

# 2023 Biodiversity Report

University of Portsmouth  
& GB Row Challenge

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# University of Portsmouth and GB Row Challenge on track to provide comprehensive eDNA biodiversity data for UK waters with NatureMetrics

UK coverage of eDNA samples collected by GB Row Challenge in 2022 and 2023

○ 2022  
● 2023



A key goal of our collaboration is to provide one of the most detailed baselines of British coastal biodiversity available for marine vertebrates (fish, mammals and birds) using environmental DNA (eDNA) analysis. The teams participating in the challenge collect samples as they circumnavigate the UK, rowing unassisted. Here you can see the location of the **143 samples collected and analysed so far**, and some of the species detected during the 2023 challenge. This data provides a unique look at the life beneath our waves.

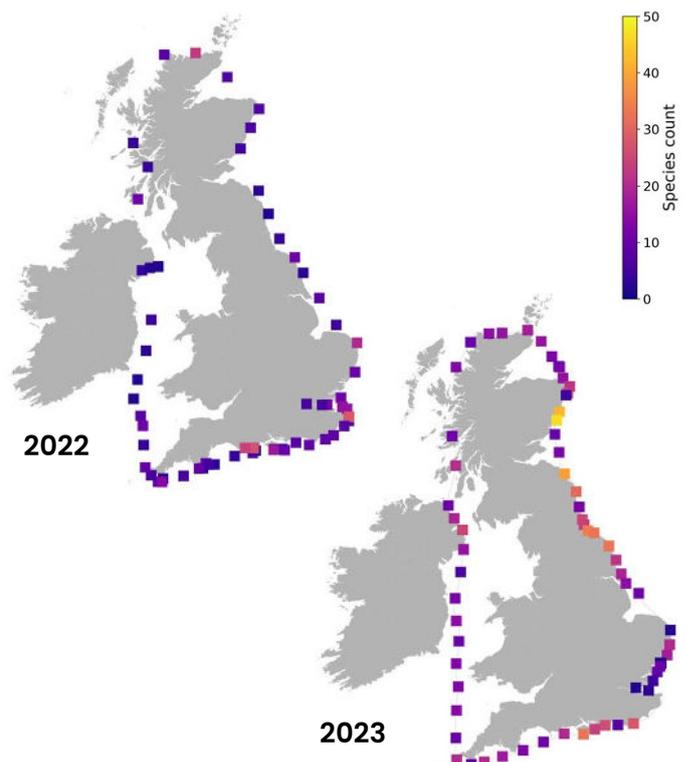


## GB Row improves the number of species detected in each sample

We detected **120 species** in 2023 across 66 eDNA samples collected by GB Row Challenge. Only 82 species were found in 77 samples the previous year. This improvement in detection comes from changes in the way samples were collected.

For the first set of samples collected in 2022, rowers filtered eDNA from the water using a bucket and a syringe, pushing seawater through a filter by hand. This was found to be very time-consuming and difficult for the rowers and the level of human DNA contamination was found to be high. In 2023, engineering partners at **Harwin** and **Porvair** worked hard to automate the process. They designed a peristaltic pump system located at the stern of the boat, that would pump seawater through a filter automatically twice daily. Rowers changed, preserved and stored the filter following each sampling event. This reduced the workload on the rowing team and the human DNA contamination. As a result, the DNA of more species could be found.

Number of marine vertebrate species found at each sampling location for 2022 and 2023

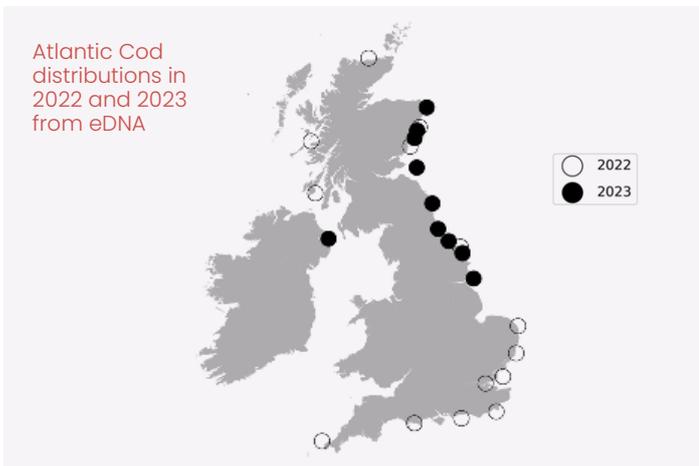


## Inter-annual comparisons

Due to the changes in sampling method, it is not currently possible to compare data directly between 2022 and 2023 for species richness (the number of species found at one location). We can, however, combine the datasets. The combined data gives exceptional spatial coverage around the UK and there are still 2 years of the project left to go! GB Row Challenge will continue to collect eDNA samples, and as the number of datasets increases, the University of Portsmouth will be able to determine if there are changes in species distributions and compositions over time. Combined with the temperature, microplastic and underwater noise data, also collected by GB Row Challenge, it

is hoped we will be able to determine current impacts of these parameters on UK coastal health. Although no conclusive findings can be gained from the data as yet due to the changes in sampling methodology, Atlantic Cod DNA was found in multiple samples both years, but in quite different locations.

These differences in distribution coincide with changes observed in the sea surface temperatures (2023 Temperature Report). As we establish baselines and expand the spatiotemporal coverage of eDNA samples, we will improve the knowledge of our seas and what is impacting them.

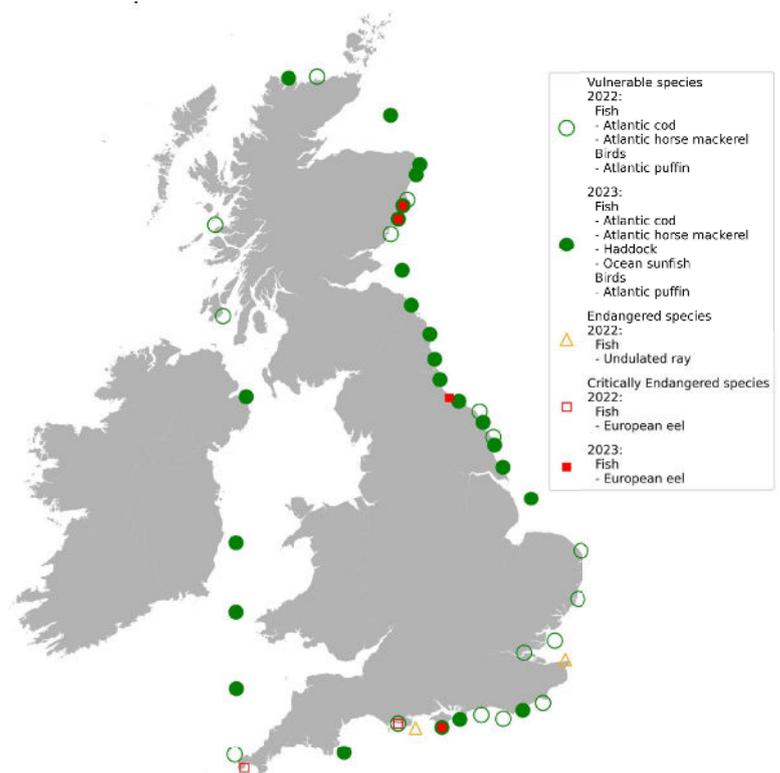


## Importance

### At risk species

We are in the midst of a global biodiversity crisis, both on land and in the oceans. From the data collected by GB Row Challenge in 2022 and 2023 alone, at risk species can be found all around our coastline. Protecting the health of our waters is therefore more crucial than ever.

It is also important to remember that not detecting a species' DNA in our sample does not mean that the species is not there, just that their DNA was not captured in the water we sampled. There could be more rare species out there, but we haven't captured the eDNA - yet. This is why continuing datasets are so important.

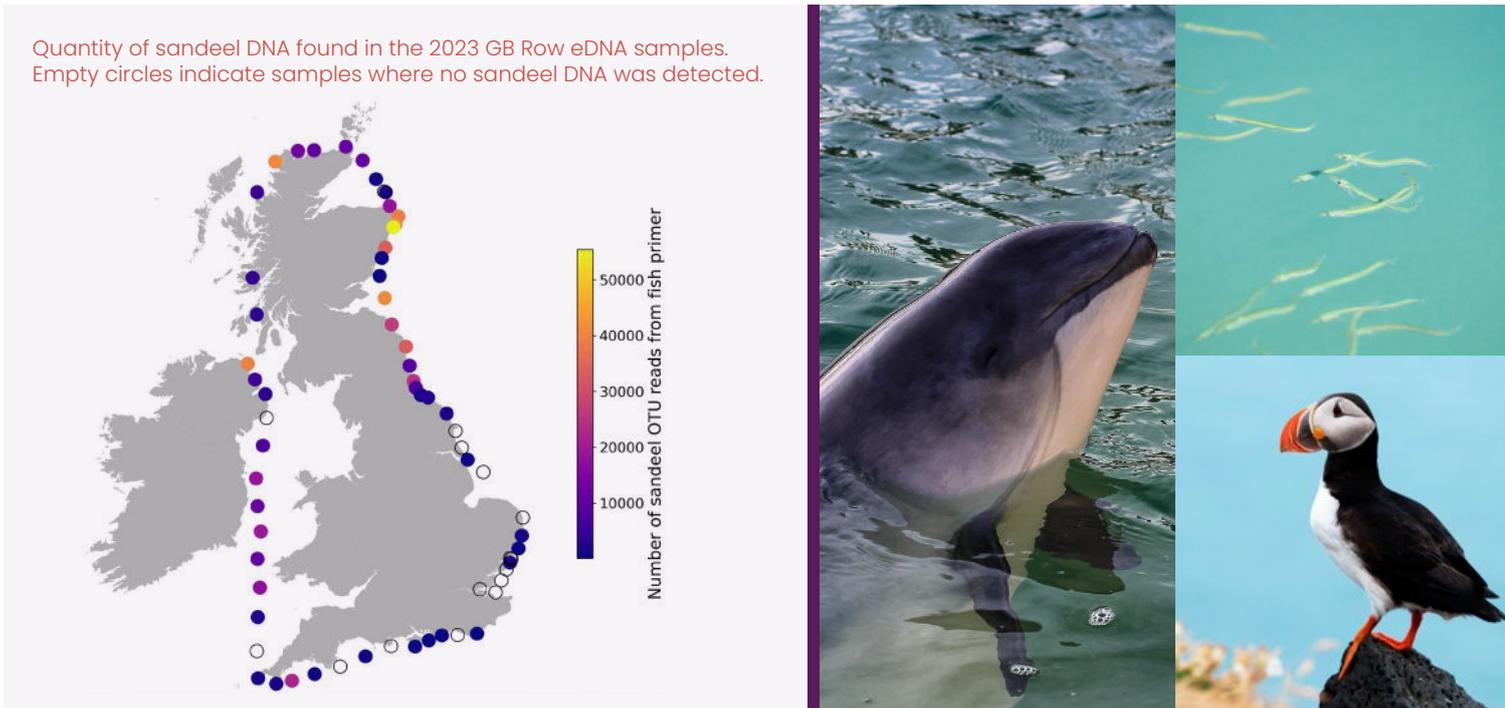


## Good news for sandeels and puffins and harbour porpoises

Sandeels are a keystone species. These are species that can define an entire ecosystem, and their removal can lead to catastrophic failure. Many seabirds, such as puffins, are completely reliant on sandeels, and sandeels are an important part of the diet for many commercial fish and cetaceans. Our eDNA data shows sandeels are still present around our coastline, but we know they are in severe decline due to climate change and overfishing. Harbour porpoise

distribution closely mirrors sandeel habitat and sea bird numbers and distributions have declined dramatically along with those of sandeels. In January 2024, the UK government announced a ban on industrial sandeel fishing in all Scottish waters and the English North Sea. With an increase in sandeel numbers on the horizon, we can look forward to monitoring the return and increased distribution of some of the iconic species that feed on them over the next few years.

Quantity of sandeel DNA found in the 2023 GB Row eDNA samples. Empty circles indicate samples where no sandeel DNA was detected.



## Data collection, Partners and Supporters



Huge congratulations to Team Ithaca who collected the 2023 eDNA samples while also breaking the world record for fastest female team!

Also a sincere thank you to all our partners, sponsors and donors who allow this important work to occur and continue.



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