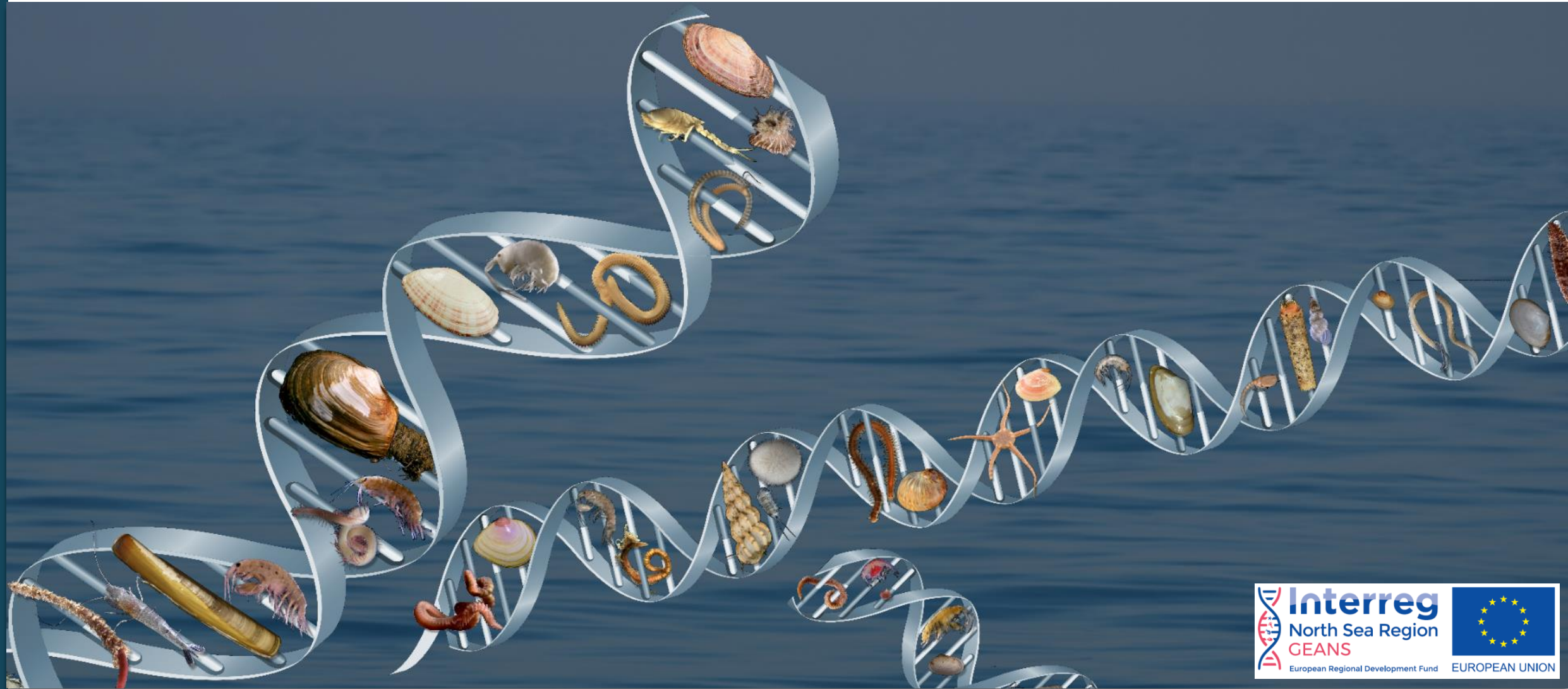


Genetic tools for **E**cosystem health **A**ssessment in the **N**orth **S**ea region



Project info

- Funding: EU Interreg North Sea region

– Under Priority 3

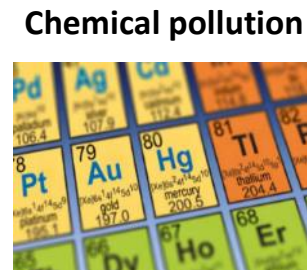
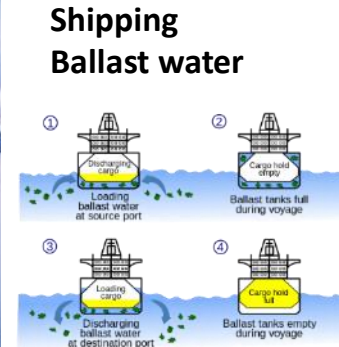


- Duration: 1 March 2019 – 1 March 2022
- Budget: € 2.5 million (50% own contribution)
- Consortium: 9 partners
- Project coordinator: ILVO, Belgium

Project partners



Why GEANS?



Why GEANS?

Climate regulation

Food provision

Coastal protection



Tourism and recreation

Carbon storage

Why GEANS?

Sustainable use and management of the North Sea = grand challenge!



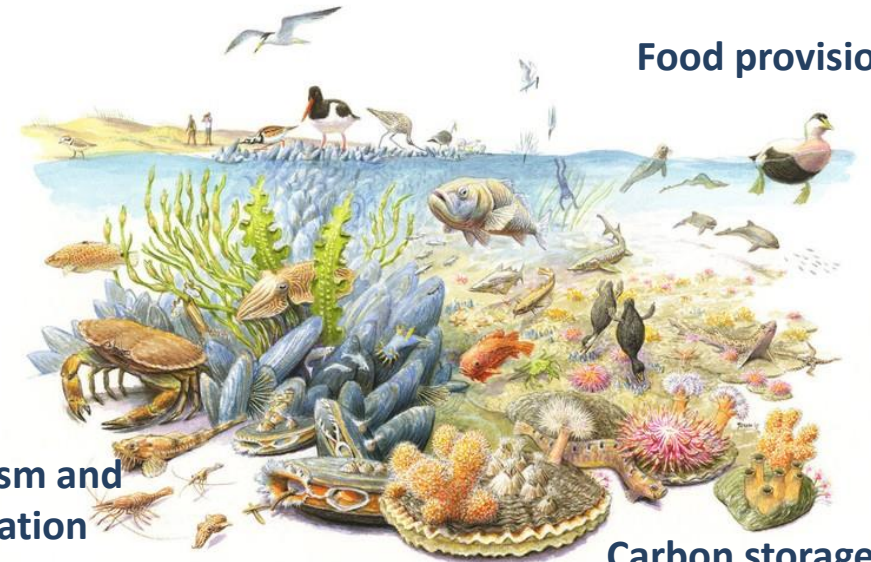
Coastal protection

Food provision

Tourism and recreation

Carbon storage

Climate regulation

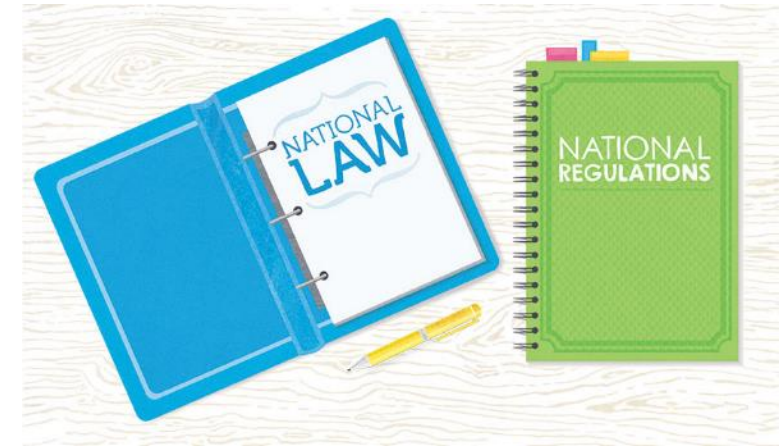


⇒ Fast and accurate monitoring needed!

Monitoring for ecosystem health

Marine Strategy Framework Directive (MSFD)

1. Biological diversity 	2. Non-indigenous species 	3. Population of commercial fish/shellfish 	4. Elements of marine food webs 
5. Eutrophication 	6. Sea floor integrity 	7. Alteration of hydrographical conditions 	8. Concentrations of contaminants 
	9. Contaminants in fish/seafood for human consumption 	10. Marine litter 	11. Introduction of energy including underwater noise 



Water Framework Directive



Environmental Impact Assessments



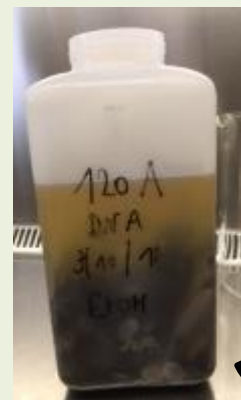
Ecosystem health indicators



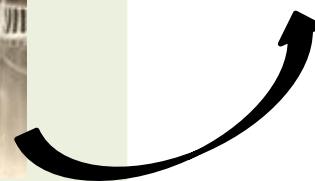
Current monitoring - morphology-based



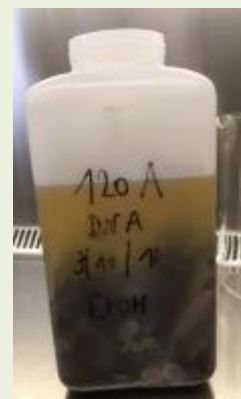
Grab sample



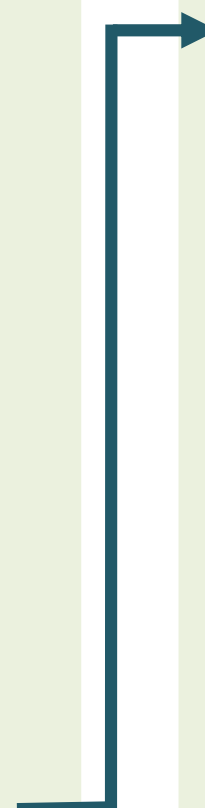
Processing time 1 sample ~ upto 3 days



The future!? - DNA-based analysis (metabarcoding)



Processing 96 samples ~ 10 days



Current obstacles for routine use of metabarcoding

- Link with traditional monitoring data is missing
- Reliable reference sequence library needed for bio-informatics pipeline
- Only relative abundance useable
- Different approaches between countries hamper standard routine application
 - Primer and barcode choice introduce bias
 - Lab protocols are not standardized
 - Sample used: bulk – ethanol - ...

Goals GEANS

- Set-up of a reliable and open **DNA reference library**
- **Harmonisation and consolidation** of metabarcoding approach across NS countries
- **Real time pilot studies** for validation of genetic tools and methods
 - in close cooperation with (local) managers, policy makers and involved stakeholders
- **Transnational co-operation** will create synergies and assure comparability

Aims and objectives

1. Develop **joint time- and cost-reducing genetic monitoring tools that feed into existing indicators** to assess NSR ecosystem health
2. **Implement standardised genetic tools and SOPs** in routine biological assessments
3. Develop a **policy decision framework** including fit for purpose choice of genetic tools and protocols, helping to translate genetic results into simple indicators

GEANS in a “graphic” nutshell

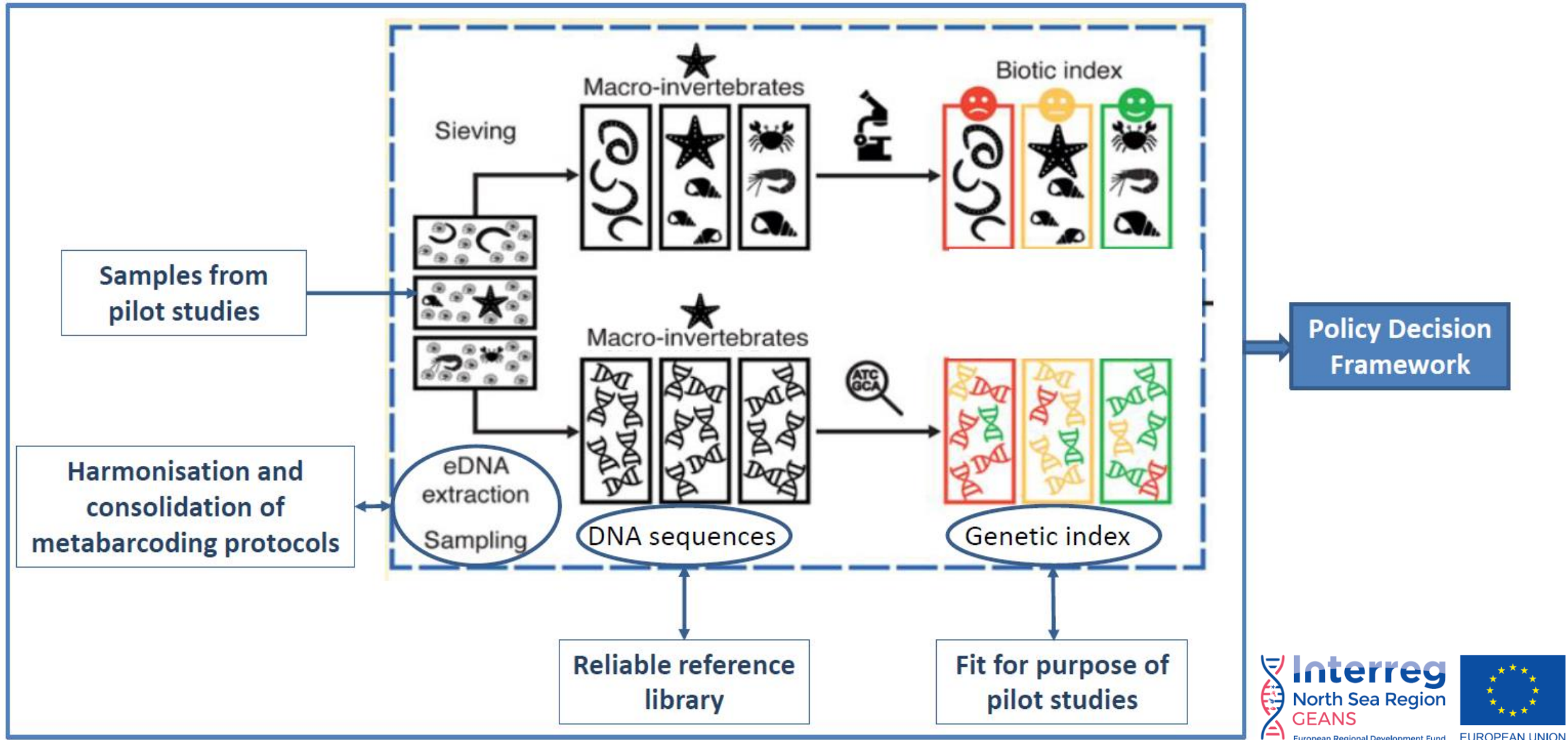


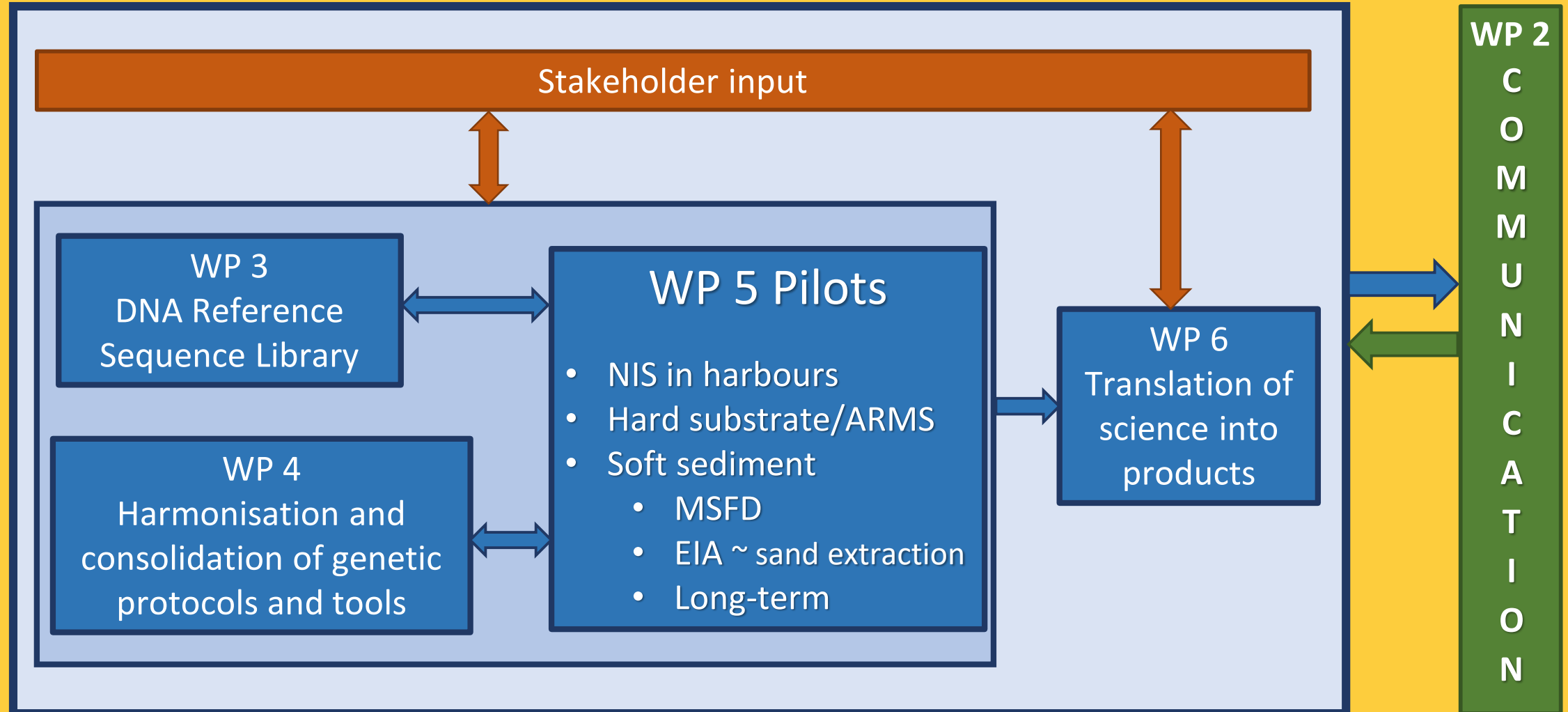
Figure after Cordier et al. 2017

Use of DNA-based tools can result in...

- 60% increased time-efficiency in monitoring assessments
- 40% reduction in costs of legally binding monitoring

GEANS Project overview

WP 1 – GEANS Project Management



WP 2
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Main stakeholder groups

- Policy makers responsible for ecosystem health assessment at local, national and regional level
- Scientists and other experts
- Organisations involved in EIA's and ecosystem health assessments, like SMEs, consultancy agencies,...
- Other interest groups including NGO's

Stakeholder involvement wanted!

- Where do you see advantage in your area of expertise for implementation of DNA based tools?
- Which species of marine policy importance are urgently needed in the DNA reference library
- Which type of pilot study would be interesting for you?
- Other thoughts/remarks?

Genetic tools for Ecosystem health Assessment in the North Sea region

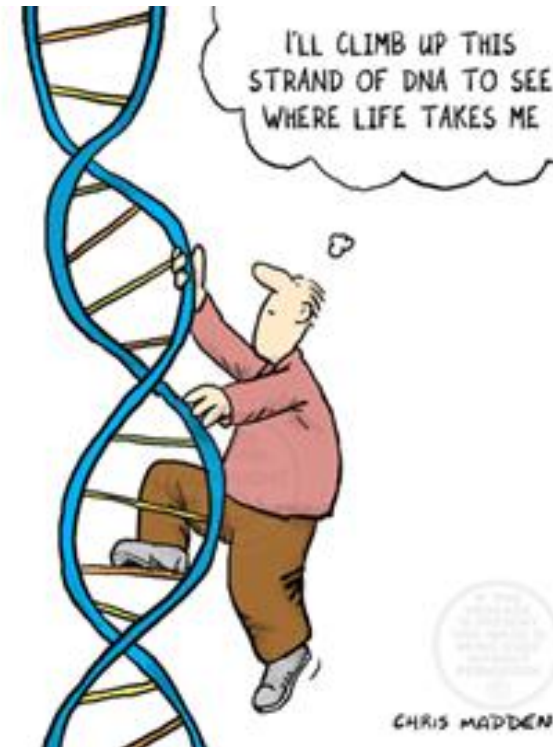


The quality of the seafloor habitat is an important barometer for marine **ecosystem health**. In order to accurately measure that quality, GEANS will mainstream implementation of fast, accurate and cost-effective **DNA-based** assessments. This will enable national authorities to improve the management of human activities and protection of the marine environment across the **North Sea Region** in a transnational coherent way.

GEANS will conduct pilot studies concerning environmental impact assessments (renewable energy, aquaculture and sand extraction and suppletion), and concerning monitoring in relation to European directives (non-indigenous species and hard substrates). These pilots will be conducted in close cooperation with stakeholders.



Thank you !



Website: <https://northsearegion.eu/geans/#>



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@NorthSeaRegion