



# What is an estuary?

*The tides of kanamaluka/Tamar*

## ISN'T IT A RIVER?

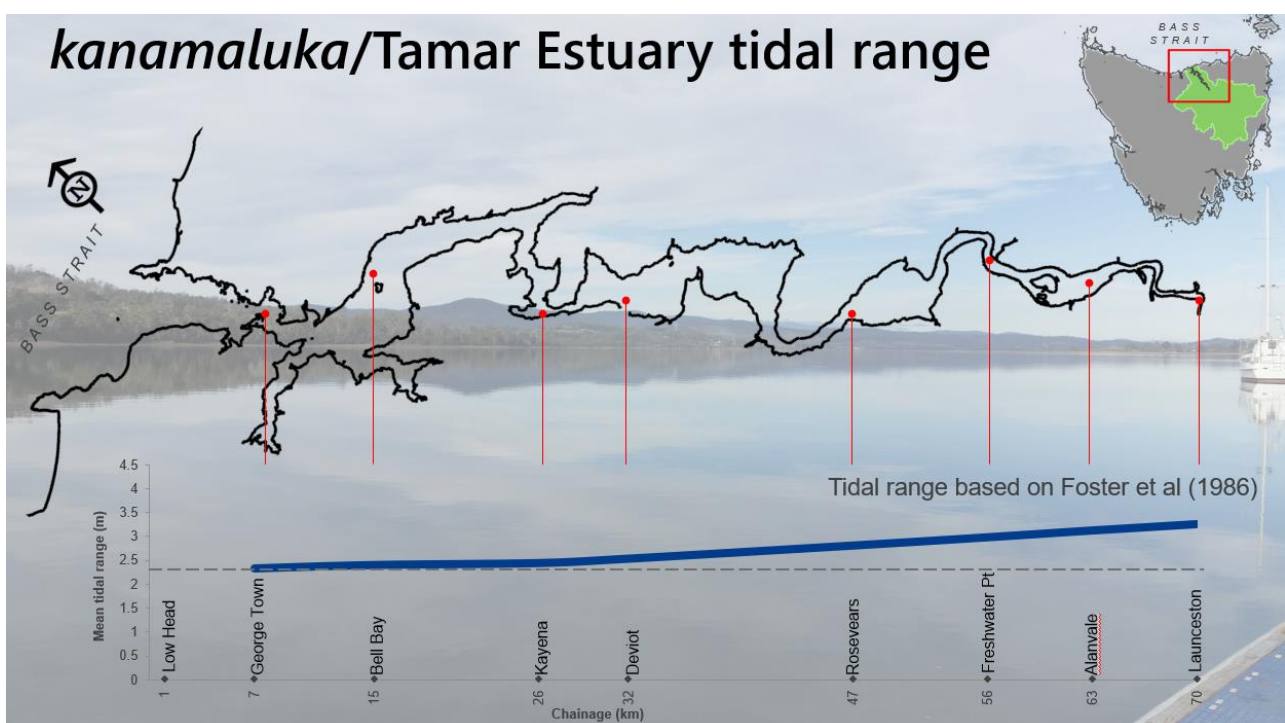
The kanamaluka/Tamar is an estuary, not a river. An estuary is the place where fresh water from rivers meet marine water from the sea. We usually think of an estuary as being at the coast, at the mouth of a river, but because the kanamaluka/Tamar is a drowned river valley – the result of rising sea levels about 6,500 year ago – it is much longer than a normal estuary and it behaves differently. At 70 km in length, the kanamaluka/Tamar is the longest navigable estuary in Australia. The strong tides from Bass Strait push salt water upstream all the way to Launceston! The North Esk continues to be tidal all the way to St Leonards, and in summer, the water in Launceston can get really salty.

## WHAT IS AN ASYMMETRICAL TIDE AND WHY DOES IT HAPPEN?

An asymmetrical tide refers to situations where there are differences in the duration and speed of incoming and outgoing tides.

The size of the tides is large in the kanamaluka/Tamar, ranging between 2.5 m to 3.5 m. Various factors cause the tidal range to increase as it travels up the estuary, meaning the tidal range is greater near Launceston than it is near Low Head.

It's not unusual for the tides in an estuary to be asymmetrical, in fact, it is quite unusual for them to be the same. The difference between the incoming and outgoing tide is caused by resistance and friction in the estuary and how it acts against the incoming or outgoing tidal energy.



Friction is provided by the shape of the estuary, as well as bed materials, wetland vegetation, and freshwater discharge from rivers. In the Tamar, the incoming tidal energy is stronger than the friction in the estuary so the rising tide is shorter in duration, by about one hour on average. The falling tide is slower in comparison.

## CLIMATE CHANGE AND SEA LEVEL RISE

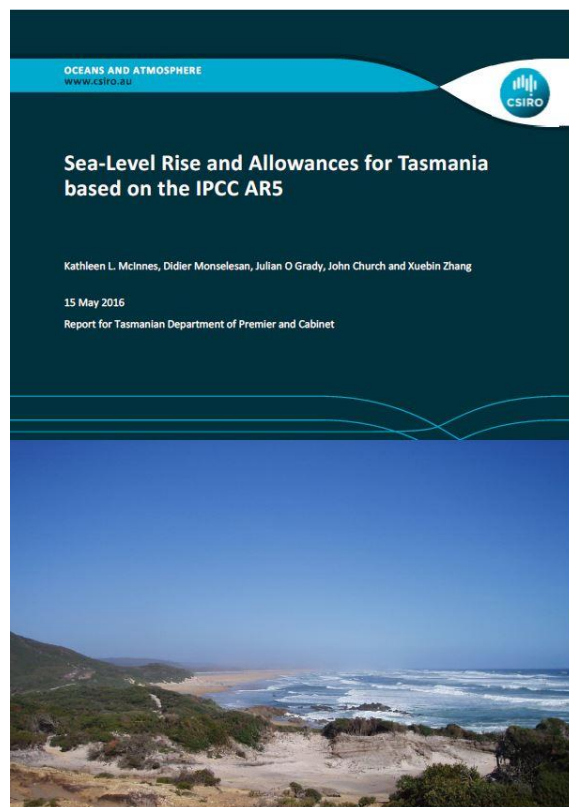
Climate change is causing global sea levels to rise at an ever increasing rate (currently about 3 mm/yr), and this will gradually affect the tides in the kanamaluka/Tamar estuary. Storm surges are likely to occur more frequently, along with more extreme weather events. Extreme rainfall events in the South and North Esk river catchments are becoming more likely, which will result in increases in the frequency and size of flood events experienced in Launceston.

The levee renewal program by City of Launceston provides flood protection to certain low lying areas of the city and surrounding suburbs, but changes in climate and sea level are gradually leading to increased flood risks in areas outside those area protected by the levees. One option for reducing the magnitude of impact from storm surge and extreme rainfall events is to increase the friction and the storage volume



Launceston's flood levees protect many low-lying areas of the city.

in the estuary by restoring wetlands on the foreshore of the estuary. These projects would help to mitigate the effects of storm surges and sea level rise, as well as providing many other environmental benefits.



A 2016 report from CSIRO addresses sea-level rise in Tasmania.



Wetland restoration increases friction in the estuary. Somerset, UK.



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