Observations of a new patch of saltmarsh in the Trent Water

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Figure 1. Trent Water, Bridport. Google Earth image, 2015.

Trent Water

Bridport, where I live, is a small coastal town that nestles on the shores of Anderson Bay in the north-east coast of Tasmania. Once, both the Brid and the Great Forester rivers drained into the estuary named Trent Water and thence into Anderson Bay, but the Great Forester now has a different exit. Known locally as 'The Cut', it was diverted through the dunes around 1926, 4 kilometres from the original mouth. The consequence of that action is that Trent Water, now fed only by the Brid River, Brewers Creek and Coxs Rivulet, has become quite shallow and prone to unpredictable changes in sand movement, due to the lack of scouring.

Anecdotal observations cited by Steane (1996) suggest that there have been sea level fluctuations and sediment movements in the north-east since the Pleistocene Age. Steane co-ordinated a dune stabilisation program at East Sandy Point, a project which caused considerable community opposition, the effects of which are still debated. Steane observed that during the 1950s and '60s

sand had washed away from the many small beaches at Bridport. During the 1970s the sand returned to the beaches but the port suffered. I mention these movements of sand and sediment as they may be relevant to the current formation of a new patch of saltmarsh inside the estuary that is the subject of this paper. There has definitely been a build-up of sand since 2019, concurrent with the three recent La Niña years.

Saltmarsh

Saltmarsh is a unique habitat dominated by halophytes, which are plants that can tolerate salinity.

In 2013 temperate saltmarsh was listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. At this time, there was a distinct lack of baseline data including detailed mapping of Tasmanian saltmarshes. Enter Vishnu Prahalad, who completed this enormous task in 2014. In particular, the extent of saltmarsh in Trent Water was calculated at 12 hectares, all upstream from the township (Prahalad 2014b). My interest in saltmarsh began after attending a Field Nats outing and later a workshop led by Vishnu.

There has always been a small patch of saltmarsh measuring approximately 10 square metres growing along the banks of Trent Water, approximately 350 metres north-west of the Brid River (Figure 1). This patch contains 13 of the possible 132 plants that are **typically** found in a saltmarsh ecosystem (Prahalad 2014a). Here grow: *Atriplex prostrata*, creeping orache; one or two bushes of *Atriplex cinerea*, grey saltbush; *Austrostipa stipoides*, coast speargrass; *Carpobrotus rossii*, native pigface; *Ficina nodosa*, knobby clubsedge; *Juncus kraussii*, sea rush; *Plantago coronopus,* slender buckshorn plantain; *Poa labillardierei*, silver tussockgrass; *Puccinellia stricta,* Australian saltmarsh grass; *Spergularia tasmanica*, greater seaspurrey; *Sarcocornia quinqueflora*, beaded glasswort; *Senecio pinnatifolius*, common coast groundsel; *Tetragonia implexicoma,* bower spinach.

Plate 1. *Sarcocornia quinqueflora*, beaded glasswort

A characteristic and common component of saltmarsh, *Sarcocornia quinqueflora* is a perennial succulent herb that grows to 20 cm in height (Plate 1). By 2018 some of the *Sarcocornia* from the 10-square-metre patch of saltmarsh had begun to spread out from the bank. It was during this time that an elderly community member could often be seen hoeing the plants, mistaking them for a weed (Plate 2). He had been advised by a Natural Resource Management (NRM) officer that he should stop; some say he was also warned by police. I presented

Plate 2. The hoeing 'work' done by a community member

Plate 3. Saltmarsh beginnings, 2020

him with a copy of Vishnu's *Guide to the Plants of Tasmanian Saltmarsh Wetlands* (Prahalad 2014a) to convince him of the importance of this ecosystem.

The community member eventually gave up his 'work' and by 2020 we began to see healthy, though quite sparse, establishment of new plants spreading outwards from the bank. I have concluded after reading Saintilan (2009) that the 'weeding' may have been responsible for transplanting fragments of these perennial plants. I think it is in the community's interests to believe thus.

Plate 4. *Heloecius cordiformis*, the semaphore crab

Once *Sarcocornia* plants began to establish and spread, sand and silt became trapped at a rapid rate on the saltmarsh facing the incoming tide (Plate 3).

Crabs

As the small saltmarsh community grew, crab burrows appeared amongst the plants. Soon the crab population increased dramatically both amongst the plants and spreading out into an area of sandy mud on the south side of the plants. This area now covers approximately 1 hectare. In February 2023, I counted crab burrows in quadrats of 1 m × 1 m and the density was on average 40 burrows per square metre. The burrows amongst the *Sarcocornia* were not so easy to count, though that area covers approximately a hectare as well.

Despite this huge number of excavated burrows, crabs cannot be seen easily at low tide. As soon as any movement is sensed, the crabs make a hasty retreat into their burrows. But with patient use of binoculars, it is just possible to see eyes on stalks, and claws waving in the air. This is *Heloecius cordiformis*, the semaphore crab, easily identified by its mottled purple carapace; the juveniles have orange claws while the claws on the adults are purple (Plate 4).

I learned semaphore for my girl guide badge in 1961 but even with this knowledge, I cannot read the male crab's signals as it stands at the entrance to its burrow. It may be trying to attract the attention of females by showing off its large claws or perhaps warning other males to stay out of its territory (Australian Museum 2020).

Saintilan (2009), in his book *Australian Saltmarsh Ecology*, gave me a thorough understanding of how the components of saltmarsh fit together. In his chapter on crabs, I learned that they eat detritus, fine particles of organic matter that is deposited on the sediment by the tide every day. This way, the dead vegetation, which is prevalent in the winter here, gets recycled.

Each female crab produces thousands of eggs, which hatch into larvae. With high spring tides, large quantities of these crab larvae – called zoeae – are released on the ebb tide, providing food for small fish.

A very common crab in a tidal saltmarsh such as this is the grapsid crab *Helograpsus haswellianus*, which Richardson et al. (1997) have found co-existing with *H. cordiformis*. However, I have only found empty shells of *H. haswellianus* amongst the *Sarcocornia*.

Another crab I have observed stranded in the *Sarcocornia* at low tide is *Paragrapsus gaimardii*, the spotted shore crab. It is omnivorous and consumes both algae and small marine mammals such as worms, shellfish and other crustaceans (Richardson et al. 1997). The specimen I found had been dismembered, perhaps by a bird or rakali.

Plate 5. *Carcinus maenas*, the European green crab

Plate 6. *Mictyris longicarpus*, the soldier crab

Carcinus maenas is a non-indigenous European green crab that has adapted to a variety of substrates (Plate 5). It is invading our saltmarshes, and is a voracious predator feeding on many types of organisms, including other crabs. It also competes with native crabs for food and space. It is easily identified by the five spines either side of the eyes. *Carcinus maenas* was declared a marine pest of national significance in the Australian Priority Marine Pest List report (MPSC 2019). I have only observed dead specimens over the past two years.

Mictyris longicarpus, the soldier crab, is quite distinctive with its small, round, blue body on long jointed legs (Plate 6). As the crabs march around feeding, often in groups, they mould the sand into pellets, sorting through large quantities of sand in order to extract small quantities of algal and detrital food. The pellets are dropped and soon cover the whole

Plate 7. *Phallomedusa solida*, an air-breathing snail

Plate 8. *Salinator fragilis*, the fragile air-breather

feeding area. If disturbed, they burrow into the sand with a corkscrew motion, disappearing as quickly as they arrived. At this Trent Water site, they largely occupy the sandy area on the seaward side of the developing saltmarsh.

Other detritivores

The food chain in the saltmarsh is based almost entirely on detritus, rather than green plant material. Crabs are one group of the detritivores that are important in structuring this new saltmarsh environment through their burrows. Other detritivores contributing to the breakdown of the dead and decaying material in the saltmarsh ecosystem are snails and worms.

I found some snails living in disused crab burrows, but more often they are on the mudflats and amongst the *Sarcocornia*. They leave faecal trails as they move about feeding on slime and microalgae; the faeces contribute to building saltmarsh soils. The two most common snail species here are *Phallomedusa solida* (Plate 7) and *Salinator fragilis* (Plate 8). *P. solida* is a small (≤ 20 mm) air-breathing snail with an operculum, which is the structure snails use to close off the shell when the animal is retracted. According to Saintilan (2009), *P. solida* populations process about 45 kg of carbon per hectare per year.

Salinator fragilis is also an air-breathing snail commonly referred to as the fragile air breather. Its shell length is up to 15 mm.

Fish

Trent Water does not empty entirely at low tide and smaller fish can retreat to pools and tidal creeks. I was able to photograph some small fish which were stranded in a pool near the shore. Small fish seen from time to time are the common jollytail, smallmouth hardyhead, goby, and eastern dwarf galaxias.

Baitfish is a generic name for four or five species of small semi-transparent fish which inhabit these shallow tidal waters. In spring, large schools of *Lovettia sealii*, Tasmanian whitebait, come into the embayment and swim towards the creeks, where they spawn. Their

eggs are deposited on the bottom or amongst seagrass or other debris. They hatch in 2–3 weeks, and the fry are swept out to sea. The adults die shortly after spawning. This is an anadromous species, one that begins its life cycle in the breeding habitat of freshwater and later migrates to the non-breeding habitat in the ocean, where the juveniles grow and become mature. They are an important source of food for many larger predators.

The story of the southern black bream

Because of a lack of data, I had to rely on anecdotal evidence about the fish population in Trent Water. Fishing from a boat is not very popular owing to the shallowness of Trent Water, but there are five dedicated fishermen who have been fishing there on foot or in kayaks for probably twenty years. They provided me with this catch list: flounder, two species of flathead, mullet, yellowtail scad, the occasional silver trevally, small whiting, garfish, and the ubiquitous toadfish.

A surprising exchange of information took place with these fishermen. They had puzzled over the fact that until three years ago, none of them had ever caught bream in this water. They were indeed aware of the burgeoning growth of the 'weedy stuff' (saltmarsh), but had not realised what massive amounts of food had become available for bream because of it. Eighty percent of the diet of *Acanthopagrus butcheri*, the southern black bream, consists of crabs. They also feed on the banks of pippies (bivalves) growing close to and on the seaward side of the saltmarsh. We were excited to join the dots, though the picture is not complete yet, the bream being present only from November to April.

Birds

During the past three years I have made a list of 24 birds seen in the Trent Water. At all times of the tide, masked lapwings, pied and sooty oystercatchers, Pacific gulls, kelp gulls and silver gulls can be seen roosting on whatever patch of samphire stays above the water (Plate 9).

Plate 9. An assortment of birds roosting

Plate 10. Off-road vehicle use is one of the threats to the Trent Water saltmarsh.

Other birds in the estuary, though not necessarily near the saltmarsh, are white-faced herons, white-bellied sea eagles, great egrets, pelicans, little pied and little black cormorants, crested terns, red-capped plovers, black swans, royal spoonbills, and nankeen night herons.

As the estuary provides more food, the number of birds and different species has increased.

Risks and threats to saltmarsh

Tasmania's saltmarshes are under threat from a range of human activities – unchecked pollution, inappropriate development, off-road vehicle use (Plate 10), and rubbish-dumping, to name a few. Trent Water is no exception. It should not be taken for granted that this wetland is safe from future abuse, just because it is protected under the EPBC Act.

In late 2018 Marine and Safety Tasmania commissioned the Bridport Foreshore Master Plan (Burbury et al. 2022) to investigate the opportunities for future infrastructure upgrades and new development to support the growth in recreational fishing, tourism and commercial marine operations in Bridport. This would involve a new river entrance for the port and many changes to the natural systems. Dredging could disturb acid sulphate soils, and alter tidal regimes and water circulation patterns. These projects are deemed to be in the public interest but not necessarily in the interests of the environment.

A new outbreak of *Spartina anglica*, rice grass, is causing concern, as is the spread of *Euphorbia paralias*, sea spurge, into Trent Water.

Conclusion

All this burgeoning life is a testament to an increasingly healthy body of water. Plate 11 shows an aerial view of Trent Water and the saltmarsh. I am passionate about maintaining the natural assets of the Trent Water. As a citizen scientist, I see my task to document its natural development, and to achieve formal recognition and protection of it.

Plate 11. A drone shot of Trent Water and the saltmarsh, 2023 (photo by Jeff Jennnings)

I am in the process of mapping it and adding my observations to the Natural Values Atlas. I want to bring the community with me by talking about it, writing about it and generally fostering a love of the natural world. This is a start!

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