

# Moana Project submission on Fisheries NZ's Proposal to reopen the Kaikōura coastline to pāua, shellfish, and seaweed fishing for the 2022-23 fishing year

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## Introduction

Fisheries NZ is seeking feedback on a proposal to reopen the Kaikōura coastline to pāua, shellfish and seaweed fishing for the 2022-23 fishing year. Apart from a 3-month reopening last year, the area has been closed to commercial and recreational fishing of pāua and most other shellfish and seaweed species for five years following the 2016 earthquake.

Fisheries NZ now proposes to reopen the commercial and recreational pāua fishery (blackfoot and yellowfoot) and is seeking feedback on this proposal. Fisheries NZ is also seeking feedback on whether to consider using other approaches for managing the recreational pāua fishery, and whether to open the Kaikōura coastline for fishing of other shellfish and seaweed.

## Moana Project science determining the pāua connectivity along the Kaikōura coastline

As part of the MBIE Endeavour funded [Moana Project](#), Victoria University of Wellington and MetOcean Solutions have been investigating the connectivity of pāua populations along the Kaikōura coastline. This research involved setting up a high-resolution hydrodynamic model for the area to determine current flows and using genetic techniques to determine the connectivity of pāua from different areas along the coastline.

The research aimed to determine the impact of the 2016 Kaikōura earthquake on the pāua populations in the area. The earthquake involved significant uplift of parts of the coastline, which changed the hydrodynamics of the area. As pāua larvae are distributed by ocean currents, there was a risk that the altered bathymetry arising after the earthquake changed the hydrodynamics to an extent where it may influence the level of pāua recruitment along parts of the coastline. There was also a biological risk to the pāua populations that post-earthquake reproduction success may be reduced and pāua populations could potentially have experienced a genetic bottleneck (leading to extensive inbreeding and possible loss of genetic fitness) due to the very high pāua mortality rates reported at some sites.

The modelling shows that the near-shore circulation along the Kaikōura coastline was significantly changed by the 2016 earthquake. The strength and direction of ocean currents in the area are driven by a multitude of processes that includes winds, tides, and ocean waves. Overall, however, the area is dynamic and the ocean well-mixed.

The pāua genetics involved comparing the genetic connectivity of adult pāua from along the Kaikōura coastline with that of juvenile pāua from the same sampling sites. This work was supported by the Pāua Industry Council, which helped with the sampling design and collection of specimens from south of the Kaikōura peninsula to Cape Campbell in the north. The research tested whether there were significant differences between the genetic connectivity pattern of pre-earthquake pāua (i.e., adults

that survived the earthquake) to that of the post-earthquake recruits (i.e., juveniles born after the earthquake). High-resolution molecular data showed little to no impact of the earthquake on the genetic diversity or regional structure of pāua populations at Kaikōura. Both adults and juveniles are characterised by moderate to high levels of genetic diversity, large effective population sizes and overall weak genetic structure resulting from high levels of gene flow. Model estimates showed a connectivity dominated by short distance dispersal, in the 10km range. However, all populations around Aotearoa remain connected through stepping-stones, except at the Chatham Islands which are isolated.

These results indicate the resilience of pāua populations to the Kaikōura earthquake and support the recent evidence of the ongoing recovery of the populations. Nonetheless, genomics studies like this may not reveal long-term effects of the earthquake on pāua. We therefore suggest caution and advocate for ongoing monitoring of the pāua populations during the upcoming years.

## Recommendations arising from the research

The oceanographic modelling and genetic analyses indicate that the probable impact of the 2016 earthquake on the Kaikōura regional pāua populations was not as severe as was first generally thought. Nonetheless, we suggest that a conservative approach (based on the Precautionary Principle as outlined in the Fisheries Act) to re-opening the pāua fisheries is required given that some of our work is not yet complete and that not all populations could be sampled.

### Recreational fishery

In response to the ‘management tool or method’ approaches proposed for the re-opening of the recreational fishery our science supports the following:

**Season** – option 1 (two months)

**Daily limit** – option 3 (2 pāua per person)

**MLS** – option 1 (125 mm – status quo)

NOTE – there is a lot to be said for not harvesting the very largest pāua because these are likely to contribute disproportionately to gamete production. By setting the MLS at 125 mm it might therefore be possible to reduce fishing pressure on the very largest individuals.

**Maximum vehicle and vessel daily limit** – option 1 (maximum of up to 2 daily limits)

NOTE – a genuinely conservative approach (i.e., our preferred option) is a maximum of 1 visit per day to allow the populations to rebuild as fast as possible.

### Commercial fishery

For commercial fishing activity, if the fishery is open year-round, then a sensible and conservative approach based on the science presented here is to reduce the current TACC. Although we have reported levels of genetic diversity and regional genetic structure that have not been negatively impacted by the earthquake, and also large effective population sizes for most sites sampled, our work does not and cannot take account of earthquake-related mortalities and/or ecological changes to the local environment. Thus, we submit that a

reduction in TACC by approximately 50% (e.g., to a value of 12 tonnes pa) is a reasonable option based on the science.

### Other species (seaweed, shellfish, etc.)

#### **Should the Kaikōura coastline be opened to all other shellfish and seaweed species fishing, except bull kelp?**

We consider that the whole Kaikōura coastline should not be opened to harvesting of these other species. If there are data to support an opening of these fisheries, we suggest that that happen at some but not all sites. A conservative approach (the precautionary principle, which is specifically mentioned in the Fisheries Act) would be to open some sites and to look at the local effects before opening the whole coastline. In many respects the Kaikōura earthquake gives NZ a unique opportunity to take back full control of harvesting in the region and to 'start again', and to learn key lessons from this. To go back directly to the status quo will not advance our understanding of impacts of harvesting on coastal ecological communities.

#### **Should the current temporary closure be extended or included in an ongoing closure of the Te Taumanu o Te Waka a Māui Taiāpure?**

We consider that this area ought to remain closed, or ideally extended, and included in the ongoing closure of the taiāpure.

#### **Should long-term approaches for managing recreational pāua catch at Kaikōura be explored further?**

Anything we can do to better understand pāua catch data (numbers, sizes, sites, frequency of harvest etc.) is a good thing. But we know that voluntary reporting measures seldom work and at best lead to under-reporting. Such information is unhelpful (and can be misleading) and should not be used to inform management decisions. We support the introduction of a catch tagging system.

## Conclusion

The science produced by the Moana Project clearly shows that the effect of the 2016 Kaikōura earthquake on regional pāua populations was not as bad as many first imagined. Our data support the decision to re-open the fisheries (recreational and customary) but the uncertainty around a number of different aspects clearly indicate that the re-opening must be conservative, well-managed and monitored. An adaptive strategy-type approach is likely to be helpful, such that decisions for subsequent years can be based on outcomes from the re-opening in 2023. But this will require extensive monitoring and record keeping of the activities of the fisheries from the time that they re-open.