Under pressure: The cumulative effects of multiple stressors on shellfish

Lolita Rynkowski, Natalie Prinz, Joanne Ellis & Conrad Pilditch

School of Science, University of Waikato

ldv5@students.waikato.ac.nz

www.linkedin.com/in/lolita-maria-v

What's the problem?

Shellfish play a key role in coastal & estuarine soft-sediment ecosystems.

- Due to human activities, shellfish are now exposed to multiple stressors. This has resulted in a loss of shellfish worldwide (Fig. 1) & increased motivation to restore populations to recover lost ecosystem services.

But…..we currently lack understanding on the cumulative effects of multiple stressors on shellfish

Figure 1. Cockle (*Austrovenus stutchburyi*) mass mortality event (photo: Conrad Pilditch). Events like these are becoming more common due to the increasing pressure of interacting stressors on shellfish.

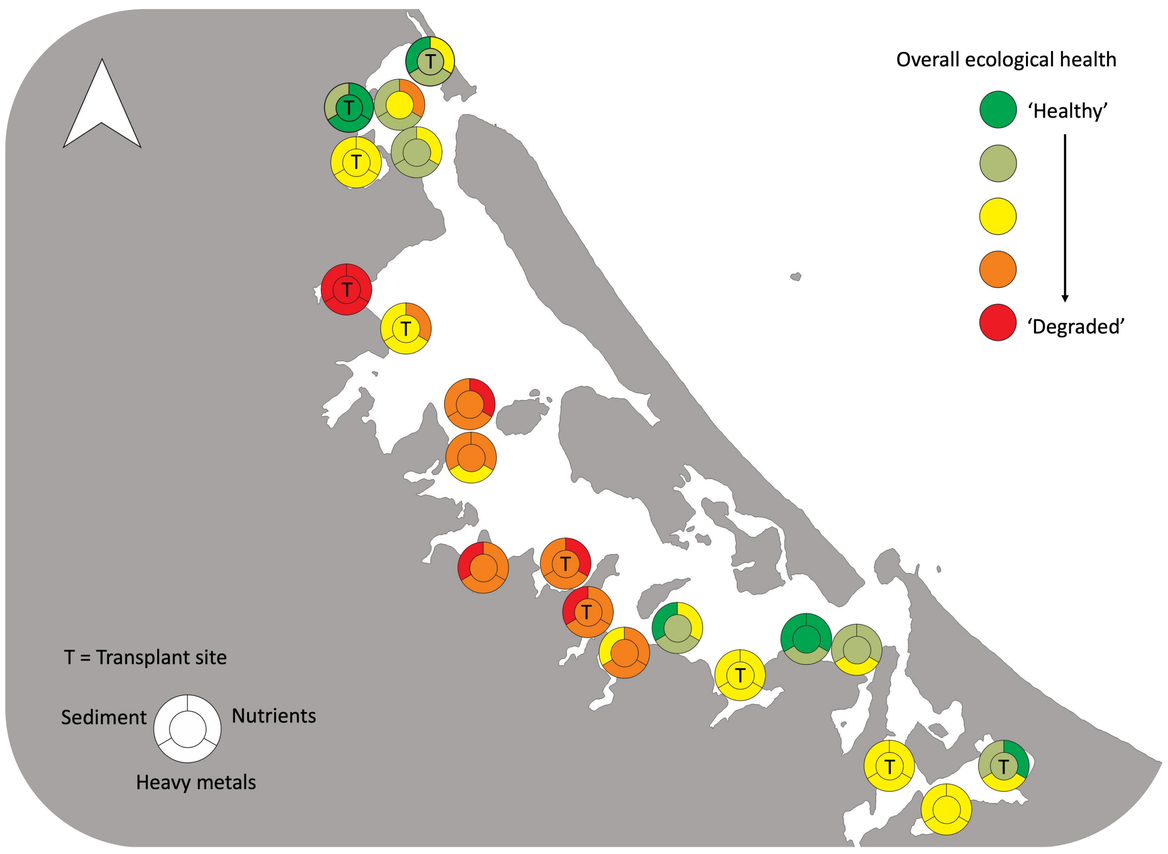

Figure 2. Study sites selected along a gradient of stress within the Tauranga Harbour (adapted from Ellis et al. 2013).

Experiment

- Within the Tauranga Harbour, we selected 20 sites along a gradient of benthic health. Sites have varying levels of nutrients, heavy metal contamination & sedimentation (Fig. 2).

- A field survey will help us understand the effects of nutrients, heavy metals & sedimentation on cockle health. Tuangi will be collected from these sites & burial rate, condition, heavy metal burdens, population density & size structure will be examined.

- A transplant experiment is underway to:

a) Determine if tuangi may be beneficial to the recovery of benthic ecosystem functioning.
b) Assess the condition of transplanted cockles over time.
c) Examine the capacity of tuangi to handle stressful conditions & their bioremediation potential.

How will this project help?

This work is important because it focuses on:

- Locally manageable stressors.
- A functionally important taonga species.
- Multiple life stages.

Results can aid in effective ecosystem-based management & restoration of shellfish in Aotearoa.

Figure 3. Amazing field volunteers transplanting tuangi into experimental plots.

References:
Ellis, J., Clark, D., Hewitt, J., Taiapa, C., Sinner, J., Patterson, M., … McCallion, A. (2013). Ecological Survey of Tauranga Harbour. Prepared for Manaaki Taha Moana, Manaaki Taha Moana Research Report No. 13. Cawthron Report No. 2321. 56 p.

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This research is part of the *Ecological Responses to Cumulative Effects* theme.

March 2023