

SMASH IT UP!

PARTNERSHIP PROJECT TO CONTROL PACIFIC PESTS

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Introduction

Sydney Rock Oysters grown on the NSW South Coast are sold to fish markets and served at iconic seafood restaurants throughout the country. However not many who feast on these aquatic delicacies are aware of the battle some Sydney Rocks have to endure with their Pacific counterparts before reaching fine diners' plates, nor the unique partnership projects which have been undertaken to combat this declared pest.

This paper describes the unique nature of a pest control model which has not only protected the local estuarine ecology, but also improved the sustainability of the south coast oyster industry and provided training and employment opportunities for the local Aboriginal community to continue their work as Coastal Custodians.

The Nature of the Beast – the Ecology and History of Pacific Oysters in NSW

Endemic to northeast Asia including Japan, the Pacific Oyster (*Crassostrea gigas*) is incredibly adaptable and has become the most ubiquitous and extensively cultivated shellfish species worldwide. In Australia, Pacifics were successfully introduced for aquaculture to Tasmania, Victoria and South Australia in the 1950s and 1960s. Although they were not brought legally into NSW, it is suspected that small numbers of Pacifics were introduced which soon established populations in NSW estuaries. Their spread to other areas has likely been facilitated by unintentional mixing with native Sydney Rock Oyster (*Saccostrea glomerata*) spat which is often moved between estuaries by growers. However, Pacific Oyster larvae can also be carried large distances by tides and oceanic currents.

Initially selected for its hardy nature, disease resistance, rapid growth, high reproductive rate and ability to thrive in a wide range of environmental conditions, these same Pacific characteristics have caused significant problems for oyster farmers who culture Sydney

Rock Oysters. Capable of reproducing at ten times the rate of Sydney Rocks, Pacific Oysters will often form dense mats; settling on, then smothering the farmed native molluscs. They also occupy a greater diversity of habitats, including offshore reefs and subtidal mud, and feed on a wider range of phytoplankton species compared to the Sydney Rock Oyster.

Pacifics not only pose a significant threat to the local aquaculture industry, but detrimentally impact on estuarine ecology through habitat modification and altering benthic community structure, largely through competition with other native species for food and habitat resources. In addition, the continued spread of this introduced oyster by the aquaculture industry and restaurateurs has the potential to transport exotic seaweeds and other species, and to spread diseases or parasites that are harmful to native molluscan species.

The Fisheries Management Act (1994) lists Pacific Oysters as a Class 2 Noxious Species in NSW, requiring oyster farmers to undertake control work on their leases, except in estuaries such as the Hawkesbury, Port Stephens, Wallis Lake and more recently the Shoalhaven where approvals have been issued to culture genetically modified triploid Pacifics. It is important to note that despite this industry diversification in some NSW estuaries, Sydney Rock Oysters remain the prized seafood species and dominant aquaculture industry in this state.

Pacifics as a South Coast Pest Problem

Prior to 2000 Pacific Oysters generally only posed periodic and largely manageable problems for the South Coast Oyster Industry. However a large rainfall event in early 2008 led to a substantial overcatch of Pacifics on cultivated Sydney Rock stock and infrastructure in three south coast estuaries; the Clyde River, Wagonga Inlet and Pambula Lake.

There was widespread concern amongst the growers and local Fisheries Officers in these estuaries. Whilst growers could work with Industry and Investment NSW to remove Pacifics from their own contaminated stock and leases, large expanses of public foreshore and subtidal areas potentially harbouring thousands of these pests remained untreated. Unchecked, the opportunity for large breeders to continue spawning in what has traditionally been viewed as 'no-mans' land', and cause further economic burden to industry, was enormous.

From 'No-mans Land' to Shared Responsibility - the Partnership Approach to Aquatic Pest Management

It was recognised that a rapid, targeted and co-operative management intervention was imperative before widespread economic and environmental repercussions developed. So local growers partnered with government agencies including Southern Rivers Catchment Management Authority (CMA), Industry and Investment NSW (both the Aquaculture Unit and local officers) and Marine Park Authority, and volunteers from the

Nature Coast Marine Group to determine a control strategy. Given the size of some of the outbreaks and control effort required in some estuaries, there was also the opportunity to engage a new stakeholder in this work; the local Aboriginal Lands Councils' Koori Work Crews.

Prior to control work commencing, detailed project planning was undertaken, with critical timing considerations including the tide (work needed to be undertaken during low tide to maximise foreshore coverage), season (control efforts had to occur prior to spawning which generally corresponds to an increase in water temperature in late spring) and project longevity (previous experience had shown that a concerted effort over a minimum of several years is required to reduce feral populations to a manageable size). Surveys by agencies and growers were also undertaken to assess the scale of the problem and highlight control hotspots. In estuaries where community volunteers and Koori Work Crews were involved, training days were held in the first year to provide background information, improve Pacific Oyster identification skills and ensure a consistent and methodical approach to control work was taken. Pacific Oysters can be extremely difficult to identify; their physical appearance is highly variable and is governed by the type of environment they are found in. Understandably, training and identification skill development for those involved is a key factor in effective control efforts.

An adaptable model was also required, depending on the size and significance of the outbreak. Thus over the past three years, a slightly different approach has been used in each of the three estuaries.

However all have involved working bees or 'Smash-up Days' engaging all partners. During working bees, small teams led by growers were allocated a stretch of foreshore and feral oysters were scored and physically removed with hammers and/or metal poles. In the Clyde and Wagonga Estuaries, teams of divers have also used snorkelling and/or SCUBA to target priority areas on the bed of the estuaries where large breeding Pacifics can grow undetected in the mud for up to 20 years, reaching sizes greater than a dinner plate and producing up to 100 million spat in a single spawning event.

The innovative partnership established between oyster farmers and Local Aboriginal Lands Councils has been pivotal to the approach used in the Clyde River and Wagonga Estuaries where significant outbreaks have been detected. Following 'Smash up Days', under grower supervision, the Koori Work Crews have undertaken critical follow-up control and survey work by returning to the control sites and targeting additional infested areas. Similar endeavours are underway further south with Pacific Oyster control flagged as a possible NRM niche under the Eden Local Aboriginal Lands Council's Land and Sea Country Plan.

During 2010 in the Clyde River, the local Koori Work Crew were also employed to clean-up derelict oyster infrastructure which was abandoned prior to 2000 making it too difficult and costly for Industry and Investment NSW to pursue the previous owners. These derelict leases harboured significant numbers of large breeding Pacifics both on and underneath the post and rails, and provided a substrate for future by-catch.

Achievements and Benefits of the Pacific Oyster Control Project

Quantitative results

Despite the different approaches and levels of effort applied in the three estuaries, overall more than 37,000 Pacific Oysters have been removed from these systems.

Quantitatively, the most significant results have been seen in Wagonga Inlet. Although 2009/10 control efforts are still ongoing, between 2007/8 and 2008/9 the number of Pacifics removed fell from over 18,000 to 9,780. This year's 'Smash Up Day' also resulted in almost half the number of feral oysters compared to the one held in 2007/8. In addition, anecdotal evidence suggests the project is having a real impact on the size of spawning events, as measured by the reduced degree of Pacific overcatch on cultivated material on growers' leases.

Interestingly in the Clyde River, similar numbers (approximately 2,500) of Pacifics were removed during the 2007/8 and 2009/10 years.

In Pambula Lake, approximately 1,500 oysters were physically removed from foreshore areas during the 2008 'Smash Up Day', whilst the two working bees held in 2009 yielded 3,000 oysters.

Environmental benefits

This work has significantly reduced the impact of a recognised aquatic pest species on the ecological integrity of the Clyde, Wagonga and Pambula estuaries. Estuaries are extremely sensitive coastal systems and the brackish and sheltered waters that typify them represent the preferred habitat for Pacific Oysters. As mentioned, Pacific Oysters are very adaptable; they are masters of disguise and exploit lengthy tracts of estuarine habitats ranging from the lower estuary to upper estuarine waters. They cause significant habitat modification and outcompete many native species. The control work undertaken during this project has therefore achieved significant and widespread environmental benefits for the three treated estuaries.

Furthermore, there is still much to learn about Pacific Oysters and their impact on NSW waters. Even in some significantly affected estuaries, there are great lengths of foreshore and other likely areas where it is difficult to locate individuals, yet in the same estuary there can be unexpected hotspots. This project has thus provided additional information which will contribute to our understanding of the occurrence and habits of this aquatic pest.

Economic benefits

Economically, Pacific Oyster control efforts have helped improve the long-term sustainability of the oyster industry on the NSW south coast. It has reduced the costs to farmers who can spend up to an additional 3 hours/day (approximately \$90,000/year) manually removing this pest from farmed native stock and cultivation

infrastructure. By removing many of the large breeding Pacifics from the system, the reduction in spawning capacity and thus potential for future outbreaks has also been significantly reduced.

In the Clyde River additional economic benefits have resulted from the removal of 5ha of abandoned water-based leases. Anecdotal evidence suggests that the number of Pacifics has not only been reduced by up to 100,000, but farmers with active leases adjacent to some cleaned-up areas witnessed a triple-fold increase in the growth of their Sydney Rocks within 2 months of the derelict infrastructure being removed.

In terms of economic benefits for the local Aboriginal communities, 'consistency, reliability, competitiveness, thoroughness, quality control and communication are all skills that have been developed by the members of the Work Crew. The satisfaction that picking a wages cheque brings to the faces of the Work Crew is gratifying and inspiring' (Mal MacCallum, CEO, Batemans Bay Local Aboriginal Lands Council). Their work is not only important for the oyster industry but also the community as a whole as they help maintain the ecological integrity of our highly valued estuaries.

Social benefits

This project has improved the capacity of local Aboriginal communities to continue their work as Coastal Custodians. It has provided a different type of employment opportunity for Koori Work Crews which have traditionally been involved in land-based NRM projects such as site assessments and bush regeneration. By providing follow-up employment, it has also built up their experience and knowledge, as demonstrated in Wagonga Inlet by the increased efficiency of the crew in locating specimens during the second and third years of control work. Much of the planning for future target areas in this estuary was also guided by their valuable observations and input.

From other social perspectives, the Pacific Oyster Control Project has broadened the outlook, understanding and appreciation oyster farmers have of the local Aboriginal community and their connection to the estuaries and surrounding lands. Along with other oyster partnership initiatives run by Southern Rivers CMA, it has further encouraged growers in individual estuaries to form more cohesive groups and to actively participate in driving estuary priorities and rehabilitation efforts. It has also demonstrated to industry, the commitment of agencies to work together and help address a problem which has significant economic repercussions for their livelihood.

Where to from here?

At present, a source of on-going funding, particularly for intensive control efforts by Koori Work Crews, does not exist. A detailed project review of the last three years' efforts is currently being undertaken. If report findings reveal that Pacifics have reached a manageable threshold, it is anticipated that intensive control work could be replaced by an annual monitoring and maintenance program. This could still include annual working bees, with a view to increase future control efforts using the Koori Work Crew model if required.

Conclusion

Overall, the Pacific Oyster Control Project has not only protected the local estuarine ecology through treating a recognised aquatic pest, but has improved the sustainability of the south coast oyster industry and provided training and employment opportunities for the local Aboriginal community to continue their work as Coastal Custodians. It showcases the significance of partnerships between the oyster industry, agencies, community organisations and the local Aboriginal community, and the need for these groups to work cooperatively to achieve environmental, economic and social outcomes. There is the potential to use this model to strategically target other pest control problems or issues in the coastal zone, particularly where there is a need to move from 'no-mans' land to shared responsibility.

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