

7. EFFECTS OF SEA LEVEL RISE IN THE ESTUARY

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Corporate Plan Output: Environment Conservation and Open Space	

The purpose of this report is to advise the Community Board of the findings of the Sea Level Rise Study for the Avon Heathcote Estuary, including the potential effects of erosion in the estuary and at Moncks Bay.

The Sea Level Rise Study was commissioned by the Council last year and was carried out by coastal geomorphologist Derek Todd. The main objective of the study was to gain a comprehensive overview of the potential effects of sea level rise on the City, including an understanding of the likelihood and severity of these effects and their probable timing. A copy of the full report is available from John Shanks, Community Secretary.

As the coast is a very dynamic environment and potential changes are impossible to predict with detailed accuracy, the following predicted effects for the estuary are a “best guess” based on current knowledge. For the purpose of the study two timeframes are considered i.e. 50 years and 100 years from now.

FLOODING EFFECTS

- Water levels in the estuary will increase by 0.2 m by 2050, and 0.5 m by 2100. By 2100 monthly perigean tides (when the moon is closest to the earth) will be approximately the same as we currently experience as a 1:50 year event. This means that the level of tidal flooding which we can currently expect once in 50 years, could be expected to occur on a monthly basis.
- The area around the estuary at risk of flooding from a 1:100 year maximum tide event will increase in size by approximately 80 ha by 2100. The value of assets at risk will increase by 650%, on current value, to \$208 M.

MORPHOLOGICAL EFFECTS (CHANGES TO LANDFORMS):

- The width of the channel at the mouth of the estuary could increase by 7-10 m by 2050, and by 18-25 m by 2100 to allow for the increase in water flowing through it with each tide. It is considered that this will result in erosion on the Brighton Spit side of the channel, although it could also affect land on the southern side of the channel.
- Increased sedimentation on the ebb and flood tide deltas i.e. the triangular areas of deposited sand on the inside and the seaward side of the estuary mouth, with more sand being carried in and out of the estuary with each tide. The floodtide delta, where sand is deposited just inside the estuary, is likely to increase in size and may restrict the channel at Moncks Bay.

- Current low rates of deposition on the estuary floor from river sediment supply will continue, similar to the present situation. However the rate may increase slightly if climate change results in more storms and the rate of erosion off the Port Hills increases.
- Increased bank erosion on the estuary side of Brighton Spit as sea level rises. Bank erosion is calculated to be in the range of 0.1–3.6 m for a 0.2 m rise in estuary water level, and 0.2–9.6 m for a rise in estuary water level of 0.5 m.

ECOLOGICAL EFFECTS

- Inland migration of coastal vegetation and the reduction of suitable sites for eelgrass, saltmarsh, and marsh ribbonwood environments will result in the loss of feeding grounds for flounders, eels and inanga.

MONCKS BAY

In addition to the Sea Level Rise Report, Derek Todd comments that at Moncks Bay there is a possibility that, with sea level rise and changes to the flood tide delta, the channel could move to the west causing increased erosion at the Christchurch Yacht Club. The mouth of the estuary is a highly unstable and dynamic environment in terms of the development of channels, the spit and the deltas. Changes are affected by a combination of factors including variations in the predominant currents on the coast, inland erosion and sediment supply. It is not known when erosion might occur or for how long it might be a problem.

Recommendation: That the information be received.

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