

1.0 TECHNICAL MEMO – Marine Ecology

To:	Stacey Sharp & Blair Masefield, Beca (consultant planners)
From:	Drew Lohrer, Principal Scientist and Strategy Manager, Coasts & Estuaries Centre, NIWA
Ref:	Northland Regional Council: APP.005055.38.01 Whangārei District Council: LU2200107
Date:	16 November 2023

2.0 PURPOSE

The purpose of this supplementary memorandum is to respond to technical matters, pertaining to marine ecology, raised during initial hearings proceedings.

This memorandum is to be read in conjunction with the initial recreation technical memorandum dated 28 July 2023 appended to the Council s42A Officers Report, and the Marine Ecology Joint Witness Statement (JWS) dated 21 September 2023.

For the avoidance of doubt, the opinions and conclusions expressed in both the above-referenced documents remain unchanged.

3.0 TECHNICAL RESPONSE TO MATTERS RAISED

This memorandum covers the following matters:

- Unmitigated significant marine ecological effects
- Ecological assurance monitoring as part of the ‘turbidity’ or capital dredging conditions; and
- The ecological basis for a closed dredging period

3.1 Suitable mitigation for significant marine ecological effects

Shellfish populations in Whangareī’s Outer Harbour Ecological Zone are already depleted and the impacts of the proposed Northport expansion are likely to put further negative pressure on these populations due to increases in suspended sediment concentrations and sediment deposition as well as direct elimination of spawning stock as a result of dredging and reclamation.

Potential mitigation should be focused on shellfish enhancement, as shellfish have positive effects on biodiversity, food webs, water clarity and cultural/amenity values.

For scallops, juvenile scallops could be collected as wild caught spat (in spat collectors) and re-distributed to enhance beds and former beds in the subtidal zone.

For pipi (and also *Atrina zelandica* horse mussels), juveniles will most likely need to be reared from gametes to spat in a recirculating aquaculture system and re-seeded to beds (such as Mair/Marsden Bank) during windows of opportunity that optimise survivorship and growth.

There are technical barriers (how to spawn and grow pipi and *Atrina*) and practical barriers (OHEZ is very large and re-seeding numbers will need to be extremely high and sustained if they are to make a difference). Potential mitigation could be focused on improving our capabilities in this area as a positive step towards rehabilitating ecological and amenity/cultural values in the OHEZ.

I support the proposed Shellfish Repopulation Plan conditions in the set attached to the 42A Addendum.

3.2 Ecological assurance monitoring - shellfish

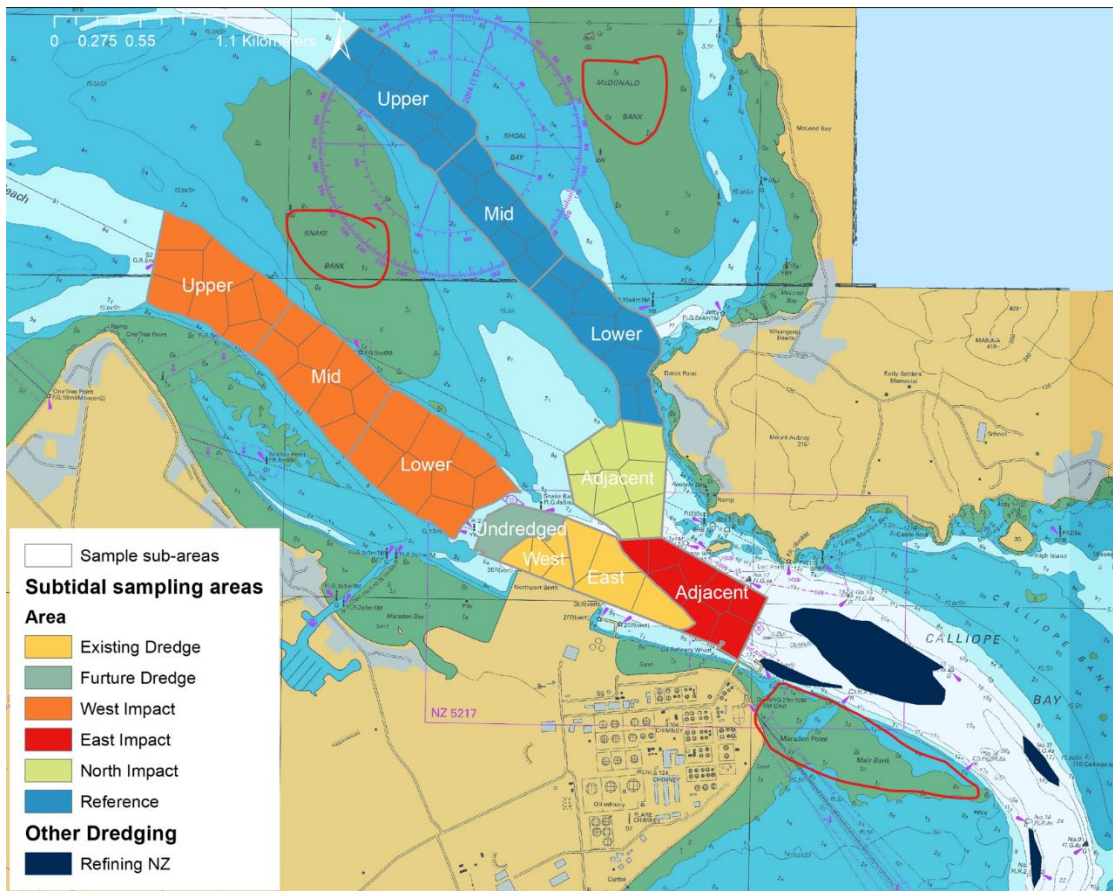
The proposed marine ecology assurance monitoring plan does not include any provision for sampling to the east of the reclamation. This is a critical gap, given that (1) the reclamation and its decant water discharge will be on the eastern side of the existing Northport development, (2) the harbour has bi-directional tidal flows, i.e., inwards to the west on flooding tides, and outwards to the east on ebbing tides, and (3) that the area to the east of Northport is an ecologically and culturally significant area due to its suitability for shellfish—specifically pipi—a species that is likely to be impacted by the proposed activities.

Moreover, the proposed plan for assurance monitoring of intertidal habitats compares a potentially impacted area west of Northport (from immediately west of the marina channel to the existing western Northport revetment) with a dissimilar area that is very far away (Tamaterau).

Plan showing indicative sample areas for inter-tidal sediment and infauna monitoring



Based on the commentary above, I believe that a much more suitable plan for marine ecological monitoring of intertidal areas would be to sample shellfish populations on three intertidal SEA shellfish-dominated banks: Snake Bank, McDonald's Bank, and Mair/Marsden Bank (each circled in red in the Figure below).



This would allow for comparisons of the “impacted” area to three nearby banks (closer and more suitable as controls than Tamaterau would be). The applicant’s modelling suggests that the three valued banks will not be impacted, so the assurance monitoring should be designed to prove that.

Proposed conditions for this would need to incorporate:

- 1) annual surveys of shellfish (or spring and autumn surveys as specified in paragraph 167 of B. Hood evidence) on the three banks using quadrats and coarse sieves and by taking pictures of the shellfish—without killing them—using readily available standard methods and building on prior survey points/coordinates.
- 2) surveys should be undertaken at the same time of year, starting at least 1 year prior any dredging/building/reclamation activity and shall continue until 5 years after activities have ceased. The B. Hood evidence suggests surveying for 3 years past the time when dredging is complete, but most of these shellfish are long lived and a longer period of five years would be more suitable for ensuring that the population size structure (including fully grown adult shellfish) remains unaffected.
- 3) in addition to shellfish, the surveys should monitor for changes (e.g., increases) in bed

sediment muddiness or other evidence of sediment deposition.

- 4) surveys should be designed in consultation with Council/iwi; surveys could be done by a Northport chosen consultant or by local iwi or other providers (assuming that they are compensated fairly to undertake these surveys). Prior surveys of the three banks have taken less than 5 working days in total to complete (Griffiths and Eyre 2014¹).

3.3 Ecological assurance monitoring - seagrass

The originally proposed marine ecology assurance monitoring plan specifies the monitoring of intertidal seagrass habitat in an area from the western Northport revetment up to One Tree Point. However, the plan only specified *intertidal* seagrass monitoring.

This is a gap, given that:

- 1) images provided in the Hood, Kelly, and Pettersson evidence clearly show patches of subtidal seagrass adjacent to the intertidal area identified for assessment,
- 2) subtidal seagrass is equally or more likely to be affected by turbidity (due to the modelling showing greater concentrations in the subtidal area), and
- 3) subtidal seagrass is more valuable as a refuge habitat for juvenile fish and invertebrates because it is submerged throughout the entire tidal cycle, not periodically dry, as intertidal areas are.

The proposed assurance monitoring shows substantial area of shallow subtidal seagrass being missed (see Figs 1 and 4 of Appendix A.A).

A new or modified condition would need to extend the monitoring of the seagrass in the intertidal area into the shallow subtidal zone (using comparable drone transect methodology, with underwater video survey transects used for validation or as an alternative when drone image penetration into the water column is insufficient).

3.4 Closed dredging season

The breeding, spawning, and settlement activities of many species of fish and invertebrates are timed to coincide with the warmer productive months that occur in summer. Therefore, concentrations of eggs and larvae in the water column, and the occurrence of vulnerable juvenile life-stages on the seabed, are generally most common in the summer months.

To reduce the potential for marine ecological effects, it is possible to restrict dredging in certain months and, specifically, to avoid dredging during the most productive summer months when eggs, larvae, and vulnerable juvenile life-stages are most common. This was a practice proposed for Whangarei Harbour recently (see Morrissey and Barter 2015,²). I

¹ <https://www.nrc.govt.nz/media/aold2phw/population-and-biomass-survey-of-cockles-whangarei-harbour-2014.pdf>

² [CawRpt_2648_Review_of_NRC_consent_for_dredging](#)

support this approach again here in this case as a means of better managing the identified ecological effects.

A proposed condition would restrict capital dredging between 1 October and 31 January (inclusive).

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

Overall, I remain of the opinion that, cumulative actual and potential adverse effects of the proposal will be **significant and** that residual significant effects would be better mitigated by taking a broader approach and considering off-site mitigation in surrounding areas.

4.2 Recommended Conditions and Advice Notes

Should consents be granted, the additional conditions discussed above are recommended to avoid, mitigate, or remedy environmental effects of the proposal and to implement mitigation proffered by the Applicant.

Memo prepared by:	Drew Lohrer, Principal Scientist & Strategy Manager, Coasts & Oceans Centre, NIWA
Date:	16 November 2023
Memo reviewed and approved for release by:	Blair Masfield, Technical Director, Beca Limited
	On behalf of the Whangārei District Council and Northland Regional Council
Date:	16 November 2023