



Tipping points in coastal ecosystems – upcoming sampling



In February and March, our multi-institutional team of researchers and students set up the first nationwide experiment to examine the impacts of the two most important stressors affecting our coasts; nutrient and sediment runoff (more details are on the next page). With your assistance, we selected 22 sites in 15 estuaries and harbours that spanned a range of sediment input throughout Aotearoa (from Whangarei to Southland).



At each site we marked out several 3 x 3 m plots and buried a small amount of slow release fertiliser to simulate the impact of more land derived nutrients entering the estuary. We have been regularly visiting the sites to check on progress and although there are no visible signs on the surface we know we have successfully increased nutrient levels for at least six months. It is now time to sample the plots and see how the ecosystem has responded to our treatments.

Between late October and early November, our teams will be visiting each site for one day to collect samples. We will be deploying small sealed chambers over the seabed at high tide to measure plant growth and the release/uptake of nutrients, as well as taking a small volume of sediment to count worms and shellfish. Our sampling is weather dependent but we have tentatively scheduled sampling in Whangateau (23 November). Prior to these main sampling times we will continue to check on the sites.



If you would like to know more about our sampling program or arrange to visit the team in the field please contact: Dr Teri O'Meara (University of Auckland teri.omeara@gmail.com); Dr Rebecca Gladstone-Gallagher (University of Waikato rebecca.gladstone-gallagher@waikato.ac.nz).



Our Project: Tipping points in coastal ecosystems

Evidence is accumulating around the world that subtle but cumulative impacts can profoundly change marine ecosystems. These changes are often called 'tipping points' and rapidly alter the way ecosystems function putting at risk the many benefits we enjoy from the sea. We need to move forward with the science required to assess the risk of these profound changes before they happen – this is the purpose of our project: to identify what activities are likely to cause them and what parts of the ecosystem are likely to be most affected.

Field experiments:

An integral component of our project is field experiments to examine the impacts of the two most important stressors affecting our coasts: nutrient and sediment runoff. Our experiments will provide real-world evidence of the consequence of change and help define new ways to manage coastal ecosystems. We will be focusing on intertidal sandflats as these habitats are responsible for processing excess nutrients and their ability to do this is compromised by mud from the land. Sandflats are also an important source of kaimoana, provide nursery habitats and food for birds and fish.



Where, when & how:

Our multi-institutional project allows us to conduct the first national experiment in the marine environment using estuaries and harbours from Northland to Southland. In total we expect to be working at 1-3 sites in 10 estuaries that allow us to both inform local interests and provide strong comparisons across the country. The sites need to be mid-tide, accessible from the shore or by a small boat, sandy with a small amount of mud, and ideally have abundant wedge shells (hanikura).



At each site we would like to establish nine 3 x 3 m plots that would be marked with small stakes. In six plots we would bury a small amount of slow release fertiliser to simulate the impact of more land derived nutrients entering the estuary. Over time we will sample the plots by deploying chambers over the sediment and taking several samples to count the worms and shellfish. We may add more fertiliser over time, though the aim is not to make the sediment toxic, but rather to allow us to assess the efficiency of the ecosystem in processing nutrients. We

have done similar experiments in 1-2 locations before and it has had no lasting impact on the environment. We would like to setup the experiments in February 2017 and they would finish one – two years later.

A large scale study with local benefits:

A team of highly regarded researchers from throughout New Zealand is collaborating on this project; the key people are Prof Simon Thrush (project lead, University of Auckland), Dr Drew Lohrer (NIWA), Prof Conrad Pilditch (University of Waikato), and Dr Candida Savage (University of Otago).

Conducting research in your estuary will provide real data on its sensitivity to nutrient runoff, increase understanding on how it functions and ultimately contribute to better management. We are ready to engage with local communities to share knowledge and provide opportunities for people to join our field teams.