Memo

Date	12 March 2018
To	Waimakariri Water Zone Committee
CC	Stefanie Rixecker
From	Dr Lesley Bolton-Ritchie and Zeb Etheridge

Te Aka Aka in the face of climate change

Climate change is a significant environmental issue that will have major implications for the future functioning of the Ashley River/Rakahuri-Saltwater Creek estuary (Te Aka Aka).

Te Aka Aka, with its extensive areas of saltmarsh vegetation and intertidal sediment flats, supports a diversity of estuarine invertebrate species including shellfish, snails, worms, crabs and hoppers (Bolton-Ritchie, 2016). In turn the estuarine habitats and invertebrate species support a diversity and abundance of wading birds including migratory birds with some migratory birds over-wintering[1] here. The river and estuary are included in a list of wetland sites which meet criteria prescribed to be of international importance by the International Union for the Conservation of Nature (IUCN)[2]. The estuary is also an important habitat for fish species and freshwater fish such as inanga and eels migrate through the estuary.

The saltmarsh and intertidal sediment flats provide many ecosystem services. Ecosystem services are the many and varied benefits that humans freely gain from the natural environment and from properly-functioning ecosystems. There are four categories of ecosystem services and these are provisioning, supporting, regulating and cultural. In particular, this estuary provides mahinga kai resources and with the long history of association with this estuary, it is of high cultural significance to Ngāi Tūāhuriri runanga.

Climate change has been happening for some time. This is seen by the gradual increases in the causal mechanism of CO_2 concentrations in the atmosphere and changes in sea level (PCE, 2014, 2015). The effects of climate change are set to continue into the future with the rates of changes in effects such as sea level rise predicted to increase (PCE, 2014). There is a high degree of uncertainty in what the rate of change will be and where things will be at within 100 years (PCE, 2015).

Climate change is likely to affect Te Aka Aka through sea level rise, extreme weather events (storm tides, wave effects, high rainfall events) increased sea water temperatures, ocean acidification and reduced river flows.

The potential effects of sea level rise on Te Aka Aka are:

- Prolonged inundation of low-lying coastal areas and reduced land drainage;

[1] http://braid.org.nz/braided-rivers/ashley-river/

[2] https://www.visitwaimakariri.co.nz/things-to-do/ashley-river/

- loss of the coastal barriers such that the area is no longer an estuary;
- change in the depth regime within the current estuary;
- changes to the water circulation patterns within the estuary;
- changes in the sediment composition and distribution within the estuary;
- changes to the mixing of freshwater and seawater and hence the salinity regime within the estuary;
- saltwater/freshwater interface in the rivers moves further inland;
- potential erosion and breach of dunes, stopbanks, landward edge and sand bars at the mouth:
- landward displacement of shorelines;
- water quality impacts;
- threats to infrastructure such as the SH1 bridge at Saltwater Creek, water supplies and wastewater disposal in the low-lying coastal land.

Science investigations are required to determine the likely extent and magnitude of possible impacts in and adjacent to the estuarine area. A focus of this work should be on whether it will be possible to maintain Te Aka Aka as a functioning estuary in the face of climate change and sea level rise. The results of such investigations would inform the rūnanga, the wider community and local and regional authorities about the issues. The information collected on the extent and magnitude of issues could then form the basis for robust conversations, development of options and decision making about maintaining Te Aka Aka as a functioning estuary to inform the proposed future revision of the Regional Coastal Environmental Plan.

We recommend that the Waimakariri Zone committee make a commitment to addressing the issue of the possible impacts of climate change and sea level rise in and adjacent to Te Aka Aka. A possible first step would be to set up a working group with key partners (e.g. Waimakariri District Council, Ngāi Tūāhuriri runanga) and stakeholders to focus on how best to address the issues discussed in this memo.

References

Bolton-Ritchie, L. 2016. Ecological and water quality assessment, Ashley River/Rakahuri-Saltwater Creek Estuary (Te Akaaka). Environment Canterbury Report R15/137

PCE (Parliamentary Commissioner for the Environment) 2014. Changing climate and rising seas: Understanding the Science.

PCE (Parliamentary Commissioner for the Environment) 2015. Preparing New Zealand for rising seas: Certainty and uncertainty.