

Introducing GEANS: <u>G</u>enetic tools for <u>E</u>cosystem health <u>A</u>ssessment in the <u>N</u>orth <u>S</u>ea region



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- Funding: EU InterregNorth Sea region (<u>https://northsearegion.eu</u>)
- Under Priority 3 (Sustainable North Sea Region: Protecting against climate change and preserving the environment)

SEANALYTICS AB

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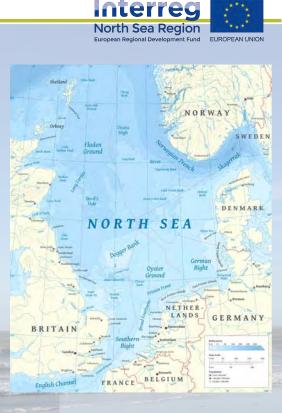
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- Duration: 1 March 2019 –1 March 2022
- Budget: € 2.5 million
- Consortium: 9 partners

• Project coordinator: ILVO, Belgium

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LVO «Cefas AARHUS UNIVERSITY



GEANS – Importance





From Mark Dickey-Collas

GEANS – Importance



Marine Strategy Framework Directive (MSFD)



GEANS – Importance

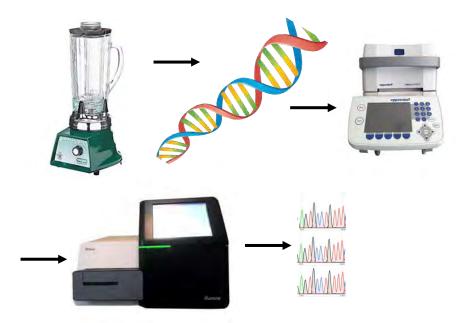


Morphology-based analysis



- Processing time ~ one sample about 5 days (sorting, identifing, counting)
- Requiring trained taxonomic experts
- Quality assurance not quaranteed across institutes

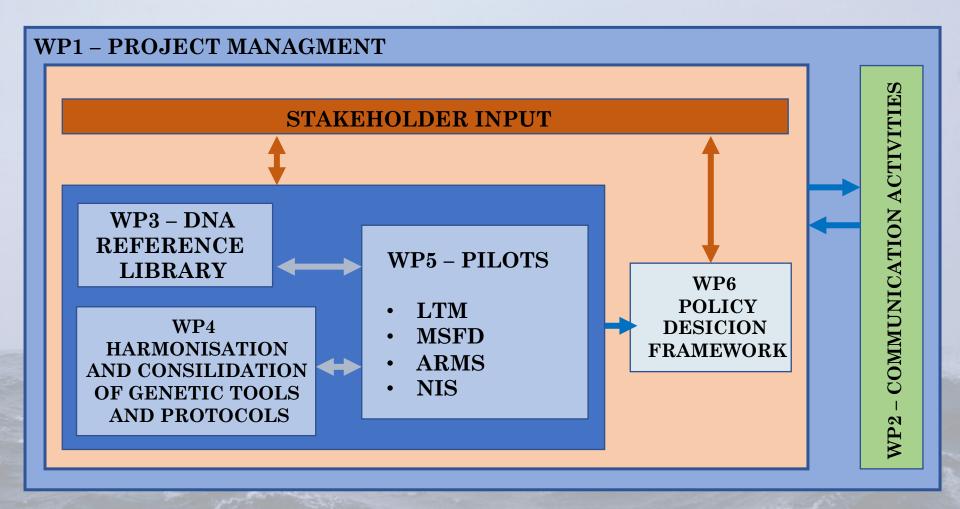
DNA-based analysis (metabarcoding)



- Processing time ~ 96 samples about 10 days
- Standarisation accross institutes through SOPs

- 1. <u>Transnational co-operation</u> will create synergies and assure comparability
- 2. Creation of a reliable and <u>open DNA reference library</u>
- 3. Implement <u>standardised genetic tools and SOPs</u> in routine biological assessments across North Sea countries
- 4. <u>Real time pilot studies</u>, in close cooperation with managers, policy makers and stakeholders, for validation of genetic methods in environmental health assessmet
- 5. Develop joint time-and cost-reducing genetic monitoring tools that feed into existing <u>indicators</u> to assess North Sea ecosystem health
- 6. Develop a <u>policy decision framework</u> including fit for purpose choice of genetic tools and protocols

GEANS – Overview

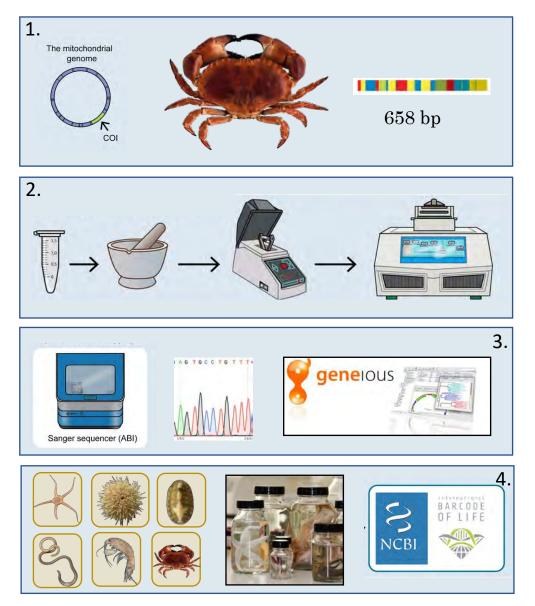


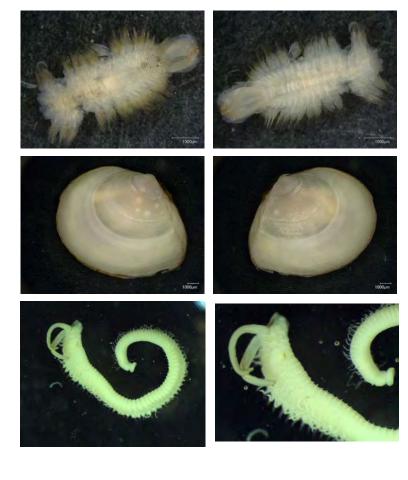
GEANS: WP3 – DNA Sequence Reference Library

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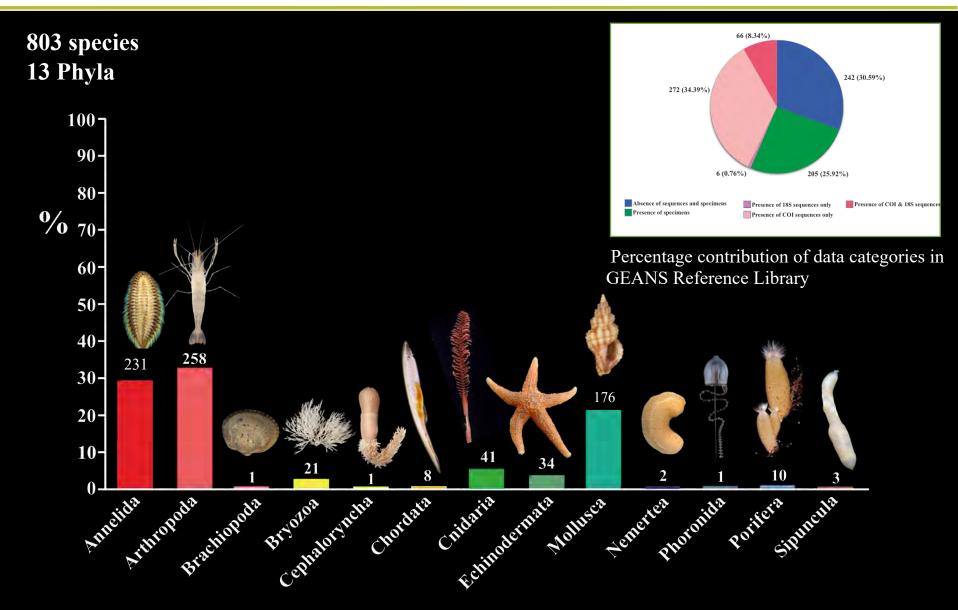
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Workflow



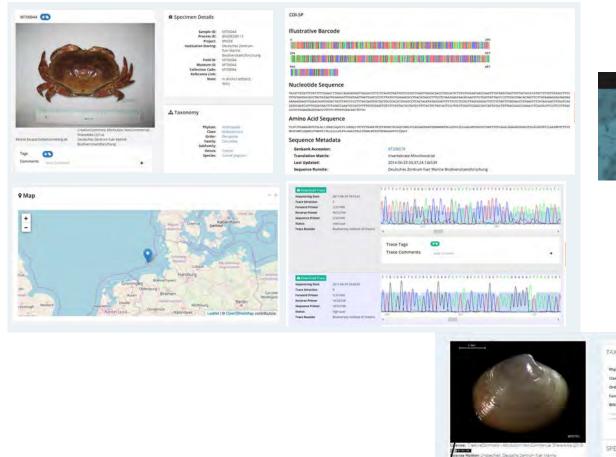


GEANS: WP3 – DNA Sequence Reference Library



Percentage contribution of species in GEANS Reference Library grouped by phylum

GEANS: WP3 – DNA Sequence Reference Library





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GEANS: WP5 – Pilots

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Species and Ecosystem Analyses XX

DNA-based techniques (eDNA, metabarcoding) will be applied in addition to traditional techniques in existing monitoring programs, providing proof of concept on the added value of genetic approaches in environmental health assessment.





Morphology

VS



Metabarcoding

GEANS: WP5 – Pilots

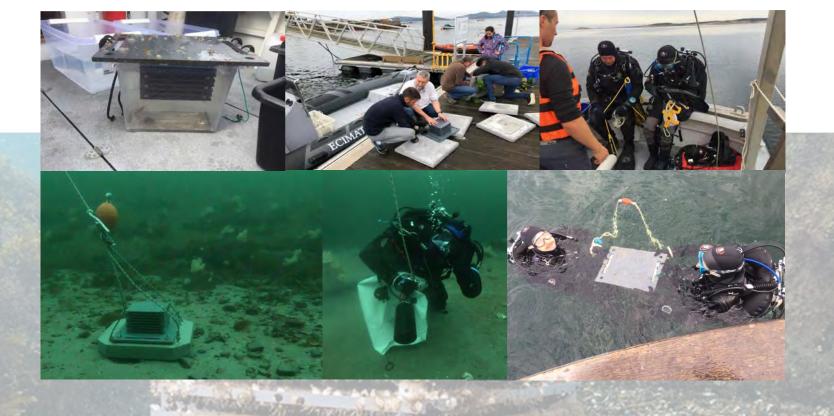
1. Soft bottom pilot

- Impact of marine aggregate extraction on the soft sediment ecosystem
- MSFD Monitoring in the North Sea
- Long-term soft-bottom monitoring station



2. Hard bottom pilot

ARMS (Autonomous Reef Monitoring Structures), a standardized sampling technique, combined with molecular methods will enable the monitoring of marine communities in the North Sea



GLOBAL ARMS PROGRAI



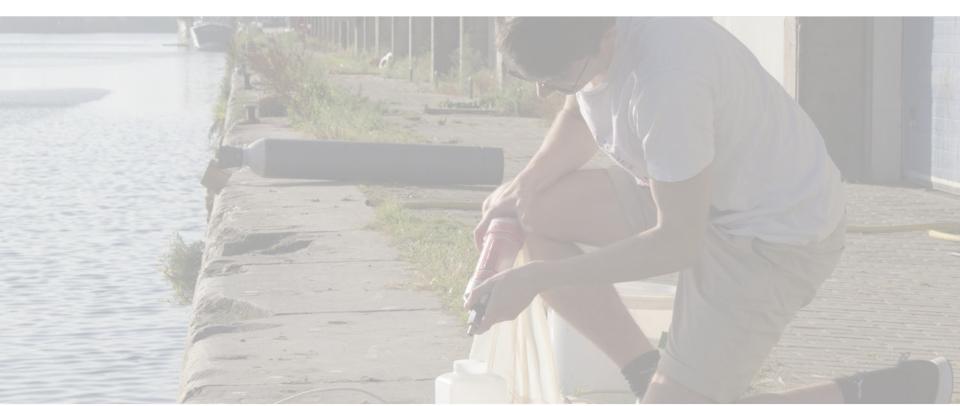


Species and Ecosystem Analyses XX

GEANS: WP5 – Pilots

3. Detection of non-indigenous species (NIS) in harbours

HELCOM/OSPAR protocol will be used as a baseline, while it will be investigate to which extent morphological examination can be complemented or replaced by meta-barcoding or eDNA.



GEANS – Expected Results

- Improved transitional environmental health assessment
- Increased time-efficiancy (60%)
- Cost reduction (40%)





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