Seabed Habitat Classification Issues

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• Classifications of nature types are necessary to provide an explicit view of the seabed on maps, however they are only an imperfect model of reality;

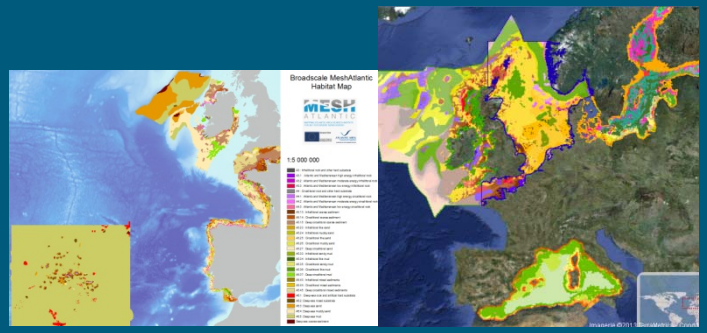
• With the advent of acoustic techniques and the subsequent thrust in seabed habitat mapping, classifications have had to reconcile the biological vision (biocenosis) and their physical context (biotope); Whilst the biology mostly exhibits small entities, the physical environment has significance at many scales (which makes aggregation of both difficult);

• How classifications are adapted to the needs of the Directives is not a straightforward issue; Specifically, can classifications capture change?

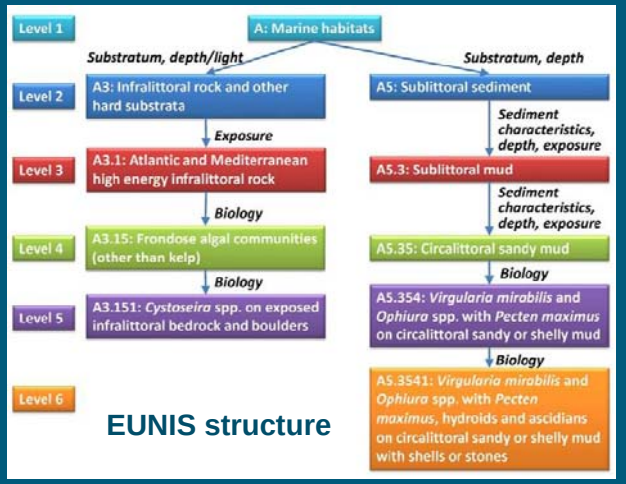
- not at species level (because taxons needed);
- possibly at biocenosis level but at high cost surveys or using proxies (but with high degree of uncertainty);
- certainly at physical habitat level BUT these predominant habitats are of limited value for change assessment.

About EUNIS (EU)

- EUNIS is hierarchically built on a most generic set of key drivers (substrate, depth zones, energy at seabed); biology is introduced at lower lovels as well as «modifiers» to address more local specificities (salinity, oxygen, geomorphology)
- EUNIS is almost univocal and the advantage of its fully hierarchical system is to provide management units above the biotope units
- From its inception in Celtic/North Sea EUNIS has gradually become a standard and is widely accepted on EU Atlantic façade and also in NW Med., while its extension to entire EU marine basins is currently underway
- EUNIS has no formal reporting role (unlike EUR27 or the Ospar priority habitats) but MSFD is pressing for it



The EUNIS physical map of Europe

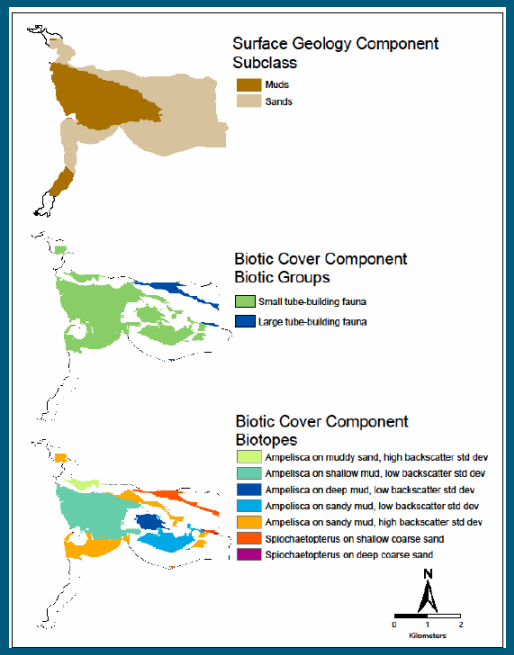


EUNIS structure

About CMECS (USA)

- CMECS is a 4 component catalogue
  - Biotic Cover
  - Water Column
  - Geoform
  - Substrate

- Not primarily designed for mapping



- CMECS is quite thorough, Arctic to tropical, mangrove to coral, coastal to deep

- CMECS produces several maps, an issue for managers

Biotope: *Phragmatopoma lapidosa* Reefs on High Energy Sand
Biogeographic Component:
Realm: Tropical Atlantic
Province: Tropical Northwestern Atlantic
Ecoregion: Floridian

Aquatic Setting:
System: Marine
Subsystem: Nearshore
Tidal Zone: Intertidal, Subtidal

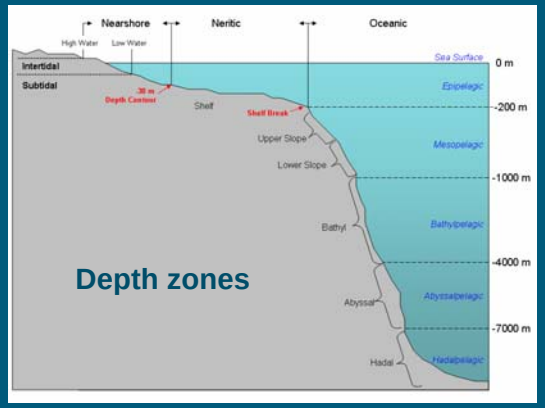
Geoform Component:
Tectonic Setting: Passive Continental Margin
Physiographic Setting: Continental/Island Shore Complex
Geoform Origin: Geologic, Biologic
Level 1 Geoform: Beach
Level 1 Geoform Type: Wave Dominated Beach
Level 2 Geoform: Worm Reef
Level 2 Geoform Type: Linear Worm Reef, Patch Worm Reef

Substrate Component:
Substrate Origin: Geologic Substrate
Substrate Class: Unconsolidated Substrate
Substrate Subclass: Fine Unconsolidated Substrate
Substrate Group: Sand, Muddy Sand

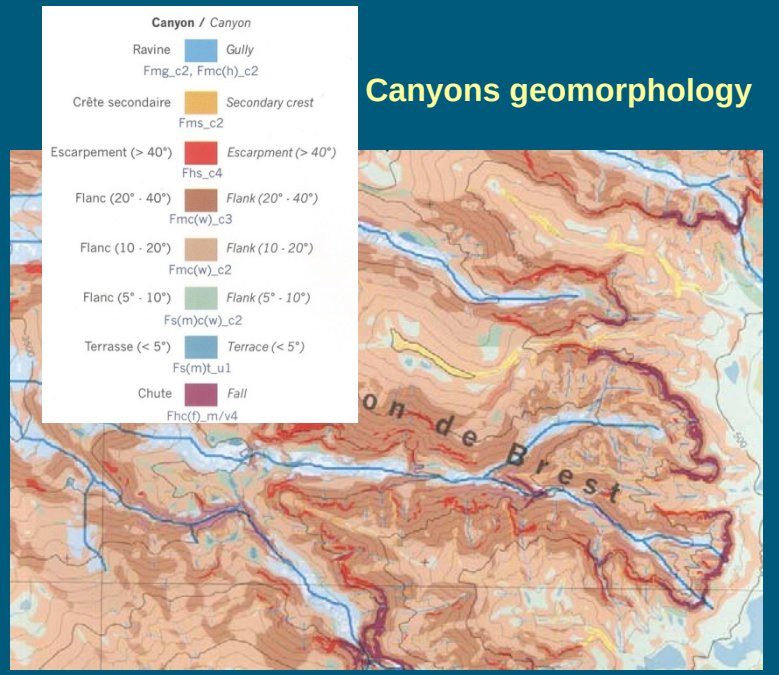
Biotic Component
Biotic Setting: Benthic Biota
Biotic Class: Reef Biota
Biotic Subclass: Worm Reef
Biotic Group: Sabellariid Reef
Biotic Community: *Phragmatopoma lapidosa* Reef

Improvements to EUNIS - Current trends

- Extend to deeper waters
- Improve sedimentation and substrate classification system (with full grain size data) and allow for two component mosaics
- Add geomorphology (sub-surface, structures and features - incl. biogenic structures, e.g. carbonate, reefs)
- Add new habitats and more biogeography without effecting higher levels
- Perhaps keep levels 1- 4 common to all for regional /transnational approaches, and leave levels 5-6 to be adapted locally according to biogeography
- Make it more geared to categories easily identified by remote sensing (intertidal)



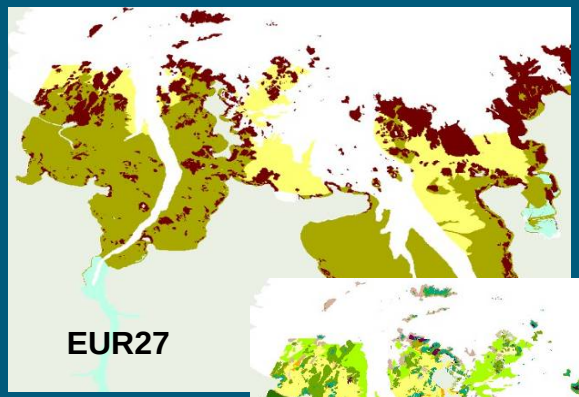
Depth zones

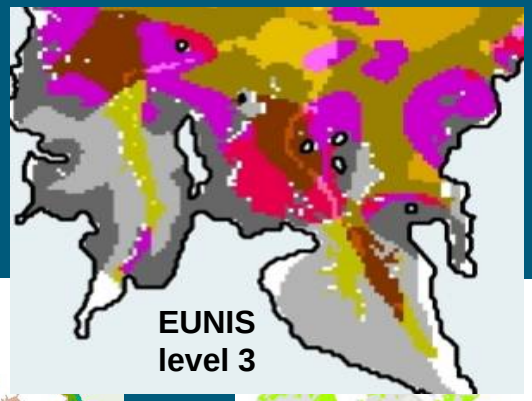


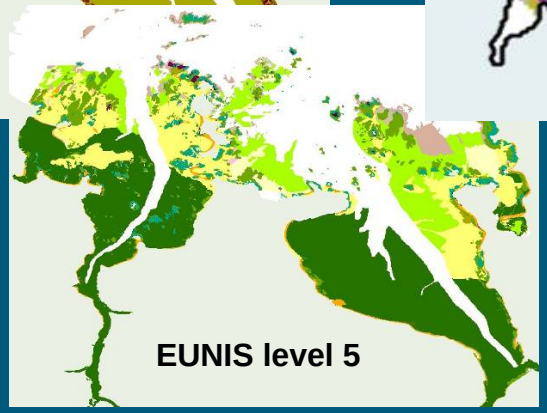
Canyons geomorphology

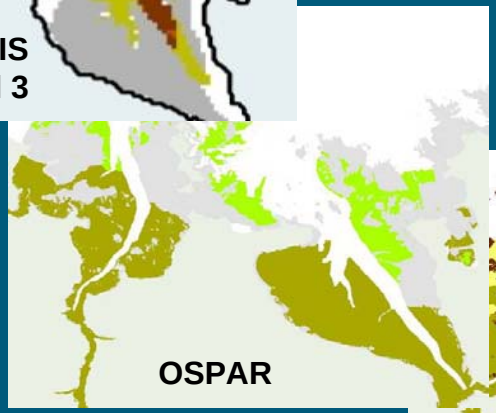
A pragmatic view
Different classifications for different uses

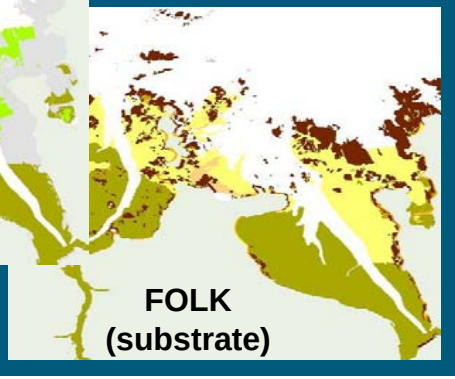
- EUR27: Habitat Directive reporting
- EUNIS level 3: Regional planning (MPA designation, network design, fisheries
- EUNIS level 5: Local impact studies / developments
- OSPAR: Priority Habitats reporting
- Substrate only: Energy project siting, aggregate extraction assessment etc.







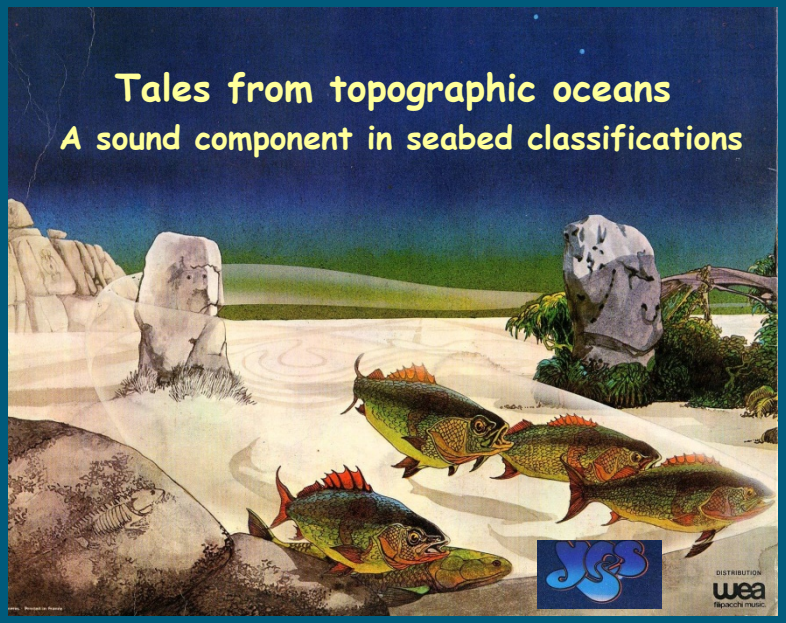




Recommendations

- On one hand a classification system coping with the full diversity and complexity of the marine environment is desirable (e.g. CMECS);
- On the other hand EUNIS is best adapted to mapping. It has some shortcomings but can be worked up to a degree;
- If two systems are to be maintained, by all means bridges should be established between them (today the case in EU between EUNIS , EUR27, UK MNCR, OSPAR.
- Decison-makers need pragmatic and simple (yet not simplistic) maps for habitat conservation and resource management so classifications must readily offer these options by being applicable at a number of hierarchical levels;
- Maps and data sets alike must be stored in a homogeneous interoperable context that enables quick retrieval by a majority of actors;
- Keeping track of raw/interpreted data to their utmost degree of detail is also desirable, especially when it comes to measuring change (Directives)

Thank you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