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3 May 2024

## Submission: Enabling the removal of sea urchins for management or prevention of urchin barrens

### Recommendations

1. **We recommend the Minister supports FNZ's proposal for special permits – enabling persons or organisations to harvest, cull or translocate kina and *Centrostephanus* for the management or prevention of urchin barrens.**
2. **We insist the Minister only allows for urchins to be harvested by hand-gathering while freediving or using underwater breathing apparatus.**

### The Submitters

3. The New Zealand Sport Fishing Council (**NZSFC**) appreciates the opportunity to submit on Fisheries New Zealand's (**FNZ**) proposal for a new special purpose permit, enabling the removal of sea urchins for management or prevention of urchin barrens. FNZ's Discussion paper was received on 26 March 2024, with submissions due by 20 May 2024.
4. The NZ Sport Fishing Council is a recognised national sports organisation of 50 affiliated clubs with over 36,700 members nationwide. The Council has initiated LegaSea to generate widespread awareness and support for the need to restore abundance in our inshore marine environment. Also, to broaden NZSFC involvement in marine management advocacy, research, education and alignment on behalf of our members and LegaSea supporters.  
[legasea.co.nz](http://legasea.co.nz).

5. The New Zealand Angling and Casting Association (**NZACA**) is the representative body for its 24 member clubs throughout the country. The Association promotes recreational fishing and the camaraderie of enjoying the activity with fellow fishers. The NZACA is committed to protecting fish stocks and representing its members' right to fish.
6. The New Zealand Underwater Association comprises three distinct user groups including Spearfishing NZ, affiliated scuba clubs throughout the country and Underwater Hockey NZ. Through our membership we are acutely aware that the depletion of inshore fish stocks has impacted on the marine environment and the wellbeing of many of our members.
7. Collectively we are '*the submitters*'. The joint submitters are committed to ensuring that sustainability measures and environmental management controls are designed and implemented to achieve the Purpose and Principles of the Fisheries Act 1996, including "maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations..." [s8(2)(a) Fisheries Act 1996].
8. Our representatives are available to discuss this submission in more detail if required. We look forward to positive outcomes from this review and would like to be kept informed of future developments. Our contact is Helen Pastor, [secretary@nzsportfishing.org.nz](mailto:secretary@nzsportfishing.org.nz).

## Background – sea urchin barrens

9. There are two primary species of sea urchin on temperate rocky reefs in New Zealand. Kina (*Evechinus chloroticus*) is endemic to New Zealand and a valued species for customary Māori, commercial and recreational fishers. Long-spined urchins (*Centrostephanus rodgersii*) have been known to occur in New Zealand since the 1920s or earlier. *Centrostephanus* is less common, however, with warming waters and changing ocean currents, their spatial distribution is expanding and abundance has been increasing.
10. There is currently no stock status estimate for any kina stock in New Zealand. However, reports from iwi, scientists and fishers have indicated kina abundance is high, to an extent where both species of sea urchins are negatively impacting the wider ecosystem in the form of urchin barrens.
11. The proliferation of urchins has led to areas known as urchin barrens or kina barrens. FNZ have defined a sea urchin barren as:
 

*“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,”<sup>1</sup>*
12. Urchin barrens are thought to be driven by a combination of changes in environmental conditions (climate change, ocean currents) and a fishery-induced trophic cascade (**FITC**).

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<sup>1</sup> Proposed recreational daily limits for kina and *Centrostephanus*: Fisheries Management Area 1. Fisheries NZ. At [50]

13. FITCs are the outcome of where fishing has indirectly or directly altered ecosystem functioning through reduction or elimination of the functional role of top predators within an ecosystem.<sup>2</sup>
14. In New Zealand, the occurrence and severity of sea urchin trophic cascades is complex and consideration should be given to other spatial, temporal and environmental factors.
15. Large snapper (*Pagrus auratus*), blue cod and rock lobster (*Jasus edwardsii*) are accepted as the primary predators of kina. Both snapper (SNA 1) and rock lobster (CRA 1) populations have historically been fished down below their designated management targets. Additionally, there is anecdotal information from fishers and local communities that has highlighted localised depletion of snapper and rock lobster in areas of known urchin barrens.
16. Both rock lobster and packhorse lobsters (*Sagmariasus verreauxi*) have been reported as being predators of *Centrostephanus*, however, their long spines may make them a less favourable prey option, therefore, requiring alternative management interventions where predation does not limit spread.
17. Heavy grazing by urchins have turned previously diverse biogenic habitats into barren areas with low biodiversity and productivity. This ecosystem imbalance is a clear example of where the single-species based QMS with Maximum Sustainable Yield (**MSY**) targets has failed.
18. Active and historic management of urchin barrens involved culling, removals and translocation of urchins. This required people to use the recreational daily limit, a customary permit or commercial ACE to carry out such work. This has been an issue for commercial fishers having to use their ACE to reduce kina densities in areas when their roe condition is poor and unmarketable. Additionally, using a recreational daily limit of 50 restricts any meaningful work that can be completed.

## Proposal

19. FNZ has released a [Discussion Document](#) proposing to seek approval from the Minister to establish a new purpose for issuing special permits,

*“to allow persons or organisations to harvest, cull, or translocate sea urchins for the purpose of habitat restoration and/or prevention of urchin barrens.”*

20. The special permit will include both species of sea urchins in New Zealand, kina and *Centrostephanus*.
21. Special permits are a regulatory tool under section 97 of the Fisheries Act (the Act) that can authorise the take of fish, aquatic life or seaweed when an activity does not fall within the scope of customary, commercial or recreational fishing frameworks. The Minister may approve a new purpose under section 97(1)(c) of the Act.

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<sup>2</sup> Doheny B., Davis J.P., Miller B. (2023). Fishery-induced trophic cascades and sea urchin barrens in New Zealand: a review and discussion for management.

## Conditions

22. FNZ have highlighted in their Discussion Document that upon approval of a special permit, specific conditions will be outlined according to the requirements of the project prior to its commencement.
23. Conditions outlined in the Discussion Document include in-depth reporting and recordkeeping as well as,
  - a. A clear plan of the location of where the permit will apply to and how that area falls within the definition of an urchin barren;
  - b. Outline how the removal will take place;
  - c. Outline how the kina and *Centrostephanus* will be disposed of;
  - d. The application highlights that the applicant has engaged with appropriate iwi and hāpu and they are aware of any concerns relating to the special permit.<sup>3</sup>
24. FNZ are proposing that the new special permit purpose will only enable sea urchin removal activities within areas that have been identified as an urchin barren of concern, or areas at risk of becoming an urchin barren if intervention did not occur.<sup>4</sup>
25. **The submitters urge the Minister to insist that special permits are only approved for projects which intend to remove sea urchins by hand-gathering while freediving or using underwater breathing apparatus.**

## Discussion

26. At a kina barren management workshop in 2023, attendees agreed that while kina removal can support kelp regrowth and biodiversity in local areas, it does not address the underlying cause of elevated kina populations and is not a long-term solution for ecosystem recovery.
27. Work by FNZ, community groups and scientists has been ongoing to implement management, restorative and preventative measures that will be effective solutions long-term. However, it is evident that a suite of management measures will need be required for any meaningful progression toward a previous balanced state. In this regard, we agree with FNZ's statements [at 23, 25] –

“However, while large-scale removals of kina can lead to rapid algal recovery, without the presence of large predators such as snapper and crayfish to maintain kina at low densities, kina barrens were observed to re-establish....while large-scale removals have the potential to be a significant component of ecosystem restoration efforts going forward, it is considered that they should be part of a comprehensive, long-term approach that addresses the range of factors contributing to the formation of urchin barrens, including measures to maintain ecological balance....”

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<sup>3</sup> Enabling the removal of sea urchins for the management or prevention of urchin barrens. Fisheries New Zealand. At [42]

<sup>4</sup> At [31]

28. Discussions regarding direct urchin barren management included, targeted culling, kina translocations, changes to catch limits and a more in-depth understanding of climate change responses. Other indirect management that is being explored includes, finer scale management of rock lobster (splitting CRA 1), rebuilding abundance of key predator species, reviewing the minimum legal size of crayfish, implementing a maximum legal size of crayfish and spatial and temporal closures.<sup>5</sup>
29. FNZ have not outlined in their discussion document whether the proposed special permit purpose will allow activity within marine reserves, however, we are aware that special permits have been granted for past work in reserves. Permitting urchin barren management within reserves will be highly beneficial for areas such as the Poor Knights Islands Marine Reserve where the invasion of *Centrostephanus* is having a marked increase on biodiversity. **We insist that special permits allow for removal, culling and translocations (excluding *Centrostephanus*) of sea urchins from marine reserves.**
30. **The submitters support FNZ in their proposal for a new special permit purpose.** Harvesting of kina may lead to an increase in the abundance of macroalgal and invertebrate species which will therefore lead to an increase in associated biodiversity. However, we note that removals alone will not prevent the formation of kina barrens on the scale required over the long-term.
31. We acknowledge that there has additionally been success with past translocation projects. James & Herbert (2009), translocated kina from a kina barren site in the Coromandel that had limited food sources to an appropriate translocation site. At the end of the project, the gonad value index increased and quality overall improved in translocated kina. Additionally there was a noted increase in the kina that were left in the initial site.<sup>6</sup> This provides economic benefits in addition to a low-impact alternative if culling is not a favourable option.
32. **We recommend the Minister supports FNZ's proposal for special permits – enabling the removal and translocation of kina and *Centrostephanus* for the management or prevention of urchin barrens.**

## Trophic cascades

33. If the Minister and Fisheries New Zealand are serious about addressing kina barrens then we must acknowledge the mismanagement of its prime predators, large crayfish and snapper. In *The Environmental Law Initiative v Minister of Oceans and Fisheries* ELI submitted the scientific evidence establishes that:

Rock lobster are a key predator of sea urchins,...(kina). Through overfishing, rock lobsters are now functionally or ecologically extinct within CRA 1, meaning they no longer interact significantly with other species in the ecosystem, including in particular in their role as a predator of kina. Where kina populations are not controlled by predation, they can destructively graze down entire kelp forests, resulting in areas known as “kina barrens”, which are areas of bare rocky reef. This chain of events is known as a ‘trophic cascade’. Once established, a kina barren can take decades to reverse, even when kina

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<sup>5</sup> Doheny B., Davis J.P., Miller B. (2023). Fishery-induced trophic cascades and sea urchin barrens in New Zealand: a review and discussion for management.

<sup>6</sup> James & Herbert. (2009). Kina roe enhancement by translocation. NIWA. Seafood Innovations Ltd.

numbers are reduced. Kina barrens are already present within CRA 1, which is concerning given the significant ecological and economic value of kelp forests.

34. Trophic cascades are the signature of indirect effects of change in the abundance of individuals in one trophic level on other trophic levels (Pace et al. 1999). Trophic cascades can occur when the abundance of a top predator is decreased, releasing the trophic level below from predation. The released trophic level reacts by an increase in abundance, which imposes an increased predation pressure on the next lower trophic level, etc. In the case of marine systems, the outside perturbation typically stems from fishing, which can easily exceed the 'natural' predation mortality. Trophic cascades had traditionally not been thought to occur in marine systems, however, examples have been documented in several large marine systems: the Black Sea (Daskalov et al. 2007), the Baltic Sea (Casini et al. 2008; Möllmann et al. 2008) and parts of the Northwest Atlantic (Frank et al. 2005, 2006; Myers et al. 2007). These trophic cascades cover up to four trophic levels and reach all the way down to primary production<sup>7</sup>.
35. Exploding urchin populations devouring kelp forests requires an integrated strategy to reverse the ecosystem disruption. MSY driven single species stock assessments are blind to any trophic cascades that result from prescribed catch levels. Such risks are not usually spelt out to the Minister in order for him/her to make a precautionary, ecosystem-based fisheries management decision. Section 9 of the Fisheries Act 1996 requires all persons exercising or performing functions, duties or powers under the Act to take into account the environmental principles. The Minister must be provided with the best available information on ecosystem disruption so he can make an appropriate, precautionary decision.
36. The relationships within marine ecosystems are not well understood and the Minister has a statutory obligation to consider the management of kina within the complex ecosystem that it resides and make a precautionary decision.

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<sup>7</sup> Andersen, Ken & Pedersen, Michael. (2009). Damped trophic cascades driven by fishing in marine ecosystems. *Proceedings. Biological sciences / The Royal Society*. 277. 795-802. 10.1098/rspb.2009.1512.