

A holistic approach to Invasive Alien Species management in freshwater aquatic, riparian and coastal ecosystems across England

Invasive Non-native Species: Marine Examples



Slipper limpet (*Crepidula fornicata*)

The Slipper limpet first arrived here from North America in 1872, that and several further accidental introductions probably resulted from importations and subsequent stock movements of American oysters and other shellfish to which Slipper limpets were attached. By the 1970s it was thought to be the dominant seabed creature in the Solent. It is now common especially in estuaries and other sheltered sites, from Milford Haven all along the south coast of England and Wales and up the east coast as far as Spurn Head.



Image © www.jaxshells.org

Bivalve fisheries and mariculture may be severely affected economically due to the loss of suitable habitat for farming, competition for food, and increased costs associated with the sorting and gathering of heavily infested catches and the cleaning of fouled shells. In Brittany, the scallop industry has lost an estimated 97% of the harvestable area. Stock movements and dredging activities may also be restricted.

In 2006 Slipper limpets were accidentally brought into the commercially important mussel beds in the Menai Strait, north Wales with mussel "seed" from an infected area of the English Channel. Such was the considered threat that a costly eradication attempt was undertaken by the industry during which 1,200 tonnes of mussels were removed from the beds, which were then completely smothered with clean mussel seed. This seems to be one of the very few successful eradications of a marine INNS and has led to changes in the industry's codes of practice.

Slipper limpets also significantly impact natural intertidal and subtidal habitats as they deposit large quantities of faeces and pseudo-faeces as silt causing smothering and the loss of hard-surface habitat available for other species. They also frequently aggregate in huge numbers, competing with native species for space and food.



Stack of Slipper limpets. Image © John Bishop, MBA



Shells covering a beach in Connecticut, USA. Image © Lori Schroeder

External links:

[GBIASIP](#) Factsheet

[CABI](#) Factsheet

Carpet sea squirt (*Didemnum vexillum*)

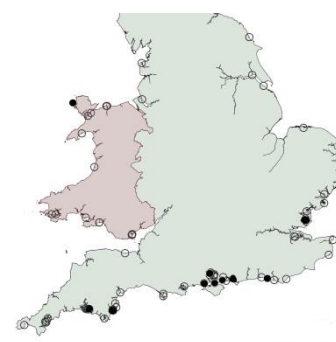
The highly invasive carpet sea-squirt *Didemnum vexillum* is an animal from a group known as colonial ascidians. Thought to be native to the NW Pacific, it has been spreading rapidly globally since the 1970s. It was first recorded in the UK in 2008 in Holyhead, Wales. It is now well-established in marinas along the S coast of England from Lymington to Brighton, and sub-tidally off the Kent coast in Herne Bay. An attempt is currently being made to manage an outbreak in Loch Creran in Scotland. The cost of an ultimately unsuccessful eradication attempt in Holyhead marina (2009-2012) was in excess of £800,000.



Image © John Bishop, MBA

Economic impacts include the overgrowth of fish spawning grounds, smothering of shellfish beds and ropes, and the fouling of ships' hulls, leisure craft and aquaculture equipment. The shellfish fisheries most at risk in the UK are those of bivalve molluscs such as mussels and oysters grown from ropes or on hard substrates.

A study into the likely impact on blue mussel seabed cultivation in Wales suggested a potential 40% coverage of beds by *D. vexillum* and a 25% loss in production due to poor growth or mortality due to smothering. It can also have ecological impacts on natural habitats as it is capable of overgrowing most hard substrata in the sub-tidal zone and rockpools, potentially competing with native species for space and food, altering habitats and/or displacing native species such as seagrasses and scallops. Areas under threat include a number of Natura 2000 European Marine Sites with habitats and native species in the Biodiversity Action Plan (BAP).



Distribution in England and Wales 2017 (black dots).
Image © C Wood, MBA

Carpet sea-squirt can easily be spread via shipping, leisure craft or aquaculture stock movements. Colonisation of new areas can occur sexually via swimming larvae or asexually through translocation of viable colony fragments.



D. vexillum fouling in British Columbia. Image © Gordon King

External links:

GBNNS [Factsheet](#)

Alert [recording scheme](#)

[Video of dive](#) off Herne Bay

[Report on Holyhead eradication attempt](#)

Trumpet tube worm (*Ficopomatus enigmaticus*)

The Trumpet tube worm (also known as Coral worm or Australian tube worm) *Ficopomatus enigmaticus* is native to the Southern hemisphere but now occurs in warm and temperate regions globally. It was first recorded in the UK in 1922 in London Docks. It thrives in low energy coastal brackish waters subject to fluctuating salinities such as estuaries and lock-gated marinas with input from storm drains.

Its ability to rapidly proliferate forming dense encrustations or biogenic reefs up to a metre thick makes it a problematic species whose impact seems to be worsening in the UK as our waters get warmer. In marinas and harbours, within just a few weeks, it can cover any underwater surfaces, and particularly metal objects such as props and anodes, this can lead to reduced speed, increased fuel consumption or in extreme cases engine failure. It seems to be resistant to most antifouling coatings although it can be removed with hard brushing or scraping. One lock-gated marina has found that increasing the periods of free-flow has reduced the problem.

The Trumpet tube worm also presents problems for power stations as cooling water pipes can become blocked.

Ecologically the Trumpet tube worm can be beneficial as few native species can survive under such variable salinity conditions. It can enhance water quality by removing particulate matter and also alter the hydrodynamic and sediment characteristics providing a new complex habitat for native benthic species.

External links:

[Investigating the Impacts of Marine Invasive Non-Native Species](#) (NECR223)

GBNNS [Pathways newsletter](#) No. 13

JNCC [Factsheet](#)



Image © John Bishop, MBA



Fouled rope in R. Itchen. Image © Christine Wood, MBA



Fouled yacht. © Image Rob Holland

Brush-clawed crab (*Hemigrapsus takanoi*)

This small Asian crab is one of the most recent arrivals to the UK the earliest record being from the Colne estuary, Essex in 2011. It is now well-established there as well as in the Orwell estuary, Suffolk and along the N Kent coast. The Brush-clawed crab had previously invaded the coasts of France, Belgium, The Netherlands, Denmark, and Germany. In less than 20 years, it has spread along more than 2000 km of coast in western Europe.



As a species which prefers sheltered estuaries and ports, it poses a real threat to our native shore crab *Carcinus maenas*.

On some Dutch shores there has been a drastic reduction in the number of juvenile *C. maenas* and in Dunkirk harbour the Brush-clawed crab is now the dominant crab with as many as 60 individuals m⁻² being recorded. *C. maenas* is the only native shore crab to be found in our UK estuaries where it occupies a key position in the estuarine food webs.

Image © John Bishop, MBA

Commercially it can have an impact upon newly settled shellfish, such as mussel and oyster spat through predation. *C. maenas* is the most common "peeler" crab used by UK sea anglers as bait. Whether the Brush-clawed crab will be a suitable replacement remains to be seen.

A second Asian shore crab *Hemigrapsus sanguineus* has been found at two sites in the UK, south Wales and Kent, but is not yet considered to be established. However, It is causing similar problems in NW Europe as the Brush-clawed crab and, as it is slightly larger, it is capable of preying on larger native species such as juvenile native crabs including the commercially important Edible crab *Cancer pagurus*.

Wakame (*Undaria pinnatifida*)

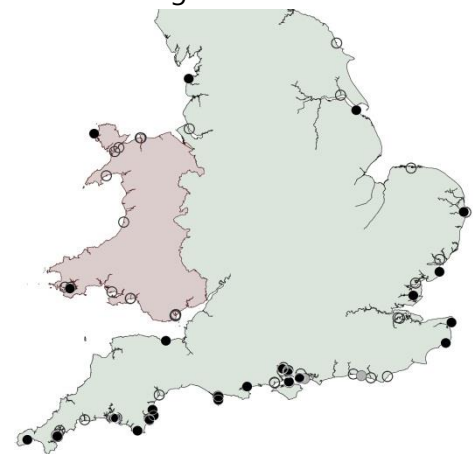
The Japanese kelp *Undaria pinnatifida* known as Wakame is considered to be a highly invasive species worldwide. It was first spotted in the UK in 1994 in the Solent. It can tolerate a wide range of temperatures and salinities, growing well in estuarine conditions, unlike many native kelps.

It competes with other macroalgal species, such as *Laminaria digitata* and *Saccharina latissima* for space and light, it can shade and abrade native seaweeds and seagrasses, dominate rockpools, alter habitats leading to changes to in faunal species, and impact on mobile species such as sea urchins. It has been recorded in at least 23 MPAs in England and Wales.

Wakame can also have an economic impact, its fast growth (typically 1-3m in a season) makes it a potential fouling nuisance of aquaculture equipment, nets, yachts (where it can tangle in propellers), and pipes which can become blocked. It is able to overgrow oyster trestles, foul mussel ropes and clog cages reducing water flow. It may impede recreational and commercial use of waterways by formation of large rafts. It became the dominant fouling alga on the pontoons in a Plymouth marina within a year of its first sighting.



Image © John Bishop, MBA



Distribution in England and Wales 2017 (black dots). Image © C Wood, MBA

External links:

[GBNNS Factsheet](#)

[Investigating the Impacts of Marine Invasive Non-Native Species](#) (NECR223)

GBNNS [Pathways newsletter](#) No. 12

[Recording site](#)