

# eDNA Frontiers at a glance

## Assays available



Universal



Fish



Sharks & rays



Corals



Crustaceans



Bacteria



Plants & algae



Mammals



Insects



Vertebrates



Molluscs



Reptiles



Birds



Fungi

## Sample experience



Water



Plankton tows



Sediment



Deposition arrays



Biofoul



Groundwater



Scats



Tissue



Plants



Fossils



Pollen



Stomach contents



DNA



### Applications

Invasive and rare species

Biodiversity and ecosystem health audits

Environmental impact statements

Port monitoring

Remediation and restoration of natural areas

Animal dietary studies

Long term temporal and spatial observation



### Our client groups

Oil and gas

Ports and shipping

Mining

Environmental consultants

Regulators and government

Research

Community groups

## Contact information

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ENVIRONMENTAL DNA | BIOMONITORING SOLUTIONS



eDNA Frontiers

# Statement of Capabilities

Innovative technology solving complex environmental challenges through biodiversity profiling

**Our mission is to integrate environmental DNA into biomonitoring practices across all ecosystems, and to be global leaders in the field of complex ecosystem understanding.**

eDNA Frontiers has deep expertise in isolating and characterising environmental DNA (eDNA) to characterise species diversity across ecosystems and environments.

eDNA is virtually ubiquitous in natural ecosystems being shed by organisms through their natural processes of existing. By analysing eDNA, the need to observe, collect and identify individual organisms is removed, and instead users can gain a rapid assessment of entire communities across taxonomic groups from environmental samples.

As leaders in this field, eDNA Frontiers uses a customised metabarcoding technique with in-house next generation DNA sequencing, allowing us to sensitively audit environmental samples for DNA signatures. Generated sequence data can be matched against global databases that hold catalogues of all life on Earth, producing a wealth of information for studies on biodiversity, food web dynamics, diet analysis, detection of rare or difficult to visualise species, and identification of invasive species for monitoring.



This cutting edge biodiversity detection tool is being increasingly deployed by industry, government, regulators and research to fast track environmental impact assessments and bolster biosecurity monitoring programs.

eDNA analysis is a disruptive technology to environmental studies, delivering biodiversity insights that are opening new opportunities.



## Facilities

eDNA Frontiers laboratories and offices are located at Curtin University's main Bentley campus in Perth, Western Australia. Our specialised eDNA labs are accredited to receive both domestic and international samples for analysis as an 'Approved Arrangement' facility under Class 5.1.1 Biosecurity containment level 1 (BC1) Microbiological facility. Our Import Permits can facilitate analysis on international soil, water, DNA, and biologically complex substrates.

### Advanced Clean Environment (ACE) laboratory

A 434 m<sup>2</sup>, pressurised, class 100 (ISO 5) clean air space housing five class 10 (ISO 4) ultra-trace laboratory modules. The facility contains cutting edge technology and preparative robots to eliminate contamination and increase precision and accuracy in pre-PCR set-up. This facility is a major contributor to why the Curtin team can provide confident data detection at levels which are filtered out in other testing facilities.

### eDNA Frontiers laboratories

A dedicated set of laboratories for demand-driven contract research and routine sample processing operating under a Quality Management System, validated protocols and high throughput instrumentation to meet commercial needs.

- **Sample preparation laboratory** – an isolated and dedicated space for filtering environmental water samples, pulverising sediment/coral sediment or scats for DNA extraction, and scraping of deposition arrays. This

laboratory contains multiple robotic DNA extraction systems, having capacity for hundreds of samples per standard day.

- **Amplification and sequencing laboratories** – to ensure the highest level of quality control, eDNA Frontiers has a dedicated laboratory for amplification and subsequent sequencing of DNA. We have multiple quantitative PCR systems and utilise DNA fragment analysis, DNA size selection instrumentation, and our own in-house massive parallel sequencing instrument.



### Pawsey Supercomputing Centre

The amount of sequencing data produced by high throughput sequencing technology can be vast. eDNA Frontiers has access to the Pawsey Supercomputer Centre, which is one of two Tier-1 High Performance Computing facilities in Australia, with expertise in supercomputing, data, cloud services, and visualisation. Access to this facility's resources allows us to complete the highly computationally intensive quality filtering and matching of sequence datafiles to taxonomic reference databases.

## Methodology

eDNA Frontiers is the service focussed shopfront of the Trace and Environmental DNA (TrEnD) laboratory, one of the early adopters and world leaders of eDNA. The techniques have been honed over 14 years on ancient organisms containing highly degraded material amongst modern organism contaminations. Now repurposed for eDNA, methods leverage ultra clean laboratories to eliminate cross contamination risks, a unique sample barcoding system paired with a single-round amplification (1-step amplification) metabarcoding technique, and labour-intensive but crucial quantitative PCR assessments together facilitate detection at very low levels to be reported on confidently.

The long experience of the research and service teams translate to intelligent sampling designs and reliable, robust outcomes that are being depended upon by clients in long term monitoring programs.



## 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