Oyster origin stories

How 'native' and 'alien' categories shape restoration in northwestern Europe

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The coastal road of Mersea Island in southeast England is lined with seafood restaurants proudly promoting home-grown 'gigas' (Pacific) oysters (*Crassostrea gigas*), sold raw or grilled. The island boasts a longstanding heritage of oyster fishing and cultivation. Historically, the flat oyster (*Ostrea edulis*) was the star of Mersea's oyster culture. As stocks plummeted, the Pacific oyster was introduced and subsequently replaced the flat oyster on restaurant menus. Over the last decade, however, the flat oyster has made a comeback, as the island now hosts one of many restoration projects across the European North Sea aimed at reintroducing this species to waters where it once flourished.[1]

Restoration and categorization politics

Flat oysters have all but vanished from Europe's waters over the past century – victims of overfishing, pollution, brutal winters and diseases carried by overseas shipments. The surging interest in restoring oyster reefs marks a sea change in marine conservation thinking. We are no longer content with merely preserving what little remains; instead, we are actively trying to rebuild what has been lost. This shift comes from the growing realization that in an era of climate chaos and biodiversity collapse, nature sometimes needs hands-on help to bounce back from the damage we have inflicted (Pauwelussen & Vandenberg 2024).

Despite its seemingly benign nature, care is inherently political (Parreñas 2018). It involves biopolitical assumptions about which forms of nature deserve rehabilitation, the principles guiding these decisions and which creatures should be included in these efforts. The European flat oyster has emerged as the central figure in marine restoration largely because it is considered 'native to Europe' – and therefore authentic – unlike the introduced and 'alien' Pacific oyster.

Our research, conducted between 2022-2024, is based on field visits in England and the Netherlands, document analysis and interviews with oyster farmers,[2] restoration practitioners and scientists. Drawing on this research, we trace the historical foundations of the native/alien divide as it plays out in North Sea oyster restoration. Our findings reveal that categorizing oysters into 'native' or 'alien' boxes is more than just labelling – it actively shapes what happens on the ground and determines which human-oyster bonds get the official stamp of approval in restoration work.

First, we will examine how old maps helped establish the flat oyster as a 'true native' of the North Sea, tracing how these native/alien labels evolved in biology. Then we will explore how Pacific oysters got branded as invasive troublemakers, despite their ecological benefits. After that, we will contrast scientific perspectives on oyster ecology with the knowledge that oyster farmers have gained through generations of hands-on experience. Finally, we will consider some alternative viewpoints that challenge the native/alien divide, pointing towards more blended approaches to restoration and multispecies care.

Cartographic origins of nativeness

The European flat oyster's candidacy for marine restoration got a major boost from the rediscovery of a 19th-century fisheries map (Olsen 1883). This influential document shows vast flat oyster beds sprawling across the North Sea. The map, despite being based on questionable surveys and

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Fig. 1. *Plate of Pacific oysters for consumption, Mersea, 2022.*
Fig. 2. *Flat oyster restoration in the Netherlands 2024.*

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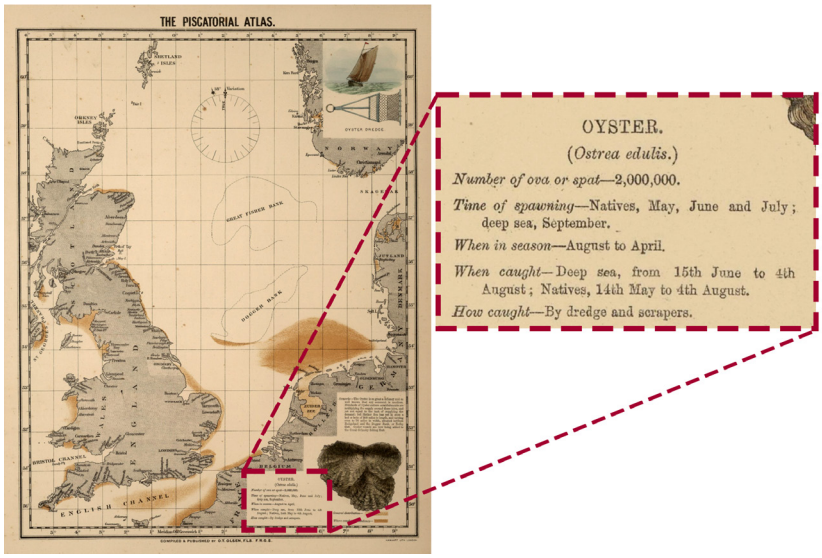
1. https://tinyurl.com/ENORI1/.

2. For simplicity, we refer to 'oyster farmers' throughout the text, though on Mersea Island the term 'oystermen' is preferred as it better reflects the integrated nature of their oyster fishing and farming practices.

3. https://open.spotify.com/episode/1JfSWEpPtt313ZENzD1xDl?si=5BTY-a2SRnSkwFtm8_i06g.



PUBLIC DOMAIN

WELLCOME COLLECTION

Japanse oester bedreigt Zeeuwse soort

Van onze correspondent

YERSEKE — Het Rijksinstituut voor Visserij Onderzoek heeft de vereniging van Zeeuwse oesterkwekers geadviseerd een grote verdelgingsactie tegen de opmars van Japanse oesters in de Oosterschelde te organiseren.

De biologen vrezen dat de kansen voor het herstel van de Zeeuwse oesters door verdere uitbreiding van het Japanse onkruid-oestertje gevaar lopen.

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Fig. 3. *Flat oyster map in O.T. Olsen's* The piscatorial atlas *(London: Grimsby 1883: 50).*
Fig. 4. *Hewett Cottrell Watson. Lithograph, 1839.*
Fig. 5. *Article on the threat of Japanese oysters to Zeeland's native oysters,* De Volkskrant, *10 July 1980.*

data translation methods, has become a standard visual in scientific reports. It is frequently cited as evidence of flat oysters' original habitat and, consequently, where they are considered native today.

What is fascinating about this map is not just its role as a reference point for North Sea restoration work, but also how differently it categorizes oysters compared to more contemporary discussions. On closer inspection, one can see that the map distinguishes between two types of flat oysters: 'natives' hugging the coastlines and 'deep sea' flat oysters living further offshore. This usage bears little resemblance to how 'native' is used in today's restoration discourse, which now encompasses the broader geographical region of Europe where flat oysters are presumed to have originated and are thus considered 'native' to. This shift reveals how categories like 'native' are not fixed biological facts but contextual ideas that gain meaning within specific frameworks and purposes.

This historical reshuffling of oyster categories mirrors a broader pattern in the way scientists have sorted organisms into 'belonging' or 'not belonging' in particular places, uncovering the social roots beneath seemingly natural taxonomic distinctions.

Genealogy of native/alien distinctions

The historical record shows that the native/alien categorization first emerged in early 19th-century Europe, when British botanists were developing taxonomic language to identify 'a true British flora' (Subramaniam 2019: 10). Amateur botanist Hewett Watson, who had a background in law, borrowed native/alien terminology from English common law on citizenship rights and applied it to plant classification (Chew & Hamilton 2011). Consequently, social classifications seeped into the natural sciences, distinguishing between organisms that 'belong' and those considered 'foreign'.

The key principle behind this distinction was human involvement: 'natives' were organisms that had reached an area 'on their own accord', while 'aliens' were those whose movement was facilitated by humans. The idea that species have original geographical territories to which they rightfully belong still underpins Western restoration policies today (Chew & Hamilton 2011: 43). It was not until the emergence of invasion biology in the 1960s, however, that the mobility of alien species became problematized through the concept of 'invasive alien', generating concern about non-native species threatening indigenous ones (Elton 1958).

Recent anthropological and interdisciplinary scholarship has taken a hard look at the xenophobic undertones in the classification of organisms as natives or aliens (e.g. Warren 2021). The native/alien distinction in restoration legitimizes assumptions about inherent 'nativeness', 'alienness' and 'invasibility' as qualities residing within particular organisms, portraying them as existing in permanent states of belonging or non-belonging in specific locations. When the dominant behaviours of 'alien' species are problematized because they 'don't belong', the native/alien categorization informs marine conservation approaches that restrict or remove aliens to protect the welfare of native species (cf. Helmreich 2005; Moore 2012).

These ideas are not just academic abstractions – they have also shaped how different oyster species are understood and managed throughout European waters, especially in labelling Pacific oysters as problematic invaders.

Constructing the invasive alien

Despite all the talk about the native origins of oysters, they have actually been highly mobile for centuries. Flat oysters have been fished, farmed and traded across Europe since at least Roman times, fuelling flourishing and interconnected oyster cultures in places like Mersea and Zeeland (Netherlands). These movements spread beyond Europe during Western imperial expansion from the 16th century onwards (Kurlansky 2007). Things took a turn for the worse in the late 20th century when flat oyster spat carrying the parasite *Bonaemia* arrived in Europe from a Californian hatchery, causing already struggling stocks to crash even further. In response, UK and Dutch authorities actively encouraged Pacific oyster imports in order to keep regional oyster industries afloat.

> The government […] wanted to make sure there's enough stock for the industry so they encouraged the introduction of the gigas [Pacific oysters]. (Oyster farmer, Mersea, 11 August 2022)

> We was told by the powers that be, that because of the water temperature difference, they wouldn't spawn. And then before you knew it, bang! They're everywhere! (Oyster collector, Mersea, 27 June 2024)

Initially, scientists and policymakers were confident that Pacific oysters could not reproduce in the chilly North Sea. Yet within a decade of their introduction, they were not only reproducing but thriving well beyond oyster farming areas. This unexpected turn raised alarm, and the Pacific (or 'Japanese') oyster became quickly labelled as an 'invasive alien' – a non-native species so dominant to be considered a threat to indigenous organisms. A 1980 Dutch newspaper headline captured the rising panic: 'Japanese oysters threaten "Zeeland" oysters' (Fig. 5).

> The National Institute for Fisheries Research has advised the association of Zeeland oyster farmers [member of the Nederlandse Oester Vereniging] to organize a major extermination campaign against the advance of the Japanese oyster in the Eastern Scheldt. The biologists fear that the chances of recovery of the [flat] Zeeland oyster are at risk due to the further spread of the Japanese oyster-weed. (*De Volkskrant* 1980; our translation)

Pacific oysters have now spread throughout European coastal areas and vastly outnumber flat oysters. But whether they actually harm or help native species remains contested among researchers and on-the-ground practitioners.

The way Pacific oysters became branded as invasive has fundamentally shaped how people view and value the ecological contributions of different oyster species in restoration projects.

Contested ecological heroism

In restoration circles, Pacific oysters are often demonized while flat oysters are celebrated as 'ecosystem engineers' – a term biologists coined in 1994 for organisms that create conditions which help other species thrive. Flat oysters get

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praised for building reef-like structures that shelter and feed other marine life. In line with this, one practitioner referred to flat oysters as 'little ecological superheroes' in a marine restoration podcast, suggesting that once reintroduced in large numbers, they would become key allies in healing damaged ecosystems. Her colleague added: 'this is what we are now finding out'.[3] Since wild flat oyster populations had largely disappeared before modern environmental science took off, their ecosystem-building abilities remain largely theoretical and are still being researched (zu Ermgassen et al. 2020).

This scientific optimism contrasts with what experienced oyster farmers told us. Oyster farmers in Essex have a darkly humorous saying: 'The first thing flat oysters think of doing is dying. They would die twice if they could'. In our conversations with the oyster farmers, some expressed scepticism about flat oysters as restoration allies, describing them as creatures that 'need constant care'. One fisherman put it bluntly: 'They're like babies, they don't survive in the wild. Why pump so much money and effort into an animal that just doesn't want to survive?' (25 June 2024). He also pointed out that flat oysters grow much more slowly than Pacific oysters and tend to form 'beds' (aggregations on the seafloor) rather than the three-dimensional reefs restoration scientists get excited about. A Dutch oyster expert we spoke to acknowledged this challenge, admitting that while the flat oyster is a 'difficult animal to work with', its status as 'the native species of the deep North Sea' makes it 'our trophy oyster' (8 April 2022).

Given their contested ecosystem benefits and the farmers' lived experience of flat oysters as fragile creatures, how did the 'ecosystem engineering' qualities become attributed to flat oysters in restoration? Oyster restoration in Europe at the beginning of the 21st century was inspired by four decades of similar work in the United States, particularly in New York and Chesapeake Bay. In the US, the focus of restoration efforts is the Eastern or 'Virginia' oyster (*Crassostrea virginica*), and knowledge of this oyster's behaviour has guided the goals and conditions for restoring flat oysters in Europe. The Eastern oyster behaves in a similar way to the Pacific oyster, sharing their ecosystem engineering qualities (Bersoza Hernández et al. 2018).

Yet in European restoration contexts, these qualities get attributed mainly to flat oysters, while similar characteristics in Pacific oysters are usually framed as invasive rather than restorative in North Sea coastal ecosystems.

While scientists continue to debate the ecological value of different oyster species, the people who make a living from these creatures may have radically different views on their worth and place in the ecosystem.

Alternative farmer perspectives

In contrast to restoration rhetoric, most European oyster farmers have grown quite fond of the supposedly 'alien' Pacific oyster. Watching Pacific oysters thrive where flat oysters struggle, a Mersea oyster farmer we interviewed explained: '[I]t's what nature does. She changes and we follow those changes' (12 August 2022). Another farmer shared a similar view:

> There is climate change, pollution. Look at them flats! It's not an environment for them to thrive in, they will never recover from that […] they are part of the story, but we shouldn't get sentimental about it. Our story of 8 generations oystermen[2] is that adaptability is our heritage, not being stuck in the past. (27 June 2024)

Oyster cultivation across the North Sea region has shifted almost entirely to Pacific oysters, with European flats now primarily marketed as culinary specialities for connoisseurs. This transition reflects the Pacific oyster's practical advantages: faster growth, popular taste and greater resilience to changing water conditions associated with climate change. Nevertheless, concerned about the further spread of this 'invasive alien', several countries – including the UK – have implemented strict regula-

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Fig. 6. *Researcher on Mersea holding a flat oyster, demonstrating how it provides habitat for other creatures.*
Fig. 7. *Ecologist on Mersea holding a Pacific (left) and flat (right) oyster.*

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Fig. 8. *Oyster farmer, the Netherlands 2023.*
Fig. 9. *Oyster pits, Zeeland, the Netherlands, 2023.*

tions limiting Pacific oyster cultivation to existing areas. One Mersea oyster farmer characterized this approach as 'racism, but for oysters' (12 August 2022), while another questioned:

> How long does it take an oyster to become naturalized? It's like the migrants we now get from London to work in the business. The gigas [Pacifics] are here to stay; they're spawning, making families, while the natives…we get them from Cornwall to resell here. These gigas are more local than the natives! (27 June 2024)

Similarly, in the Dutch oyster-farming heartland of Zeeland, the 'Zeeland oyster' is actually a Pacific oyster, proudly described by a local farmer as 'marinated in Zeeland's local waters' (13 June 2024). Though she continues to cultivate flat oysters as a niche product, her business primarily relies on these localized Pacific 'Zeeland oysters'.

These examples show how oyster farmers develop their own notions of belonging that incorporate all sorts of contextual understandings of origin and authenticity, rooted in their everyday work of raising oysters in changing seas. In contrast, the hardline native/alien split in restoration creates a kind of permanent 'immigrant' status for certain species. It constructs a way of valuing and understanding flat and Pacific oysters that does not match with those making a living from them. In the UK, this disconnect has created friction between farmers and restoration projects – not just because of potential restrictions on Pacific oyster farming, but also because restoration projects often disregard the ways farmers understand and care for oysters in their daily practices.

As scientists gradually accept that Pacific oysters are here to stay in European waters, some ecologists have begun to reconsider their potential contributions. These oysters build intricate reef structures that create homes and hunting grounds for all sorts of other sea creatures. In the Dutch Voordelta region, researchers made an unexpected discovery that challenges the standard narrative – they found Pacific and flat oysters forming mixed reefs together. This finding suggests that under specific environmental conditions, these species might coexist in a more complex relationship than the widespread pattern of Pacific oysters outcompeting their native counterparts.

This has led a group of Dutch marine scientists to ask: may 'invasive' oysters enable the recovery of native ones? (Christianen et al. 2018). While still controversial, the view that Pacific oysters could be allies in restoration opens up new possible trajectories for multispecies forms of care that challenge the prevailing dichotomies of native/alien and invasive/restorative.

Conclusion

Native/alien categories shape restoration work, determining which species deserve what kind of care and in what setting. As we have shown, these are not neutral labels but powerful conceptual tools that materially affect how human-oyster relationships develop in restoration contexts.

As Braverman (2018) has demonstrated regarding coral reefs, representational frameworks in marine science can transform organisms from 'grievable' to 'killable' entities and vice versa, reflecting shifting restoration priorities. Understanding restoration as a practice of care helps illuminate the biopolitics of how native/alien categories simultaneously construct 'good nature' (native) and 'bad nature' (alien). Our analysis of oyster restoration aligns with previous observations that care for nonhuman organisms is neither innocent nor value-neutral. Instead, it reflects historically embedded assumptions about what constitutes good and healthy nature (Lien & Law 2011; Parreñas 2018; Pauwelussen & Vandenberg 2024). If we think about care as political, the categorizations of 'alien' and 'native' are both integral to what care as a practice of ecological repair entails.

The native/alien categorization is not merely representational but consequential for the realities it describes; it determines which relationships between humans and marine organisms become integrated into restoration frameworks. Rather than advocating for a rejection of these categories, we argue for context-specific reflection on the values and assumptions that inform their use, recognizing how they determine which entities and relationships are legitimized within restoration practices. Making these assumptions explicit opens them up to critical discussion and allows for accountability regarding the human-oyster relationships and practices that these categories enable or constrain.

This approach might create a space to explore alternative, potentially more hybrid forms of coexistence and collaboration, including mixed Pacific-flat oyster reefs and partnerships with farmers based on their situated practices of oyster care. For restoration policy and practice, this means moving beyond rigid native/alien divisions to embrace multiple forms of human-oyster relationships, including those developed through farming. By listening carefully to farmers who intimately know their waters and the creatures they care for and by recognizing the complex, ever-shifting realities of coastal environments, restoration efforts can develop more inclusive and socially embedded approaches to oyster stewardship across the North Sea region and beyond. ●

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