FACT SHEET

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TEER
Healthy waterways together

What is an estuary?

The tides of the kanamaluka / Tamar estuary

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 River continues to be tidal all the way to St Leonards, and in summer, the water in Launceston can reach salinity levels equivalent to that of seawater.

WHAT IS AN ASYMMETRICAL TIDE AND WHY DOES IT OCCUR?

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

The kanamaluka / Tamar has large tides, with differences between high and low tides ranging between 2.5 and 3.5 metres. Various factors cause the tidal range to increase as it travels up the estuary, meaning the tidal range (the difference between high and low tide) 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 kanamaluka / 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 outgoing tide is slower in comparison.

Above: the kanamaluka / Tamar estuary is the longest navigable estuary in Australia at 70km long.

CLIMATE CHANGE AND SEA LEVEL RISE

Climate change is causing global sea levels to rise at an ever-increasing rate (currently about 3mm/year), and this will gradually affect the tides in the kanamaluka / Tamar estuary. Storm surges are predicted 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 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 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.

THE ESTUARINE ECOSYSTEM

Estuaries are among the most productive ecosystems in the world. Many animals rely on estuaries for food, breeding grounds and migration stopovers.

The kanamaluka / Tamar estuary is no exception, found to be the second most diverse estuary in lutruwita / Tasmania. This unique waterway is home to a multitude of plant and animal species, including several that are threatened, as well as migratory species. Large parts of the estuary are protected, including the Tamar Island Wetlands Reserve, which is recognised as a Key Biodiversity Area. The entire kanamaluka / Tamar estuary is a Protected Shark Refuge, acting as an important nursery ground for local shark species. Above the water line, the high productivity and abundance of food brings migratory birds to the estuary, making it an international Important Bird Area.

Being tidal, estuarine shorelines include wetland areas comprised of various habitat types. Along the banks of the kanamaluka / Tamar estuary, important wetland habitats include *Melaleuca* swamp forests and mudflats. Globally, estuaries and their shoreline habitats are not only crucial to the species that utilise the food and shelter on offer, but they also play an important role in mitigating flood events and climate change.

Above: it is hoped that levees will protect Launceston city against major floods, such as that in 2016.

Above: restoration of wetlands provide effective flood management, with wetlands acting as natural 'sponges' to soak up flood waters. Image from Somerset, UK.

Above: royal spoonbills (*Platalea regia*) in Tamar Island Wetlands. Photo credit: Helen Cunningham.

Above: from the wetlands to the rocky reefs, the kanamaluka / Tamar estuary is home to an abundance of diverse species. Photo credit: David Maynard.