

Motu-kauati-rahi-Cass Bay

Motu-kauati-iti-Corsair Bay



The **Motu-kauati-rahi-Cass Bay** and **Motu-kauati-iti-Corsair Bay** areas are significantly elevated and generally out of reach of coastal flooding and rising groundwater impacts.

However, as sea levels rise, we should expect the shorefront to become increasingly impacted by coastal erosion which will affect green spaces (reserves and the local playground) and the Head to Head walkway. Waste and stormwater pipes located close to the coast are also likely to be impacted by coastal erosion, as are residential properties.

Te Hapū o Ngāti Wheke Inc is the Papatipu Rūnanga legal entity that represents Ngāti Wheke, the hapū with manawhenua status over the Whakaraupō basin and surrounding areas as outlined in the Port Cooper Deed. This entire area is culturally significant to Ngāti Wheke and sustains the hapū. Te Hapū o Ngāti Wheke has a strategic plan, a key part of which is the protection and enhancement of the whenua, moana and awa. Ngāti Wheke hopes to be a part of the leadership in climate action for future generations.

Mō tātou, ā, mō kā uri ā muri ake nei.
For us and our children after us.

Christchurch City Council recognises the rangatiratanga of Ngāti Wheke over its whenua and is working in partnership to plan for impacts on public assets and places of value.

	Short-term	Long-term
Coastal flooding	Yellow	Yellow
Coastal erosion	Orange	Red
Rising groundwater	Yellow	Yellow

The colours in this table* show how exposed this area is to each of the coastal hazards and are indicative only. Yellow refers to low exposure to the hazard, orange to moderate exposure and red to high exposure.

Environmental setting

On the northern shores of Whakaraupō-Lyttelton Harbour, both bays are located in steep valleys and recognised for their significant recreational value. They are relatively low energy environments, where only small amounts of sand are likely to be moved (exchanged) between neighbouring areas.

Motu-kauati-rahi-Cass Bay is made up of a sandy beach (west), a rocky beach (middle) and a steep bank (east). Motu-kauati-iti-Corsair Bay is a sheltered sandy beach bounded by headlands.

* The table is intended to provide a sense of what hazards are most relevant to the location and how severe the impacts might be. The colouring has been informed by the Christchurch City Council's 2021 Coastal Hazard Assessment and data held by the Council about risks to assets.

Rising seas

Sea level rise

The long-term record at Lyttelton Port tells us that sea level rose by around 30cm between 1901 and 2018, at a rate of 2.2mm/year. Over this period the rate of sea level rise increased slightly.

In terms of the future, the Intergovernmental Panel on Climate Change (IPCC) provides global projections of sea level rise. The New Zealand projections indicate that between 17cm and 23cm of sea level rise will occur by 2050 and between 52cm and 1m will occur by 2100.

The amount of sea level rise that we experience can depend on where we are located in New Zealand, because the land that we stand on also moves.

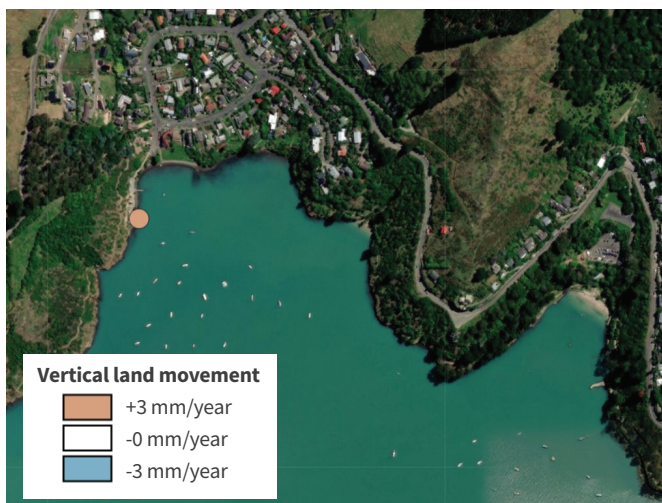
Vertical land movement

The NZ SeaRise Programme (www.searise.nz/) has estimated local rates of land movement to help us understand where land is going up (uplift) and where it is going down (subsidence). These changes in the land level, known as vertical land movement, can decelerate local rates of sea level rise in areas experiencing uplift and accelerate sea level rise where land is subsiding.

When thinking about how we can adapt, it is useful to understand ‘relative sea level rise’ which includes the effects of local vertical land movement.

Historically, the ground surface near Motu-kauati-rahi-Cass Bay and Motu-kauati-iti-Corsair Bay has been relatively stable, with minor uplift taking place, around 1mm/year. If this rate of uplift continues over the next 30 years (to 2050), the rate of sea level rise could be slowed by roughly 10 percent, from around 6.5mm/year to around 5.5mm/year.

In areas experiencing uplift the onset of coastal hazards is slowed because the land surface moves up with rising seas, albeit more slowly than the sea in this case.



Coastal hazards in Motu-kauati-rahi-Cass Bay and Motu-kauati-iti-Corsair Bay – today

Like all coastal areas in the harbour, these bays can be affected by storm surge, which is a temporary rising of water levels that occurs during a low pressure weather system. The height of the land means that there is no real risk of coastal flooding or rising groundwater in these locations.

Storm surge will however cause erosion, particularly when it occurs during spring or king tides. The water is relatively deep around these bays, meaning that larger waves can reach closer to the beach before breaking than in areas with shallower water. Equally however, these bays are sheltered by their associated headlands which serve to reduce wave energy in the bays.

You might have photos or stories about previous storms in this area. If you would like to share these with us then please get in touch at coastalcommunities@ccc.govt.nz

Coastal hazards in Motu-kauati-rahi-Cass Bay and Motu-kauati-iti-Corsair Bay – the future

Coastal flooding & rising groundwater

Due to the height of the land, rising sea levels are unlikely to significantly increase the risk of coastal flooding and rising groundwater around these bays.

The image on the next page shows the projected flooding extents and depths with 40cm of sea level rise.

Coastal erosion

Coastal erosion is the primary hazard in Motu-kauati-rahi-Cass Bay and Motu-kauati-iti-Corsair Bays. With higher sea levels in the future, the shorefronts will be impacted by erosion more frequently and to a greater extent. The image on the next page shows the storm erosion distances we can expect with 40cm sea level rise. The maximum erosion distances are around 30m, meaning that this much land could be lost to coastal erosion.

Future erosion distances are shown to be most significant in the eastern-half of Motu-kauati-rahi-Cass Bay. This is where the most significant erosion has taken place in the past.

Land is shown to be uplifting at Motu-kauati-rahi-Cass Bay, as per orange-coloured dots, no data is available for Motu-kauati-iti-Corsair Bay (Source: NZ SeaRise). There is uncertainty associated with this data, so this information should be considered indicative only.



Coastal flooding extent and depths with 40cm of sea level rise during a rare (1 in 100 year) storm event – sourced from Coastal Hazard Assessment 2021 (Tonkin & Taylor).



This image shows the probability of storm erosion occurring with 40cm of sea level rise. The dashed orange lines represent areas of cliff prone to future instability. The brown areas are where more detailed assessment has been undertaken and show the probability of short-term storm erosion - sourced from Coastal Hazard Assessment 2021 (Tonkin & Taylor).



What is at risk?

Coastal hazard impacts will increase as sea levels rise. This is likely to mean poorer access to the beach in some places due to erosion of land. A number of recreational spaces are liable to be impacted by coastal erosion, these include the Cass Bay playground, the Corsair Bay Reserve, Pony Point Park and the Head to Head walkway. Wastewater and stormwater pipes are also likely to be impacted by coastal erosion as they are located near the beach.

Residential properties located close to the beach could also be impacted by coastal erosion.

Where to find out more:

- Christchurch City Council webpage on coastal hazards and adaptation planning ccc.govt.nz/adapting-to-coastal-hazards/
- Christchurch City Council coastal hazards portal gis.ccc.govt.nz/hazard-viewer/
- NZ SeaRise webpage, for information on sea level rise and vertical land movement www.searise.nz/