

**I TE KŌTI TAIAO Ō AOTEAROA  
IN THE ENVIRONMENT COURT  
OF NEW ZEALAND**

**ENV-2019-AKL-117  
ENV-2019-AKL-127**

**UNDER** the Resource Management Act 1991 (the Act)

**IN THE MATTER OF** appeals pursuant to Clause 14 of the First Schedule of the Act against decisions of the Northland Regional Council on the proposed Northland Regional Plan

**BETWEEN**

**Bay of Islands Maritime Park Incorporated**  
ENV-2019-AKL-117

**The Royal Forest & Bird Protection Society of New Zealand Incorporated**  
ENV-2019-AKL-127

**Appellants**

**AND** **Northland Regional Council**

**Respondent**

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**REBUTTAL STATEMENT OF VINCE CARLYLE KERR ON BEHALF OF  
TE URI O HIKIHIKI HAPU AND MANUHIRI KAITIAKI CHARITABLE TRUST**

**MARINE ECOLOGY**

**DATED 22 June 2021**

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## INTRODUCTION

1. My name is Vincent Carlyle Kerr. I provided evidence in chief on behalf of the Te Uri O Hikihiki Hapū dated 25 March 2021. My evidence addressed the marine ecological work that has been completed in the Mimiwhangata area relevant to the appeal raised by Te Uri O Hikihiki Hapū. I also presented evidence on the ecological and conservation values of the relief sought by the Hapu.
2. I provide this reply evidence on behalf of Te Uri o Hikihiki and Manuhiri Kaitiaki Charitable Trust.
3. In preparing this statement of evidence I have read the statements of: Simon West, Dr. Mark Morrison, Dr. Nick Shears, Dr. Vicky Froude, Dr. Rebeccas Stirnemann, Carmen Hetaraka, Vania Kaika, Dr. Mark Bellingham, Dr. Phill Ross, James Griffin, Kim Drummon, Phil Mitchell, Julia Riddle, Tim Denne, and draft rebuttal statement of Dr. Simon Thrush.
4. This rebuttal evidence addresses:
  - a. Comment on the validity and significance of the concept of trophic cascades as description of factors responsible for large and persistent kina barrens at Mimiwhangata and in northeast Northland generally.
  - b. Comment on various statements made on the 'cost' of displacement of fishing efforts brought about by the establishment of no-take fishing areas<sup>1</sup>.
5. In my primary evidence I set out my qualifications and experience, and confirmed compliance with the Code of Conduct for Expert Witnesses. I confirm that I have also complied with the Code of Conduct in preparing this supplementary evidence.

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<sup>1</sup> I note however that I am not an economics expert and dont put myself forward as an expert in this area.

**Trophic Cascades and the loss of shallow algal forests at Mimiwhangata and East Northland generally**

6. In my primary evidence and supplementary evidence I presented documents which record the loss of kelp forest in Northeast Northland and the Mimiwhangata area. This evidence is based on 20 years of work in the region most of which was done in partnership with the late Dr. Grace.
7. Dr. Shears has also presented evidence on research supporting the connection between overfishing of predators of kina the main grazer of kina. Both Dr. Shears and I have presented ample evidence of the similar connections shown between overfishing of reef predator species and kelp grazers and formation of stable kina barrens in overseas temperate regions.
8. The trophic cascade process in this case is well understood and has not been seriously challenged in the literature. Additionally there is not an alternative explanation for the wide-spread formation and persistence of kina barrens which follows similar time lines to the acceleration of commercial and recreation fishing.
9. In the Joint Witness Ecology caucus these issues were discussed at some length with Dr. Shears and myself presenting explanations of research findings in New Zealand and overseas. We presented an agreed set of statements on kina barrens, their cause and importance, Sections 21 and 22 of the JWS. Amongst the ecologists present there were no exceptions to these summary statements put forward. In my opinion these statements provide a workable summary of what is known.
10. I note that Section 8 in the Joint Witness Statement (Fisheries) continues to cast doubt on the explanation for and significance of kelp forest loss. There is no actual data presented to support the opinions expressed in sections a), c), e), and f) so I will not dwell on these comments.
11. Section e) refers to evidence from Mr Holdsworth stating, “while kina barrens may have increased in recent times, this has been at the same time as an increase in the biomass of snapper in east Northland and of rock lobsters in the

relevant fisheries reporting area from Bay of Islands to Mimiwhangata". There are two important points relating to this statement I wish to address:

- a. Firstly it is not made clear what 'recent times' means in the context of this discussion. However it is important to be clear here that habitat mapping and survey work shows that the large kina barrens at Mimiwhangata were predominantly established and persisting by the time the 2005 habitat mapping work was completed. There is also evidence (Supplementary Evidence V. Kerr Sections 30-41) demonstrating that this condition has not significantly changed since 2005.
- b. The second point raised but not explained in an ecological context is that snapper and by inference crayfish abundance has increased in 'recent times' inferring that kina barrens should have reduced in size. In my read of the fisheries data I think a fairer statement of snapper and crayfish abundance would be; in terms of recovery of algal forest at Mimiwhangata, predator numbers remain very low (relative to natural abundance levels with an age class structure highly skewed towards small animals that are less effective in controlling kina at natural densities). Based on what we know about algal forest recovery from overgrazing of kina we would not expect natural control of kina abundance and recovery of the ecosystem to be taking place.

12. In this area there is clear evidence of a significant risk to marine biodiversity and ecological function in the form of persistent and large kina barrens and that this is not a natural condition. It is clear from fisheries data and analysis that stock levels of key predator species are at very low levels. Likewise the information relating to kina barrens and their ecology has been known for decades. The extent of this loss and its importance is summarised in my primary evidence Sections 37-42. Without question, shallow kelp forests are an important component of our coastal ecosystem with ecological and food web connections to many important species including commercial species. While research at Mimiwhangata has focused on key predator species and kina barrens this does

not mean there are not other ecological impacts of overfishing occurring. The severity of kina barren situation suggests we should be equally concerned about biodiversity impacts that we have not yet seen or studied.

### **Displacement of fishing effort and the use of MPA's**

13. Displacement of fishing effort as a disadvantage of using MP's has been mentioned in evidence of the respondents' but typically as a generality as opposed to a specific evidence based objection. This is an important design consideration however the general statements that fishing displacement is a significantly negative result of MPA's appears to be simplistic.
14. I acknowledge that comments regarding impacts to fishing management step outside of my area of expertise. However, comments regarding positive effects of MPA's to ecology are within my expertise. Other comments are shared from my experience in Mimiwhangata.
15. In Mr Torkington's evidence for the NZ Sports Fishing Council in Section 9.1, he makes a statement that introduces the idea that we are considering a balance or trade-off between benefits and costs of introducing an MPA:

*"The costs of concentrating fishing effort via displacement are not addressed in these proceedings. This issue should be of critical concern to a Regional Council contemplating closing areas to fishing in waters within its jurisdiction. **Displaced fishing effort is the cost which is proportional to the benefit to closed areas.**"*

16. What is important about this issue is summed up accurately in Mr Torkington's last sentence where he points to understanding the balance between the MPA benefits and displacement of fishing 'costs'. On the cost side of the equation I would like to make two basic points:
  - a. Given the relatively small areas of proposed MPA's we are discussing, displacement of effort in a spatial sense does not necessarily affect a stock management fishing quota as no more or less volume of that stock is taken from a statistical area.
  - b. If the argument is that access of a fisher or the fishery is affected this would be based on spatial relationship of protected area size to the

fished area. In our case in Northland the percentage of the coastal area taken up in MPA's is very small and will remain minor as compared to the spatial area fished, so displacement is diluted in a mathematical sense to a very low factor. An opposing argument is that displacement is quite specific however that is a difficult conclusion to assert given the variations recorded in spatial distribution of fishing. Resolving potential local concerns would need to be examined on a case-by-case basis in relation to the need and benefits of the proposed MPA or network of MPA's.

17. Section 2a of the Joint Witness Statement (Fisheries) gives an example of how the local displacement argument can sometimes be stated. There the experts agree:

*“because fishers will not be able to fish in both Area A's the effect of this will be the fishing pressure on adjacent and wider areas. Both Area A's are attractive to fishers because they are sheltered and provide a range of fishing opportunities. This is particularly important for Charter Fishing Operators as they have a business to run in a wide range of weather conditions. Fishers in small boats use sheltered waters for safety reasons.”*

18. While it is a valid statement to say that these types of concerns regarding constraints on people's use of proposed MPA areas should be investigated and considered in balance against benefits, this consideration should be evidence based and reflect what actually is the history of use and likewise how displacement works in a spatial sense, if that is possible. In the case of Mimiwhangata in the period preceding the release of the discussion document for a Marine Reserve proposal at Mimiwhangata the Department of Conservation commissioned a study of visitor use at Mimiwhangata which I supervised.<sup>2</sup> I think it is relevant to repeat the finding information from the report that looked at the safety issues raised at the time:

*“The Mimiwhangata survey period ran from the 25th November 2002 to the 7th June 2003. The survey at Whananaki ran from 15th December 2002 to 13th May. The timeframe was chosen to include the busy*

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<sup>2</sup> Kerr, V.C., Kerr, A. M. 2003. Summer use survey of Mimiwhangata Marine Park and Whananaki. A Report to Northland Conservancy, Department of Conservation December, 2003

*Christmas and New Year period as well as the summer season on either side of Christmas. A long period was chosen to allow for sufficient data collection in a variety of wind conditions to enable analysis of how wind conditions affect use of the Park. The long collection period also enabled some analysis of how visitor use varies over the different summer periods.*

*The effect of wind direction and wind intensity on activity levels was also analysed. As expected boat counts and (to a lesser degree) shore-based activity were highest in periods of fine weather and light winds. In both areas boats made some use of more sheltered areas in moderate winds up to 15 knots and boating use dropped off markedly as wind rose above 15 knots. Sheltering advantages of Mimiwhangata in strong winds greater than 15 knots was not supported by boat counts in these conditions.”*

### **Assessing Benefits of MPA’s**

19. On the benefit side of the equation, I wish to point out that there is a considerable body of information that addresses the varied benefits of MPA’s, including indirect and direct benefits to fisheries and actual effects of fishing effort displacement.

20. A leading international marine ecologist Enrique Sala has published a comprehensive review of benefits incorporating both fishery and tourism benefits over time following the designation of full take marine reserves.<sup>3</sup> The abstract of this international review is a good summary stating that the benefits of MPA’s have been shown to be substantial:<sup>4</sup>

*“Marine reserves are an effective tool for protecting biodiversity locally, with potential economic benefits including enhancement of local fisheries, increased tourism, and maintenance of ecosystem services. However, fishing communities often fear short-term income losses associated with closures, and thus may oppose marine reserves. Here we review empirical data and develop bioeconomic models to show that the value of marine reserves (enhanced adjacent fishing + tourism) may often exceed the pre-reserve value, and that economic benefits can offset the costs in as little as five years. These results suggest the need for a new business model for creating and managing reserves, which could pay for themselves and turn a profit for stakeholder groups. Our model could be expanded to include ecosystem services and other benefits, and it provides a general framework to estimate costs and benefits of reserves and to develop such business models.”*

<sup>3</sup> Reference 21 in Supplementary Evidence Sec 28 (along with Roberts 2017) Sala E, Costello C, Dougherty D, Heal G, Kelleher K, et al. (2013) A General Business Model for Marine Reserves. PLoS ONE 8(4): e58799. doi:10.1371/journal.pone.0058799

<sup>4</sup> I also do not put myself forward as an expert on economics.

21. The other difficulty with the position that fisheries interests put forward re fishing effort displacement is the lack of acknowledgement of the ecological significance of having protected areas within a system which is based on allowing fishing everywhere with little ability to monitor direct impacts on local ecological impacts or uneven fishing effort in a spatial sense, e.g. fishers targeting accessible areas or biodiversity 'hotspots'. The full benefit of this aspect of MPA's cannot be fully quantified in a system as complicated and big as the Ocean. We can only look to examples from which we can draw working principles from on the benefits and design goals for MPA's and networks of MPA's. I have offered some summary statements on the principles behind design of MPA's from a New Zealand perspective, the Mimiwhangata example and international consensus in sections 5-21 in my Supplementary Evidence.
22. The presence of the first marine reserves in New Zealand has allowed marine ecologists to begin to study ecological impacts of our fisheries systems and comparisons between a fished state and a full no-take reserve serving as our best proxy for the natural state. I would like to point to two quite significant examples of ecological studies looking at specific benefits:

Crayfish: In section 54-55 of my primary evidence I summarised the findings of a comprehensive review paper on the New Zealand ecological studies of this species produced by Dr MacDiarmid of NIWA and her colleagues. In Sections 55 (a-j) I listed brief descriptions of the findings of this research to date. In my opinion the need to have MPA's to protect and restore this species and its prime ecological role is urgent when considering the low stock levels that our fisheries system has produced and maintained notably in the Mimiwhangata areas. It is hard to quantify the benefit of an MPA in this case but surely the cost of the near extinction of this species ecological role must be addressed against the benefits of protection and restoration benefits of full no-take MPA's.

In Section 59 of my primary evidence I stated that evidence is building that no-take reserves can have significant contributions as nursery areas to support recovery and productivity of the greater area. A recent

research paper by Le Port (2017)<sup>5</sup>, studied the contribution made by snapper from the Leigh Marine Reserve to the areas adjacent to the reserve in the Hauraki Gulf. This excerpt from the report serves as just one example to demonstrate that no-take reserves can have 'disproportionate' benefits to the greater system in reference to their size:

*“Using a combination of genetic parentage and relatedness analysis, we measured larval subsidies to local fisheries replenishment for Australasian snapper (Chrysophrys auratus: Sparidae) from a small (5.2 km<sup>2</sup>), well-established, temperate, coastal MPA in northern New Zealand. Adult snapper within the MPA contributed an estimated 10.6% (95% CI: 5.5–18.1%) of newly settled juveniles to surrounding areas (approx. 400 km<sup>2</sup>), with no decreasing trend in contributions up to 40 km away. Biophysical modeling of larval dispersal matched experimental data, showing larvae produced inside the MPA dispersed over a comparable distance. These results demonstrate that temperate MPAs have the potential to provide recruitment subsidies at magnitudes and spatial scales relevant to fisheries management.”*

23. I have previously mentioned the need to apply principles to decision making around MPA planning, this also applies to the consideration of displacement of fishing efforts in designing MPA's. Dr Ballantine who published widely on the principles of MPA's in his review paper on fifty years of experience of MPA's in New Zealand offered this perspective on how we might approach the displacement arguments that are advanced in opposition to MPA's being established:<sup>6</sup>

*“In the real world, fisheries are highly dynamic. They ‘displace’ all the time for a wide variety of reasons (e.g. market forces and fashions, fuel costs, tax and subsidy arrangements). Fishermen are intelligent, energetic and adaptive. Most of their adjustments and displacements are not even recorded still less monitored or measured. It is absurd to suggest these could be predicted or allowed for in any particular situation. In any case, marine reserves will cause the ‘displacement’ of many human activities, including coastal development, tourist destinations, outdoor education*

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<sup>5</sup> Le Port A, Montgomery JC, Smith ANH, Croucher AE, McLeod IM, Lavery SD. 2017 Temperate marine protected area provides recruitment subsidies to local fisheries. Proc. R. Soc. B 284: 20171300.

<sup>6</sup> Ballantine, W.J. 2014, Fifty years on: Lessons from marine reserves in New Zealand and principles for a worldwide network.

*and many forms of recreation. No useful prediction or allowance can be made for them. The sensible reaction of the authorities to the idea of displaced fishing is simply to ignore it. Indeed, the fish are still there, and their progeny will disperse outside the reserve in due course to contribute to fisheries elsewhere. Even if this 'spillover' is hard to quantify and measure, it is inevitable (Ballantine, 1996)."*

**Dated** 22 June 2021