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Jodi Frawley

Oyster Culture in the Estuary Worlds of Southern Queensland

Oysters—*Saccostrea* sp.—once lived in abundance in the complex of estuaries between Moreton Bay and Wide Bay in southern Queensland. Until the 1890s, these estuaries were thick with intertidal and subtidal oysters. As the cities and towns of Queensland grew from the 1860s, locals demanded more oysters from the fledgling oyster fishery. A lover of oysters could buy these Queensland foodstuffs as close as Maryborough or Brisbane or as far away as Sydney and Melbourne. This early trade between 1860 and 1900 saw the destruction of largely self-sustaining populations of oysters. As settlers scrambled to sustain this industry, fishing communities moved from being oyster harvesters to oyster farmers. This change required the introduction of oyster culture technologies. Here, I trace the ways that the culture technologies of Aboriginal, European, North American, and Chinese people combined to create new oyster ecologies in these systems. While this shows the adaptation of older techniques to new circumstances, these changes were not without consequences to the estuary life of southern Queensland.

The southern Queensland estuaries nest between the Great Barrier Reef to the north and the Northern Rivers region, formed through ancient volcanic activity, to the south. These were embayment estuaries, where fresh water from the rivers poured into the large salty bays that were partially sheltered from the ocean swells by barrier islands. There were four ocean-facing sand islands: Stradbroke, Moreton, Bribie, and Fraser. In between the islands and the mainland, the bays were dotted with further islands large and small. Some were ephemeral, shifting with the tides, while others sunk deep roots into the bay, taking on the illusion of permanence. Cyclones, although once infrequent this far south, have been known to tear these islands apart. In 1896, a tropical storm created the islands of South Stradbroke and North Stradbroke when it ripped a new passage through the narrow southern end of the old island. Sometimes, smaller sand islands in the bays disappeared altogether. Although each island's estuary had its distinct ecologies, with both subtle and substantial differences, for those people engaging in oyster fishing in the nineteenth century, these systems were parts of an interconnected whole.

Today, fisheries scientists declare oysters to be keystone species in estuaries. That is, these species act as an anchor to ecosystems and food webs that grow around them. In

nineteenth-century Queensland, oysters provided a number of critical services to their systems. Born free-moving animals, oysters become spat when they attach to substrate material. In both intertidal and subtidal areas, the best substrate for oysters is the older oyster shells anchored together as reefs. In principle, oyster reefs form in the same way as coral reefs: as older animals die, new animals grow on the residual matter. For coral, the skeletal limestone remains of individuals compound into solid structures to house new animals. For oysters, the new animals anchoring onto old shell eventually build enough layers to create large, three-dimensional assemblages. Like coral reefs, oyster reefs are home to a range of other plants and animals. In addition to being food for some species, they are especially important as shelter for juvenile fish and shellfish of the estuary. Additionally, oysters play an important role in filtering the sediment from upstream in southern Queensland rivers. They extract micronutrients for themselves and remove the detritus from the water columns, contributing to the water quality of each estuary.

Local Aboriginal people left huge middens of oysters and other shellfish all over this region. Archaeologists date the earliest remains in these middens to 3–4,000 years ago, although Aboriginal people contest this date, arguing that their occupation was from the beginnings of time. The Dandrabbin-Gorenpul peoples of Quandamooka deployed a range of strategies to ensure that subtidal oysters were plentiful in Moreton Bay. They carefully monitored the oyster reefs, translocating young oysters to enhance growth and introducing spent shells to build new substrate. Meanwhile in Wide Bay, the Butchulla people of the Great Sandy Strait focused their stewardship on the intertidal oysters. The colonial war of dispossession, particularly violent in Queensland, left fewer Aboriginal people to steward the oysters. Even so, it is clear that wherever possible these methods of Aboriginal stewardship continued after the first wave of the colonial violence eased in 1860. In 1891, Edward Boulton, the Harbour Master and Fisheries Inspector for Wide Bay, observed oysters being taken from the reefs, separated into groups of three or four for cultivation, and moved to the grass banks and mud flats around the area. Wherever possible, Aboriginal people have stayed in their traditional estuary lands, working in this industry from this period right through to the present. A systematic analysis of their contribution, and what it meant in terms of surviving colonisation, has yet to be undertaken.

Over the course of the late nineteenth century, the Queensland colonial government introduced an aggressive immigration policy to boost its social and economic prospects.

In Maryborough, for example, the closest city to Wide Bay, over 10,000 new settlers arrived between 1870 and 1880. Of these, 3,000 migrated from Germany. Some of them were fishing people escaping the collapse of the fisheries in the Wadden Sea. The community at German Creek in the Great Sandy Strait, for example, secured oyster leases for the Strait from 1886. At least three oyster bars were in operation in Maryborough, in addition to seafood sold on the docks off the fishing boats from Wide Bay. For new arrivals, fish and seafood, including oysters, was a familiar food source in these new urban environments.

The first settler groups to move into the estuaries from the 1860s were not interested in the stewardship of oysters. They were only intent on extracting as many oysters as possible from any given place to reap a financial reward. To meet the growing demand in the cities, oysterers travelled along the coast to find the fattest oysters. While oyster fishers hand-picked oysters from the mudflat areas, they also harvested the reefs by dredging from small boats. In the intertidal area, this entailed breaking the reefs apart with a steel spike to allow oysters to be bagged into 120-dozen lots for market. In the deeper water, fishers dragged a wire-dredging basket along the estuary bed, destroying the reefs as they went. Using these methods, fishers worked oyster reefs for approximately three years, taking off every animal, before moving to the next spot in the estuary. They called this “skinning” the reef, replicating a stage in the processing of terrestrial animals for meat. Oysterers expected that reefs would regrow naturally and that, after a period of time, they would be able to come back to the reefs and start again. To their surprise, they found that once destroyed in this manner, the reefs did not grow back.

This story of decline was not unique to Queensland estuaries: it echoed the destruction perpetrated in New South Wales and across the globe in New York and Chesapeake Bay, and in France, Scotland, and Ireland. Faced with the decline in oysters in this Queensland region, oysterers turned to oyster cultures from abroad to stabilise quantities of oysters for market. In each of these places, governments, scientists, entrepreneurs, and speculators had devised different methods of oyster culture. In Australia, however, a tiny mudworm directed the kind of methods adapted for local estuaries.

Mudworms, *Polydora* sp., like oysters, are also estuary creatures; they co-exist with oysters all over the world. Mudworms co-habit with oysters, boring into the interior shell, collecting sediment courtesy of the filtering from its host, and then secreting a muddy

substance into their shared space. Oysters rebel against these living arrangements by expending energy trying to oust their tenants. Individual oysters end up stunted, and when consumers open these shells, the odour of mudworm excrement assails their senses. Ordinarily, in nineteenth-century estuaries, mudworms caused negligible damage to oysters. From 1880, settlers noticed more depleted oysters in their catch; a problem for people making a living out of the sale of oysters for food. There are two views on why this happened. One blames an invasive species event, making the mudworm from New Zealand responsible for the damage to oysters in these estuaries; the other considers the broader changes to the river ecologies and subsequent sediment loads as a result of land practices associated with Australian colonial capitalism. Either way, the explosion of mudworm populations quelled the oyster trade, with the first mass occurrence in Queensland recorded in Coomera River in 1895, and the subsequent collapse in most of Moreton Bay in 1898.

In 1890, the New South Wales colonial government enlisted zoologist Thomas Whitelegge to investigate mudworms. He observed that oysters from the intertidal area had a lower incidence of mudworm infestations than those from deeper water. After a series of experiments, he showed that mudworms did not like the periods of drying in sunlight at low tide that oysters easily tolerated. This was a fortuitous outcome for oyster fishing, as harvesting from depleted reefs became secondary to the “laying down” of oysters in the intertidal zone. Oysterers shifted their practices from extraction by collection to the invasive processes of oyster farming. The mudworm moved the industry towards an artificial means of growing oysters.

As the destruction of self-sustaining oyster stocks also affected other fisheries in the world, it is not surprising that the migrant populations in the Queensland estuaries experimented with culture technologies with which they were already familiar. All introduced culture technologies focused on collecting free-flowing oyster larvae as it settled and attached itself to estuary substrate, thus becoming oyster spat. When oysters spawned as the water temperature rose, millions of young oysters floated free in the spring seas. Northern hemisphere oyster farmers concentrated on introducing artificial substrate to collect oyster spat. In Italy, they tied bundles of sticks, called fascines, together and hung them in the centre of low-flow lakes. In France, they used tiles laid out in specially made ponds called *claires*. In the United Kingdom, oysterers placed rocks and old shell into oyster areas to expand the oyster growth. In Chesapeake Bay,

Americans combined these European techniques to best effect in their conditions, while in Japan, where culture was already thousands of years old, oysterers strung old shells from bamboo rafts at regular intervals to catch spat. In China, bamboo sticks were carefully placed where oyster larvae settled, sometimes in the intertidal area and sometimes in the subtidal area. Australian oysterers trialled each of these techniques and modified them to the new oyster ecologies of the southern Queensland estuaries.

The oysterers of these southern Queensland estuaries, along with those in New South Wales, tackled these multiple challenges—mudworm, destroyed oyster reefs, and changed river systems—by turning to a techno-fix. Like their northern hemisphere counterparts, they concentrated on collecting the oyster spat; that is, intervening in the life cycle of the animal to increase the population size in captivity. They incorporated Whitelegge's scientific observation by restricting oyster culture to the intertidal area to reduce mudworm numbers. However, in the Queensland estuaries, as elsewhere in Australia, these innovators also used observations of their own. Oysters attached to the intertidal mangroves, and this became a blueprint for what was to come.

One of the simplest methods of collecting oyster spat was the use of fascines. In Europe, this method was used in low-flow lakes. In Australia, oysterers laid fascines along the foreshore. Similarly, two styles were borrowed from China: sticks were built into tents and anchored into the mud flats, or sticks were placed deep into the mud, but in a diagonal pattern that pressed all the sticks together. The tent formation, in particular, mimics the mangrove structures found all over southern Queensland. As with the fascines, the constructions ensured the bundles were anchored against the tide. The advantage of the Chinese method was a larger surface area for the oyster spat—fascines placed directly on the ground lost at least one quarter of their surface area. In both cases, oysterers aimed to provide enough weight with their constructions to withstand southern Queensland tidal flow. Then the oysterers waited for the spat to attach as the weather warmed in the spring months.

Oysterers mobilised a second phase of this kind of oyster culture once the spat attached. Whether with fascines or tents or diagonal arrangements, each stick, with its brood of animals, was individually placed into the intertidal area. From 1889 on, the Queensland government regulated the intertidal areas of these embayment estuaries with oyster leases. Settlers filled acres of these intertidal areas with cultured oysters, concentrating

especially on the perfectly suited mudflats around the barrier and inner bay islands. The deep sticky mud, which regularly caught out unknowing settlers, took each stick and held it steady as the tide came and went each day. The oysters grew, and the mudworm died. Oysterers harvested these areas at the end of a three-year period. They pulled each stick at high tide into the small agile punts that worked all over the bays. At high tide, the mud released her bounty. In the low tide, the drier mud held fast. Fishers knocked each stick, heavy with mature oysters, against the gunwale of the boat, so that the oysters fell and young hands bagged them for market. They then threw the sticks back into the estuary.

All along the eastern Australian coastline, wherever oysterers introduced these methods, they needed a steady supply of timber for the oyster sticks. Whereas bamboo was the timber of choice in China, in Australia mangroves took their place. Australia has 41 species of mangrove; oysterers favoured the black mangroves, *Aegiceras corniculatum*, a water-durable timber evolved to live in brackish water. Harvesters cut the black mangroves down to uniform four- to six-foot-long sticks for use in fascines and tent formations. These sticks survived in the water for around three years before they started to break down, which was fortunately the same time required for oyster maturation; oysterers took advantage of this biological decay. Dealing in mangrove sticks became an important trade in itself. By looking at the export trade records for one river, the Richmond River in northern New South Wales, conservation manager Patrick Dwyer estimates that three million mangrove sticks left that estuary by the 1920s, desecrating the mangrove forests for up to 20 kilometres along the riverbanks. No such historical study is available for the oyster farming areas of southern Queensland. But like the oyster trade's impact on oyster reefs before them, oyster culture devastated part of the estuary ecology, here, mangrove forests.

Oysters are found all over the world. Their briny flavour and their accessibility on the foreshores of most estuaries have made them favourites of coastal peoples on many different continents. As population numbers rose, particularly in cities, during the nineteenth century, self-sustaining oysters became a thing of the past. Settlers replicated this problem in the embayment estuaries of southern Queensland, quickly depleting stocks of abundant oysters. In their wake, oysterers heralded oyster culture as the answer to this environmental problem and adapted spat collection technologies from the northern hemisphere to local ecological conditions. These adaptations reflect the many

different technological skills of the people who lived in the estuaries, reflecting knowledge from Indigenous Australia, England, France, Scotland, Ireland, Japan, or China. Oysterers created new ecologies that demanded the constant presence of oyster people, while guaranteeing the loss of some estuary flora and fauna. Such was the devastation by the 1920s that oysterers looked to new technologies to replace the mangrove stick culture. But that is another story.

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