



Future Coasts Aotearoa

Quarterly Update. July 2023.

Welcome to our second quarterly update

The Future Coasts Aotearoa research team wants to ensure the programme's stakeholders are up to date with our progress and achievements. In this update, we present significant reports completed as part of our research.

It includes a report prepared by WT on the indicative cost of raising existing residential and non-residential properties to counteract sea-level rise. It found that raising existing properties by 2m would only be economic for a single storey and 2/3 storey timber framed residential units. Learn more about this study in the report. This update also has a report by international consultant Lucy Garrett exploring the relevance of paludiculture to New Zealand as part of potential adaptation options.

Programme leader

Christo Rautenbach



Cost estimates to raise existing residential and non-residential properties

A report on the indicative cost estimates to raise existing residential and non-residential properties by up to 2m above their current platform levels, to assess the cost benefits of relocating communities inland or to construct some form of coastal defence.

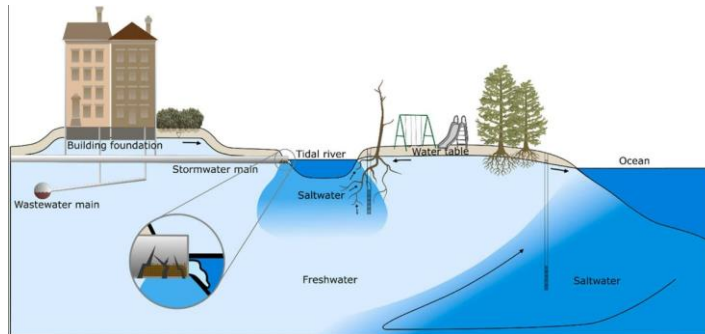
By WT, prepared for NIWA: Future Coasts Aotearoa



Potential for paludiculture in New Zealand

This report explores the relevance of paludiculture to New Zealand as part of potential adaptation options.

By Lucy Garrett, prepared for NIWA: Future Coasts Aotearoa

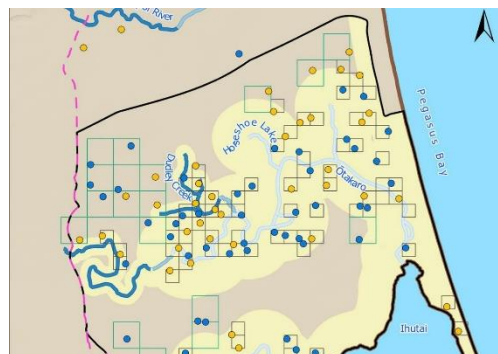


Mapping shallow groundwater salinity in a coastal urban setting to assess exposure of municipal assets

Low-lying coastal cities worldwide are vulnerable to shallow groundwater salinisation caused by saltwater intrusion and anthropogenic activities. Shallow groundwater salinisation can have cascading negative impacts on municipal assets, but this is rarely considered compared to impacts of salinisation on water supply. In this study shallow groundwater salinity in a coastal city was measured, mapped and interpolated to identify municipal assets at risk from saline groundwater.

- Source: ScienceDirect

<http://dx.doi.org/10.1016/j.ejrh.2022.100999>



Christchurch shallow groundwater quality survey dataset

Shallow groundwater quality and level across the low-lying coastal city of Christchurch, New Zealand were surveyed at a high spatial resolution (1.3 piezometers/km²) in the spring of 2020. This dataset is useful to explore shallow groundwater conditions and how these might impact co-existing subsurface infrastructure and ecosystems.

- Source: Science Direct

<http://dx.doi.org/10.1016/j.dib.2022.107982>



[Likelihood of offshore freshened groundwater in New Zealand](#)

Offshore aquifer research is an emerging field that is becoming increasingly important as population growth and climate change put pressure on coastal water resources. This study aimed to identify New Zealand's coastal aquifers likely to contain offshore freshened groundwater and document evidence for its presence.

- Source: Springer Link

<http://dx.doi.org/10.1007/s10040-022-02525-1>



[Preparing coastal communities for change](#)

Our coastline is changing as sea levels rise. Lawrence Gullery looks at a five-year research programme designed to help communities with tough decisions ahead.



Student Update: Des McCloy

A new Master's student, Des McCloy, has started at the University of Canterbury under the supervision of Dr Leanne Morgan and Zeb Etheridge (Komanawa). The aim of Des's project is to assess the temporal and spatial variability in depth-to-groundwater table for the Ashley region and evaluate whether changes in depth-to-groundwater (associated with sea level rise) could be measured, given the natural variability. The project will hopefully support the design of an early warning monitoring system for adverse impacts from SLR-driven rising groundwater levels.



Student Update: Irene Setiawan

PhD student, Irene Setiawan, has been funded to complete the final year of her PhD through Future Coasts. Irene is supervised by Dr Leanne Morgan of University of Canterbury and Dr Crile Doscher of Lincoln University. During this period Irene has maintained a field site at the

Ōtākaro Avon River and collected time series of river and groundwater head and salinity data.

Using this data, Irene has quantified sea, river, and groundwater relationships using signal processing methods. This has allowed her to describe the dynamics of saltwater intrusion from the lower reaches of the Ōtākaro Avon River. This has been published in a journal article:

Setiawan I, Morgan LK, Doscher C (2023) Saltwater intrusion from an estuarine river: A field investigation, *Journal of Hydrology* 617 Part A

128955, <https://doi.org/10.1016/j.jhydrol.2022.128955>. Recently, Irene submitted her PhD for examination.

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