Fisheries New Zealand
Tini a Tangaroa

Proposed recreational daily limits for kina: Fisheries Management Area 1

Fisheries New Zealand Decision Paper

ISBN No: 978-1-991285-90-4 (online)

June 2024

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1 Why are we proposing a review?

1. Urchin barrens, also known as kina barrens, are a significant concern across New Zealand, especially north-eastern New Zealand where they are widespread across coastal rocky reefs due to high densities of sea urchins. These barren areas occur when urchins consume virtually all of the vegetation (kelp and other macroalgae) on a reef, leading to a loss of habitat and biodiversity. The widespread occurrence of barrens at large spatial scales is generally attributed to the removal of sea urchin predators through fishing activities, noting a wide range of factors also likely play a part. Consequently, the marine ecosystem experiences reduced biodiversity and productivity, posing challenges for the overall health and resilience of coastal environments. Addressing urchin barrens, and their causes, is crucial for restoring and maintaining the ecological balance of these marine habitats.

2. Fisheries New Zealand (**FNZ**) is progressing an integrated set of measures to address widespread barren areas, recognising the need for urgent action. This approach includes various initiatives aimed at restoring kelp forests and mitigating the impacts of urchin barrens, with this review of the recreational daily limit being one tool in these efforts.

3. FNZ is advising you on options to increase the recreational daily limit for kina in the Auckland East Fisheries Management Area (**FMA 1**) (Figure 1). FMA 1 covers the inshore waters and harbours along the north-eastern coast of the North Island from North Cape to Cape Runaway. It includes the eastern coast of Northland, the Hauraki Gulf, the Coromandel, and the Bay of Plenty.

4. FNZ is not proposing that you increase the recreational fishing allowance (155 tonnes in FMA 1), as the current level of kina harvest in FMA 1 is an estimated 21 tonnes (2022/23 National Panel Survey of Marine Recreational Fishers [**NPS**][1]), which is 134 tonnes less than the combined recreational allowance. FNZ anticipates that harvest levels under either Option 2 or 3 would still be well within the existing allowances which were increased in 2023.

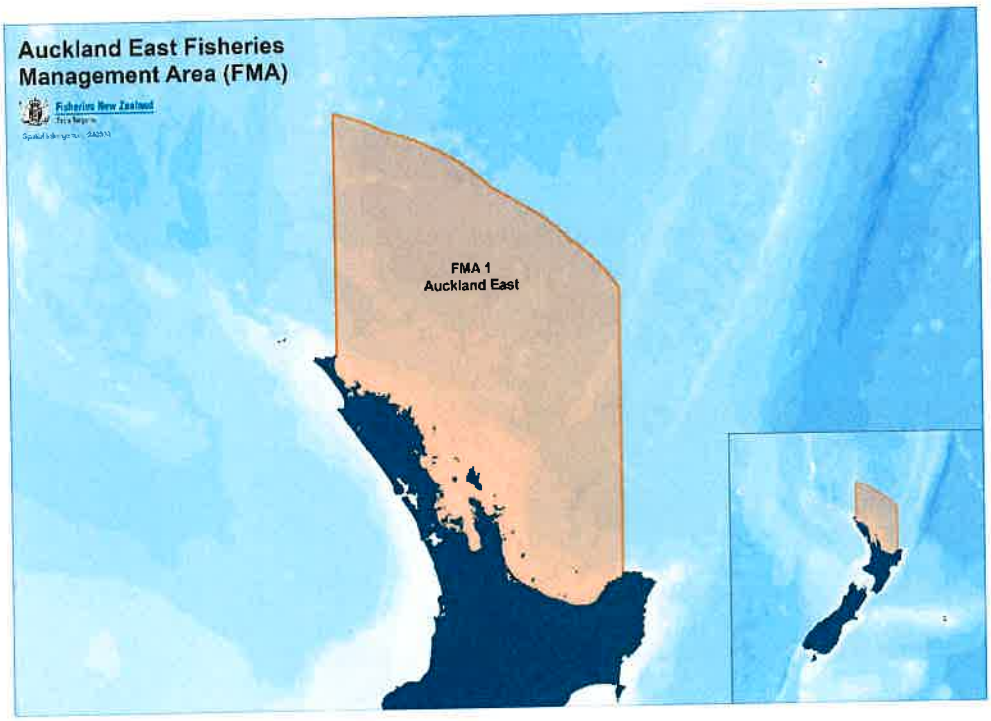

Figure 1: Auckland East Fisheries Management Area (FMA 1).

[1] The 2022/23 National Panel Survey for Marine Recreational Fishers is not yet available. Public release of this is expected in 2024. The latest available NPS is from 2017/18 and accessible at: https://www.mpi.govt.nz/dmsdocument/36792-far-201924-national-panel-survey-of-marine-recreational-fishers-201718

5. Under the Fisheries (Amateur Fishing) Regulations 2013 (the **Amateur Regulations**), the daily limit for "kina" covers two sea urchin species - *Evechinus chloroticus* (commonly referred to as kina and managed under the Quota Management System (**QMS**) and *Centrostephanus rodgersii*[2] (the long-spined urchin that is not managed under the QMS)[3].

6. Information from fishers, scientists, and other stakeholders (including through local area surveys) suggests kina abundance is high in many areas of FMA 1 leading to the formation of urchin barrens. Urchin barrens are areas of subtidal rocky reef where grazing by sea urchins has removed most, or all, of the kelp and other macroalgae, leaving bare or barren rock. In these areas, sea urchins prevent the growth of kelp and other macroalgae, causing a shift to barren rocky habitats. Urchin barrens are characterised by the absence or depletion of kelp forests and the proliferation of sea urchins, resulting in reduced biodiversity and ecological imbalance.

7. High densities of kina and associated urchin barrens were first recorded in scientific literature in 1964 and kina abundance is thought to have increased significantly since the mid-1900s.[4]

8. Urchin barrens in north-eastern New Zealand are also caused by the long-spined sea urchin (*Centrostephanus rodgersii;* hereafter referred to as *Centrostephanus). Centrostephanus* has been present in New Zealand since at least 1897, but recently due to factors such as climate change, warming waters and shifting ocean currents, the species has both extended its range southwards and increased in abundance throughout New Zealand and Australia.[5] *Centrostephanus* has few predators due to its long spines and is known to either create urchin barrens in areas where kina would not, or join existing urchin barrens alongside kina.

9. *Centrostephanus* are frequently observed at greater depths than kina and are known to form urchin barrens in these habitats as well. Unlike kina, *Centrostephanus* exhibits a nocturnal feeding behaviour, residing in cracks and pockets within the rocks during the day and emerging to graze on algae at night[6]. This nocturnal behaviour makes *Centrostephanus* less susceptible to predation compared to kina, contributing to its ability to thrive in certain environments. Despite their nocturnal habits, *Centrostephanus* can still be harvested during the day. It is important to note that *Centrostephanus* is not encompassed within the QMS and does not have an allocated Total Allowable Catch (**TAC**).

10. In recent years, urchin barrens have become an increasing concern which has prompted significant management and research, as well as engagement with iwi and stakeholders. In February 2024[7] you committed to prioritising and accelerating these initiatives, including a review of the recreational daily limit for kina.

11. It is important to note that the proposed increases to the daily limits are not intended as the sole measure to address urchin barrens. A comprehensive set of measures is required to respond to the causes and effects of urchin barrens and FNZ is also developing and implementing other actions to address the urchin barrens issue[8].

2 Summary of proposed options

12. Three options are proposed for the recreational limit for kina in FMA 1 (Table 1). These are made up of the *status quo* and two options for increasing the recreational daily limit.

[2] refer definition of 'kina in regulation 8 of the Amateur Regulations
[3] For more information about the QMS go to https://www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quotamanagement-system/
[4] Dromgoole (1964); Shears & Babcock (2007)
[5] Sweatman (2021)
[6] Byrne & Andrew (2013)
[7] AM24-0066
[8] B23-0735

Table 1: Proposed options for the recreational daily limit for kina in FMA 1. The preferred option of FNZ is highlighted in blue.

Option	Recreational Daily Limit
Option 1 (*status quo*)	50 per fisher
Option 2	100 per fisher
Option 3	150 per fisher

3 Recreational fishing rules

13. Recreational fishing rules are set under the Amateur Regulations and apply to all recreational fishers. A recreational fisher is a person not fishing for the purpose of sale and in accordance with the Amateur Regulations and includes those fishing on an amateur fishing charter vessel and commercial fishers taking fish for non-commercial purposes under section 111 of the Fisheries Act 1996[9] (**the Act**). The Amateur Regulations do not apply to commercial fishers[10] or fishing carried out under customary fishing regulations.

14. Recreational fishing rules can include minimum size limits, daily limits[11], fishing area restrictions or closures, accumulation limits, and gear restrictions. This proposal only considers changes to the recreational daily limit for kina.

3.1 Recreational daily limits

15. A recreational daily limit refers to how many fish[12] one person can take each day. There are two types of recreational limits:

    - **an individual species limit**: the total number of a specific species of fish that one person can take per day; and
    - **a combined daily limit**: the total number of any combination of specified fish species that one person can take per day.

16. Individual species and combined daily limits can operate together or separately and these limits can also differ depending on region.[13] A daily limit is intended to ensure sustainable harvesting levels and to share the resource between individual fishers. With no constraints on the number of recreational harvesters, overall recreational harvest is unconstrained.

17. Taking or possessing catch above the daily limits may be subject to enforcement action, including infringement notices or prosecution.

3.2 Daily limits for shellfish

18. The daily limit for recreational take of kina across New Zealand is 50 kina per fisher. *Centrostephanus* is included in this daily limit for kina.

19. Under regulation 5A of the Amateur Regulations, you may make any instruments that set or vary any daily limits, accumulation limits, minimum or maximum legal sizes, or other recreational fishing management controls.

[9] Fisheries Act 1996

[10] Commercial Fishers are fishers who have a fishing permit issued under section 91 of the Fisheries Act entitling them to take fish for commercial purposes.

[11] Also known as 'daily catch limits' and referred to as 'daily limits' in the Amateur Regulations.

[12] Fish includes all species of finfish and shellfish, at any stage of their lie history, whether living or dead.

[13] For more information on regional recreational daily limits visit Recreational Fishing Rules

20. These controls are currently specified in the Fisheries (Recreational Management Controls) Notice (**the Notice**).[14] FNZ is advising you on options for a new daily limit for kina taken from FMA 1, which (if agreed to) would be given effect through an amendment to the Notice.

4 Sea urchins

4.1 Biology

4.1.1 Kina

21. Kina are found on rocky reefs throughout New Zealand and the sub-Antarctic Islands. They have a wide depth distribution and can be found from shallow subtidal waters down to at least 60 metres.[15]

22. Kina have an annual reproductive cycle which culminates in multiple spawning events across mid- and late summer.[16] Size at maturity appears to vary between locations and may be as small as 30 mm test diameter (**TD**) and as large as 75 mm TD.[17] The rate of settlement is likely to vary between years and appears to differ among locations and habitats. Larval abnormalities have also been correlated with increasing suspended sediment concentration in laboratory experiments.[18] This signals a link between environmental factors associated with terrestrial runoff and kina abundance.

23. Feeding experiments have indicated that kina possess a selective mode of feeding, being able to distinguish between algal species but with a preference for the kelp *Ecklonia radiata*[19] and to a lesser extent *Sargassum sinclarii*, *Landsburgia quercifolia* and *Carpophylum maschalocarpum*.[20] However, kina can also feed on encrusting organisms, such as sponges, when algal food is scarce.[21]

24. There is little genetic difference between kina that have been analysed in different parts of New Zealand, and the boundaries of the biological stock are unknown.

25. Other factors, for example, wave exposure, climate, disease, and toxic microalgae[22], are also known to negatively impact on the abundance and distribution of kina and urchin barrens.

4.1.2 Centrostephanus

26. Up until recently, *Centrostephanus* were thought to be largely restricted to the northern regions (particularly offshore islands) of New Zealand. However, in recent years they appear to be undergoing a range expansion and are now commonly found to the south of what was previously considered their main distribution and are increasingly present on inshore reefs. This expansion is facilitated by factors such as climate change, warming waters, and alterations in ocean currents. They are commonly observed in rocky reef habitats and can be found along the coastline of FMA 1.[23]

27. They have an annual reproductive cycle and reach sexual maturity at 40-60 mm TD. Spawning in smaller individuals (30-50 mm TD) can be induced but individuals of these size classes are not reliably fertile.[24]

[14] Fisheries Notices: https://www.mpi.govt.nz/fisheries-notices/
[15] Miller & Abraham (2011)
[16] Walker (1982)
[17] 'Test diameter' refers to the measurement of the diameter of a sea urchin's shell; Miller & Abraham (2011)
[18] Phillips & Shima (2006)
[19] Cole et al. (1998); Choat & Schiel (1982)
[20] Choat & Schiel (1982)
[21] Ayling (1978)
[22] Shears et al. (2008); Shears & Ross (2010)
[23] Balemi & Shears (2023)
[24] Byrne & Andrew (2020)

28. *Centrostephanus* feed on kelp, other macroalgae and benthic invertebrates. They exhibit a different grazing pattern to kina, showing a preference for understorey grazing which inhibits new recruitment of algal species.[25]

4.2 Status of the stocks

4.2.1 Kina

29. Kina was introduced to the QMS in 2003 and there are two fisheries in FMA 1: East Northland (**SUR 1A**) and Hauraki Gulf/Bay of Plenty (**SUR 1B**) (Figure 2).

30. There are no established reference points to use for estimating the maximum sustainable yield[26] of kina, no recognised approach for assessing the status of the stock and there is insufficient information to estimate current stock status.[27]

31. While there is no formally assessed estimate of kina biomass for the SUR 1A and SUR 1B stocks, kina do exist at extremely high densities (greater than 20 per m^2)[28] in areas known as urchin barrens. Information from tangata whenua, fishers, scientists, and other stakeholders suggests kina abundance is high in many areas and having clear impacts on other species and the wider marine ecosystem. Kina abundance is thought to have increased significantly since the mid-1900s[29].

32. As an indication of the biomass present in some areas within SUR 1A and 1B, University of Auckland researchers, operating under a FNZ special permit, recently removed an estimated[30] 65 tonnes of kina (~403,000 individual kina) from just 7.1 ha of shallow subtidal reef at sites at Hauturu-o-Toi / Little Barrier Island, Leigh, and Ōtata (Noises)[31].

33. FNZ recognises that kina are not uniformly distributed and do not occur at such high densities at all locations. However, there is suitable reef habitat for kina along much of the FMA 1 coastline and it is anticipated that the overall kina biomass for both stocks is very high relative to the current TAC.

4.2.2 *Centrostephanus*

34. Currently, there is limited information available on the stock status of *Centrostephanus*. However, reports from fishers indicate an increasing abundance and range of *Centrostephanus*, raising concerns about the potential impact. This expansion is of concern particularly due to the ability of *Centrostephanus* to form new urchin barrens and extend existing ones, highlighting the need for further research and management measures to address this issue.

4.3 Management background

4.3.1 Kina

35. The TACs of SUR 1A and SUR 1B were last reviewed in 2023. The Minister at the time decided to increase the TACs for both stocks, noting that (despite the absence of a formal stock assessment) reports from iwi, scientists, and fishers indicated the abundance across FMA 1 is high and would sustainably support increased utilisation. Through this review some concerns were raised by iwi in the SUR 1A region that this taonga species may be over-exploited,

[25] Doheny et al. (2023)
[26] The Fisheries Act (1996) defines 'maximum sustainable yield' as the greatest yield that can be achieved over time while maintaining the stock's reproductive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock.
[27] Fisheries New Zealand (2023) – May 2023 Fisheries Assessment Plenary.
[28] Miller & Abraham (2011)
[29] Dromgoole (1964); Shears and Babcock (2007)
[30] Miller & Shears, (unpublished data)
[31] Miller & Shears, (2022)

particularly in areas significant to customary harvest. As such the decision was made to implement a more cautious increase in this fishery.[32]

36. A national science workshop was held in March 2023, at which widespread concerns were expressed about urchin barrens, emphasising the need for an integrated management approach. It was noted that while kina removal aids in kelp regrowth, it doesn't tackle the root causes of high sea urchin populations. Thus, lasting ecosystem recovery hinges on addressing a range of broader issues concurrently.

37. In August 2023, FNZ held a urchin barren management workshop with Te Uri o Hikihiki hapū, (one of the applicants on the 2022 and 2023 Judicial Review of the Northland rock lobster fishery), to discuss possible tools to address urchin barrens in Northland. At the time, the hapū expressed concern about increasing abundance of *Centrostephanus* and expressed support for hapū-led local management of urchin barrens.

38. In January 2024, FNZ convened management workshops with tangata whenua in Northland to explore various management strategies and tools. During these sessions, there was support for ecosystem-based approaches and management tools that empower kaitiaki, reflecting a desire for indigenous stewardship. Additionally, it was also expressed that each management tool alone may not be effective, highlighting the need for integrated and complementary approaches. Specific insights and considerations regarding the daily limit are discussed in section 6 of this document.

39. In May 2024, you met with stakeholders in Northland. During this meeting attendees expressed support for addressing the issue of urchin barrens, increasing daily limits for kina and for a special permit purpose that would allow for reef restoration via kina management. Attendees also emphasised the need to address the causes of the ecological imbalance that has led to urchin barrens becoming a widespread phenomenon.

4.3.2 *Centrostephanus*

40. *Centrostephanus* is not currently managed under the QMS. However, there has also been engagement with iwi, fishers, and other stakeholders to discuss their potential impacts and management.

41. Abundance surveys for *Centrostephanus* have been carried out in limited areas across New Zealand. The exact arrival time of this species is uncertain, but it is believed to have originated from Australia in the last century with its presence first being recorded in 1897.[33] Its long larval stage, lasting approximately three months, suggests it could have been transported successfully across the Tasman Sea during this time. Due to factors such as climate change, warming waters, and shifting ocean currents, *Centrostephanus* is extending its range southward and increasing in abundance in northern New Zealand and southern Australia. There is little knowledge on the extent of the threat this species poses in New Zealand. However, it is known to have potential to create more persistent urchin barrens across a range of differing habitats, as seen in Tasmania.[34]

4.4 Recreational catch information

4.4.1 Quota Management System

42. The QMS currently only accounts for kina (*E. chloroticus*). *Centrostephanus* is not currently managed under the QMS framework.

43. The current TACs for kina in SUR 1A and SUR 1B are 247 and 509 tonnes, respectively (Table 2). This is made up of allowances for customary Māori, recreational, and all other mortality caused by fishing and a Total Allowable Commercial Catch (**TACC**). The recreational allowance

[32] The Minister's Decision Letter for October 2023.
[33] Sweatman (2021)
[34] Doheny et al. (2023)

in SUR 1A is 65 tonnes and in SUR 1B it is 90 tonnes. The combined recreational allowance across FMA 1, which encompasses SUR 1A and SUR 1B is 155 tonnes (Table 2; Figure 2).

Table 2: TAC, TACC and Allowances (in tonnes) for SUR 1A and SUR 1B from 1 October 2023.

Stock	TAC	TACC	Allowances		
			Customary Māori	Recreational	All other mortality caused by fishing
SUR 1A	247	80	100	65	2
SUR 1B	439	280	135	90	4

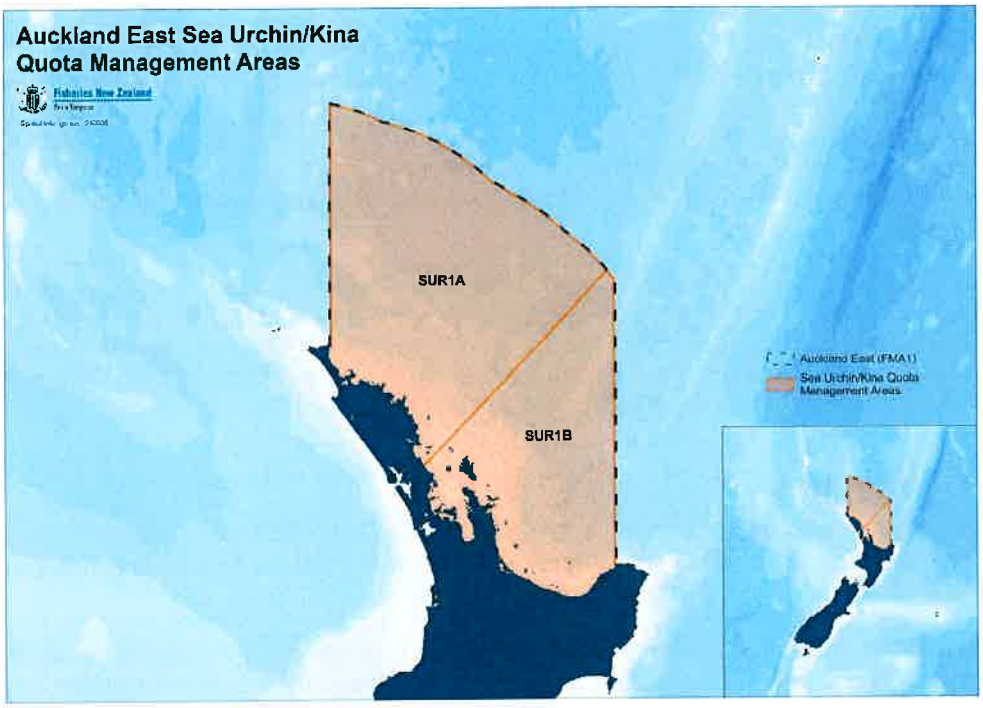

Figure 2: Quota Management Areas East Northland (SUR 1A) and Hauraki Gulf /Bay of Plenty (SUR 1B) encompassed by FMA 1.

4.4.2 Recreational fishery

44. Under the Amateur regulations, kina is defined as both *E. chloroticus* and *C. rodgersii* species.

45. The best available information on the current recreational catch is preliminary data from the 2022/23 NPS[35]), which provides a snapshot of the level of recreational take in that fishing year. The 2022/23 NPS estimated 557,000 kina were harvested across all kina areas in New Zealand, with approximately 23% (130,000) of the national recreational harvest of kina taken in FMA 1.

46. Catches in the NPS are reported as numbers of individual kina. However, by using a conversion factor of 161 grams per individual (used recently by researchers studying urchin barrens in SUR 1B[36]), the recreational catch from FMA 1 can be estimated at approximately 21 tonnes.

[35] The 2022/23 National Panel Survey for Marine Recreational Fishers is not yet available. Public release of this is expected in 2024. The latest available NPS is from 2017/18 and accessible at: https://www.mpi.govt.nz/dmsdocument/36792-far-201924-national-panel-survey-of-marine-recreational-fishers-201718

[36] Miller *pers comm.*

47. New data indicates a decline in recreational harvest within FMA 1, dropping from 290,000 to 130,000 individuals between 2017/18 and 2022/23. It's important to note that while this represents a decrease, there is some uncertainty surrounding these estimates.

48. A breakdown specifying the species caught under the category of kina is unavailable. However, it is understood the vast majority of recreational harvest is kina (*E. chloroticus)*.

5 Sea urchin barrens

49. In parts of New Zealand (and in other places globally), sections of rocky reef previously covered in kelp forest have been, or are being, converted to homogenous sea urchin dominated barrens, largely devoid of kelp and other benthic biodiversity.

50. Urchin barren areas vary depending on ecological factors, but they typically exhibit low biodiversity and reduced primary production compared to healthy ecosystems. There is currently no broadly accepted formal definition of what constitutes an urchin barren. Consequently, FNZ has developed a definition for the purposes of identifying those areas that are of concern:

> *"sea urchin dominated areas of rocky reef that would normally support healthy kelp forest but have little or no kelp due to overgrazing by sea urchins."*[37]

51. The driver for this pattern of increased urchin barrens in north-eastern New Zealand is a trophic cascade, where the ecosystem is controlled from the top down.[38] [39] There is evidence to suggest that sea urchin predators, including snapper and spiny rock lobsters, when at sufficient abundance, can prevent kina attaining a density where they graze a kelp forest to the point of complete algal removal.[40] However, when predator abundance is reduced (by fishing or other factors), sea urchin populations are released from top-down control, and eventually reach an abundance where their grazing results in kelp deforestation and the formation of urchin barrens. These urchin barrens are less biologically diverse and less productive environments than the kelp forest habitats they replace. In areas of FMA 1, evidence indicates that snapper and spiny rock lobster are not present at an abundance that enables them to meaningfully contribute to controlling kina populations, whether alone or in combination with other factors.[41]

52. The increase in sea urchin abundance and subsequent loss of kelp forests is considered a problem because it is indicative of a significant adverse effect of fishing on aquatic ecosystems[42], and because kelp forests provide a wide and diverse range of ecosystem services. These include:

- Providing important settlement, nursery, shelter, and refuge habitats for a wide range of coastal and inshore shellfish and finfish species, including sea urchin and rock lobster.
- Providing food for invertebrates, shellfish, finfish, and seabird species, which in turn supports a variety of important commercial and non-commercial fisheries resources.
- Modifying wave and tidal action and influencing coastal and physical processes such as erosion, sedimentation, and turbidity.
- Driving primary production and energy and nutrient recycling that contribute to other near-shore systems including sandy beaches and deepwater ecosystems.

Once a reef is converted from kelp forest to urchin barren, these ecosystem services are lost.

53. Urchin barrens in north-eastern New Zealand are also caused by *Centrostephanus*. As highlighted in section 4.3.2, *Centrostephanus* has been present in New Zealand since at least 1897, but recently due environmental factors, the species has both extended its range and

[37] Doheny et al. (2023)
[38] Paine (1980)
[39] Doheny et al. (2023)
[40] Shears & Babcock (2003)
[41] Shears et al. (2008)
[42] Ministry for Primary Industries (2021) Aquatic Environment and Biodiversity Annual Review (AEBAR): A summary of environmental interactions between the seafood sector and the aquatic environment.

increased in abundance. It is known to either create urchin barrens in areas where kina would not or join existing urchin barrens alongside kina.

Relevant predators of sea urchins

54. Kina are an important prey species on rocky reefs and within FMA 1, their main predators are considered to be rock lobsters and snapper (although numerous other fish and echinoderm species also prey on them to a lesser extent).

55. In describing predators of urchins there is an important relationship between the size classes of both predator and prey. A wide variety of species predate kina, with the range of predators narrowing as kina increase in size. Large predators are generally required to successfully manipulate and kill a large sea urchin whereas smaller urchins are easier to both pry off rocks and consume whole. Predatory consumption by fish has been linked directly to gape size (mouth size) in New Zealand.[43] While they have a similar relationship between predator and prey size, lobsters are more unique in their ability to pry sea urchins from rocks and consume the animal via the unprotected mouthparts.[44] Thus, the largest size classes of kina (>15 cm) 'might be immune to predation by all but the largest of lobster'.[45]

56. The only known predators of *Centrostephanus* are lobsters.[46] *Centrostephanus* likely has few predators and is not a preferred prey for rock lobster due to its long spines and nocturnal grazing behaviour.

6 Treaty of Waitangi obligations

57. Section 5(b) of the Act requires that the Act be interpreted and people making decisions under the Act do so in a manner that is consistent with the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (**the Settlement Act**). The Settlement Act provides that non-commercial customary fishing rights continue to be subject to the Principles of the Treaty of Waitangi and give rise to Treaty obligations on the Crown.

58. Section 10 of the Settlement Act requires the Minister to develop policies and programmes to give effect to the use and management practices of tangata whenua. Consistent with this section, the Ministry has worked with iwi to develop engagement processes that enable iwi to work together to reach a consensus where possible and to inform the Ministry on how tangata whenua wish to exercise kaitiakitanga in respect of fish stocks in which they share rights and interests and how those rights and interests may be affected by sustainability measures proposed by the Ministry.

6.1 Input and participation of tangata whenua

59. Section 12 (1)(b) of the Act requires that before undertaking any sustainability process you shall provide for the input and participation of tangata whenua who have a non-commercial interest in the stock or an interest in the effects of fishing on the aquatic environment in the area concerned. In considering the views of tangata whenua, you are required to have particular regard to kaitiakitanga.[47] Input and participation of tangata whenua into the sustainability decision-making process is provided mainly through Iwi Fisheries Forums, which have been established for that purpose. 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

[43] Marinovich (2022)
[44] Flood (2021)
[45] Andrew & MacDiarmid (1991)
[46] Balemi & Shears (2023)
[47] The Fisheries Act 1996 defines Kaitiakitanga to mean "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", where tikanga Māori refers to Māori customary values and practices.

importance to them, and their objectives for the management of their interest in fisheries. Iwi Fisheries Forums may also be used as entities to consult iwi with an interest in fisheries.[48]

60. The proposal to review the recreational daily limit for kina has been discussed with Te Hiku o te Ika Iwi Fisheries Forum and the Mid-North (East and West) Iwi Fisheries Forums, as well as wider kaitiaki in the region. These discussions took place during the management meetings held in Whangarei and Kaitaia on the 23rd and 24th of January 2024, and subsequent iwi fisheries forum hui in February 2024.

61. Feedback from tangata whenua regarding the proposal to increase the recreational daily limit was mixed (Table 3). Support for the proposal was expressed only if this was coupled with spatial restrictions to address the risk of recreational fishers over exploiting areas in which kina populations are healthy. Additionally, the issue was raised that recreational fishers exhibit selective harvesting behaviour when collecting kina, often opening a few kina at a site to see if they are ripe, before deciding whether to continue harvesting. It was suggesting that fishers would abandon the effort if the initial collection is unsatisfactory. Thus, an increase in the daily limit may not achieve any meaningful impact on reducing kina densities from within urchin barren areas.

Table 3: Summary of engagement with Iwi Fisheries Forums.

Iwi Fisheries Forum	Engagement on SUR 1A & SUR 1B
Te Hiku o te Ika	Noted concern that increasing the recreational bag limit is unlikely to resolve urchin barrens as recreational harvesters will not target 'skinny' kina from barren areas. This extended to concern that providing for additional recreational harvest may impact significant cultural and customary harvest areas. Forum members did not want to see the balance upset by stripping areas of good kina. The forum indicated that restoring populations of kina predators should be a priority and that communications about the issue of urchin barrens should be available so people can engage in the issue and get involved.
Mid-North (East)	Also raised concerns that the recreational limit would not be an effective tool for controlling urchin barrens and that the key measure was restoring predator numbers to maintain ecosystem balance. There was also a strong desire for iwi and hapu to be directly involved in monitoring and management of urchin barrens within their respective rohe moana. There was also a desire to connect those doing research and monitoring of urchin barren areas to ensure the best available information was available to iwi and hapu, as well as Government, to inform management approaches.
Mid-North (West)	The forum stressed the need for local input in monitoring, research and management decision making for fisheries issues, including urchin barrens.

62. All iwi forums agreed that urchin barrens were an issue of concern however also stressed that kina are a taonga species that is culturally important and regularly taken as customary harvest.

63. Additionally, the Hei o Wharekaho Settlement Trust, Ngāti Manuhiri Settlement Trust, Te Kapu O Waitaha, and Te Waiariki, Ngāti Korora, Ngāti Takapari Hapu Iwi Trust have made submissions on the proposed options. More information on their submissions is outlined below in the '*Submissions*' section of this paper.

[48] However, Fisheries New Zealand also engages directly with Iwi (outside of Forums) on matters that affect their fisheries interests in their takiwā and consults with any affected Mandated Iwi Organisations and Iwi Governance Entities where needed.

6.2 Kaitiakitanga

64. Information provided by forums, and iwi views on the management of fisheries resources and fish stocks, as set out in Iwi Fisheries Plans, are among the ways that tangata whenua can exercise kaitiakitanga in respect of fish stocks.

65. Neither of the Mid-North forums currently have established fisheries plans. However, kina is identified in the Te Hiku O Te Ika Iwi Fisheries Forum Fisheries Plan as a taonga species.[49]

66. FNZ considers that the management options presented in this paper align with the objectives in the Te Hiku O Te Ika Iwi Fisheries Forum Fisheries Plan, which generally relate to the maintenance of healthy and sustainable fisheries.

6.3 Mātaitai reserves and other customary management tools

67. Section 21(4) of the Act requires that, when allowing for Māori customary non-commercial interests, you must take into account –

    a) any mātaitai reserves in FMA 1 that are declared by notice in the Gazette under regulations made for the purpose under section 186;

    b) Any area closures or any fishing method restriction or prohibition in FMA 1 that is imposed under section 186A or 186B[50]

68. There are 11 customary fisheries management areas within FMA 1. These include two taiāpure, five temporary closures, and four mātaitai reserves implemented under section 186A of the Act (Table 4).

Table 4: Customary fisheries management areas in FMA 1.

Customary Area	Management Type
Waikare Inlet Taiāpure	**Taiāpure** All types of fishing are permitted within a Taiāpure. The management committee can recommend regulations for commercial, recreational, and customary fishing.
Maketu Taiāpure	
Marsden Bank and Mair Bank Temporary Closure	**Section 186A temporary closures** Section 186A temporary closures are used to restrict or prohibit fishing of any species of fish, aquatic life or seaweed or the use of any fishing method.
Maunganui Bay Temporary Closure	
Rehuotane Ki Tai	
Te Mata and Waipatukahu Temporary Closure	
Umupuia Beach Temporary Closure	
Raukokere Mātaitai	**Mātaitai reserve** Commercial fishing is not permitted within mātaitai reserves unless regulations state otherwise.
Te Kopa o Rongokānapa Mātaitai	
Te Maunga o Mauoa Mātaitai	
Te Rae o Kohi Mātaitai	

69. Recreational fishing is permitted (subject to any bylaws) within mātaitai reserves. The section 186A temporary closures above prevent recreational fishing of the species to which they apply. The Maunganui Bay and Rehuotane Ki Tai section 186A temporary closures are an exception as they allow harvesting of kina. At this time no taiāpure within FMA 1 have introduced regulations that prohibit the harvest of kina.

[49] Taonga is defined as a treasure, or anything prized and considered to be of value.
[50] Section 21(4) does not refer to section 186B, but this is the provision used for temporary closures or fishing method restrictions or prohibitions in South Island fisheries waters.

70. FNZ does not anticipate that an increase in daily limit for kina will impact customary management areas as the best available information suggests that kina abundance is high across the FMA.

7 Purpose of the Act – section 8 of the Act

71. The purpose of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability. Section 8(2) of the Act defines ensuring sustainability:

a) as maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and

b) and avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment.

72. FNZ considers the proposals to increase the daily limit for kina aligns with section 8(2) of the Act. Given that information suggests that there is a high abundance of kina, there is an opportunity for utilisation while ensuring sustainable management practices. While increasing the daily limit is not considered the sole solution to manage urchin barrens, it may contribute to reducing herbivory in some areas, potentially leading to increased abundance of macroalgae. When combined with other management initiatives (including tools to increase the abundance and kina predators), this could aid in mitigating adverse effects on the aquatic environment.

8 Environmental principles – section 9 of the Act

73. The environmental principles that you must take into account when considering sustainability measures for kina in FMA 1 are as follows:

- Associated or dependent species should be maintained above a level that ensures their long-term viability.
- Biological diversity of the aquatic environment should be maintained; and
- Habitats of particular significance for fisheries management should be protected

8.1 Associated or dependent species – section 9(a) of the Act

74. Associated or dependent species includes any non-harvested species taken or otherwise affected by the taking of any harvested species. This includes protected species such as marine mammals and seabirds.

8.1.1 Protected species interactions

75. Harvesting of kina is considered to pose little to no risk to seabirds.[51] However, when harvesting involves the use of boats or vessels there is a risk of direct collisions between seabirds and the vessels which may lead to injury or death.

76. There are no known captures of marine mammals, seabirds, or protected fish species in New Zealand kina fisheries.

8.1.2 Fish and invertebrate bycatch

77. Kina are recreationally harvested by hand-gathering while freediving or SCUBA diving in FMA 1. The method of hand-gathering is a highly selective one and there is no direct bycatch of any fish and invertebrate species.

[51] Ministry for Primary Industries (2021) Aquatic Environment and Biodiversity Annual Review (AEBAR): A summary of environmental interactions between the seafood sector and the aquatic environment.

8.2 Biological diversity of the aquatic environment – section 9(b) of the Act

78. In FMA 1, harvesting is largely conducted through hand gathering while freediving. The selective nature of this method of harvesting ensures that there is no direct bycatch or incidental mortality of non-target organisms. Some incidental mortality of kina may occur from recreational fishers who crack open kina to check roe quality and may then discard the kina.

79. Additional harvesting of kina may lead to a reduction in herbivory on a reef resulting in an increase in the abundance of macroalgal and invertebrate species and a corresponding increase in associated biodiversity.

80. The removal of predators (particularly large predators) through fishing, and the occurrence of urchin barrens as a result, will have an impact on associated biodiversity.[52] The full extent of this impact is unknown (including on associated and dependent species), but a shift from productive kelp forests to urchin barrens will result in reduced primary and secondary production and biodiversity. It is acknowledged that kelp habitats are likely to be important for a range of harvested and non-harvested species, and any reduction in such habitats is therefore likely to be adverse to species that rely on kelp[53]. Increasing the recreational daily limit may provide opportunity for removal and utilisation of additional kina and therefore have a positive impact on reef environments. However, the extent to which this may occur is unknown, and given that fishers are unlikely to target kina from urchin barren areas, any positive effect would likely be limited to mitigating further expansion of urchin barrens in areas fished.

81. FNZ notes that environmental factors, such as sedimentation and water quality, also affect the distribution and abundance of biological diversity on rocky reefs but these are not directly managed by FNZ.

8.3 Habitats of particular significance for fisheries management – section 9(c) of the Act

82. There are no specific habitats of particular significance formally identified[54] for FMA 1 but certain features of rocky intertidal and subtidal reefs important to kina are discussed in Table 5.

Table 5: Summary of information on potential habitats of particular significance for fisheries management for FMA 1.

Habitat of particular significance	Rocky intertidal and subtidal reefs
Attributes of habitat	Sea urchins are found along most coastal habitats, particularly in rocky intertidal and subtidal reefs dominated by encrusting algae. They inhabit shallow subtidal waters to depths of about 60 metres. Sea urchin populations are not uniformly distributed across all rocky reef habitats. Abundance is primarily determined by depth and wave exposure[55]. On the north-eastern coastline of the North Island, dense aggregations of sea urchins can form at depths between 3-20 metres. These areas are characterised by low algal abundance and are known as urchin barrens.
Reasons for particular significance	Sea urchin larvae settle on rocky substrate indicating the importance of the presence of suitable settlement surfaces. Rocky intertidal and subtidal reefs are also characterised by the growth of seaweed species and algae. Rocky shores provide stable platforms for seaweeds to anchor themselves to and create forests. These kelp forests provide shelter and nursery grounds for many fish species such as kina, snapper, and crayfish. They also

[52] MacDiarmid et al. (2013)

[53] Dayton (1985)

[54] Habitats of particular significance for fisheries management are not defined in the Act. Fisheries New Zealand recently consulted on guidance for defining, identifying, and managing habitats of particular significance for fisheries management and for how Fisheries New Zealand takes into account that these habitats should be protected when preparing fisheries management advice.

[55] Shears & Babcock (2007)

	provide food for grazing species such as kina, crabs and snails which serve as prey for large predatory fish species. Rocky shores in areas of wave exposure are important, as species that attach themselves to substrate permanently, such as barnacles and sea squirts, cannot forage for food, and therefore rely on waves to transport food to them. Intertidal and subtidal reefs, as a result of the points mentioned above, are typically defined as ecosystems that are high in biodiversity.
Risks/threats	The overfishing of key predator species, such as snapper and rock lobster, is considered a key contributor to the formation of urchin barrens. Urchin barrens are characterised by bare rocky substrate, a complete or significant loss in seaweeds, low biodiversity, and high densities of kina and they ultimately threaten healthy kina habitats. Fine sediments introduced from runoff from the land may have adverse effects on sea urchins and their habitat. Layers of fine sediment can reduce light levels for marine plant species which could impact food availability for intertidal and subtidal species[56]. The oceans around the east coast North Island of New Zealand are warming at a rate well in excess of the global average[57], and moderate to strong heatwaves have been recorded in recent years in the Hauraki Gulf[58]. Changes in the environmental conditions associated with marine heatwaves may have impacts on the survival of larval kina and food availability for kina. However, the extent to which changes in climate and temperature may be affecting kina habitat suitability in FMA 1 is unknown. The increased presence of the *Centrostephanus* may also pose a risk to sea urchin habitat. *Centrostephanus* has been observed to cause urchin barren expansion[59].
Confidence	A body of empirical work exists but it is associated with some uncertainty, or the expert has direct personal research experience.

9 Considerations for setting sustainability measures under section 11 of the Act

83. Section 11 of the Act sets out various matters that you must take into account or have regard to when setting or varying sustainability measures (such as the daily limit changes proposed in this paper). These include:

    a) any effects of fishing on any stock and the aquatic environment; and

    b) any existing controls under the Act that apply to the stock or area concerned; and

    c) the natural variability of the stock concerned; and

    d) any relevant planning instruments, strategies, or services.[60]

9.1 Effects of fishing on any stock and the aquatic environment

84. You must take into account any effects of fishing on any stock and the aquatic environment when making your decision about the recreational daily limit of kina in FMA 1. "Effect" is defined widely in the Act.[61]

[56] Nicholls et al. (2003)
[57] Sutton & Bowen (2019)
[58] Moana Project (n.d.)
[59] Kerr (2016)
[60] Sections 11 (2) and (2A).
[61] Section 2(1) of the Act defines "effect" to mean the direct or indirect effect of fishing, and includes any positive, adverse, temporary, permanent, past, present, or future effect. It also includes any cumulative effect, regardless of the scale, intensity, duration, or frequency of the effect, and includes potential effects.

85. All information regarding the effects of harvesting kina on any stock and the aquatic environment is discussed above under '*Environmental principles*', and below under '*Options and analysis*'.

9.2 Existing controls that apply to the stock or area

86. In setting or varying a sustainability measure, you must take into account any existing controls under the Act (including rules and regulations made under the Act (s 2(1A)) that apply to the stocks.

87. Aside from the daily limit for recreational take in FMA 1 of 50 kina per fisher, there are catch limits and allowances set under the TAC.

88. Non-commercial kina harvest also occurs under customary fishing provisions, using customary fishing authorisations. While kina is a common species for which customary authorisations are issued, there is limited quantitative information available on the level of customary take of kina from FMA 1. It is likely that Māori customary fishers also utilise the provisions under recreational fishing regulations (recreational fishers can take up to 50 kina per day).

89. Parts of FMA 1 are not currently covered under the Fisheries (Kaimoana Customary Fishing) Regulations 1998. Customary fishing authorisations in some parts of SUR 1A and SUR 1B, if issued, would be under the Amateur Regulations, where there is no requirement to report on catch. As such, customary harvest records held by FNZ are likely to be incomplete.

9.3 The natural variability of the stock

90. In setting or varying a sustainability measure, you must take into account the natural variability of the stocks.

91. Settlement of kina larvae within FMA 1 is likely to vary between years and appears to differ among locations and habitats, attributed to the variability in larval mortality.[62]

92. In laboratory and field studies, larval mortality and developmental abnormalities have been observed to increase with increasing concentrations of suspended sediment. The suspended sediment concentrations used in these experiments were equivalent to typical peak sediment loads to the Wellington Harbour System.[63] This suggests that environmental conditions associated with terrestrial runoff are of importance.

93. Population growth of kina and the establishment of urchin barrens has been attributed to fishing of large predators, as discussed under section 8 of this paper.

94. The proposed increases to the daily limit for kina provide for additional sustainable utilisation of the kina resource and may also contribute, in part, to managing the expansion of urchin barrens in the short to medium term for areas that are fished. FNZ does not anticipate a sustainability risk with the proposed increases as the best available information on recreational catch suggests that kina are being under-caught and information from fishers, scientists, and other stakeholders (including through local area surveys) suggests kina abundance is high in many areas. However, FNZ notes that there is some risk that any additional recreational pressure may be focused on kina populations in non-barren areas as these kina will likely produce better quality roe.

95. FNZ will continue to monitor recreational catch in both fisheries, and should new information suggest that kina abundance has changed over time in a way that may signal a sustainability concern, the management settings will be reviewed.

[62] Walker (1984)
[63] Phillips & Shima (2006), Schwarz et al. (2006)

9.4 Relevant statements, plans, strategies, provisions, and documents – section 11(2) of the Act

96. In setting or varying any sustainability measure, you must have regard to relevant statements, plans, strategies, provisions, and planning documents that apply to the coastal marine area. The following plans and strategies apply to kina in FMA 1.

9.4.1 Regional Plans – section 11(2)(a)

97. Four Regional Councils have coastlines within the boundaries of the kina in FMA 1 areas: Northland, Auckland, Waikato, and Bay of Plenty. Each region has policy statements and plans to manage the coastal and freshwater environments, including terrestrial and coastal linkages, ecosystems, and habitats.

98. FNZ considers that the proposed options presented in this document are in keeping 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.

99. The Environment Court has released its finalised decision on marine protection measures under the proposed Northland Regional Plan. Of relevance to kina in SUR 1A, is the prohibition of all fishing, except for kina harvest, in Maunganui Bay to Oke Bay and Mimiwhangata under the proposed Plan to protect the biodiversity values identified. It is uncertain what effect these areas will have but FNZ will take interest in any data and studies produced in the future about the closed areas and will continue to work with the council and share information in this regard.

100. The Bay of Plenty Regional Coastal Environment Plan also contains rules since 2021 prohibiting all fishing in the three areas that make up the Motiti Protection Area. The rules have been introduced to protect indigenous biodiversity and acknowledge the significant marine landscape and cultural values in the area. Those three areas comprise of Ōtaiti (Astrolabe Reef); including Te Papa (Brewis Shoal), Te Porotiti, and Okarapu Reef, Motuhaku Island (Schooner Rocks) and Motunau Island (Plate Island). These areas are located in the SUR 1B QMA.

101. FNZ engages with the RMA coastal planning processes (including regional authorities) to support marine management decisions to manage not only the fishing effects on the coastal environment but also land-based impacts on fisheries.

9.4.2 Hauraki Gulf Marine Park Act (HGMPA) – section 11(2)(c)

102. The Hauraki Gulf Marine Park (**HGMP**) is situated within FMA 1. Therefore, sections 7 (recognition of national significance of Hauraki Gulf) and 8 (management of Hauraki Gulf) of the *Hauraki Gulf Marine Park Act 2000* (**HGMPA**) apply to the management of this fishery.

103. Section 7 of the HGMPA considers:

> (1) the interrelationship between the Hauraki Gulf, its islands, and catchments and the ability of that interrelationship to sustain the life-supporting capacity of the environment of the Hauraki Gulf and its islands are matters of national significance.
>
> (2) The life-supporting capacity of the environment of the Gulf and its islands includes the capacity—
>
> (a) to provide for—
>
> (i) the historic, traditional, cultural, and spiritual relationship of the tangata whenua of the Gulf with the Gulf and its islands; and
>
> (ii) the social, economic, recreational, and cultural well-being of people and communities:

(b) to use the resources of the Gulf by the people and communities of the Gulf and New Zealand for economic activities and recreation:

(c) to maintain the soil, air, water, and ecosystems of the Gulf.

104. Section 8 of the HGMPA states that to recognise the national significance of the Hauraki Gulf, its islands, and catchments, the objectives of the management of the Hauraki Gulf, its islands, and catchments are—

(a) the protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments:

(b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:

(c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:

(d) the protection of the cultural and historic associations of people and communities in and around the Hauraki Gulf with its natural, historic, and physical resources:

(e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:

(f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.

105. FNZ considers that this review and the proposed options are consistent with obligations under sections 7 and 8 of the HGMPA in that the proposed options aim to address a sustainable utilisation opportunity. Addressing this should help to:

a) support the life-supporting capacity of the environment of the Hauraki Gulf and its islands;
b) protect natural and historic resources (i.e., kina and their ecosystems) in the Hauraki Gulf; and
c) provide the capacity for future use of these resources by people and communities in the Hauraki Gulf.

9.5 Relevant services or fisheries plans – section 11(2A) of the Act

106. Before making any decision or recommendation under this Act to regulate or control fishing or setting or varying any sustainability measure, you must take into account any conservation or fisheries services, and any relevant fisheries plans approved under section 11(2A) of the Act.

9.5.1 Hauraki Gulf Fisheries Plan

107. In addition to the HGMPA, the *Revitalising the Gulf: Government action on the Sea Change Plan* Strategy is relevant to the future management of the portion of SUR 1A and SUR 1B that lies within the HGMP. A key fisheries output from Revitalising the Gulf was the development of an area specific fisheries plan under section 11A of the Act. There are also new marine protection proposals for the HGMP which would overlap FMA 1.

108. The Hauraki Gulf Fisheries Plan proposes specific management measures to support the sustainability and improved future management of kina within the HGMP. The plan was approved by the then Minister in August 2023. FNZ considers that the changes to the daily limit would be consistent with the actions in Hauraki Gulf Fisheries Plan.

109. Fisheries services of relevance to the options in this paper include the research used to monitor the fisheries and the tools used to enforce compliance of management controls in the fishery. Fisheries Compliance regularly monitors FMA 1 areas to ensure that management controls, including daily limits, are being adhered to.

9.6 Other plans and strategies

110. The following plans and strategies are not mandatory considerations under section 11 of the Act, but they may be considered relevant to this review.

9.6.1 Te Mana o te Taiao (Aotearoa New Zealand Biodiversity Strategy)

111. Te Mana o te Taiao – the Aotearoa New Zealand Biodiversity Strategy sets a strategic direction for the protection, restoration and sustainable use of biodiversity, particularly indigenous biodiversity, in Aotearoa New Zealand[64]. The Strategy sets a number of objectives across three timeframes. The most relevant to setting sustainability measures for SUR 1A and SUR 1B are objectives 10 and 12:

Objective 10: Ecosystems and species are protected, restored, resilient and connected from mountain tops to ocean depths.

Objective 12: Natural resources are managed sustainably.

112. FNZ is working with the Department of Conservation and other agencies on implementation of the strategy. As part of that work, we are progressing to a more integrated ecosystem-based approach to managing oceans and fisheries. In that context, this review contains information on biodiversity impacts, ecosystem function and habitat protection associated with adjustments to sustainability measures (see '*Environmental principles*' and '*Associated and dependent species*' sections above).

10 Information principles – section 10 of the Act

113. Under section 10 of the Act, you are required to take into account four information principles when making this decision:

a) decisions should be based on the best available information.

b) decision makers should consider any uncertainty in the information available in any case.

c) decision makers should be cautious when information is uncertain, unreliable, or inadequate.

d) the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act.

114. FNZ considers that the information presented in this paper represents the best available information.

10.1 Uncertainty in information

115. In various sections of this paper, FNZ has pointed out where information is uncertain and warrants caution for your decision making, in line with the principles above.

116. As discussed under sections '*Status of the stocks*' and '*Recreational catch information*' there is some uncertainty in the stock status of SUR 1A and SUR 1B and the estimate of recreational catch in FMA 1 respectively.

[64] Accessible at: https://www.doc.govt.nz/nature/biodiversity/aotearoa-new-zealand-biodiversity-strategy/.

10.2 Weight to give uncertain information

117. You have discretion as to how much weight to give uncertainty in information noted above. However, the information principles note that you cannot use the absence of, or any uncertainty in, any information as a reason for postponing or failing to take any measure to achieve the purpose of the Act.

118. In considering both the uncertainty in the current information, and availability of new information, you must ultimately be satisfied that your current decision promotes the purpose of the Act.

11 Submissions

119. A total of 75 submissions were received in relation to the proposal to increase the recreational daily bag limit of kina in FMA 1. Twenty-four of these submissions supported the status quo (Option 1), while 8 supported an increase to 100 kina per fisher per day (Option 2), and 13 supported an increase to 150 kina per fisher per day (Option 3).

120. Thirty submissions did not indicate support for any specific option, and these have been collated under the '*Other*' column. These submissions represent of a mixture of views that include:

- support for an increase of the recreational daily limit, either with or without other conditions, or suggest different figures to those proposed during consultation,
- no indication of option support, or
- support for separate management measures for *Centrostephanus*.

121. Table 6 summarises the submissions received and shows each submitter's feedback on the options provided.

Table 6: Written submissions and responses received for the proposed options for the recreational daily bag limit for kina in FMA 1.

Submitter	Option Support				Notes
	1	2	3	Other	
A. Dawn	✓				
A. Jeffs				✓	Did not indicate option support but submits that the management to increase kina predator abundance should be advanced as a priority.
A. Kahl			✓		
A. Kew			✓		As a participant in kelp gardening programmes, submits that kina removal has positive impacts on the afflicted areas and when participating in removals, and has always been constrained by the current bag limit. This will support regeneration of kelp.
A. McGlinn				✓	Did not indicate option support. Highlights that there is a lack of large predators that can prey on kina due to commercial dredging and submits that commercial dredging be banned, in the Hauraki Gulf at a bare minimum.
A. Reihana		✓			
Dr. A. Spyksma	✓				Recreational increases to the bag limit will allow restoration attempts without needing the special permit pathway. Shares concerns about localised depletion of healthy and good quality kina. Submits that kina and *Centrostephanus* should be

Submitter	Option Support				Notes
	1	2	3	Other	
					managed by separate individual bag limits, with 50 for kina and a large increase for *Centrostephanus* only.
A. Trass	✓				Submits that an increase will not be effective at targeting barrens, but that large-scale culling targeted at barrens will make a difference.
B. Hori				✓	Highlights the need for large snapper to remain in the water to control kina abundance and did not indicate option support but supports an increase as 50 kina is not enough for hapu to manage their rohe.
B. Price				✓	Did not indicate option support but supported an increase. Challenges management to address the overfishing of predator species by raising its biomass by 2% each year.
Bay of Islands Maritime Park Incorporated Society		✓			Submits that kina and *Centrostephanus* should be managed by separate individual bag limits of 50 of each species or a combined bag limit of 100 (Option 2).
C. Balemi	✓				Recreational increases to the bag limit will allow restoration attempts without needing the special permit pathway. Shares concerns about localised depletion of healthy and good quality kina. Submits that kina and *Centrostephanus* should be managed by separate individual bag limits, with 50 for kina and a large increase for *Centrostephanus* only.
C. Merito			✓		Only supports an increase as a short-term solution with expectations that future management focuses on predator abundance.
C. Parker				✓	Emphasises the need to focus on education around overfishing which will then address the symptom which are barrens. Did not indicate option support but suggests that kina should not be removed from marine reserves as the ecosystems are balanced in these areas.
Carbon Neutral New Zealand Trust				✓	Supports Option 3 only if measures to address predator abundance are implemented.
CRA 1 Rock Lobster Industry Association Inc.	✓				Submits that before any changes to the recreational daily limit are made, an understanding of the level of good quality edible kina biomass is required as this biomass will be targeted by fishers. An increase will risk depletion of good quality, healthy kina populations.
D. Cupples			✓		Provides window for commercial harvesting per annum with annual reviews to help reduce barrens, these harvests can then be sold commercially at a reduced cost.
D. Guccione				✓	Supports an increase in the daily limit but did not indicate option support. Suggests the limit on *Centrostephanus* be removed and would like to see restoration of large crayfish and snapper.

Submitter	Option Support				Notes
	1	2	3	Other	
D. Hazard				✓	Does not oppose increase in the short term but strongly supports the view that management efforts need to focus on increasing predator abundance.
D. Lindsay	✓				Submits that the proposed increases are only temporary measures that do not focus on address the root cause of barrens: low predator abundance.
D. Lourie				✓	Did not indicate option support but supports an increase only as a temporary measure while management efforts focus on increasing predator abundance.
Environmental Defence Society				✓	Only supports Option 2 if spatial restrictions are implemented and provided other measures are adopted to address the overfishing of kina predators.
Environmental Law Initiative				✓	Submits that the proposal is not useful without addressing the underlying cause and protecting abundance of predators. An increase will not see harvesters targeting barrens as kina from barrens are in unfavourable condition.
G. Oliver				✓	Submits that the proposal to increase the recreational allowance, without measures to protect predator abundance, is not the best solution.
G. Relph				✓	Supports an increase to 60 per person per day and is concerned that predator abundance is low.
H. Ryall	✓				Does not believe that increasing the daily limit will have any effect on kina barrens. Submits that more no-take marine protected areas are required, and only in conjunction with this measure, will large scale kina removals be effective.
Hauraki Gulf Forum		✓			Submits that while they support an increase in the recreational daily catch limit, higher biomass targets for kina predators and maximum size limits need to be set as alone, this mechanism will not achieve long term goals of ecosystem restoration.
Hei o Wharekaho Settlement Trust	✓				Submits that measures to address predator abundance need to be implemented.
J. Dawson				✓	Does not feel this measure will actually accomplish anything without measures to protect predators and their abundance.
J. Ferrier				✓	Submits that measures to address predator abundance need to be implemented.
Dr. K. Miller	✓				Recreational increases to the bag limit will allow restoration attempts without needing the special permit pathway. Shares concerns about localised depletion of healthy and good quality kina. Submits that kina and Centrostephanus should be managed by separate individual bag limits, with 50 for kina and a large increase for Centrostephanus only.

Submitter	Option Support				Notes
	1	2	3	Other	
Prof. K. Probert	✓				Submits that measures to address predator abundance need to be implemented.
Kina Industry Council	✓				Submits that Option 2 would only be supported if a recreational catch report is required to be able to monitor where harvesting is occurring.
L. Birch				✓	Did not indicate option support but supports an increase on the east coast.
L. Byrne				✓	Submits that measures to address predator abundance need to be implemented such as reducing the take on crayfish and snapper as alone the proposal does not address the underlying issue.
L. Lumley				✓	Did not indicate option support. Submits that kina populations have not changed in the areas dived by them in Northland however have seen an explosion in Centrostephanus numbers.
M. Fenwick			✓		
M. Johnson				✓	Did not indicate option support. Submits that kina barrens are everywhere except for within marine reserves that have been in place for many years. Encourages measures to address predator abundance be implemented by cutting back the take on snapper and crayfish at commercial and recreational levels.
M. Ngata-Aerengamate			✓		Only supports an increase as a short-term solution with expectations that future management focuses on predator abundance.
M. Steven				✓	Did not indicate option support. Submits that efforts be focused on predator abundance instead.
Mountains to Sea Conservation Trust	✓				Submits that measures to address predator abundance need to be implemented and that increased harvesting will not occur in barrens.
N. Davey	✓				Submits that harvesting will not occur in barrens as kina are in unfavourable condition. However, does believe that culling is required to combat kina barrens.
N. Hazard				✓	Supports Option 3 only if measures to address predator abundance are implemented.
N. Palfreyman		✓			Expresses concern about diver safety issues associated with a limit of 150 which can potentially overload boats.
Dr. N. Shears	✓				Recreational increases to the bag limit will allow restoration attempts without needing the special permit pathway. Shares concerns about localised depletion of healthy and good quality kina. Submits that kina and *Centrostephanus* should be managed by separate individual bag limits, with 50 for kina and a large increase for *Centrostephanus* only.

Submitter	Option Support				Notes
	1	2	3	Other	
New Zealand Federation of Commercial Fishermen		✓			Expresses concerns about increased recreational take being harvested from healthy kina populations and making its way into the black market. Strongly supports the development of an integrated management strategy. Submits that *Centrostephanus* be removed from the combined daily limit.
New Zealand Rock Lobster Industry Council Ltd	✓				Expresses concerns about increased recreational take being harvested from healthy kina populations and making its way into the black market. Submits that there is no evidence that the current limit is constraining recreational take. Supports a separate daily limit of 50 for *Centrostephanus*, and believe it needs its own management strategy.
New Zealand Sports Fishing Council				✓	Supports an increase from 50 to 70 per person as the average diver's bag can fit 70 kina. Concerned of the risks associated with localised depletion without spatial restrictions.
Ngāti Manuhiri Settlement Trust	✓				Expresses concerns about increased recreational take being harvested from healthy kina populations. Submits that focus be shifted to implementing fisheries closures, investing in initiatives to target kina barrens and the active restoration of these removal sites, support passing the Hauraki Gulf Marine Protection Bill, and commit to climate resilience and adaptation planning.
P. Clow			✓		Understands that gathering will not occur in barrens but believes that there is an abundance of healthy kina that calls for increased utilisation. Suggests ongoing monitored removals of kina from barrens is required with a target density of 1 urchin/m2.
P. Glassie			✓		
P. Leighton				✓	Did not indicate option support but supports an increase alongside measures to address the overfishing of kina predators.
P. Leong			✓		Supports this figure if it's supported with scientific rationale.
P. Nepia – Korokota Marae, Te Parawhau, Ngāti Whātua			✓		Submits that removal of kina barrens will have a major positive impact on the overall health and biodiversity of the marine ecosystem. However, submits that this proposal, alone, will not have any effective long-term impact on kina barrens and measures to increase predator abundance is required. Highlights the importance of collaboration with interested parties, iwi, hapu, scientists, and harvesters.
Pāua Industry Council		✓			Submits that an increase to 100 is not likely to present sustainability issues due to the reported high abundance of kina within FMA 1 and is unlikely to see the recreational take exceed the recreational allowance. Expresses concerns that this increase in take will have meaningful impact without recreational monitoring and reports and

Submitter	Option Support				Notes
	1	2	3	Other	
					would support a staged increase to 150 if recreational reporting was introduced. Cautions management to consider the risk of increased illegal sales of kina. Submits that Centrostephanus be managed under a separate daily bag limit of 100.
R. Meuller-Glodde				✓	Only supports an increase if future management focuses on predator abundance.
R. Saunders	✓				Submits that kina from barrens are not worth harvesting and expresses concerns that an increase may only see targeting of healthy populations risking localised depletion.
R. Smith			✓		Only supports Option 3 as a short-term solution with expectations that future management focuses on predator abundance.
Royal New Zealand Society for the Prevention of Cruelty to Animals Inc.				✓	Did not indicate option support but supported an increase.
S. Hazard	✓				Submits that focus on increasing predator abundance is required by limiting recreational and commercial fishing of crayfish and snapper.
S. Kulins				✓	Expresses concerns that increases in the bag limit will see localise depletion of healthy kina populations and encourages management efforts to be focused on protecting predator abundance. Supports an increase only to Centrostephanus. Suggests wording to be clear on what is permitted as 'take' (such as culling).
S. Newsome			✓		Submits that barrens are creating a large ecological issue and without the sea floor vegetation fish stocks are affected.
S. Nicholas	✓				Expresses concerns that increases in the bag limit will not see increased harvests in barren areas and submits that measures to increase predator abundance need to be implemented.
Sea Urchin New Zealand	✓				Does not support recreational increases without them being coupled with spatial restrictions that target harvests in barren areas only.
Specialty and Emerging Fisheries Group	✓				Submits that Option 2 would only be supported if a recreational catch report is required to be able to monitor where harvesting is occurring.
Stet Ltd.	✓				Does not support an increase in TAC and submits that measures to increase predator abundance need to be implemented.
T. Kumar				✓	Supports an increase to 200 per person to allow more meaningful harvesting activities. Where tangata whenua and community groups are leading rohe moana kaupapa, removal should be allowed to where a minimum of 5 kina per m^2 remains.
T. Lawrence			✓		

Submitter	Option Support				Notes
	1	2	3	Other	
T. Simhony		✓			Only supports Option 2 in conjunction with other integrated measures that target snapper and crayfish management and expects that this is the focus of FNZ. This should also be monitored, and concerns of mana whenua should be given a lot of weight.
T. Turner				✓	Supports either Options 2 or 3 but believes that this will only be effective with appropriate spatial restrictions to avoid depletion of healthy kina populations.
Te Kapu O Waitaha				✓	Submits an increase in daily limits be based on customary practices that are governed by Maramataka: 50 kina per person during the winter, 100 in October to November, and 150 from December to March.
Te Waiariki, Ngāti Korora, Ngāti Takapari Hapu Iwi Trust	✓				
W. Poore				✓	Did not indicate option support. Submits that kina be made a sought-after delicacy, as this method may reduce populations.
World Wildlife Fund New Zealand		✓			Only supports Option 2 in conjunction with other solutions to be integrated and expects that this is the focus of FNZ specifically snapper and crayfish management.

12 Proposed options and analysis

122. FNZ is proposing three options for the recreational daily limit for kina taken from FMA 1. If any changes were implemented, it would be given effect through amending the Fisheries (Recreational Management Controls) Notice[65].

12.1 Option 1 – Status quo

Option	Recreational Daily Limit
Option 1 (status quo)	50 per fisher

123. Option 1 is status quo and would retain the current recreational daily limit of 50 kina per fisher in FMA 1.

124. Option 1 does not provide for further utilisation despite the high likelihood that further kina harvest in FMA 1 would be sustainable. This option reflects a cautious approach to management and puts the most weight on the concern expressed by tangata whenua and submitters that increases to the recreational daily limit, without additional restrictions (such as spatial closures) may negatively impact on local customary fisheries and considers that additional harvest may not be taken from urchin barren areas due to poor roe quality.

125. This option carries the least sustainability risk to kina in FMA 1. However, it does not provide for any potential benefits of additional harvest.

[65] Fisheries Notices: https://www.mpi.govt.nz/fisheries-notices/

126. Twenty-four submissions supported Option 1 and suggested that increasing bag limits does not address the cause of urchin barrens which is low abundance of predator species, and rather addresses the symptom.

12.2 Options 2 and 3

Option	Recreational Daily Limit
Current settings	50 per fisher
Option 2	100 per fisher
Option 3	150 per fisher

127. Options 2 and 3 propose increases to the recreational daily limit in FMA 1. FNZ is not proposing that you increase the recreational fishing allowance under the TAC (155 tonnes across FMA 1), as the estimated harvests of kina in FMA 1 from the 2017/18 NPS is estimated at 48 tonnes, which is 107 tonnes less than the combined recreational allowance. FNZ anticipates that harvest levels under either option 2 or 3 would still be well within the existing allowances.

128. The proposed increases to the recreational daily limit for kina may result in a lower abundance of kina in some areas which may reduce herbivory and result in increased abundance of macroalgae. It may also contribute to managing the expansions of urchin barrens in the short to medium term for areas that are fished.

129. It is important to note the concerns of mana whenua around the potential for localised depletion of healthy kina populations, as it is unlikely the any additional harvest under increased daily limits would be taken from urchin barren areas. Feedback from tangata whenua so far suggests that the intended purposes of these increases, which is to provide for additional sustainable utilisation with additional potential of reducing kina densities in areas fished, may not have the desired impact without spatial restrictions to prevent harvest occurring in healthy kina populations.

130. Reports of kina abundance suggest that there is an opportunity for increased utilisation. Community-led restoration projects are likely to utilise these increases to harvest for the purposes of kelp restoration without having to apply for special or customary permits. FNZ recognises that, if daily limits of kina were increased, there is a risk that the additional harvest for consumption would not be taken from urchin barren areas because of roe quality. However, in areas that are currently fished, and new areas that may be fished, harvest would likely be sustainable and may also help prevent the formation of additional urchin barrens[66].

12.2.1 Option 2

131. Option 2 was supported by 8 submissions. This option carries a more balanced approach than Option 3 as it places weight on the risks associated with an increased daily limit without spatial restrictions and considers that abundance is able to provide for increased utilisation.

12.2.2 Option 3

132. Thirteen submissions support Option 3. This option places least weight on the risks associated with an increased daily limit without spatial restrictions and the possibility of localised depletion of healthy kina populations. It also places the most weight on the reported information of high kina abundance that can provide for increased utilisation.

12.3 Other options proposed by submitters

[66] Keane et al. (2019)

133. G. Relph, New Zealand Sports Fishing Council, and T. Kumar submitted that increases to 60, 70, and 200, respectively should be provided.

134. FNZ has not included these proposals as additional options. The scale of an increase to 60 or 70 was not considered large enough to have a meaningful effect. Conversely, an increase to 200 was not considered preferable considering the concerns raised by iwi and some stakeholders with respect to the potential for localised depletion and impacts to important customary fishing areas.

135. Te Kapu o Waitaha submitted on increases to the recreational daily limit that were governed by Maramataka[67] and should be 50 kina per fisher in the winter, 100 kina per fisher in October and November, and 150 from December through to the end of March.

136. The suggested increase governed by Maramataka would pose challenges for compliance as enforcing fishing regulations tied to Maramataka could be more challenging compared to fixed rules. Fisheries officers and recreational fishers would need to be educated on the lunar phases and their associated rules, adding complexity to regulatory processes and could lead to non-compliance, both intentional and non-intentional. Further challenges in monitoring would arise because recreational catch is not reported, leading to potential errors and inaccuracies in the collected data. For these reasons, FNZ is not including this as additional option.

137. However, Maramataka has been applied when issuing customary permits for harvesting. Work is currently underway to progress the implementation of a new customary permit for kina removal and FNZ anticipates the inclusion of Maramataka through this.

12.4 Other matters raised

138. Twenty-two submissions called for measures to protect kina predators (specifically snapper and rock lobster) and address the concerns related to their low abundance. Twelve submissions only supported an increase in the recreational daily bag limit on the conditions that FNZ would put effort into measures to address low predator abundance, and overfishing of predators was being addressed.

139. Eighteen submissions expressed concerns about the risk of localised depletion of healthy kina populations without spatial restrictions and the associated risk of an increase of black-market sales. FNZ intends to monitor the response to any increases in the daily limit and if there are concerns of certain areas being depleted, FNZ will consider further management measures (e.g., spatial restrictions) to mitigate the risk.

140. Nine submissions also called for *Centrostephanus* to be managed separately to kina. FNZ sees merit in the suggestion as it aligns with the intention to address the ecological challenges posed by *Centrostephanus*. Implementing this change would require a regulation change to decouple kina and *Centrostephanus* in the definition of kina within the Amateur Regulations. FNZ will closely monitor how the recreational fishery responds to any increases in the recreational daily limit for kina. Based on these observations, FNZ will consider whether this regulatory change may be appropriate in the future.

13 Conclusions and recommendations

141. While there is no formal stock assessment of kina biomass in FMA 1, best available information suggests that kina do exist in high densities. FNZ recognises that kina are not uniformly distributed and do not occur at such high densities at all locations. However, much of the FMA 1 coastline provides suitable reef habitat for kina and it is anticipated that the overall kina biomass is very high.

142. As there are no sustainability concerns for kina in FMA 1, FNZ recommend Option 2; that you increase the recreational daily limit for kina in FMA 1 to 100 kina per fisher.

[67] Traditional Māori lunar calendar

143. While this option was the least supported by submitters, FNZ considers the increase to the recreational daily bag limit under Option 2 will provide a utilisation opportunity for kina in FMA 1 while retaining the ongoing sustainability of the stock and considers the potential risks highlighted around localised depletion and black-market sales.

144. It is likely that increasing the recreational daily bag limit by 50 would result in little change to current fishing effort in the recreational kina fisheries across FMA 1. This can be attributed to recreational fishers generally harvesting based on immediate consumptions needs. Kina harvesting can be labour intensive and time consuming and so FNZ does not anticipate large quantities of kina to be harvested. However, FNZ will continue to monitor the kina fisheries in FMA 1 and consider adjusting the management measure if any concerns arise.

145. While some submissions advocate for separate management of *Centrostephanus*, conducting further population and habitat studies, alongside a literature review, would provide essential insights to inform specific management measures for *Centrostephanus*. Consultation with tangata whenua, scientists, and other relevant stakeholders would also be important in this process.

146. The proposal to increase the recreational daily limit for kina is considered one part of the integrated set of measures to address urchin barrens. FNZ notes the ongoing importance of predators (particularly large snapper and rock lobster) in controlling kina populations and will continue to consider the implications of urchin barrens in future reviews of management and sustainability measures for these predator stocks.

14 Decision for the recreational daily bag limit for kina in FMA 1

Option 1

Agree to retain the recreational daily bag limit for kina at 50 per fisher in FMA 1.

Agreed / Agreed as Amended / Not Agreed

OR

Option 2 *(Fisheries New Zealand preferred option)*

Agree to increase the recreational daily bag limit for kina from 50 to 100 kina per fisher in FMA 1.

Agreed / Agreed as Amended / Not Agreed

OR

Option 3

Agree to increase the recreational daily bag limit for kina from 50 to 150 kina per fisher in FMA 1.

Agreed / Agreed as Amended / Not Agreed

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