

COASTAL INVASIVES

What they are, how they're impacting our coasts, and what may be facilitating their spread.

What are invasive species?

Invasive Non-native Species (INNS) are organisms that have been introduced to areas outside their natural range. These species have a tendency to spread to the point that they threaten the survival of native wildlife or damage the environment, economy, or human health. INNS can outcompete native species for food, space, and breeding locations, making them one of the greatest threats to biodiversity. In the coastal environment, there is evidence that many exotic species actually establish populations more easily on artificial structures like sea walls or breakwaters, and that there may be a greater proportion of exotic to native species on these compared to adjacent natural habitat (Glasby et al. 2007).

Spreading Species

The species below have been found along Welsh and/or Irish coastlines and are of concern given their ability to spread and potentially harm local biodiversity.

Carpet Sea Squirt *Didemnum vexillum*



The carpet sea squirt may have spread from Japan to the British Isles via hull-fouling or on oyster spat traded for aquaculture. It can smother important farmed species such as oysters and mussels, and can prevent the settlement of fish eggs due to its acidic outer surface.

Slipper Limpet *Crepidula fornicata*

Crepidula fornicata



Slipper limpets can live in large colonies by creating dense stacks. At these high densities, they can smother the seafloor, clogging the water with silt and faeces and preventing other bivalves like oysters from living amongst them.

Wireweed *Sargassum muticum*

Sargassum muticum



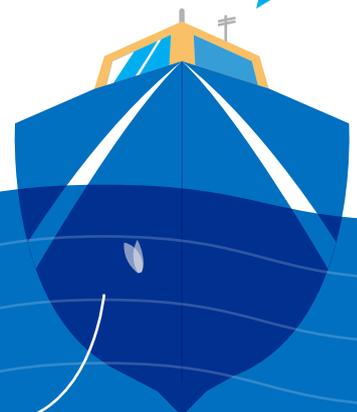
Wireweed is a brown algae that grows in dense strands. It can reduce the available nutrients and block out the light needed by neighbouring species. Fast growing, it can clog marinas, boat intake pipes, and smother eelgrass meadows.

How do non-native species spread?

The introduction, establishment, and spread of invasive non-native species has accelerated due to the expansion of global trade and transportation, and presents one of the biggest global threats to biodiversity and ecosystem functioning. Ports and marinas are particularly susceptible to the introduction of non-native species due to the movement of vessels around the globe, which can inadvertently transport INNS in their ballast waters and on their hulls. Hard structures such as coastal defences—built to combat the effects of climate change—may facilitate the spread of INNS from these initial points of introduction by forming stepping-stones of suitable habitat for these organisms.

Hull fouling is one method by which invasive species can spread:

- 1 Boats come from other ports carrying non-native species on their hulls...



- 2 When near shore, these species can move from boats to colonise coastal structures or other vessels.



Studying *D. vexillum* genetics to shed light on invasive species' resilience

Invasive species endure the extreme stress of traveling thousands of miles and still manage to succeed at establishing new populations far from their native ranges, leading scientists to believe that these species deal well with novel, stressful environments. In a collaboration between Aberystwyth University's genetics team and Bangor University's biosecurity team, Ecostructure researchers are asking just what makes invasive species able to survive and thrive outside their native ranges, when most species would not be able to.

Through experiments in the lab, Ecostructure researchers have been trying to understand the role of genetics in the variable success of several invasions of the carpet sea squirt around the Irish Sea. They aim to better understand what makes some new colonies more successful than others by testing the response of different populations to environmental stressors like marine heatwaves. This will have implications for understanding the potential for this species to continue spreading under climate change, where marine heatwaves will become more prevalent.



The Carpet Sea Squirt, Didemnum vexillum, is a highly invasive species that poses a threat to native species.

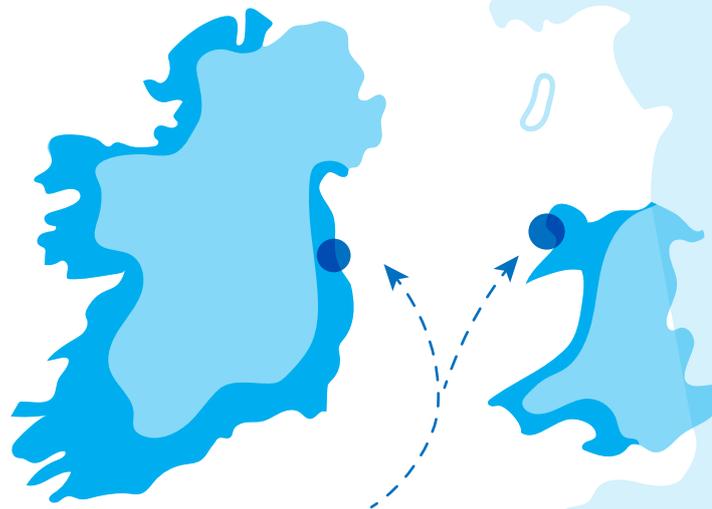
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How can I help?

The Welsh and Irish governments recommend the following steps to prevent the accidental introduction of non-native aquatic species. If you think you have encountered an invasive species, report this to Invasive Species Ireland or the GB Non-native Species Secretariat.

- CHECK** your equipment, boat, and clothing
- CLEAN** everything thoroughly with hot water as soon as possible
- DRY** for as long as you can before using again



Non-native species have arrived in Ireland and Wales on marine debris, boat & ship hulls, and on imported spat for aquaculture farms. Monitoring programmes are in place by the Irish and Welsh governments to track their spread and record new introductions.

References

Glasby et al (2007). Nonindigenous biota on artificial structures: Could habitat creation facilitate biological invasions? *Marine Biology* 151(3):887-895. -- Biodiversity Wales: www.biodiversitywales.org.uk -- Invasive Species Ireland: www.invasivespeciesireland.com -- GB Non-Native Species Secretariat: www.nonnativespecies.org.

