Marine Biodiversity Monitoring in the Age of Intelligent Robots: Needs, Challenges and Insights

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INTRODUCTION

Motivation:

- Assist fishery stocks' management
- Assess recovery/restoration success
- Digitalize & homogenize multi-source data
- Assess impact of activities/infrastructures

} Coordinated intelligent networks of mobile, fixed, and stationary monitoring platforms {

Emerging needs:

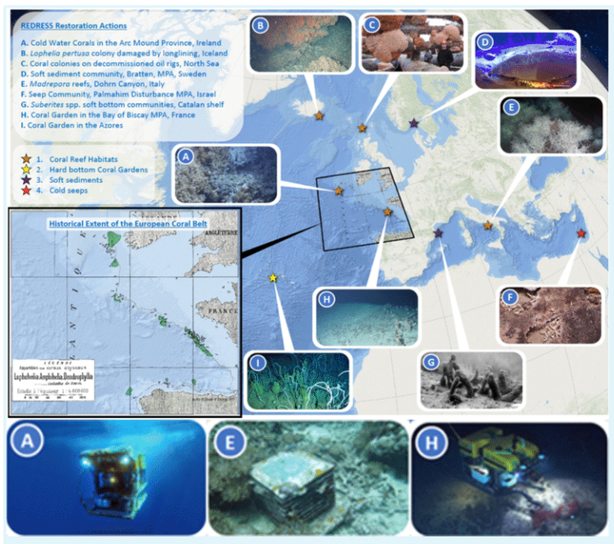
- Adequate platforms to cover space & time
- Reduce shiptime and personnel costs
- AI tools to process vast volumes of data
- Appropriate statistical tools and models

PROJECTS

CINNEPHILIA (GAP-101104596)

- Advance the stock assessment of the Norway lobster *N. norvegicus* with robotic technologies
- Determine the relationship between Norway lobster burrow & individual densities
- Develop a pipeline for data treatment & extraction of ecological indicators from count data

Campbell *et al*. Investigating and mitigating uncertainties in the assessment of Scottish *Nephrops norvegicus* populations using simulated underwater television data. *ICES J Mar Sci* 66, 646-655. 2009. 10.1093/icesjms/fsp046

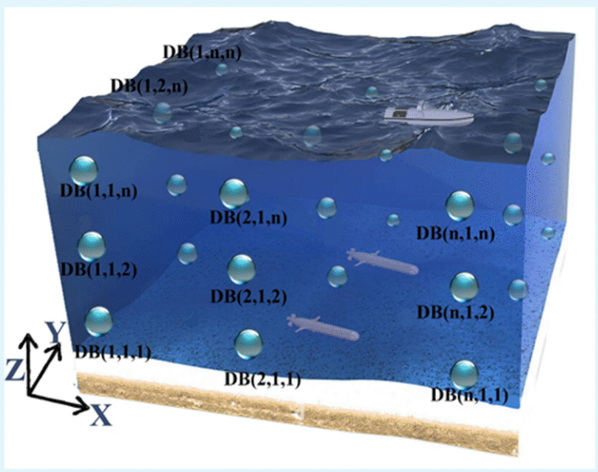


REDRESS (GA-101135492)

- Innovative solutions to upscale the restoration of deep-sea habitats
- Advanced, efficient but also cost-effective restoration & monitoring approaches
- Build the roadmap & public engagement for the future protection of european seas

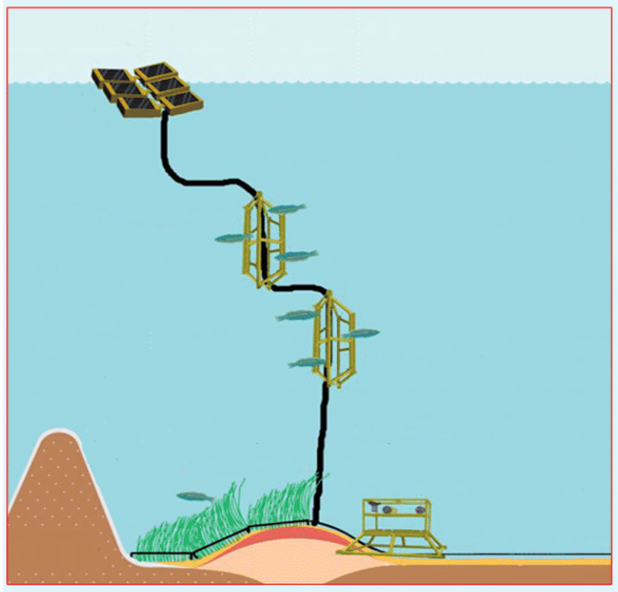
DIGI4ECO (GA-101112883)

- Generate new data through demo-missions (PTO)
- Unlock, harmonize & merge with historical/sleeping data
- Spatiotemporal cause-effect & socio-economical models
- Digital representation with user-friendly interface (DTO)



SUNBIO (GA-101157493)

- Develop harvesting platform for solar & wave energy
- Sustainability → materials & design
- No net negative impact on biodiversity → restoration
- Ecological monitoring to support policies and goals



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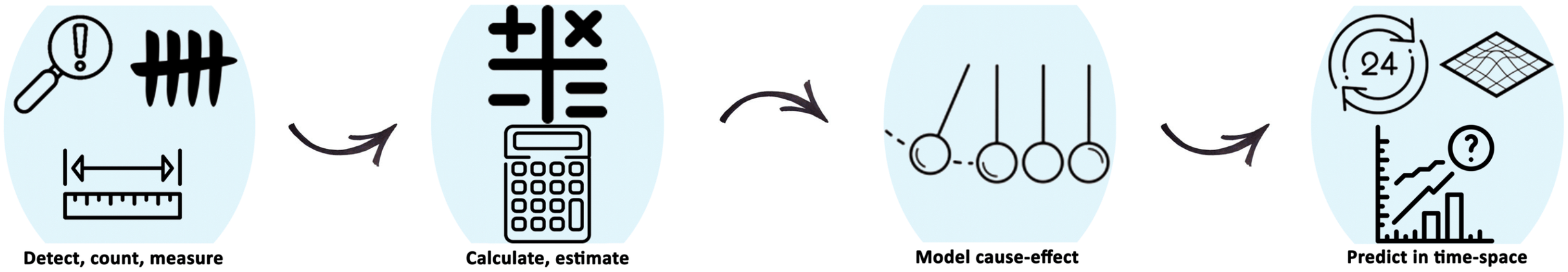

CONCLUSION

The ever-increasing capabilities of monitoring platforms need to be accompanied by smart sensor packages, efficient on-board AI processing algorithms and adequate applications of ecoinformatics in order to unlock the full potential of marine biodiversity monitoring and revolutionize monitoring program design (what, where, when, how much)

Funded by the European Union

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