

Mapping of EUNIS seabed habitats based on ground-truth and multibeam acoustic data: What can realistically be achieved?

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Centre for Environment
Fisheries & Aquaculture
Science



Cefas

Habitat Mapping to Support MCZ Designation

- Marine and Coastal Access Act, 2009
- **Marine Conservation Zones:** protect a range of nationally important marine wildlife, habitats, geology and geomorphology
- Protect biodiversity in English waters
- Ecologically coherent network (MCZs, European Marine Sites, SSSIs)
- Evidence based
- 50 MCZs designated in two tranches so far
- Third tranche out for public consultation in the near future (2016 to 17)



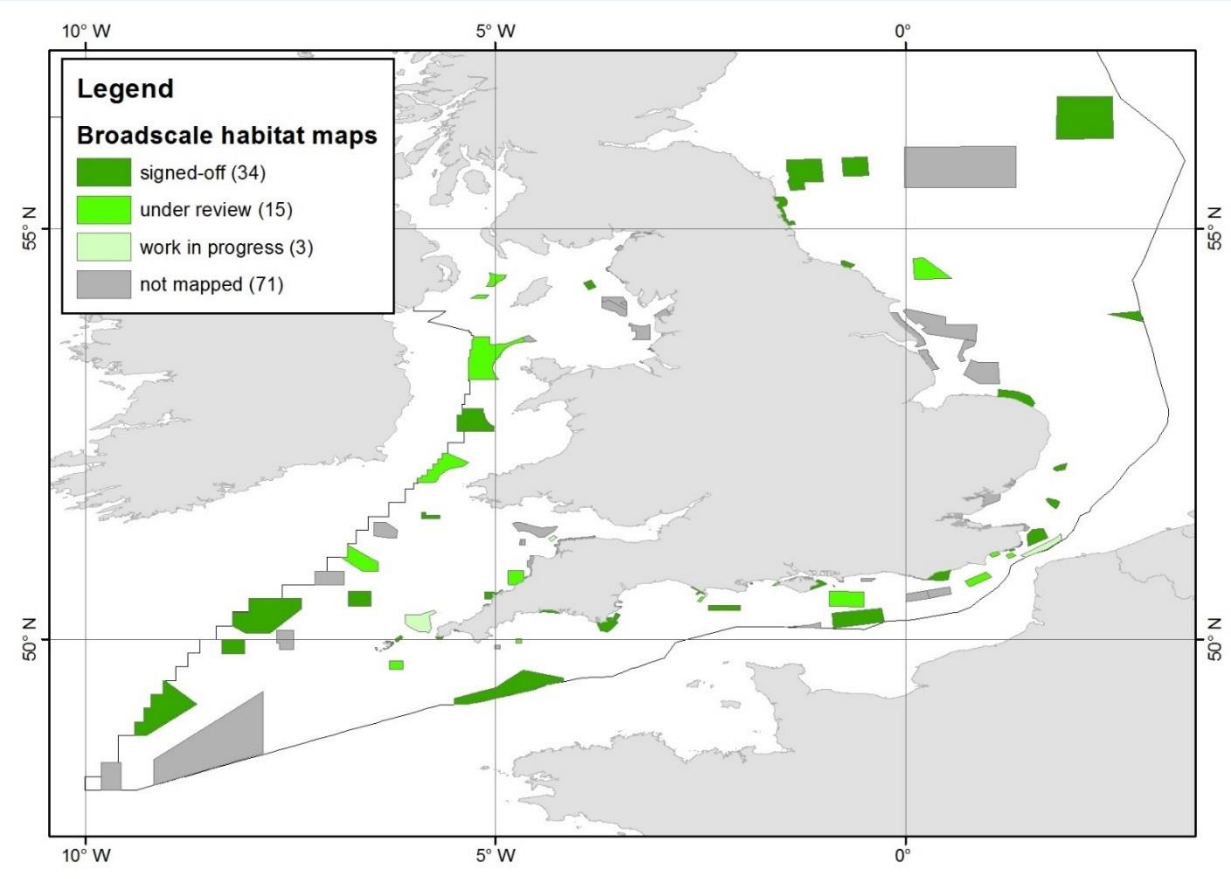
MPA data and evidence gathering programme

Survey and Data Acquisition

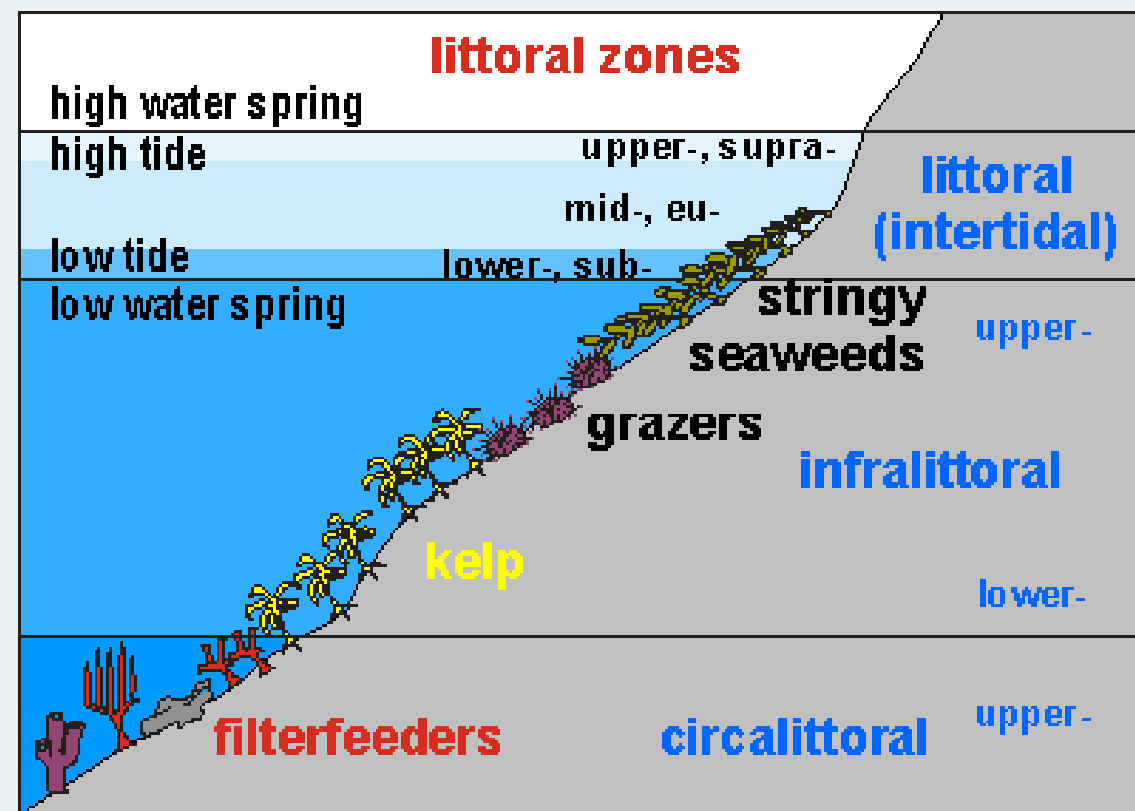
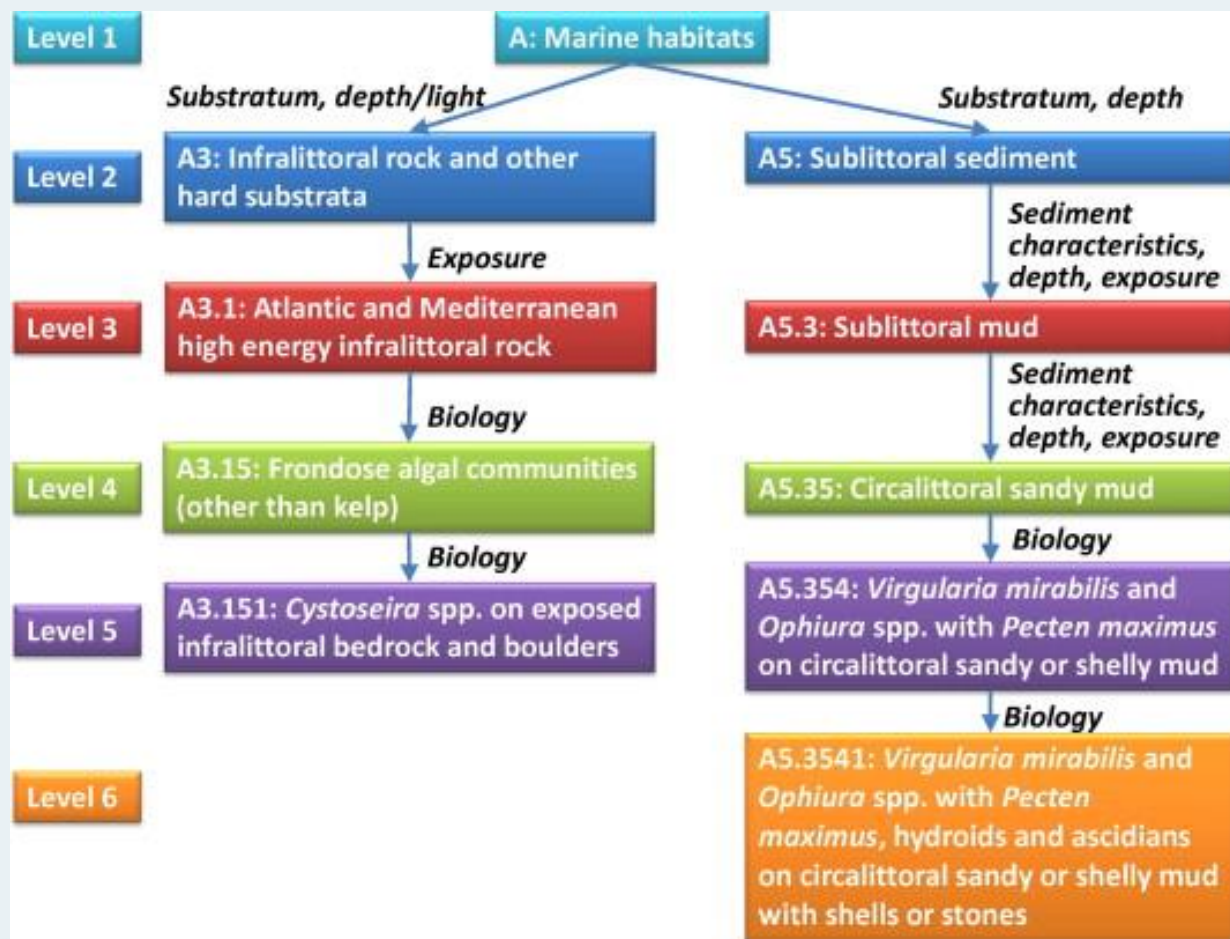
- Visited 75 MCZ sites
- Used 25 vessels delivering >1,200 sea days
- 826 hours of video
- 68,678 still images
- >3000 seabed samples
- Acoustic data = >9,000 km²

Data Processing and Interpretation

- Processed and archived all data collected to date
- 75 survey reports and 52 site reports
- 34 site reports publically available
- Cefas, BGS, NOCS, CCO, U Newcastle



EUNIS habitats



Galparsoro et al. (2012) Mar Poll Bull 64, 2630–2638

(Subtidal) broadscale habitats

A3.1 High energy infralittoral rock

A3.2 Moderate energy infralittoral rock

A3.3 Low energy littoral rock

A4.1 High energy circalittoral rock

A4.2 Moderate energy circalittoral rock

A4.3 Low energy circalittoral rock

A5.1 Subtidal coarse sediments

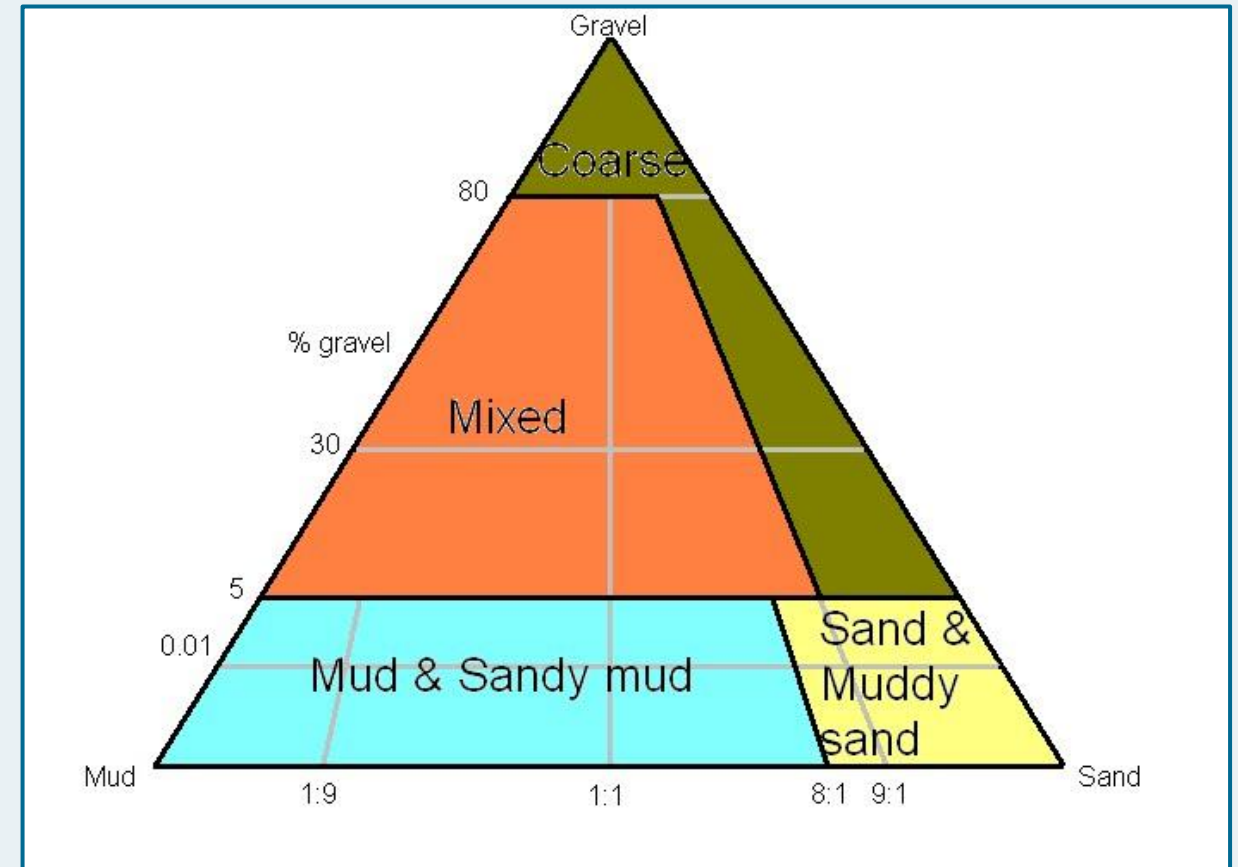
A5.2 Subtidal sand

A5.3 Subtidal mud

A5.4 Subtidal mixed sediments

A5.5 Subtidal macrophyte dominated sediment

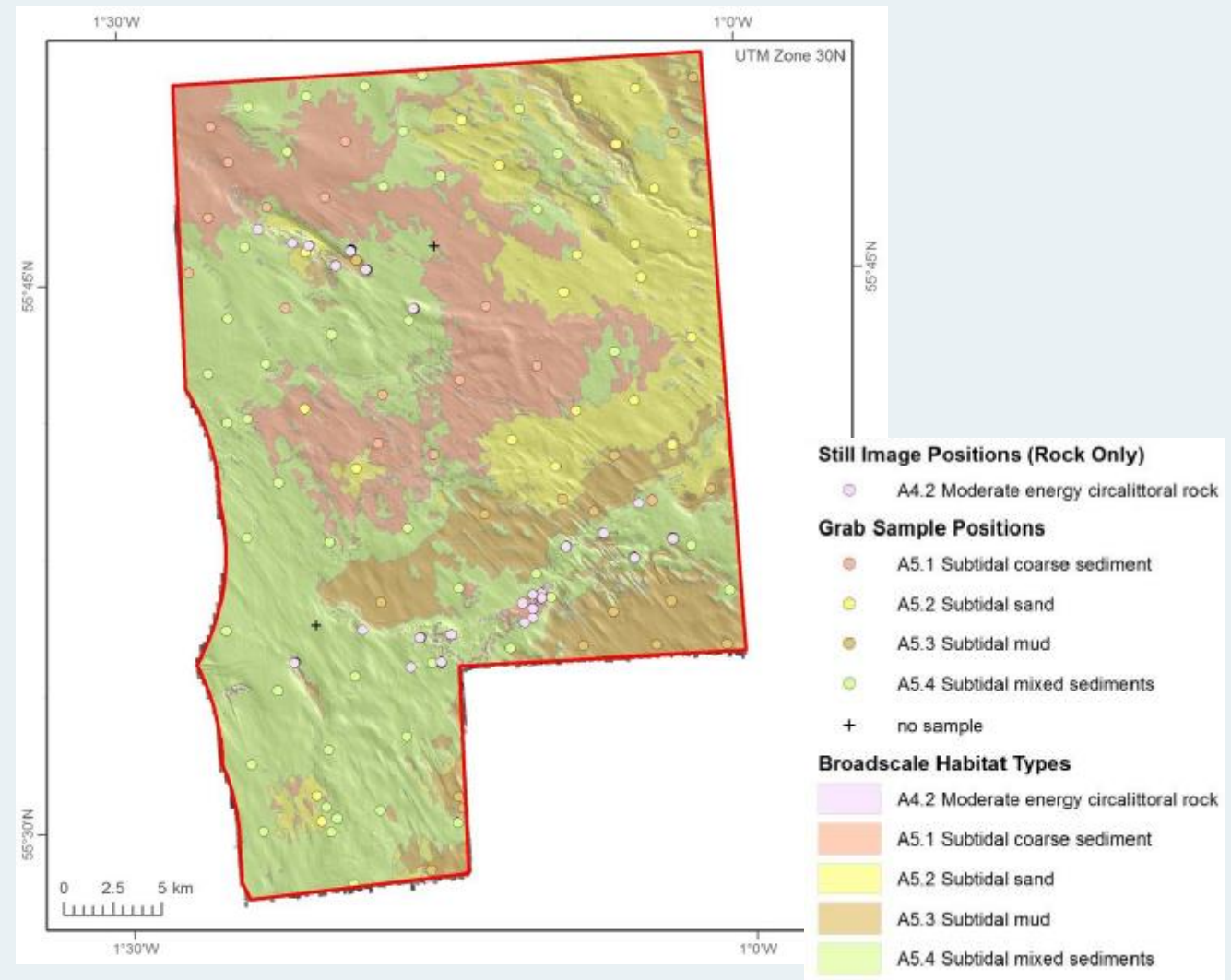
A5.6 Subtidal biogenic reefs



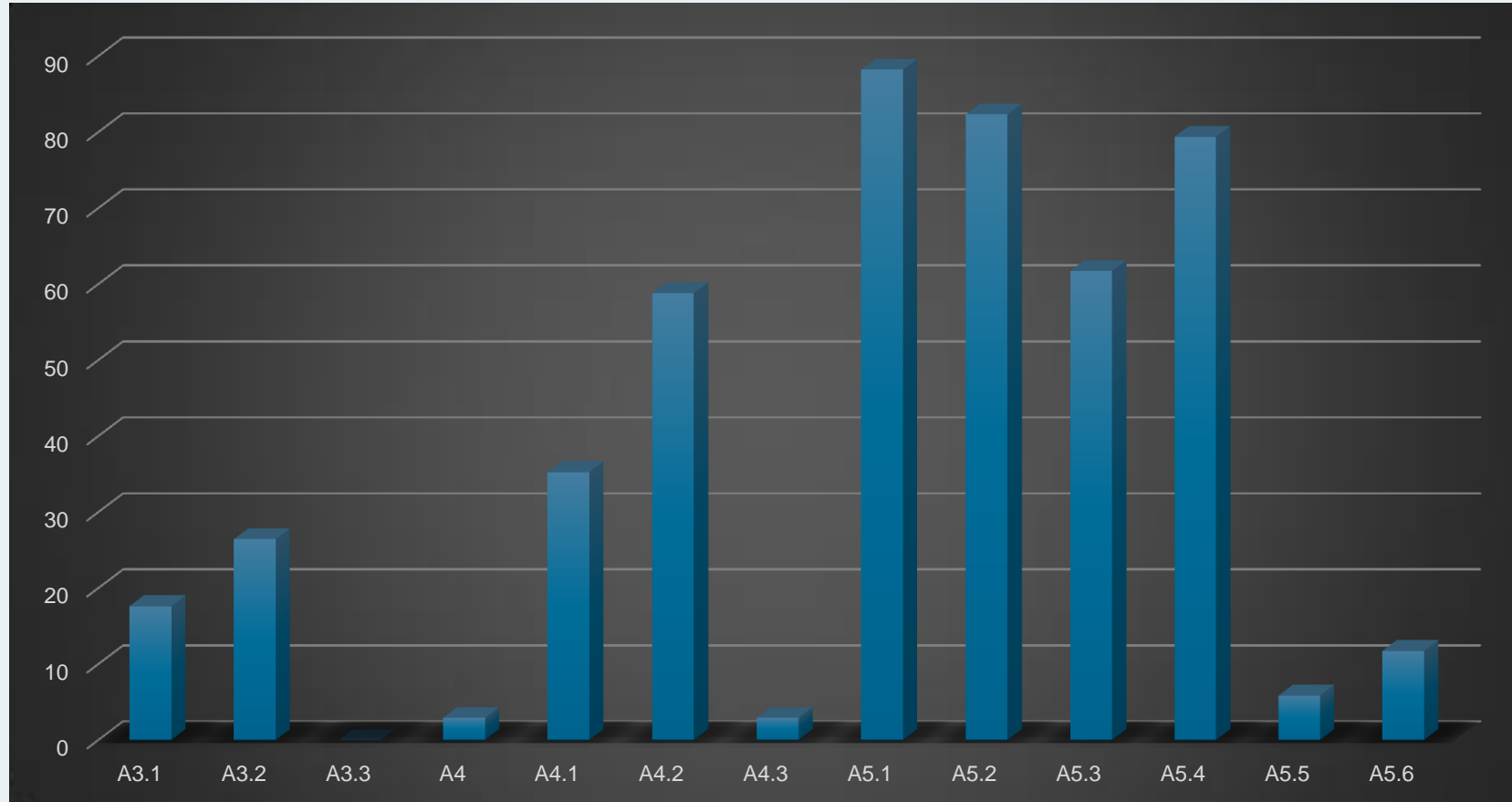
The review process

For every reported MCZ, record...

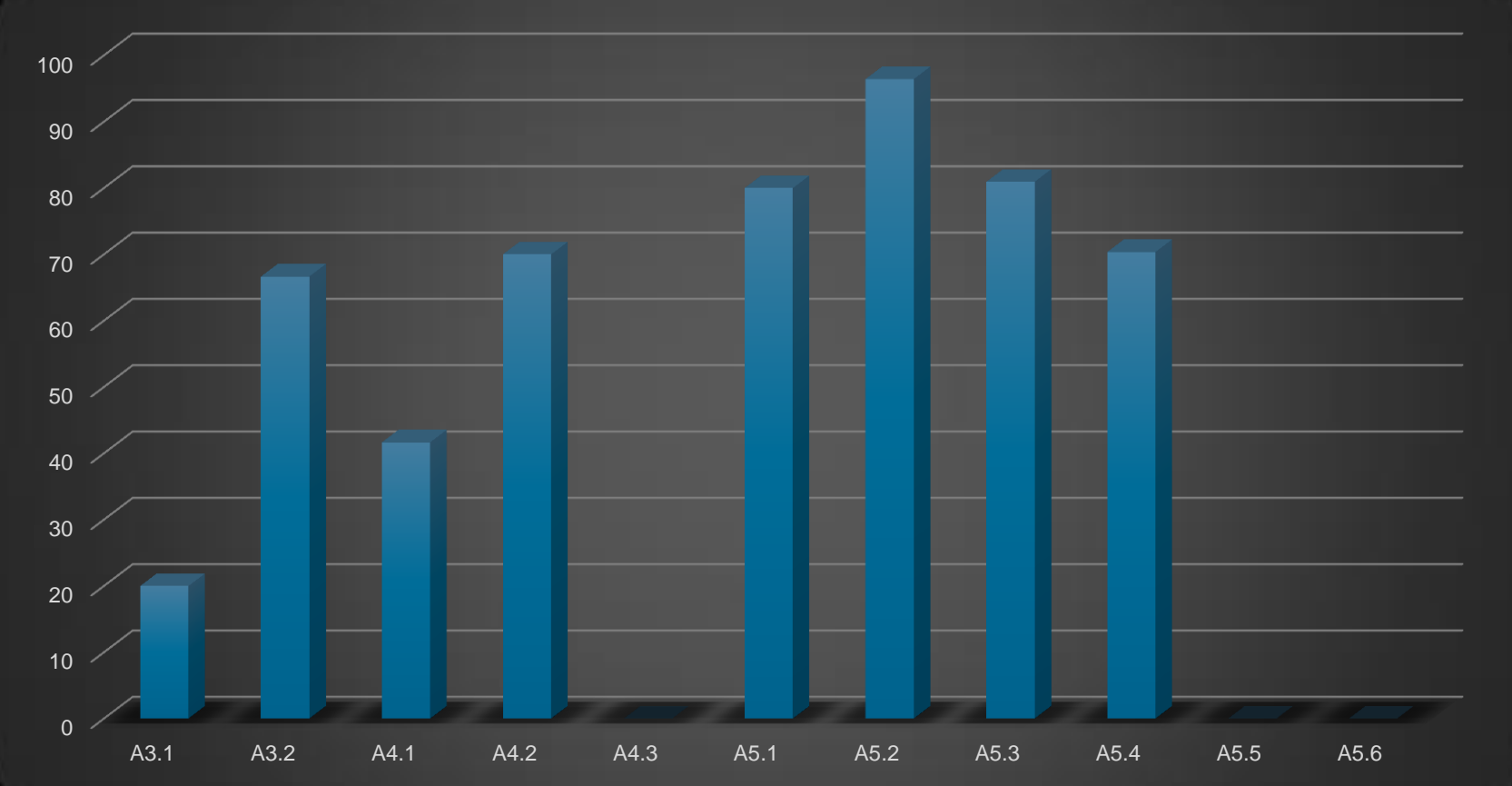
- Observed habitats (grabs and stills)
- Mapped habitats
- Reasons mentioned why not mapped



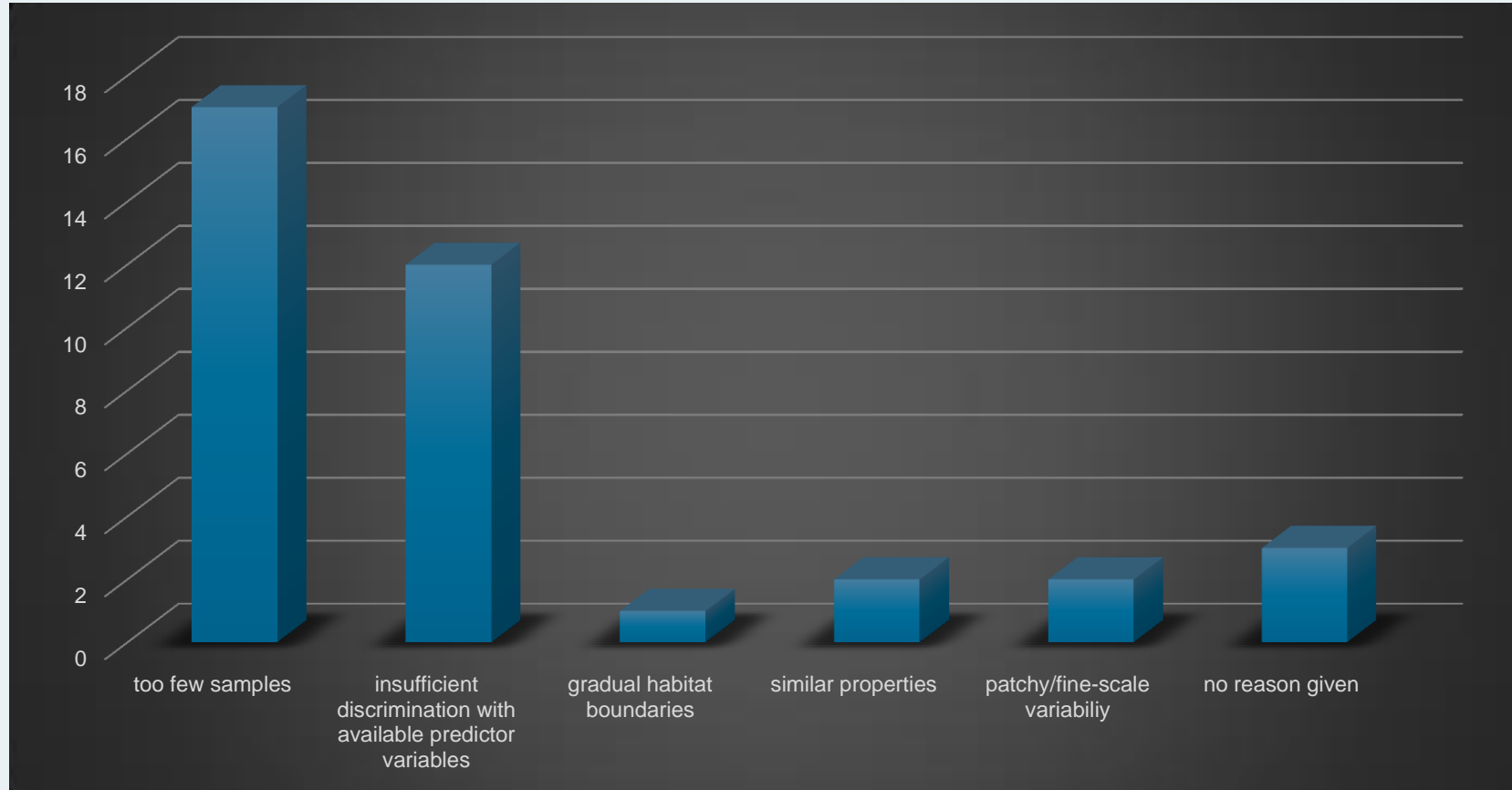
Habitats observed at x % of MCZs



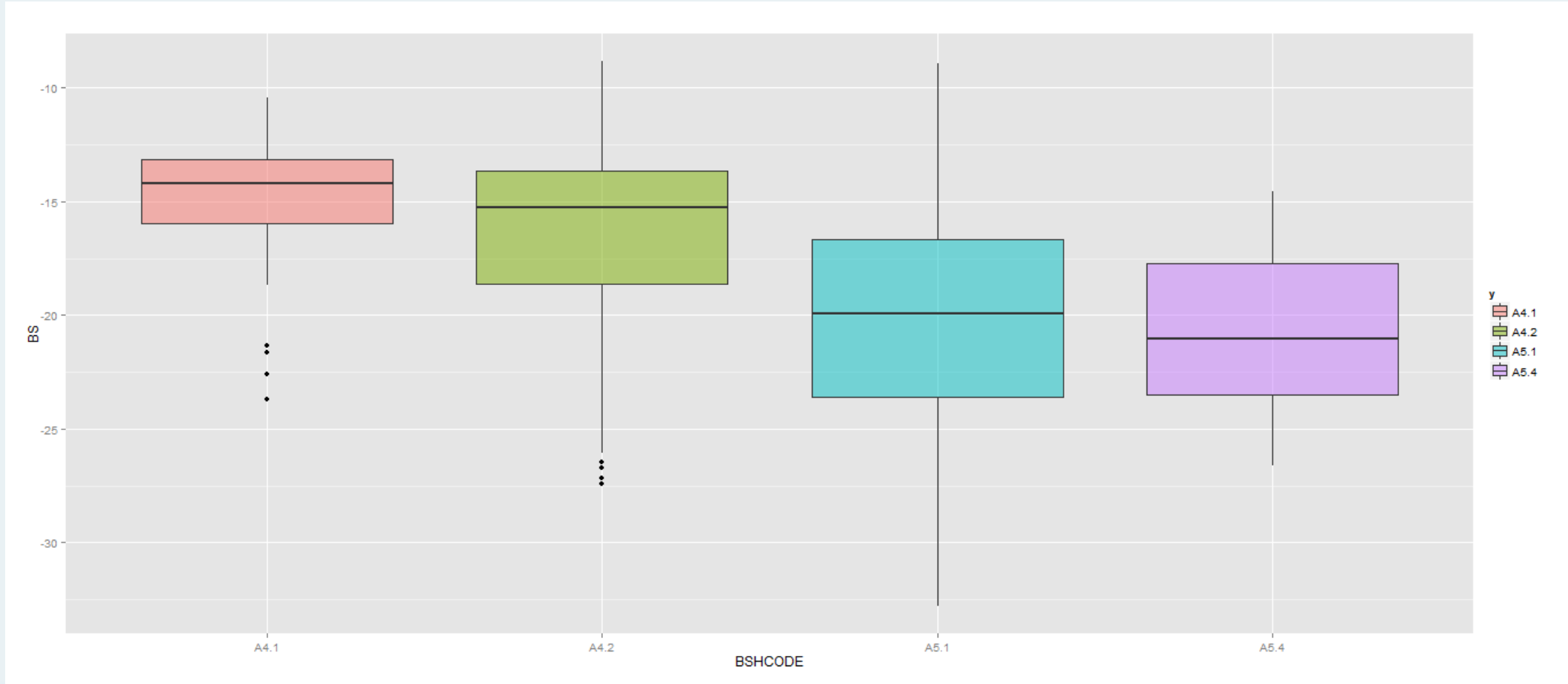
Mapped habitats as fraction of observed (%)



Reasons for unsuccessful discrimination

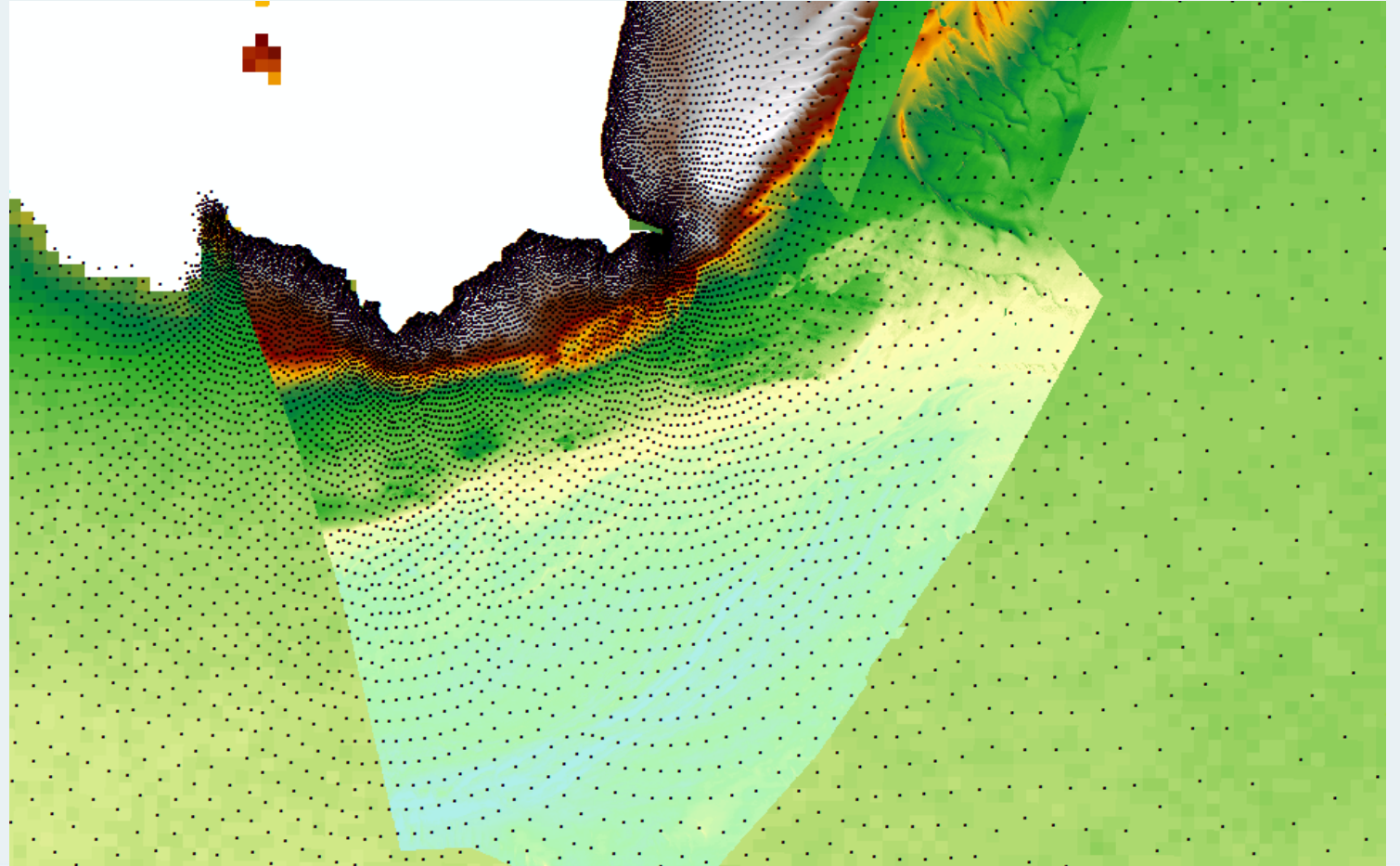


Insufficient discrimination

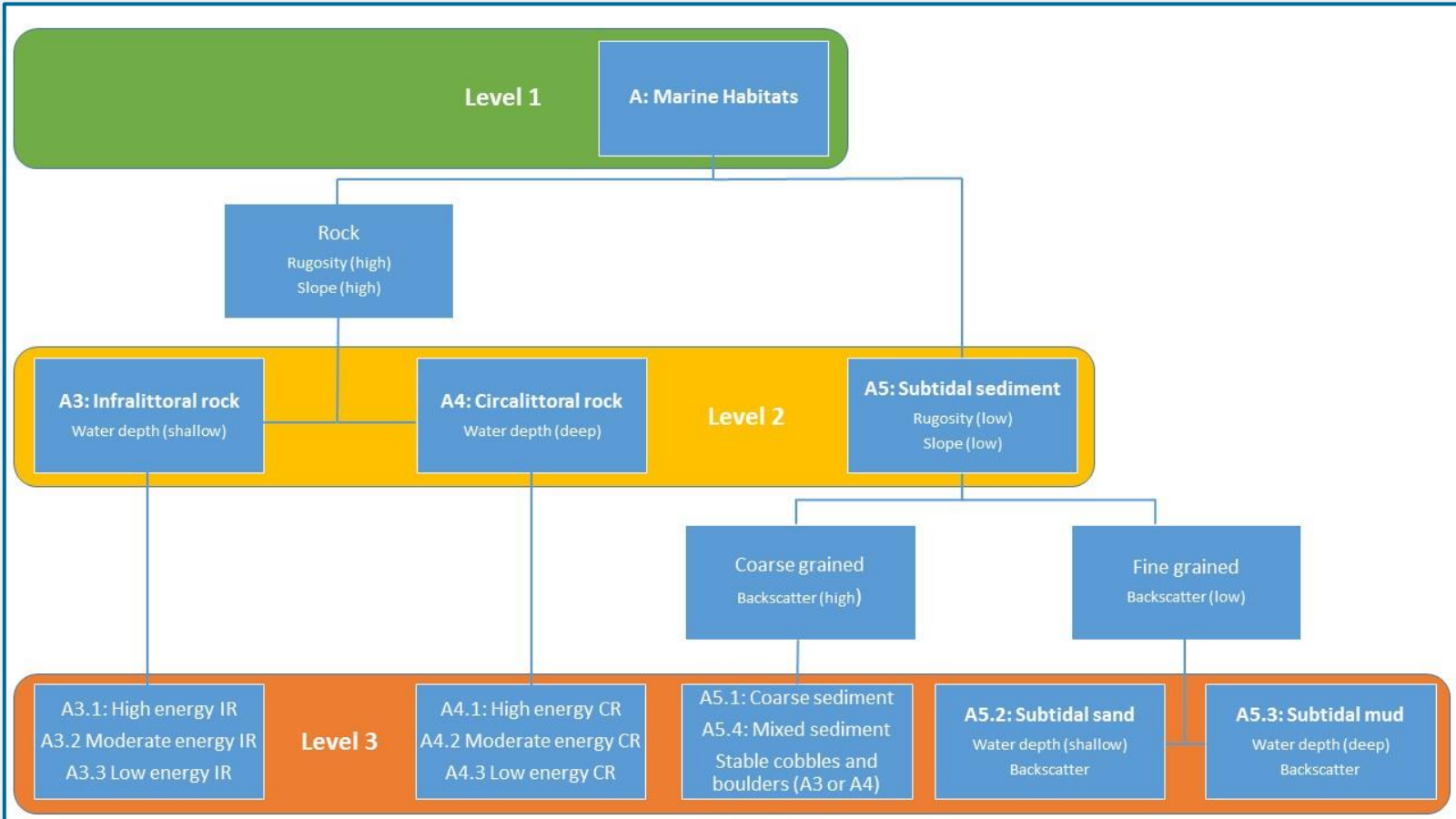


Resolution of predictor variables

- MBES – 2 m
- Currents – 30-1000 m
- k_{PAR} – 250 m



Generic decision tree for mapping EUNIS habitats



Summary

Challenges:

- Insufficient number of samples available for robust predictions
- Backscatter 'signatures' are often ambiguous
- Relevant predictor variables (light, hydrodynamics) not available at required resolution

Possible solutions:

- Optimise sampling effort and design
- Include spatial autocorrelation in sediment mapping
- Multi-frequency MBES?
- Bespoke high-resolution hydrodynamic models



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