



*top The Yacht Basin in its heyday – clear freshwater and a broad water body
above Mudflats in the Yacht Basin exposed at low tide, July 18, 2011*

200 years of mud and misunderstanding

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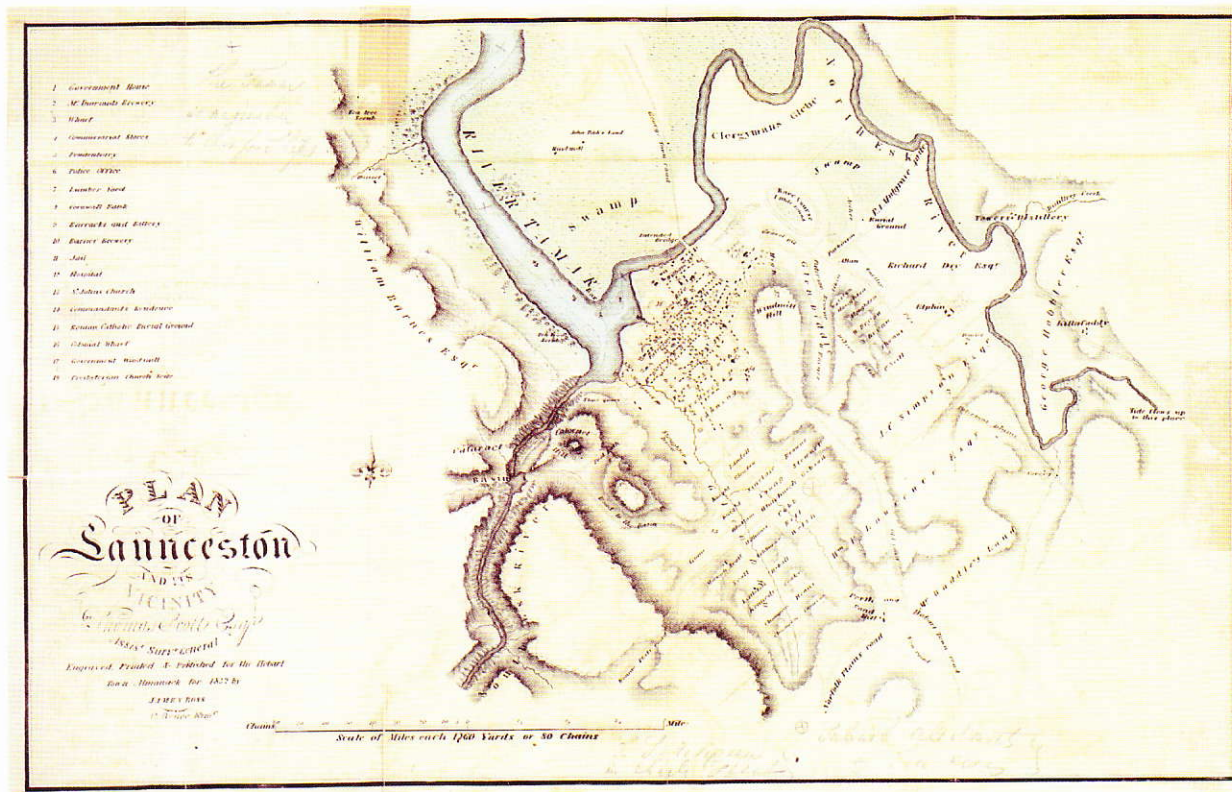
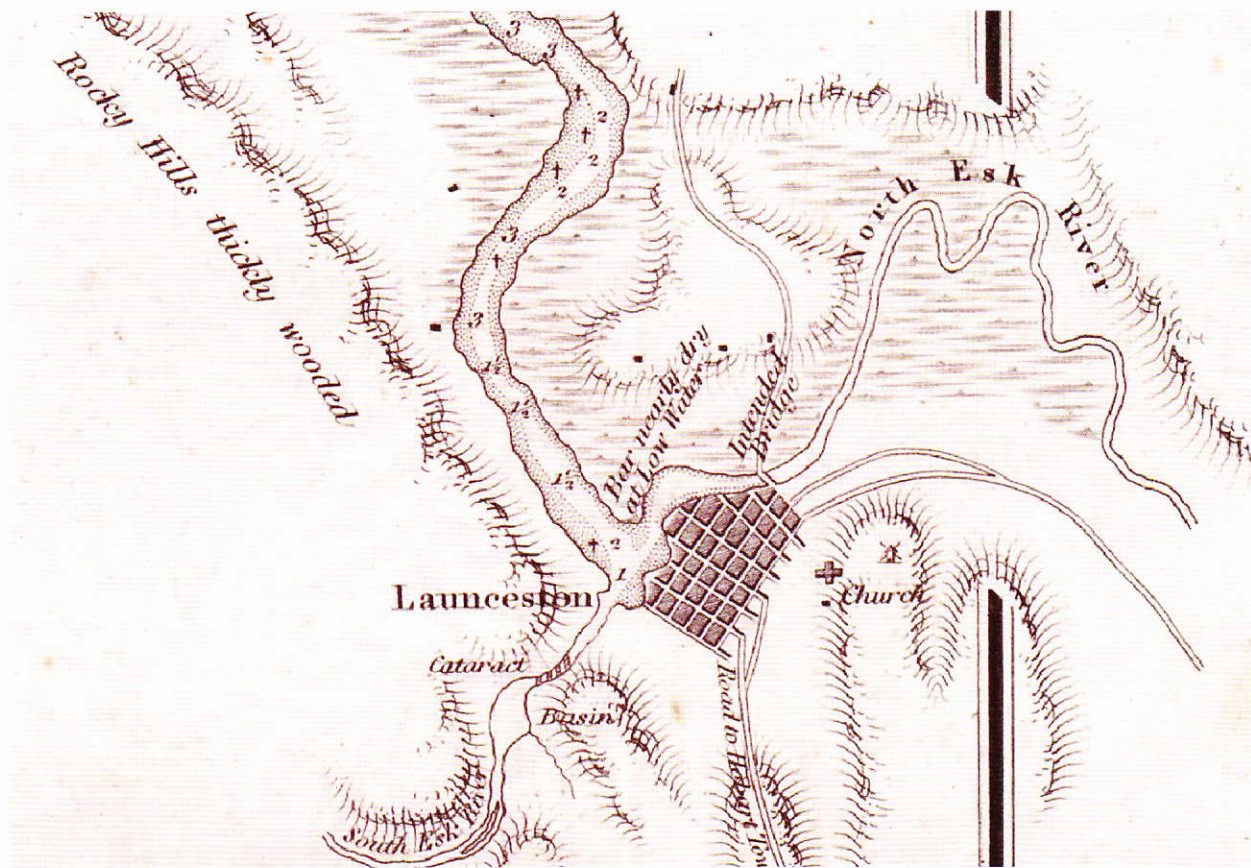
At high tide the beautiful upper Tamar River, in the heart of Launceston, is a fitting gateway to the iconic Cataract Gorge. However, beneath the turbid waters lurk issues of sewage effluent and excessive silting. Blame has been cast on upstream municipalities in the Esk River catchments, forestry practices, an outdated sewage system and other local factors. Consensus on how best to proceed seems as remote as any time over the past 200 years. Now, a better understanding of how the estuary works gives new hope that consensus and a sustainable solution are achievable.

What is the problem with the upper Tamar? The answer depends on your point of view. A keel boat owner might see a lack of deep water; a long-time resident might say there is too much silt; a photographer might see interesting patterns in the mud; a visitor might not see a problem at all.

Whatever their perspective, all observers see a simple system of two components, silt and water, and the undeniable reality is that the system has changed markedly since 1806. We now have much more silt and much less water. We have mud.

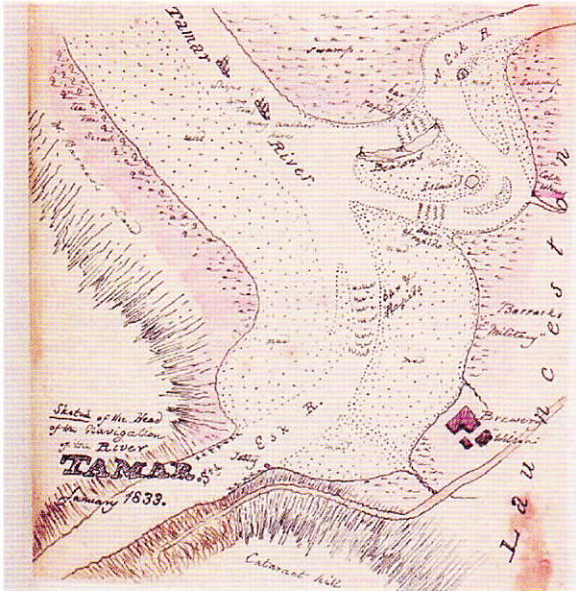
Tamar silt has been removed by dredging and raking since the 1880s, but it always comes back. This suggests that the excessive silting is a symptom of a fundamental underlying issue, and that moving mud will never fix the Tamar.

What, then, is or are the causes of excessive silt accretion? A timeline of events provides some clues. Lieutenant-Colonel William Paterson and the crew of the *Lady Nelson* explored the upper estuary January 4, 1804. They saw a pristine river system, in a state of equilibrium between the amount of sediment and the river channel.



top The 1830 navigation chart by John Welsh

above A Hobart Almanac map from 1822 shows a dry Clergyman's Glebe precinct, suggesting levees had already been built



above 1833 sketch by Thomas Scott

above right A postcard c1900; a full spring tide floods Invermay and Inveresk

right Kings Bridge (1861) spans the South Esk River which meets the broad expanse of the North Esk almost head-on



A crew member, William Collins, described the North Esk with these words, "The water is perfectly fresh and good ... it runs through low marshy country which appears at times to be overflowed." Of Cataract Gorge, Collins wrote, "I observed a large fall of water over rocks, nearly a quarter of a mile up a straight gully, between perpendicular rocks nearly 150 feet high; the beauty of the scene is probably not surpassed in the world."

An 1830 navigation chart by John Welsh shows the Esk Rivers meeting almost head on and the extent of the tidal wetlands, which had been described 26 years earlier by Collins. The spring tide inundation of these areas was more than half a metre and the mouth of the North Esk was about 300 metres across. Ships moored in the southern channel in what is now a bowling green, playing fields and the Seaport complex. A canal ran to

the C. H. Smith buildings in Canal Street. The old river bank followed what is now the four-lane highway leading to and from the Charles Street Bridge.

Changes occurred as early as the 1830s, changes which were to have a devastating effect on the estuary.

The central Launceston precinct known as Clergyman's Glebe was dry, according to a map published in the *Hobart Almanac* of 1832, indicating that tidal levees had been built around this area some time previously. This caused a considerable loss of spring tidal volume (called the tidal prism), and may have influenced the formation of a previously uncharted island in the mouth of the North Esk, as shown in Thomas Scott's 1833 sketch.

In the 1880s an engineer, Charles Napier-Bell, was charged with the dredging of Home Reach, although not with unanimous support.



above The picturesque weir at the First Basin — the flow of 2.5 cumecs is insufficient to flush the Yacht Basin
 left In 2003 the Trevallyn Dam was emptied for maintenance. The Yacht Basin filled with clear freshwater and turned deep blue in colour photo Geoff Smedley

Captain George Marsey Jackson was one who found the dredging an affront to his seamanship. He wrote in a personal communication, “The masters of the vessels and others trading on the river ... (are) ... quite competent to find the depth of water anywhere.”

Perhaps not much longer, however. By the 1890s the North Esk had become severely degraded, effectively lengthening the Yacht Basin by about 150 metres. More levees were built around Invermay and Inveresk, and by the early 1900s the mouth of the North Esk was officially infilled by building the retaining walls we see today, thus completing its demise.

Further controversy dogged the Tamar through the ill-fated Hunters Cut. This ambitious, ill-conceived plan was designed to save Launceston from flooding by providing a short cut for floodwaters across Stephenson’s Bend. Eloquently crafted Letters to the Editor adorned the local newspaper. Shakespeare was quoted, insults were thrown, calculations made and intelligences questioned. The doubters won the day as the project proved to be a disaster.

Almost lost amongst the squabbling was a small voice of reason on the silt issue. In part it read, “The origin of the deterioration of the upper reaches was the reclamation of the large spill areas which existed in former days at and near the head of the river ... I have personally seen the same thing occur in India on the Bididhari River, which in its

upper reaches silted up to practically nothing, but became a different river, with a deep channel, within 12 months of the opening out of a new spill area at its head. . . . Another factor which has expedited the deterioration of the upper reaches is the dumping of dredgings on the adjacent soft banks, as the great weight of spoil is slowly, but surely, squeezing the soil into the river and narrowing the channel."

The words are those of WB MacCabe M. Inst. C. E., published in *The Examiner* c1928. MacCabe has been proven correct on both counts but, despite his wisdom, was ignored, and management of the Tamar's silt issue continued on the basis of removing the symptom.

"Reclamation" of spill areas continued throughout the 20th century. The latest, and hopefully last, "great weight of spoil" to be dumped upon the "adjacent soft banks" (of the Trevallyn Foreshore) did indeed squeeze soil into the river so that starboard channel markers began to lean noticeably toward the channel and required some effort to return them to the vertical.

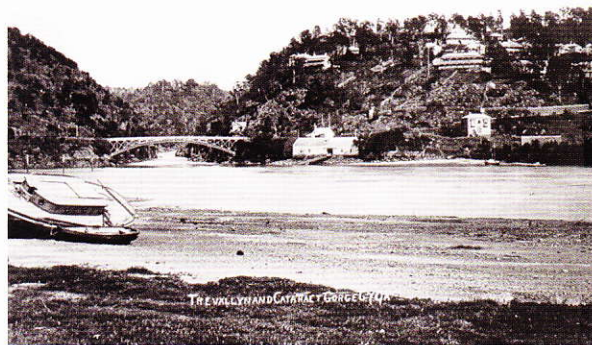
Similar problems to those of the Tamar occurred centuries before in the village of Clay, England, where the fertile tidal flats were easy pickings for development as agricultural land. By 1637 levees had been built, resulting in the estuary becoming choked with silt to the point where navigation was severely restricted. Ship owners lobbied for their removal, one writing, "The banke of earth . . . taketh away . . . the indraught of water 80 rodds and upwards in breadth and one myle at least in length . . . so that what sylt or mudd the flood tide bringeth in doth settle and remaine in the navigable channel . . . through want of the ebb tide which formely overflowed the aforesaid 80 rodds of ground in breadth and one myle in length." He would have recognised the issues in Launceston 300 years later.

The ultimate ignominy for the upper Tamar was the building of the Trevallyn Dam in 1955. The selling point seemed to be, "The Tamar is already in a mess; this is not going to make things any worse." It

did. The ramifications for the Yacht Basin were dire. For many years after 1955, just 1.5 cumecs (a cumec is a measure of water flow, one cumec equalling one cubic metre per second), flowed through the Cataract Gorge to the Yacht Basin, although in recent years this was increased to 2.5 cumecs. To this day the legal requirement is just 0.43 cumecs.

Our comparative photographs tell the story.

below 1.5 cumecs, 2011
middle 2.5 cumecs, May 2012 (pre-raking)
bottom ~30 cumecs, c1900. Plenty of water here at low tide





*A silt-choked Seaport Marina on the North Esk 2012.
For the past two years the silt has been “prop-washed” into the channel using a powerful fishing vessel*

In 1986 Professor Doug Foster, from the University of NSW, wrote a report on the Tamar silt, in which he claimed that the Trevallyn Dam (and an additional 20 cumecs from the Poatina Scheme) was beneficial in reducing the “siltation” in the Home Reach. This is an often misrepresented finding. At that time, the estuary was dredged way beyond its natural state and Foster was saying that the extra fresh water in the system meant that the process of reverting to the natural state would be much slower with the extra fresh water than without it. Therefore, he concluded, less dredging was required.

The siltation to which he referred was the process, as distinct from the result, which should more accurately be called siltage or sediment. In fact the extra fresh water makes no difference to the final volume of sediment. The sediment in the

Yacht Basin is clearly much worse, a fact which no argument over the meaning of “siltation” can refute. The fable of the emperor has no clothes springs to mind.

This historical recant clearly shows that the silt is not the problem per se, but rather a symptom of two fundamental underlying issues: reduced fresh water flow through the Cataract Gorge and the reduction of tidal prism caused by tidal levees and infilling.

The levees protect a huge investment in infrastructure and property in the low-lying suburbs of Invermay and Inveresk. Their removal is plainly not possible, and rejuvenation must rely on other strategies which act directly on the real causes.

But is the problem also in the catchment? Foster didn’t believe so and intuitively it seems


unlikely. Silt from the catchment enters the estuary during floods, which are times of estuarine scour when plumes of silt-laden water flow to Bass Strait. Silt accretion occurs in times of low fresh water flow, when the Esk rivers are essentially free of sediment, as asymmetrical tides redistribute silt from the lower silt belt. Asymmetrical tides are a natural process, present in most estuaries and are not the cause of our problems; just as the oil circulation system in our car cannot be blamed for the mess on our garage floor. Removing the oil pump may stop the leak, but is certain death for our engine.

An interesting property of the tidal prism is that any change compounds itself down the estuary. Therefore a seemingly small project in the upper estuary can have a profound effect over the whole estuary. Some tidal levees could be removed, tidal lakes could be built, old meanders re-instated. Returning the Tailrace flow back to the Yacht Basin via a waterway would have a huge positive impact.

Various combinations of projects could go some way to reinstating the lost tidal volume, but as an imperative any successful project must increase the flow. With a sufficiently increased flow, the Yacht Basin could once again be a centre

for water-based activities, with sand or pebble beaches. Dinghy sailing, swimming, fishing and rowing would all be possible.

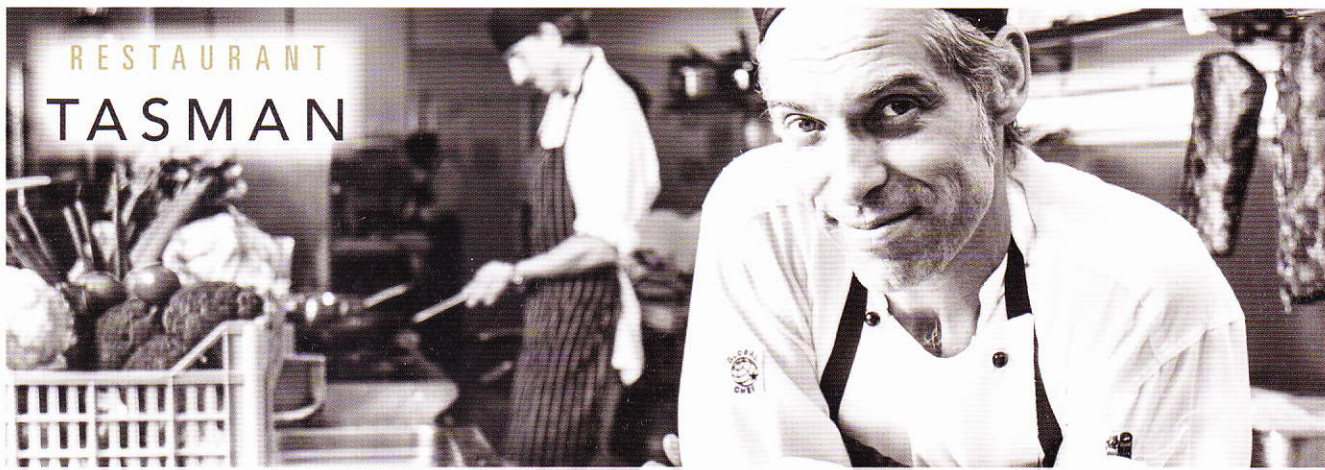
What is to become of the Tamar? The recent raking has given an indication of an acceptably rehabilitated upper estuary. Permanent extra flow would maintain this state by preventing return of the displaced silt. History has proven the adage that working with nature gives a good chance of success, while working against nature guarantees failure.

Rehabilitation which addresses the causes of the problem, not the symptoms, would return the upper Tamar to a system to be enjoyed by residents and visitors alike. 

ABOUT THE AUTHORS

Ian Kidd is a PhD candidate at AMC and a long-time resident of Launceston. He is researching the workings of the Tamar estuary, the causes of the degradation and what if anything can be done about it.

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