

FUTURE COASTS AOTEAROA

Predicted sea-level rise will require us to change the way we interact with coastal lowland environments. The Future Coasts Aotearoa research project will investigate, in partnership with mana whenua, how we can adapt and ensure our coastal communities can be prosperous.



What is the kaupapa of the project?

Future Coasts Aotearoa is an Endeavour Fund research project supported by the Ministry of Business, Innovation and Employment. The five-year study began in October 2021 and it aims to provide tools and guidance to help rural communities living in coastal lowlands to adapt and prosper, despite unavoidable sea-level rise. It will examine the environmental, social, economic, and physical changes that lie ahead and how we can most effectively respond, by co-developing options to ensure people can live well in a changing world.

The issue

Sea-level rise will potentially increase water tables in low-lying rural land, contributing to saline intrusion, and increasing the frequency and duration of flooding. Our valuable and vulnerable coastal wetlands also need to be protected and Aotearoa-New Zealand will need to adapt by enabling them to retreat inland, which may include re-purposing lands that have become salinised and flooded. Many of these areas will have originally been wetlands prior to the widespread drainage and land clearance that occurred in the 1800s. Some of the big questions are: who is likely to be affected and how and what should we do, where and when?

Proposed research locations

Four case study areas have been proposed: Rakahuri (Ashley River, Canterbury); Kaituna (Bay of Plenty); Rangaunu (Northland) and Te Puuaha (Lower Waikato River). All these study areas face unique challenges posed by sea-level rise and partnership learnings from the case studies will inform opportunities for adaptation across Aotearoa-New Zealand.

The research

The research will build models of groundwater level and salinity changes and wetland evolution. These will inform land-use change decisions sensitive to flooding and salinity at a national scale. The research-based models will support decision-making that account for environmental, social, and cultural values, not only monetary value, as a result of Aotearoa-New Zealand's land-use decisions. Mana whenua research aspirations and world views will also be interwoven into research activities where appropriate through our partnerships at the case study sites.

The benefits

The research will enable central and regional governments to develop policies, and local councils, landowners, iwi, hapū and marae to take actions which will achieve equitable and prosperous future outcomes for rural communities in Aotearoa-New Zealand coastal lowlands.





Why is this project important?

Future Coasts Aotearoa focuses on our rural, lowland landscapes. The project is interdisciplinary, addressing the physical science behind groundwater rise, salinisation and estuarine habitat evolution, but also highlighting the importance of social and economic evaluation without neglecting the impact on the four well beings (social, economic, environmental, cultural) for communities.

Our research will enable adaptation planning to be better informed by an understanding of where and when natural habitats, productive landscapes, and associated well-being values will reach a critical point. This will enable managed coastal realignment or retreat that ensures ongoing (but altered) prosperity of threatened coastal communities and environments.

The types of sea-level rise challenges researchers will investigate include:

- Rising groundwater levels
- Salinisation (saltwater seeping into the fresh groundwater)
- Increasing frequency of coastal flooding and permanent inundation of areas
- Loss of productive farmlands and transition to alternate land use
- Loss of ecologically unique and culturally significant ecosystems (mahinga kai, wāhi tapu, etc.)
- Opportunities for preservation, migration or re-establishment of coastal ecosystems
- How to make equitable decisions when planning future land use changes

The Future Coast Aotearoa research team has completed a high-level desktop review which identified that several of the research objectives also align with, and could support, mana whenua research aspirations and priorities in each of the research locations. Researchers are discussing this kaupapa further with Māori, to explore complementary research aspirations and priorities of potential benefit to mana whenua.

Programme Contacts:



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Find out more:

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Research Leaders:



Rogier Westerhoff is a senior scientist at GNS Science, a specialist in groundwater, geophysics and remote sensing. His role in the project will be to coordinate the modelling and characterisation of the freshwater-saltwater interface.



Andrew Swales is a principal scientist at NIWA, specialising in coastal and estuarine biophysical processes. Andrew will lead the research on coastal wetland response and potential for adaptation to sea-level rise.



Paula Blackett is a principal scientist at NIWA working in environmental social science. She will coordinate the team studying social wellbeing for the project and work alongside iwi, hapū and whānau who wish to collaborate and bring in their own cultural wellbeing elements into the project.



Paula Holland is an environmental economist at NIWA. She will be coordinating work to assess the economic impact of relative sea-level rise, and to assess opportunities to address it.



Connors Andrews is a coastal engineer at NIWA. He will investigate low land adaptation options related to sea level rise. He will provide advice and support for land use and coastal environmental planning.

