be prohibited.[41] No specific areas have been identified in the Discussion Paper.

33. **EDS strongly supports additional spatial measures to protect blue cod in the Marlborough Sounds.** Existing marine protected areas are of limited scale and no controls have been deployed to protect known blue cod habitats from fishing impacts.

    <u>Extent of current spatial protection is inadequate</u>

34. There are three existing areas in the Sounds where blue cod are protected from commercial and recreational fishing: the Maud Island closed area;[42] Double Cove;[43] and the Long Island –Marine Reserve.[44] These areas are relatively small and only the Long Island Marine Reserve is strictly no-take. Other fishing controls, including gear restrictions, trawl bans and prohibitions on commercial finfishing, apply to parts of the MSA; and the proposed Marlborough Environment Plan includes controls to protect

[39] Technical Group Report, above n 15, page 19.
[40] Discussion Paper, above n 1, page 2.
[41] Discussion Paper, above n 1, page 7; Technical Group Report, above n 15, page 11.
[42] Fisheries (Challenger Area Commercial Fishing) Regulations 1986, reg 2DA(1) prohibits commercial finfishing in the Maud Island closed area; Fisheries (Challenger Area Amateur Fishing) Regulations 1986, reg 4AA(1) prohibits recreational finfishing from within the Maud Island closed area.
[43] Fisheries (Challenger Area Commercial Fishing) Regulations 1986, reg 9 prohibits commercial fishing in the Maud Island closed area Fisheries (Challenger Area Amateur Fishing) Regulations 1986, reg 4 prohibits recreational harvest of finfish from Double Cove.
[44] Marine Reserve (Long Island – Kokomohua) Order 1993.

identified sites with ecologically sensitive benthic communities from dredging, bottom trawling, deposition of material and reclamation (and anchoring in certain areas).[45] Overall, these controls provide limited spatial protection for blue cod and their key habitats.

35. As previously indicated, surveys of the Long Island Marine Reserve have found blue cod are larger and more abundant in the reserve than adjacent fished areas.[46] This suggests that even a small (619 ha) protected area can effectively support localised recovery of the stock.

36. To date, no spatial measures have been implemented to protect habitats of particular significance for blue cod as required by section 9(c) of the Fisheries Act. EDS finds this concerning because:

    (a) There is a large body of scientific literature on key blue cod habitats, which identifies significant spawning and juvenile habitats in the Marlborough Sounds.
    (b) As previously indicated, historic dredging and trawling have degraded or destroyed a significant extent of important biogenic habitat in the Sounds with implications for blue cod productivity and recruitment.
    (c) Multiple stressors, including sedimentation and ocean warming, can adversely impact key blue cod habitats.[47] Cumulative impacts are likely to increase in the future (e.g. due to more frequent heavy rainfall and marine heat waves).

37. **It is critical that remaining key blue cod habitats are protected to support recovery of the stock.**

    <u>Significant blue cod habitats need to be protected as a matter of urgency</u>

38. Blue cod are known to prefer certain habitats which include coarse sediment, cobble reef, and biogenic habitats with high structural complexity (e.g. bryozoan reefs).[48] In the Marlborough Sounds these habitats are mostly concentrated around the coastal margin with soft sediment dominating the inner Sounds.[49] This is also where fishing effort is greatest.

39. In 2020, a NIWA survey of parts of the Sounds (including Queen Charlotte Sound) identified some habitats of significance for blue cod.[50] These included:

    (a) Large areas with patchy bryozoan reefs which supported diverse assemblages of sponges, anemones, ascidians and complex living structures up to 1 m in height. The survey found specific areas of patch reefs around the eastern and western

[45] Proposed Marlborough Environment Plan, rule 16.7.6; and rule 16.7.7.
[46] M Beentjes, M Page and J Hamill (2022), above n 10, page 19.
[47] TE Brough, EM Leunissen, and M Beentjes (2023), above n 7, page 82.
[48] TE Brough, EM Leunissen, and M Beentjes (2023), above n 7, page 4.
[49] TE Brough, EM Leunissen, and M Beentjes (2023), above n 7, page 6.
[50] Tara Anderson (2020), above n 6.

channel entrances to the Queen Charlotte Sound that "*importantly appear to be a nursery ground for newly settling and juvenile blue cod*".[51]

(b) Anecdotal evidence from fishers and the local community indicated that bryozoan reefs were more extensive in the past. Particularly across a large sediment bank described as the "Duck Pond" near the entrance to Queen Charlotte Sound.[52] This is thought to have been a past nursery area for blue cod.

(c) Shell debris fields below living beds of *tucetona* hosted diverse communities of sponges, ascidians, hydroids and invertebrates. These habitats "*supported notable numbers of newly settled and juvenile blue cod*".[53]

(d) Adult blue cod were commonly observed in and around the reefs and on the shell-debris fields.[54]

40. The NIWA study referred to unpublished research which has identified bryozoan reefs around the Rangitoto, Trios and Chetwode Islands as important nursery habitat for the Queen Charlotte Sound blue cod population.[55] A more recent FNZ review of sustainability measures for blue cod (October 2022) described the Chetwode Bank as "*one of the few known remaining areas of healthy bryozoan habitat in the Sounds region*".[56]

41. In the context of multiple stressors impacting on blue cod habitats, it is important that remaining habitats of significance for spawning and recruitment are protected as required under section 9(c) of the Fisheries Act. As a minimum, this should include:

(a) Area-based protection of remaining bryozoan beds and important reef habitat at Chetwode Bank and the outer Queen Charlotte Sound as well as discrete areas of shell debris habitat and cobble reefs.

(b) Appropriate buffer areas around important habitat to protect adult fish (i.e. spawning stock) that are commonly observed around the edges of reefs and biogenic habitats.

(c) Reinstatement and expansion of bryozoan beds to restore degraded bryozoan beds (e.g. the Duck Pond and wider Chetwode Bank) and support recovery of the fishery.

42. **It is important that any area-based controls are sufficiently large and representative to optimise effectiveness.** Given that blue cod prefer structurally complex habitat, protection could be applied around islands in the Sounds where larger swathes of rocky reef and biogenic habitat can be included rather than in isolated discrete areas.

Other possible regulatory and voluntary measures

43. The Discussion Paper seeks feedback on other options including:

[51] Tara Anderson, above n 6, page 15.
[52] Tara Anderson, above n 6, page 15.
[53] Tara Anderson, above n 6, page 16.
[54] Tara Anderson, above n 6, page 162.
[55] Tara Anderson, above n 6, citing "*Anderson et al. in prep*", page 50.
[56] FNZ (2022) "Review of Sustainability Measures for Blue Cod (BCO 7) for 2022/23" (Fisheries New Zealand Discussion Paper No: 2022/07, June 2022), page 12, available here.

(a) A reduced combined daily bag limit for finfish in the MSA;
(b) Refreshed education campaign on best practices and fishery issues;
(c) Approaches to enhance fine-scale recreational fishing data; and
(d) Tools to reduce release mortality.

44. EDS supports the need for additional regulatory measures aimed at reducing fishing effort and associated release mortality. These need to be applied *in addition to* an extended seasonal closure and area-based habitat protection because:

(a) The current management settings are not sufficient to manage intense recreational fishing effort and prevent localised depletion of blue cod.
(b) The proposed extended seasonal closure would not (under any of the options) sufficiently address the need to reduce release mortality. This is because other finfish can continue to be caught during the closure period. Incidental capture and mortality of blue cod occurs despite best efforts not to target the species.
(c) The seasonal closure is of limited duration. Current recreational management settings (i.e. daily bag limit for blue cod and maximum size restriction) do not adequately mitigate the risk of incidental mortality.
(d) Any additional protected areas are unlikely to be implemented before the 2025/26 fishing year.[57] It will take many years for the benefits of any protected areas to be realised (e.g. support recovery of the fishery) once implemented.

45. As outlined in the Discussion Paper, the current daily bag limit for blue cod is two fish. However, the combined daily bag limit for finfish is 20 fish. Current survey data of recreational fishers indicates that 95% of fishers only take five fish or less per trip.[58] This suggests that the current combined limit poses unnecessary risks to blue cod by allowing effort that exceeds demand. **EDS supports a combined daily bag limit of five finfish because it would reduce incidental mortality of blue cod and fishing pressure on other finfish species.**

46. EDS supports further consideration of options identified in the Technical Group Report, which include:

(a) A "*stop fishing rule*" that would require fishers to stop fishing for the day once they had caught the daily limit for blue cod.
(b) An alternative "*move-on*" rule to encourage targeting of species outside of blue cod preferred habitat. The benefit of a move-on rule is that it could be applied during the seasonal closure to limit incidental mortality of blue cod.
(c) Minimum recreational hook standards (e.g. size, shape).

[57] The Discussion Paper suggests a staged approach will be taken and further consultation would occur in 2025 before any spatial controls are progressed.
[58] Technical Group Report, above n 15, page 22.

47. The Discussion Paper includes a brief comment that "*research has shown that use of larger circle hooks reduces gut hooking and release mortality"*.[59] However, no analysis of different hook options is provided.

48. Carbines (1999) compared the survival rate of blue cod caught by recreational fishers using two different sized hooks.[60] Captured fish were subjected to either "good" or "poor" handling techniques (based on best practice at the time) and released into holding pots so they could be monitored. After two weeks, 25% of fish caught using the smaller 1/0 hooks had died whereas no fish had died using the larger 6/0 hooks. The study found that handling technique had no detectable effect on blue cod survival.

49. The Technical Group Report appears to dismiss the possibility of mandatory recreational hook standards. It states, "*Previously discussed in other advisory groups, with issues around a lack of industry standard in hook sizes and shapes meaning it is not feasible to regulate this*". [61] EDS finds it difficult to follow this reasoning as it would be possible to develop appropriate standards as part of this regulatory review process. This is particularly the case as there is independent evidence that supports the need for a minimum hook size. As a minimum, further analysis of potential costs and benefits associated with this option should be provided to inform the discussion.

50. EDS supports voluntary actions to improve compliance with best practice standards and accuracy of recreational fishing data. However, given the depleted status of the stock, voluntary actions will not go far enough to support recovery of the Marlborough Sounds blue cod fishery. It is critical that future management settings include a combination of strong regulatory measures that address both habitat loss and localised depletion.

[59] Discussion Paper, above n 1, page 9.
[60] G D Carbines (1999) "*Large Hooks Reduce Catch-and-Release Mortality of Blue Cod Papercis colias in the Marlborough Sounds of New Zealand*" North American Journal of Fisheries Management 19:4 992-998 available at https://doi.org/10.1577/1548-8675(1999)019%3C0992:LHRCAR%3E2.0.CO;2.
[61] Technical Group Report, above n 15, page 17.