

# eDNA and the management of Invasive Marine Species

Intelligently manage resources and capture early stage incursions

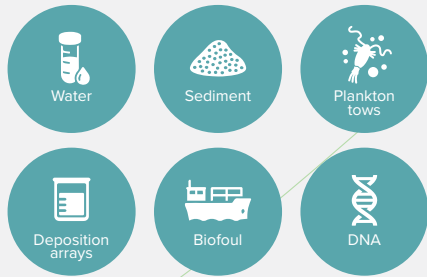
Ports are high risk biosecurity environments due to the risk of introducing Invasive Marine Species (IMS) via incoming vessels ballast water or biofoul on hulls. Historically, port monitoring has been conducted by visual inspection of high-risk vessels and infrastructure using morphological identification methods – a highly specialised skill that often requires boat time, divers, and specialists with high levels of taxonomic expertise. Further, they can usually only detect mature specimens and often miss early incursions, larvae or cryptic and elusive species.

Environmental DNA (eDNA) isolated from water, sediment, plankton tows, deposition plates or biofoul provides an alternative way to search for invasive species in ports. An eDNA approach has many benefits over traditional monitoring that include detection efficacy, time to result and cost. This meets biosecurity demands, as the early detection of first colonisers which may initially be in low abundance, is critical in successful IMS management, catching them before their establishment and they become difficult or logistically unfeasible to eradicate.

ENVIRONMENTAL DNA  
BIOMONITORING SOLUTIONS

Innovative technology solving  
complex environmental challenges  
through biodiversity profiling





A successful biosecurity program needs to cover broad spatial areas and a long list of potential invaders which can easily overwhelm the available resources. Opportunities to assign specialists to areas of need whilst withdrawing from areas of known lower threat can substantially help this balance.

The benefits of using eDNA metabarcode sequencing techniques over qPCR methods means a broad biotic audit of the taxa present over multiple phyla can be achieved in the first pass. Sequence results are linked to all the taxonomic information available in each sample. IMS studies further cross reference sequences against custom databases and flags when a particular pest species is present.

A full biotic audit also allows for comparison against species previously recorded, which as an added analytical upside may lead to the detection of introduced species that had previously not been considered by risk assessments but may be just as harmful as identified pests.

eDNA Frontiers has extensive experience in eDNA IMS studies conducting marine evaluations around Australia for a number of years. Ongoing development with government and university collaborators aims to further investigate approaches in capturing IMS eDNA in ports, and specialist bioinformatics criteria for confidence in their reporting.

\* A united front against marine invaders: Developing a cost-effective marine biosecurity surveillance partnership between government and industry, 2019, McDonald JI et al, <https://doi.org/10.1111/1365-2664.13557>

## Why work with eDNA Frontiers?

World leading methodology – published and respected

Practical experience delivering invasives detection, in port monitoring, infrastructure builds and more

Reliable, robust, scientifically valid results suited to long term studies

Responsive commercially sensitive team

Translating new research into demand-driven commercial needs

Cutting edge technology with continual method improvement from field leading researchers

Active Quality Management System delivering reliable repeat quality results

## Learn more

Visit our website at [curtin.edu/ednafrontiers](http://curtin.edu/ednafrontiers) or contact us using the details below.

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