

Developing an initial set of natural capital accounts for UK marine and coastal ecosystems

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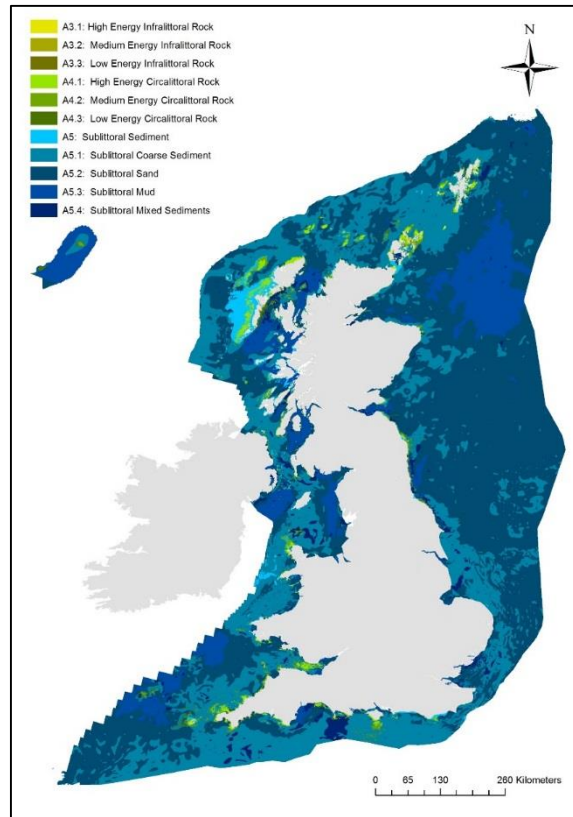
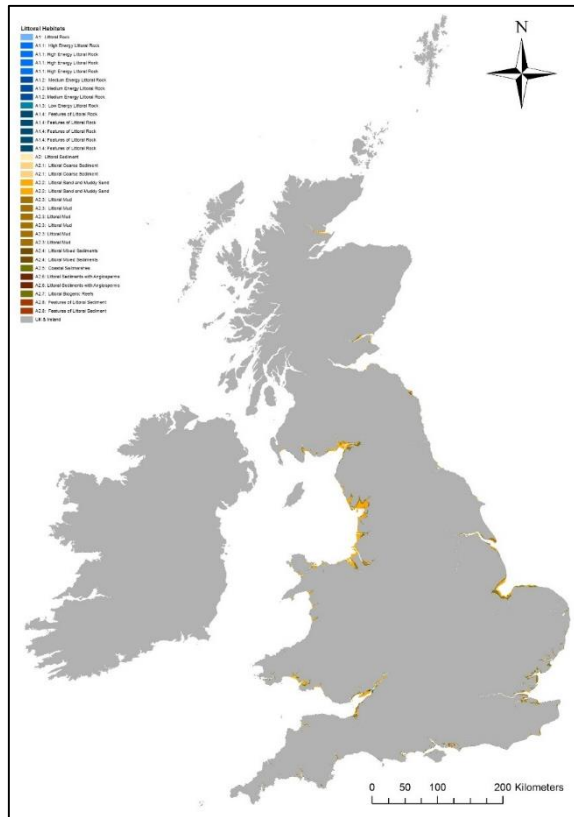
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Background

- UK has a relatively large marine area (EEZ and Continental Shelf)
- Marine natural capital accounts identified as a priority area for accounts development. Builds on some very early, probably too early, work in 2013
- An at times challenging learning process about accounting concepts and approaches for colleagues from other disciplines!

Extent of UK marine and coastal habitats



We now know what we don't know: EUNIS Level 2 habitats as proportion of total area (ha)

■ A1 Littoral rock

■ A2 Littoral sediment

■ A3 Infralittoral rock

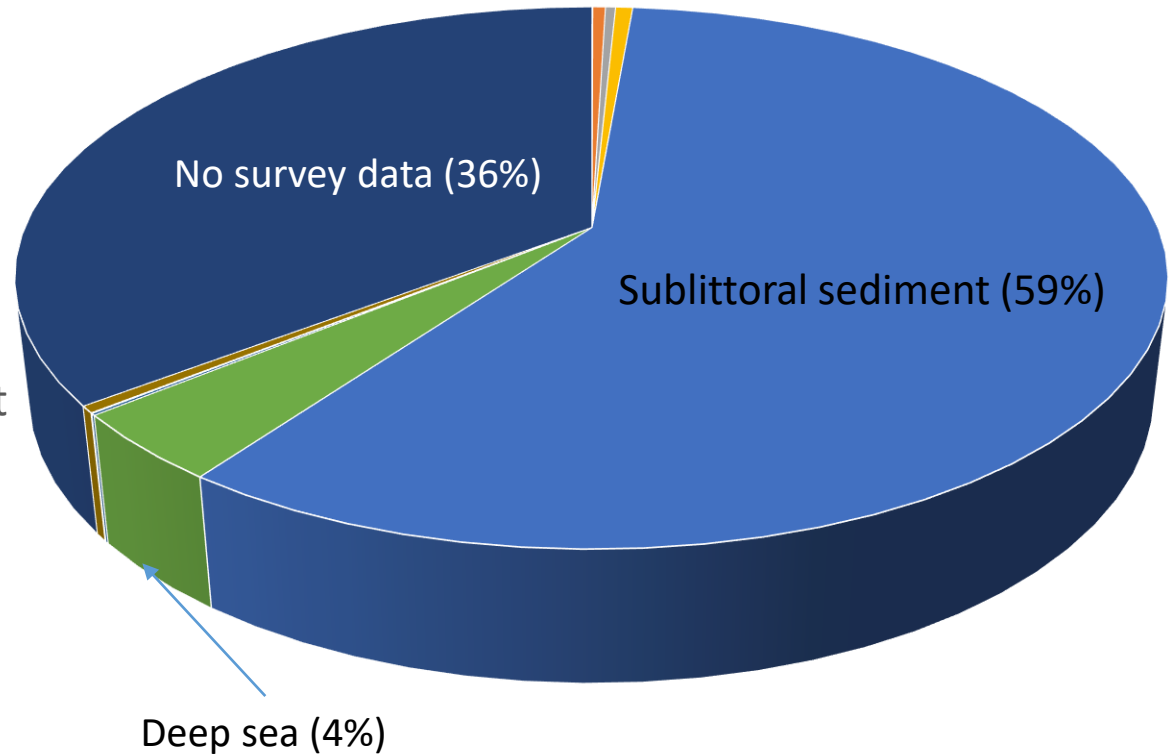
■ A4 Circalittoral rock

■ A5 Sublittoral sediment

■ A6 Deep-sea

■ B1 Coastal dunes

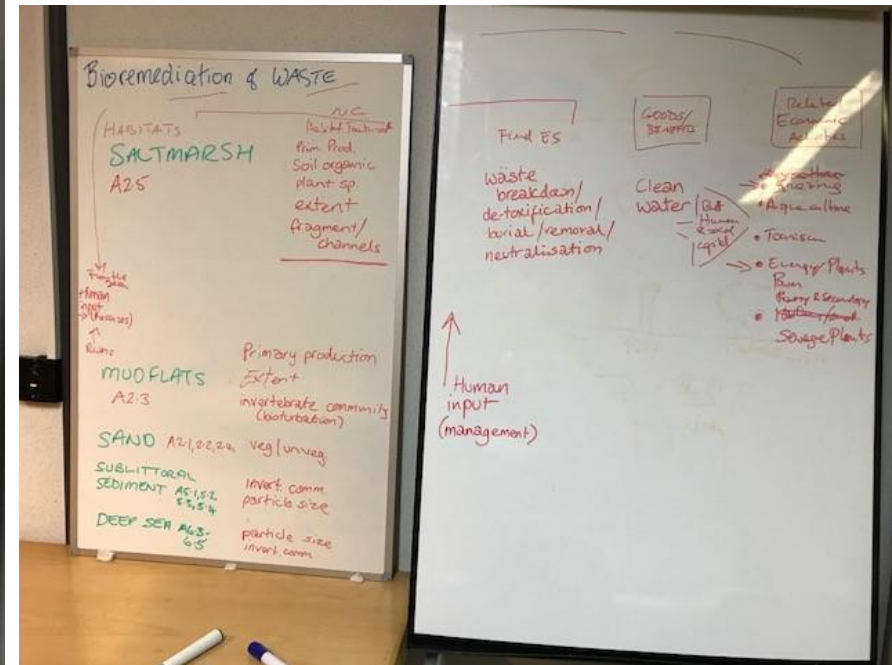
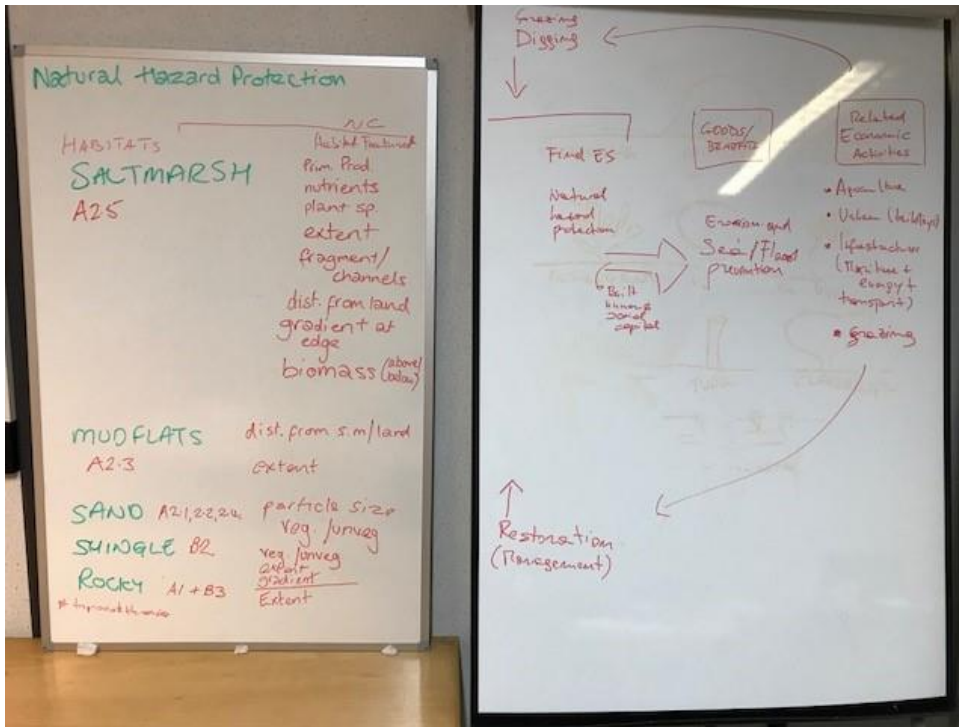
■ B2 Coastal shingle



Key ecosystem services delivered by UK marine and coastal habitats

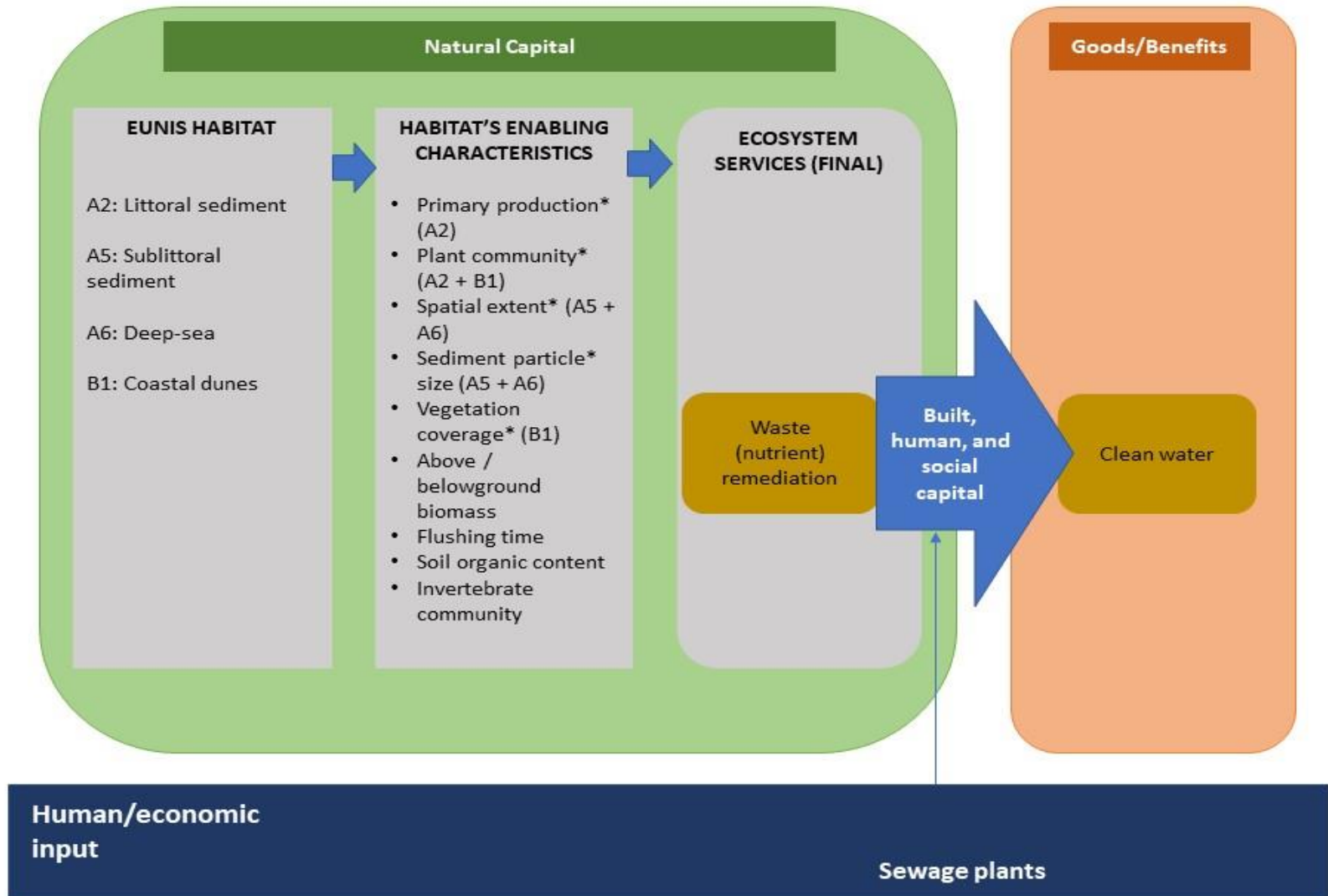
Services	Included	Not included	Benefit assessed
Provisioning services	Fish and shellfish	Algae and seaweed Ornamental materials Genetic resources Water supply Aquaculture	Food provision (wild)
Regulating services	Climate regulation Natural hazard protection Waste (nutrient) remediation	Temperature moderation	Healthy climate Coastal erosion/flood prevention Clean water
Cultural services	Recreation	Amenity Education Other cultural services	Tourism and nature watching
Abiotic services	Renewable energy (OWFs) Abiotic products extraction	Infrastructure support Transportation medium	Wind energy Aggregates

Logic chains: a multidisciplinary creative process!



Regulating services

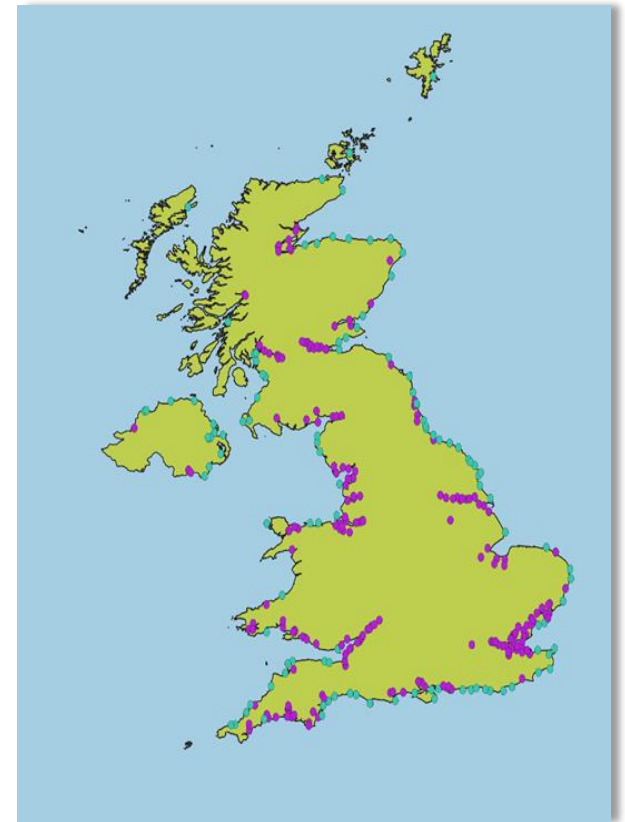
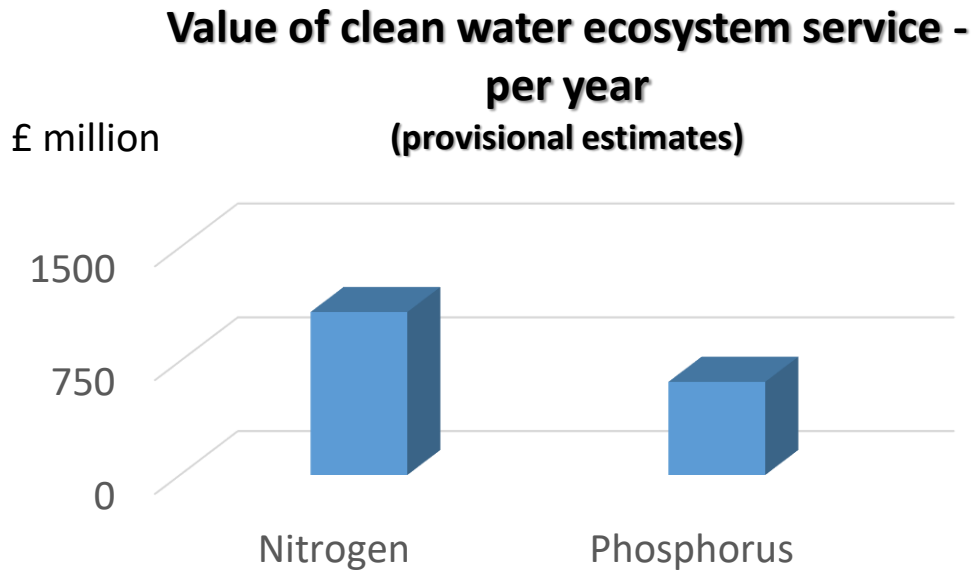
Waste (nutrient) remediation



Regulating services: Waste mediation

Cost avoided

- Wastewater discharged from urban wastewater treatment plants as proxy for the service
- Shadow price of treating a unit of pollutant (Phosphorus, Nitrogen, BOD) based on cost avoided for providing the same treatment
- Wastewater loading in UWWTPs discharging in estuarine and coastal waters from EU Urban Wastewater Directive used to estimate discharges



Regulating services: Coastal erosion and flood prevention

Replacement cost

- Extent of UK saltmarshes
- Minimum width of saltmarsh to generate relevant provision
- Annual capital cost seawall metre/year Environmental Agency
- Estimated length of coast protected by saltmarshes

But...

- Likely to overestimate the value of the ecosystem service
- Implicitly assumed all saltmarshes provide same level of protection
- Other habitats are not taken into account
- Different value of the economic activities protected

Forward look...

- Bio-economic modelling



Regulating services: Healthy climate

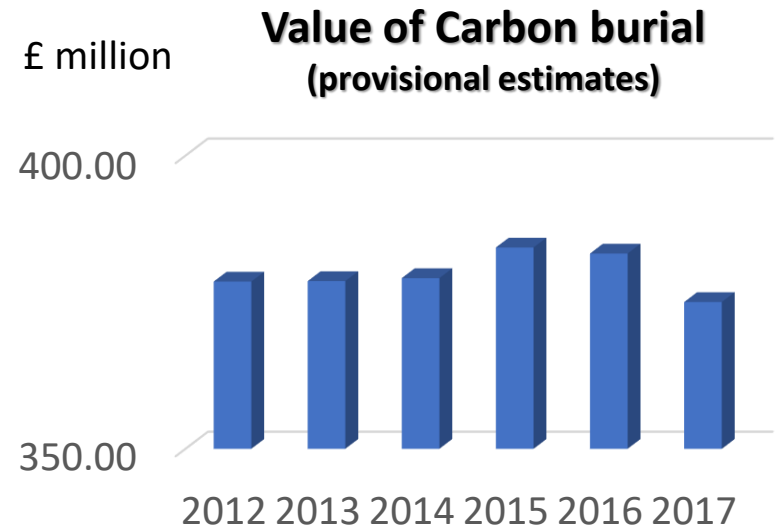
Abatement cost avoided

- Extent of the marine and coastal habitats providing the service
- Carbon storage (burial) rate (tCO₂e/ha/year)
- Monetary value of carbon - abatement cost of non-traded carbon central value

$$CB_t = S_t \times V_t$$

$$S_t = a_t^{c,m} \times Cb_t$$

- Lower burial rates estimates found in recent literature for saltmarshes and seabed sediments



'Blue economy' and marine ecosystem service supply

Illustrative/Provisional

Marine ecosystem
supply of services

Additive to
/contributes to

Blue economy GVA

Provisioning services

Fish	292	=>	2127
Carrier services (shipping)?			3301
Ports			3360
Shipbuilding			2503

Abiotic flows

Oil and gas	1157	=>	14536
Minerals and aggregates	14	=>	
Wind power	1345	=>	

Regulating Services

Air pollution removal		+	
Carbon sequestration	384	+	
Storm buffering	5590	+	
Temperature regulation		+	
Waste mediation	1692	+	

Cultural Services

Enabling recreation	1299	+	
Enabling physical activity		+	
Settings for mental health		+	
Enabling educational interactions			
Nature-based tourism	800	=>	6573

Conceptual issues and challenges (to mention a few...)

- Coverage of marine/coastal habitats (splash zone?)
- Estimation of extent of unknown habitats (“seabed” and/or “known unknown”)
- Use of pressure indicators within condition account
- Relationship to SDG 14 indicators
- Mediated and unmediated waste flows
- Carbon burial (and storage)
- Policy uses
 - Protected and unprotected areas
 - Understanding the social context of the beneficiaries
 - Relationship to Blue Economy measures

Questions?

