

Asteroceras Group Limited

Environmental Impacts, Mitigation &
Monitoring:

High turbidity environments with reference to
advancements in both Camera and Molecular
techniques in the Southern North Sea.



Ian Wilson Background

- 1989-2004 Principle scientist and founded of Gardline Environmental Limited.
- 2004 Founder/ Director Benthic Solutions Limited;
- 2014 Co-Founder/Director Applied Genomics Limited
- 2015 Director Subacoustech Environmental Limited
- 2022 Director Atlantis Geosciences Limited
- Specialist survey companies with over 50 full time staff
- All companies involved in commercial marine sciences and market leader in survey developments and innovations particularly in decommissioning and biodiversity monitoring.
- Key industry sectors are offshore renewables (wind farms), Oil & Gas (exploration and decommissioning), utilities (water companies and electrical cable companies) and aquaculture (fish farms).



Key group expertise



Environmental surveys:
field sampling and
analysis.



Underwater noise:
modelling, measurement
and mitigation



eDNA: analysis and
interpretation of marine
sediments and waters.



Geotechnical surveys:
field CPT and core sampling



Marine electronics:
vessel and buoy telemetered
systems



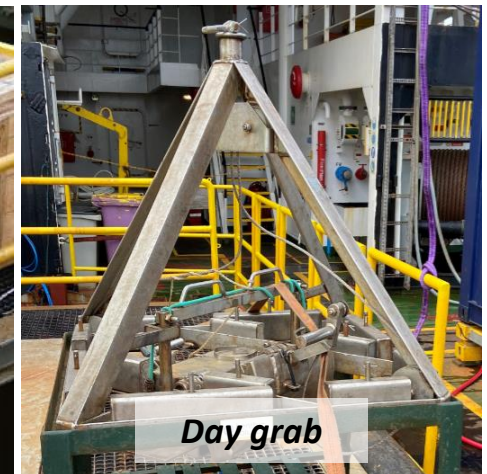
Current Techniques – Poor Water Clarity

- 2004, BSL developed and used the first commercial ‘freshwater lens’ camera system.
- Adopted by the marine survey industry, and remains a key tool in visual habitat surveys.
 - Can be used for stills and video
 - Allows seabed mapping where visibility can be <10cm.
 - Can be used over multiple sediment types
- Recent developments:
 - laser scanning systems
 - AI and software for automated image processing



Current Techniques- Varied Seabed

- Multi-faceted packages
- Selection of samplers for differing sediments
 - Grabs (Shipek, Day, van Veen, Hamon)
 - Towed and drop down cameras
 - Trawls for soft and hard grounds
- Adaptable package to work on multiple vessel types
 - Vessel size
 - Water depth
 - Access to the site
- Example sampling package from a single SNS OWF:



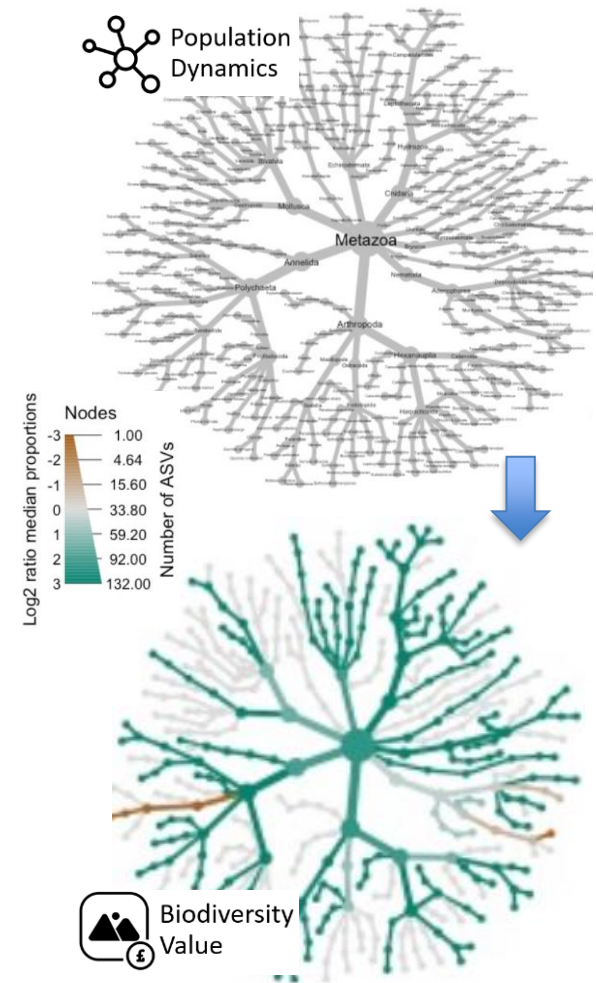
Developments in Molecular Techniques

- 2014 AGL developed the first commercial eDNA tests for marine biodiversity and impact studies
- Extremely powerful tool in advancing our understanding biodiversity and its changes
- Developed for both sediments and waters
- 2018 AGL developed an insitu programmable large volume water sampler (InDepth)
- 2021 AGL developed machine learning algorithm for interpreting the 'Ecological Status' of sediments (approved by SEPA 2023)



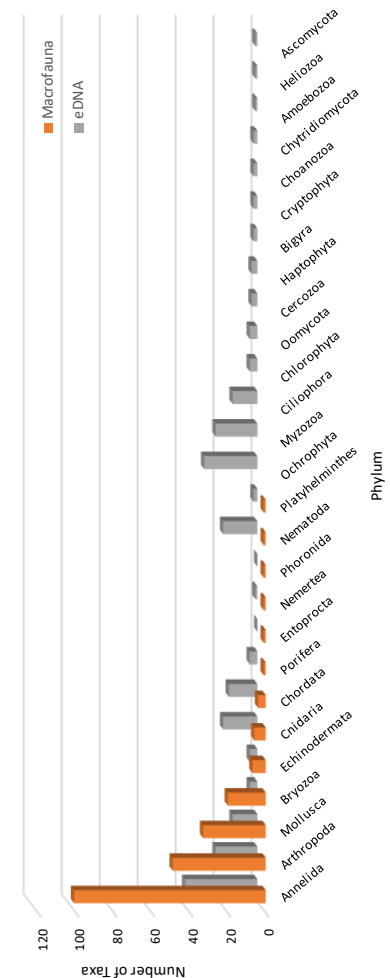
Benefits with eDNA

- Only small sediment samples required so can easily be integrated with other operations
- Samples can be recovered by non-specialists
- Molecular accuracy with an evolving database that will future-proof the data
- Detects cryptic species not seen via other methods (ideal for the SNS)
- Objective analysis and can provide a metric for calculating Biodiversity Net Gain (BNG)
- Records a huge biodiversity profile (not species specific)
 - Fisheries information
 - Invasive species
 - Target protected or rare species and habitats



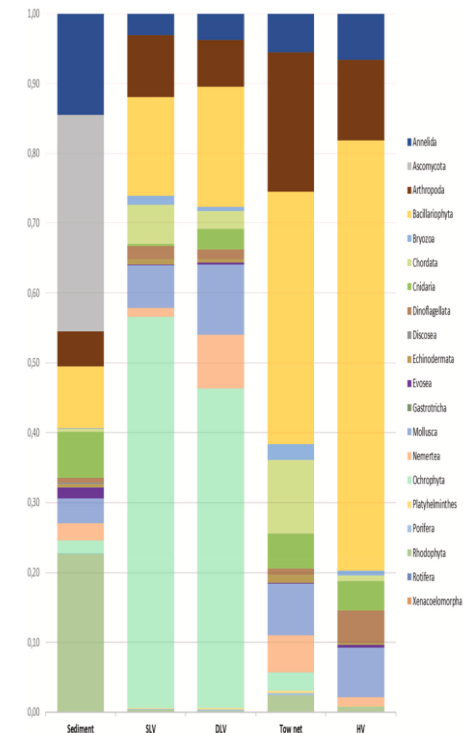
Example eDNA for a SNS OWF

- 2022 eDNA was used to support a large SNS biodiversity survey for an OWF and proposed cable route to the shore.
- Sediment eDNA supported macro-invertebrate sampling
 - <30% of macrofaunal samples analysed for eDNA
 - Recorded 340 unique taxa with 1150 Haplotypes compared to 265 taxa by macro-invertebrate analysis
 - Analysis indicated similar gradients and patterns to sediment factors
- Water eDNA supported fish/epibenthic trawls along cable route
 - Small volume spot water samples at 5 trawl sites
 - Recorded 28 fish and 2 marine mammal compared to 21 fish taxa recorded in the combined trawls
 - Data showed transition of species from inshore to offshore
 - Data included 6 protected fish species
 - Data comparison with trawls showed statistical similarity



Future Importance for eDNA to the SNS

- Multiple uses and studies have been carried out using eDNA
 - Regional biodiversity studies
 - Biodiversity net gain around structures
 - Fisheries
 - Marine mammals
 - Invasive species and pathogens
- All will play a part in future monitoring in the SNS region
- Studies have shown that large volume filtration of water samples has greater efficiency for representative understanding of the population
- BSL and AGL have developed tools for operators and survey companies to develop an understanding of their marine biodiversity
 - Used for routine acquisition (incidental and targeted)
 - Can measure biodiversity gains through the multiple use of existing licenses and protection from invasive fishing methods





Thank You

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