The increasing threat of marine invasive and non-native species (INNS) – understanding some of the issues

The sea accounts for nearly **3/4** of the world's surface...

...and is essential for food, jobs and economic growth.

However, our seas are under threat from a range of human activities, including the introduction and spread of invasive species.

Most non-native species in our seas cause few problems, but the number of damaging invasive species is increasing. This is a major issue on a global scale, particularly as there's evidence they are more tolerant to environmental change, meaning even currently benign species could gain an advantage under future climate change scenarios.

Expanding regulation is tackling this growing issue and the impacts it has on ecosystems, human health and marine economies.

But how big is the issue?

In the UK 1,795+ marine, terrestrial and freshwater non-native species are estimated to have established from Asia, North America and the Pacific. **~15% of these being invasive, costing ~£2bn a year** in natural capital and ecosystem services[1] including water and air purification, carbon sequestration and flood protection.

INNS are in the **top four greatest threats** to the world's oceans according to the International Maritime Organisation.[2] They predate on and out-compete native flora and fauna and foul artificial surfaces, causing structural damage and operational issues.

According to recent research the Antarctic is at risk from invasive species, with **1,581 ports providing 'hitchhiking' opportunities** for mussels, barnacles, crabs, and algae on ships' hulls. An extensive global shipping, fishing, tourism, research, and supply network threatens this pristine ecosystem.[3]

The lionfish is a venomous marine fish from the Indo-Pacific that has invaded the western Atlantic, and although it has not yet established in UK waters, researchers are keeping a close eye on it. The lionfish population has gone from just a few individuals in the early 1990s to an average of **150 individuals/hectare in 2008**, with an invasive range now from Belize all the way up to Rhode Island (US). The lionfish can reproduce all year round and is **regarded as the most ecologically harmful species in the Atlantic**, as it is known to reduce native fish species abundance considerably.[4]

Did you know...? The UK has fallen victim to the invasive American slipper limpet. Although this marine gastropod rarely grows larger than 5cm in length, **its effects on the surrounding habitat, biodiversity and economy are substantial.** These limpets disrupt oyster farming and fisheries and cause substantial negative effects on coastal beaches. For instance, some beaches in southern England and northern France are completely covered in slipper limpet shells, which transform the primary sandy sediment into a muddy one, **making it uninhabitable for most other organisms**.[5]

Two offenders in UK coastal waters

Photo credit: NNS Secretariat

Wireweed ***(Sargassum muticum)***
Originating in Japan, **this grows rapidly in estuaries**, out-competing native seaweed, blocking out light and oxygen.[6]

Carpet Sea Squirt ***(Didemnum vexillum)***
A filter feeding tunicate which **fast establishes huge fouling colonies** on numerous marine surfaces - piers, boat hulls, fishing equipment.

Photo credit: APEM Ltd

The solution

Early detection remains key to reducing risk and spread, and out of the box thinking is a must - such as utilising environmental DNA (eDNA) to detect presence of INNS in the water or underwater camera systems. Click here for information.

APEM's internationally recognised marine experts support government bodies, port authorities and water companies to address growing and diverse INNS related issues in estuarine, coastal and marine environments.

We know it's critical to hit this challenge head on with pathway management, rapid assessment surveys, integrated services and education. **We can support you with:**

- Baseline data surveys to determine INNS abundance and distribution
- Rapid assessment surveys to determine presence of marine INNS
- Expert INNS taxonomic identification with in-house marine BioLabs
- Risk assessments of INNS introduction/spread for specific sectors (e.g. ports and harbours, marinas) and activities (e.g. recreational boating, commercial shipping)
- Comprehensive, bespoke biosecurity plans, INNS control and eradication programmes
- Training workshops for staff and stakeholders

Click **here** to find out how APEM can support your marine INNS and ecological needs.

1. UK Government Foresight Future of the Sea report (2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/663897/Future_of_the_Sea_-_Marine_Biodiversity_Final.pdf
2. http://www.imo.org UK
3. Arlie H. McCarthy, Lloyd S. Peck, David C. Aldridge. Ship traffic connects Antarctica's fragile coasts to worldwide ecosystems. Proceedings of the National Academy of Sciences, 2022 https://www.pnas.org/content/119/3/e2110303118
4. https://www.nature.com/articles/srep32169
5. https://www.cabi.org/isc/datasheet/108234
6. RYA (Royal Yachting Association) https://www.rya.org.uk/e-news/inbrief/05-may-2021/do-you-know-your-invasive-species