

Listen to the ocean

Natural Capital: Can it be operationalised for the marine environment?

Mel Austen



@Mel_Austen mcva@pml.ac.uk



Blue
Communities



Natural Capital: Can it be operationalised for the marine environment?

YES

Marine is accustomed to systems thinking rather than species orientated approaches
We have considerable data and modelling tools available
We have legislation in place that would benefit from natural capital approaches



But

We need to give it a go to find out!
This will need resourcing ... and possibly a change of mindset
We need to accept that it won't (initially) be perfect

We will learn by doing



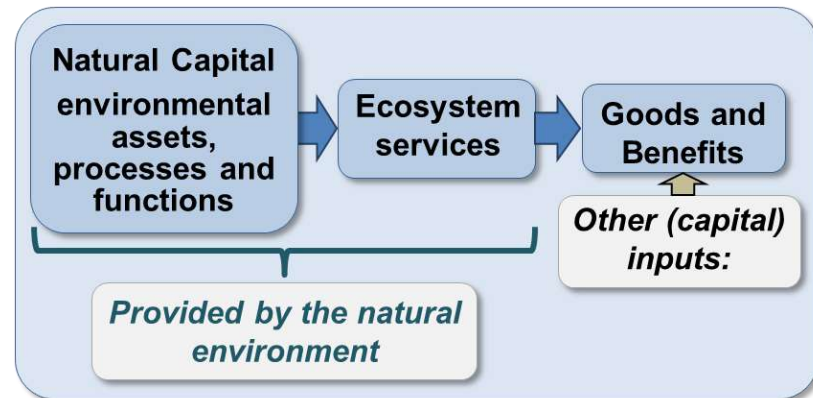
Apply at large and small scales (e.g. Marine Pioneer)

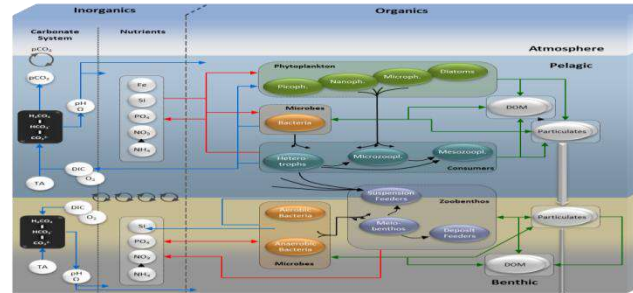
££ Valuation isn't always necessary for natural capital approach to support decisions

Identify key data and tools gaps, and fill them

We work better in collaboration

PRACTICE MAKES PERFECT





Natural Capital

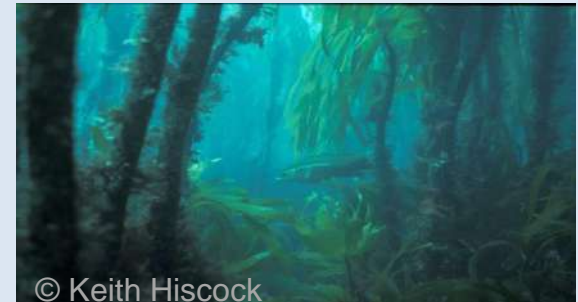
**Natural Capital
environmental
assets,
processes and
functions**



**Ecosystem
services**

e.g. flows of fish,
birds, reefs &
saltmarsh,
clean seawater,

*Provided by the natural
environment*



Natural Capital

**Natural Capital
environmental
assets,
processes and
functions**

e.g. seafood, recreation, tourism, renewable energy, flood defences, climate regulation etc.

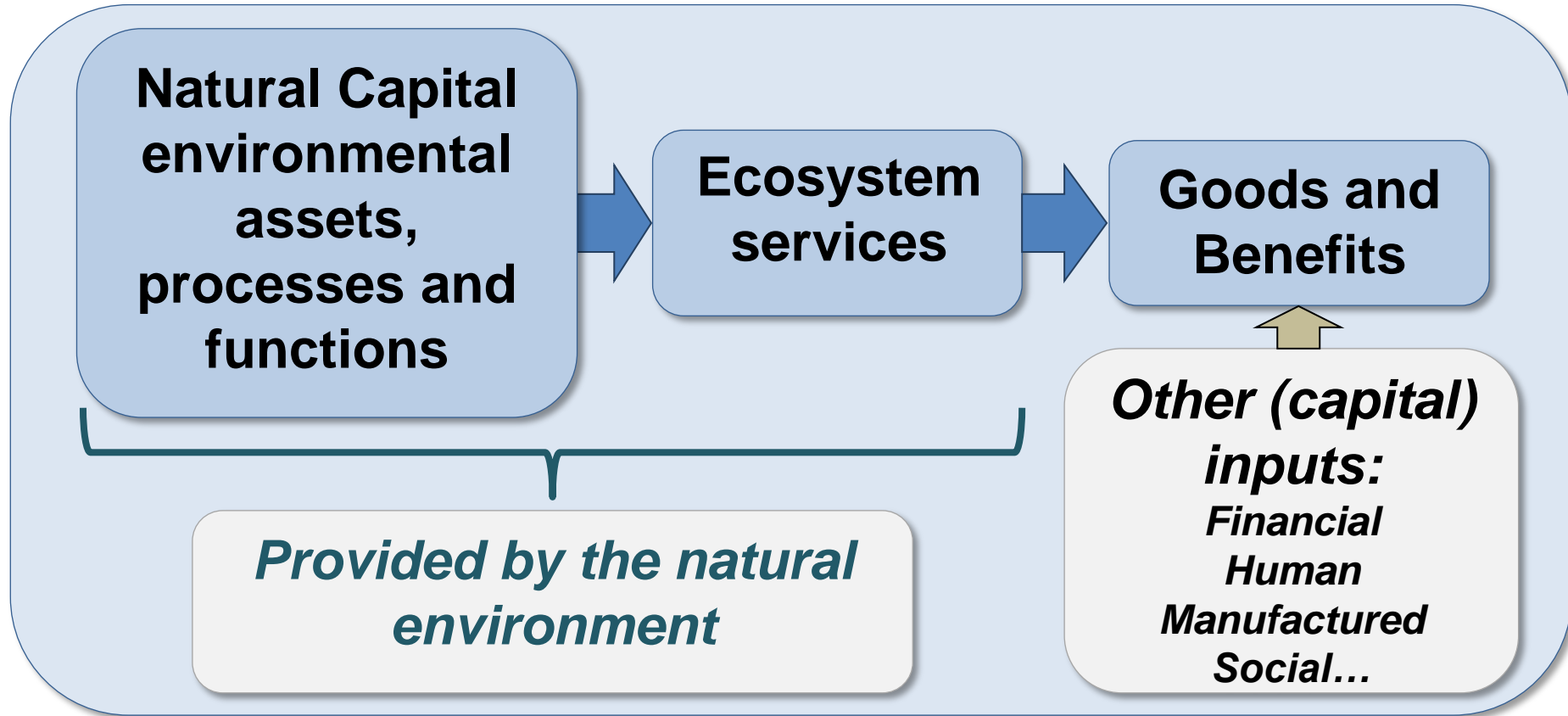
**Ecosystem
services**

**Goods and
Benefits**

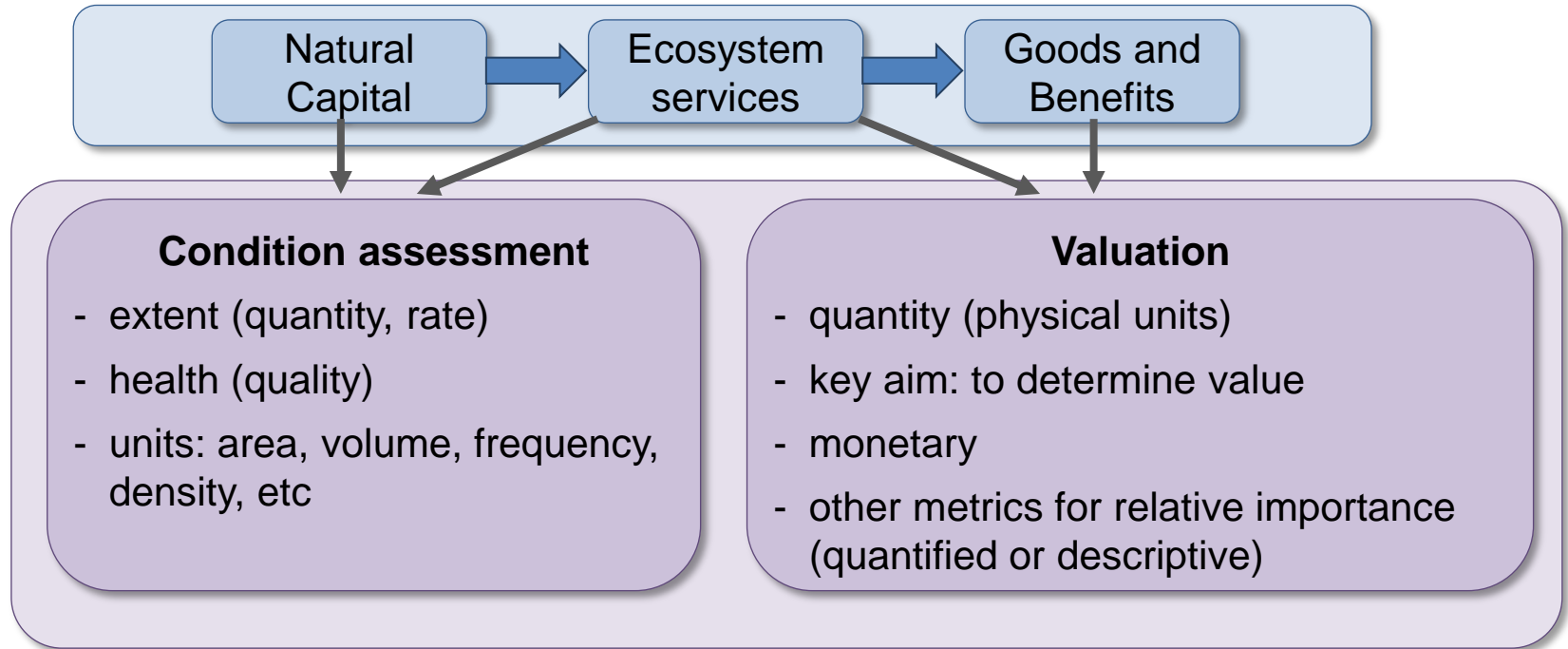
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Natural Capital

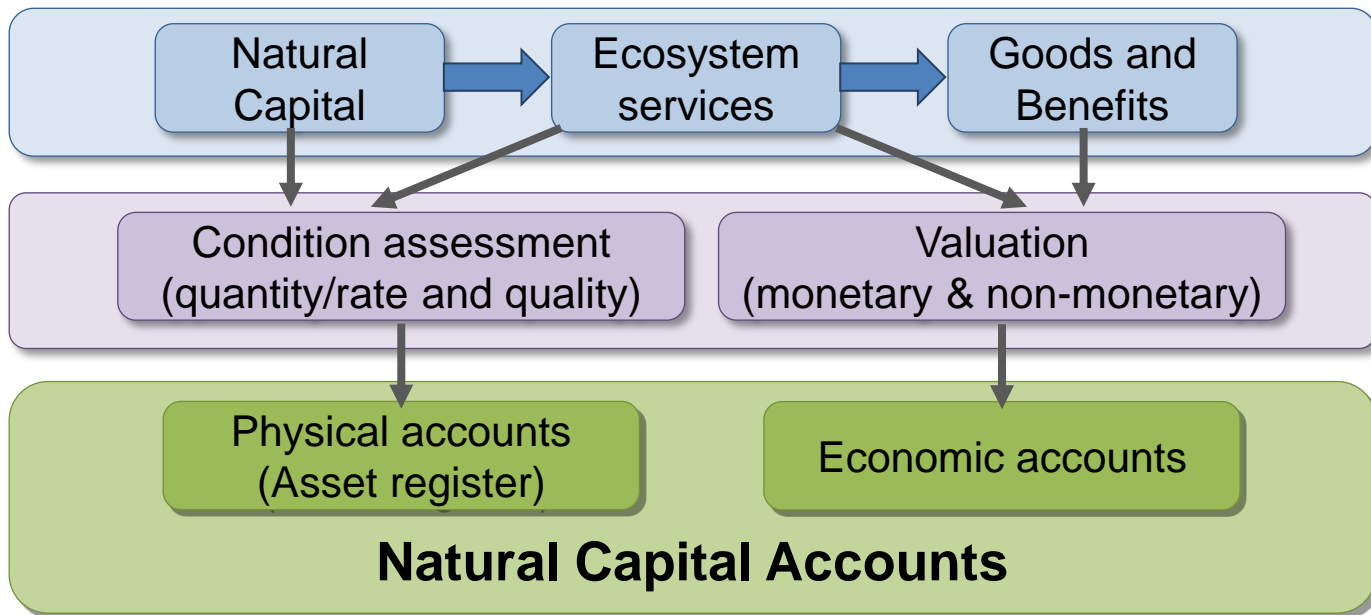


Why are the distinctions important?



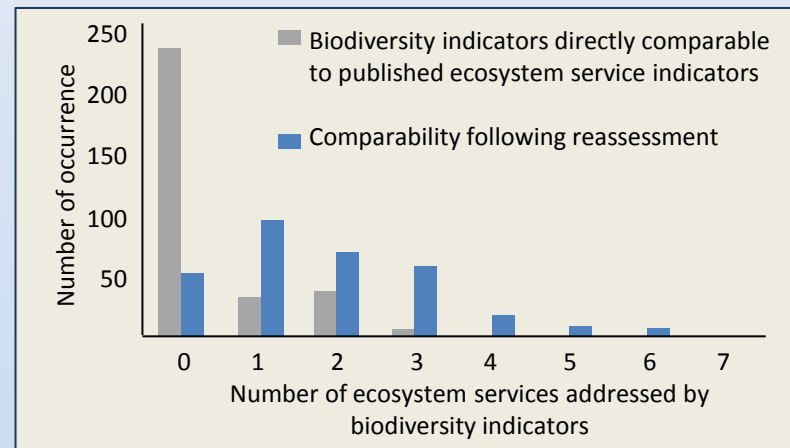
Natural Capital Accounts

*“A tool to **measure the changes** in the stock and condition of natural capital at a variety of scales and to **integrate the value** of ecosystem services into **accounting and reporting systems**.”*





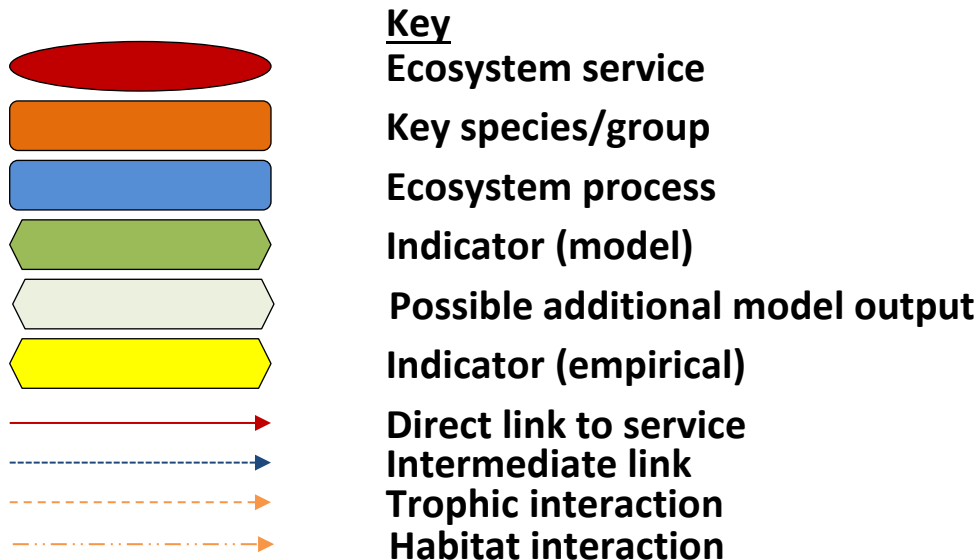
Biodiversity indicators for Good Environmental Status as a source of information on ecosystem services

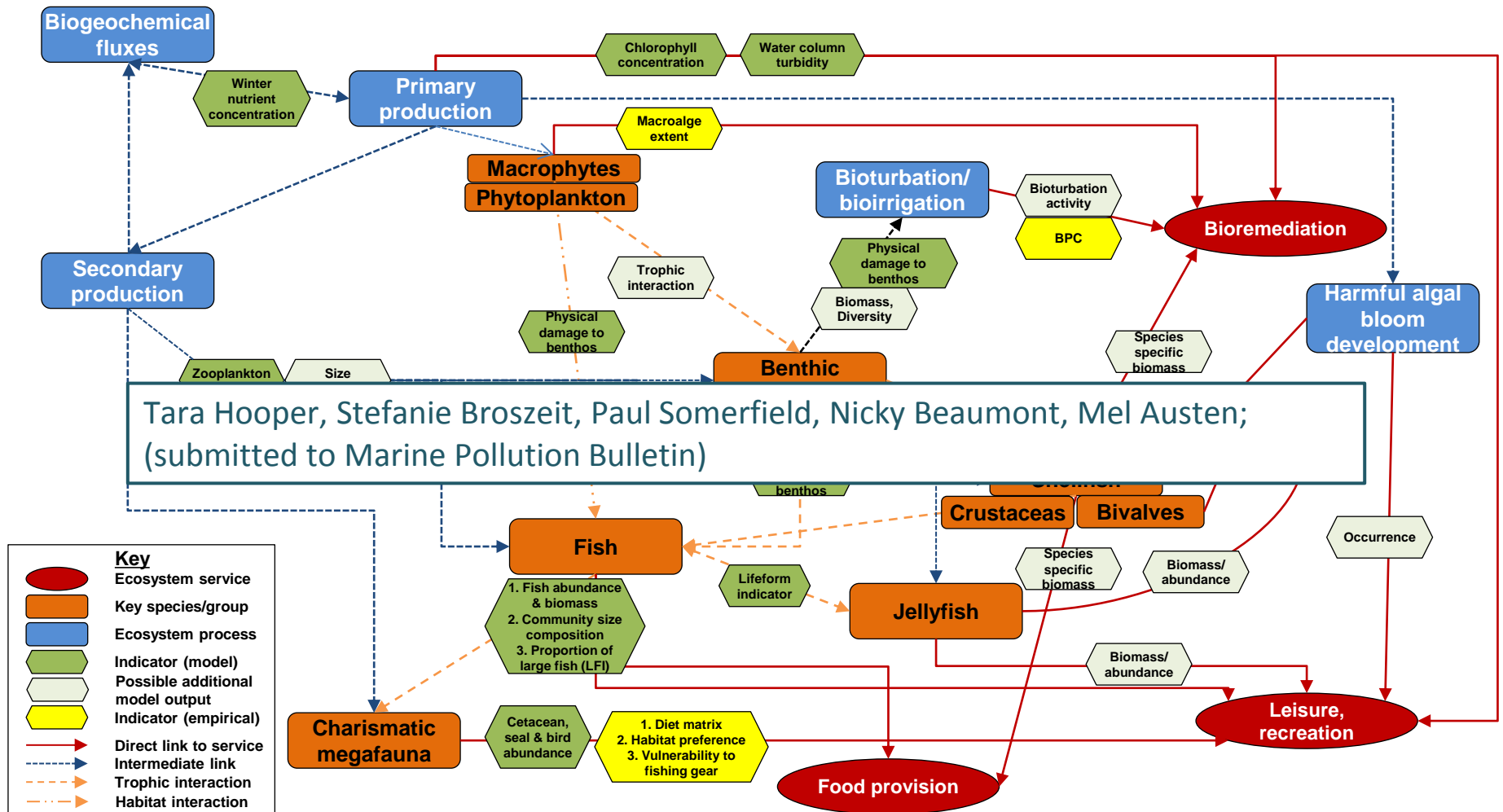


Linking natural capital and ecosystem services for decision support

Tara Hooper, Stefanie Broszeit, Paul Somerfield, Nicky Beaumont, Mel Austen;
(submitted to Marine Pollution Bulletin)

Conceptual models identify key links between natural capital assets and ecosystem services





Natural Capital Assessment Tools for the North Devon Marine Pioneer

Siân Rees¹, Tara Hooper²,
Matt Ashley¹, Andy Cameron¹,
Martin Attrill¹, Mel Austen²,

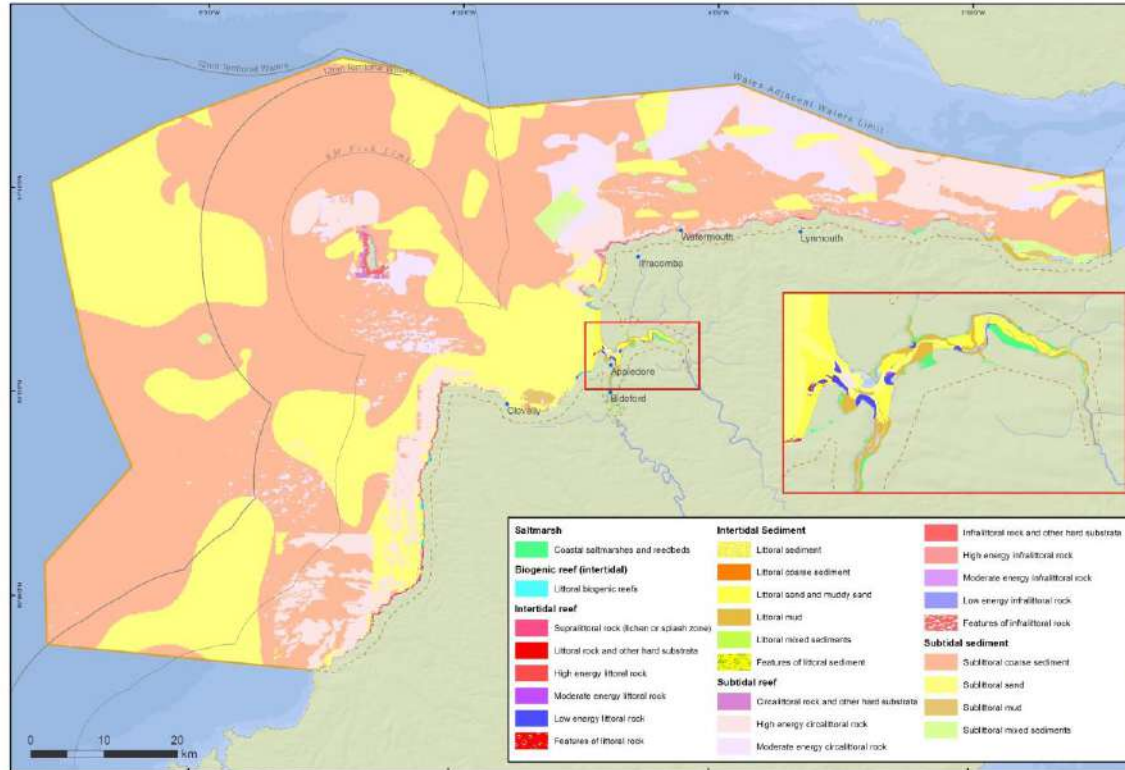
¹Marine Institute, University of Plymouth

²Plymouth Marine Laboratory

Testing the framework for the application of the Natural Capital Approach in the Marine Pioneer

- ✓ A natural capital asset register
 - extent and condition of the natural capital assets
 - stocks and flows of ecosystem services
- ✓ A risk register to identify threats to natural capital
- ✓ Recommendations on key natural capital assets on which future management opportunities could be focussed to achieve the greatest gains

Natural Capital Asset and Risk Register – Baseline map



Natural Capital Asset and Risk Register – linking ecology to ecosystem services

| Assets | Natural Capital Asset: Habitats in North Devon Marine Pioneer | Area (km ²) | Area in MPAs (km ²) | Area in management measure (km ²) | Intermediate services | | | | | Goods / Benefits | | | | |
|----------------|--|-------------------------|---------------------------------|---|-----------------------|----------------------|---------------|------------------------------|--------------------------------|----------------------------|--------------------------|--|----------------------|------|
| | | | | | Supporting services | | | Regulating services | | From Provisioning services | From Regulating services | From Cultural services | | |
| | | | | | Primary production | Carbon sequestration | Water cycling | Formation of coxides habitat | Formation of physical barriers | Formation of landscape | Biological control | Regulation of water and sediment quality | Carbon sequestration | Food |
| Coastal marine | Saltmarsh | 2.80 | 2.01 | 0.62 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | B9.1: Supralittoral rock (lichen or splash zone) | 0.82 | 0.38 | 0.00 | | | | | | | | | | |
| | A1.1: Littoral rock and other hard substrate | 11.31 | 10.42 | 1.02 | | | | | | | | | | |
| | A1.3: High energy littoral rock | 5.72 | 5.21 | 0.03 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 1 |
| | A1.2: Moderate energy littoral rock | 2.98 | 2.83 | 0.03 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 1 |
| Coastal marine | A1.3: Low energy littoral rock | 1.65 | 1.52 | 0.98 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 1 |

← Services and Goods

Literature review

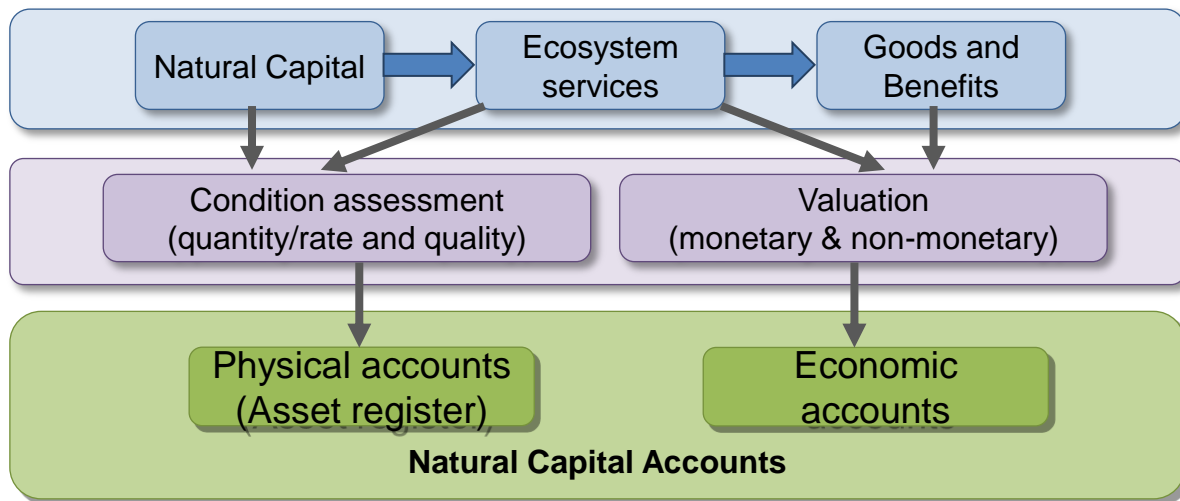
- Level of provision of each ecosystem service from each habitat (literature and expert opinion)
- Shading (darker) is the level of provision of the ecosystem service.
- 1 = Expert opinion, 2=Grey literature, 3 Peer reviewed literature
- Blank: Not assessed – or no data available

Figure 1 is a map of the Bristol Channel and surrounding areas, showing the distribution of Natural Hazard Regulation (NHR) relative provision. The map includes a legend for NHR relative provision: Not assessed (white), Low (light pink), Moderate (medium pink), and Significant (dark pink). The map also shows the 120m Territorial Waters boundary and the Wales Adj. boundary. Three inset photographs show coastal features: a rocky coastline, a sandy beach, and a coastal path. A scale bar indicates 0, 10, and 20 km.

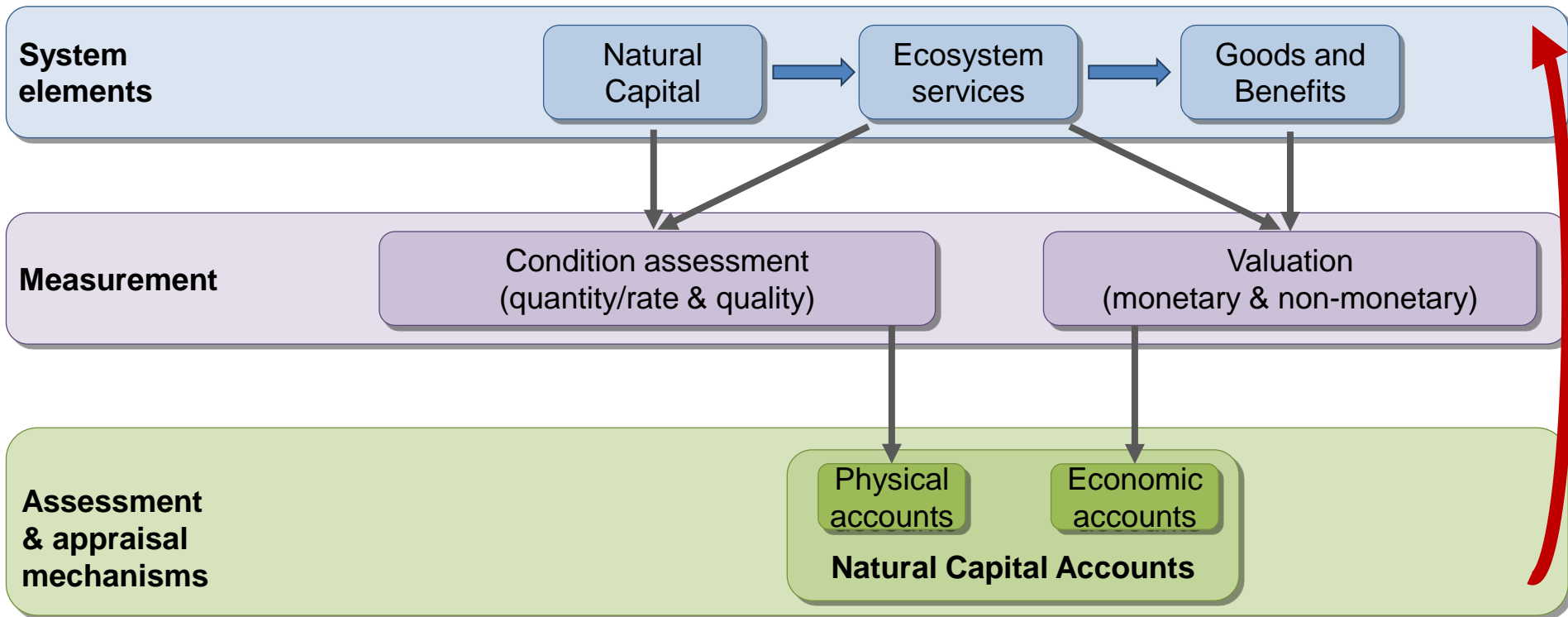
Coordinate System: ETRS 1989 ETRS-TM30Projections: Transverse MercatorDatum: ETRS 1989Projection: Transverse Mercator
Datum: ETRS 1989False Easting: 500,000False Northing: 0Central Meridian: -3Scale Factor: 1Latitude Of Origin: 0Units: Meter
Scale: 1:25,000Service Level: Corrected Coordinates © 2014 Felt

Natural Capital Accounts

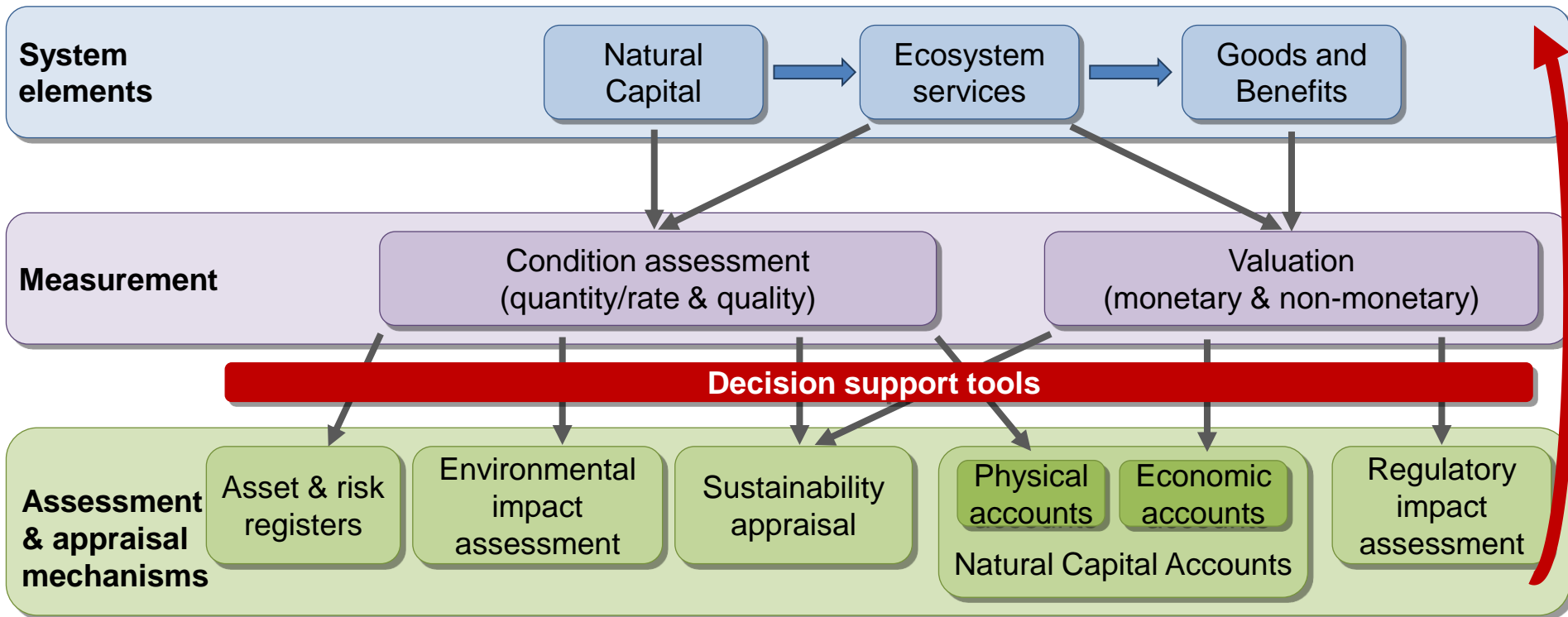
*“Enabling organisations to gather **natural capital information** in a **coherent and comparable format** will help both **companies** and **policy-makers** to make **better informed decisions** about the management of natural capital assets.”*



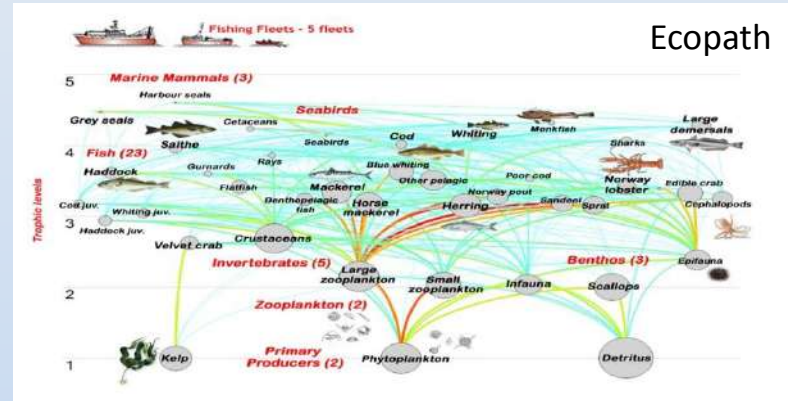
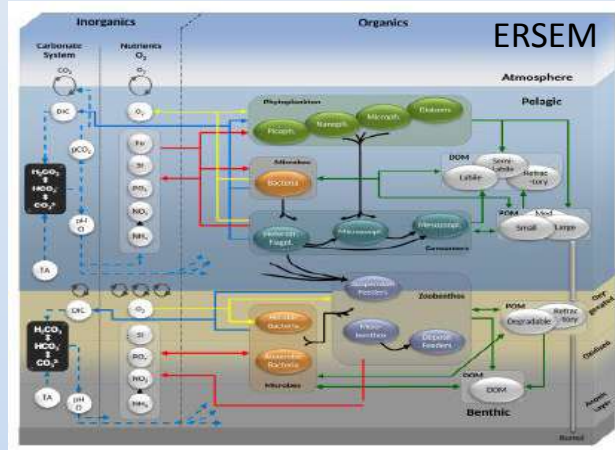
Using the Approach in Decision Support



Using the Approach in Decision Support



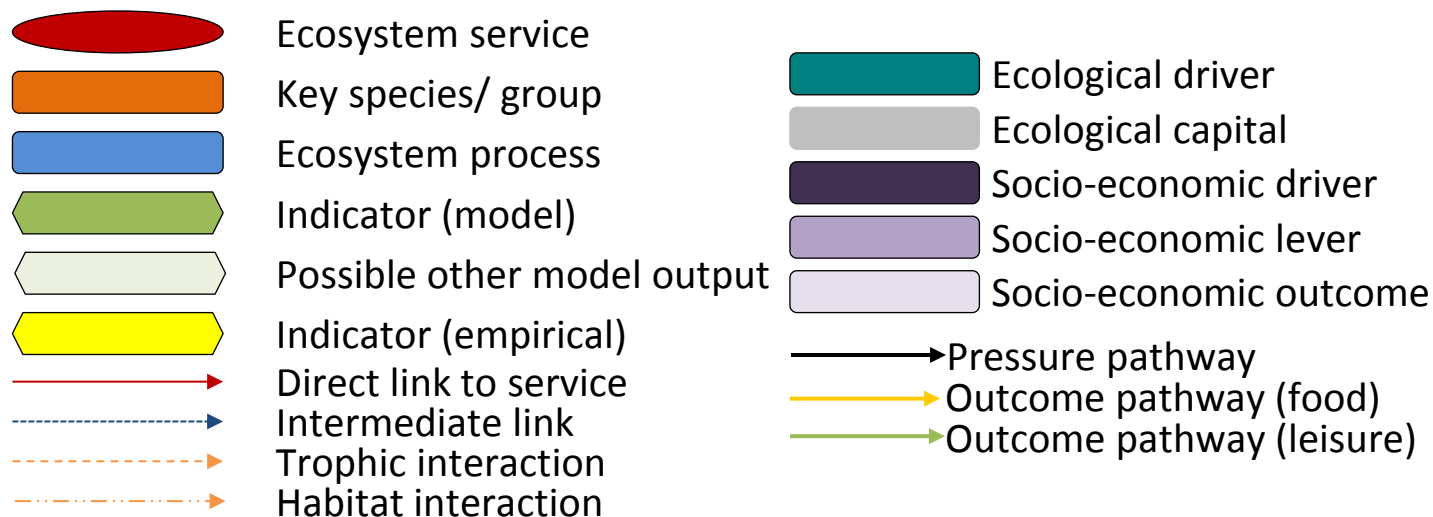
- Marine (vs terrestrial) is accustomed to systems thinking rather than species orientated approaches
- We have considerable data and modelling tools available



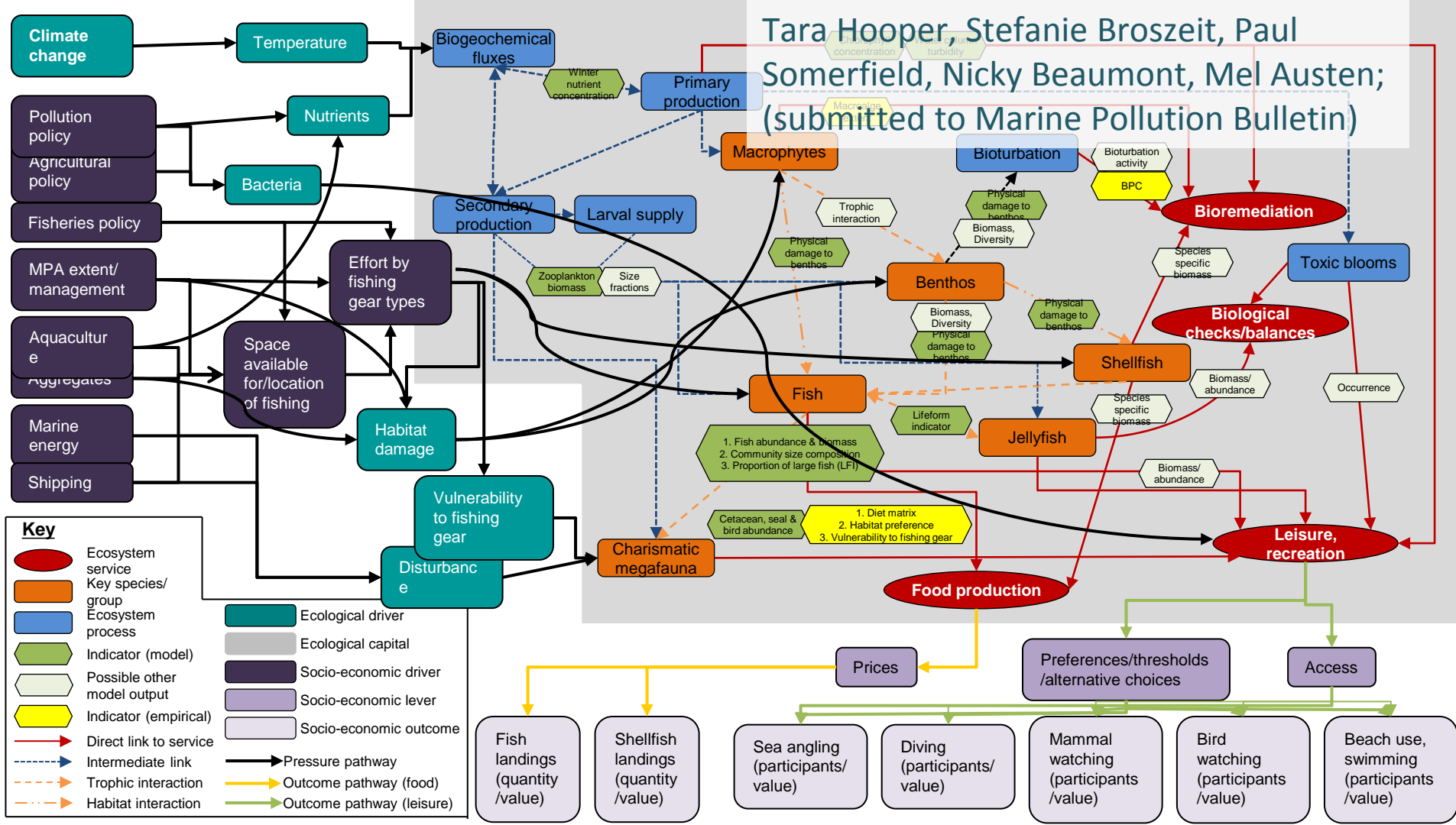
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Conceptual models identify key links between natural capital assets and ecosystem services

Links to Ecological drivers; Management measures; Economic impacts



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But to simplify things we can pull out the key links and still examine trade-offs under different options ...

Management measure

Pressure

Species group

Process

Service



Marine protected area

Reduction of demersal fishery

Mussel farms to clean water

Fishing to MSY

Habitat degradation

Eutrophication

Overfishing

Macrophytes

Phytoplankton

Benthic organisms

Shellfish

Crustaceans

Fish

Charismatic megafauna

Primary production

Biogeochemical fluxes

Harmful algal bloom development

Macrophyte development

Bioremediation

Biological control

Food provision

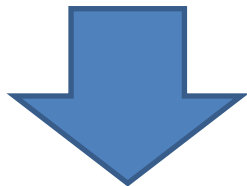
Leisure, recreation

Tara Hooper, Stefanie Broszeit, Paul Somerfield, Nicky Beaumont, Mel Austen;
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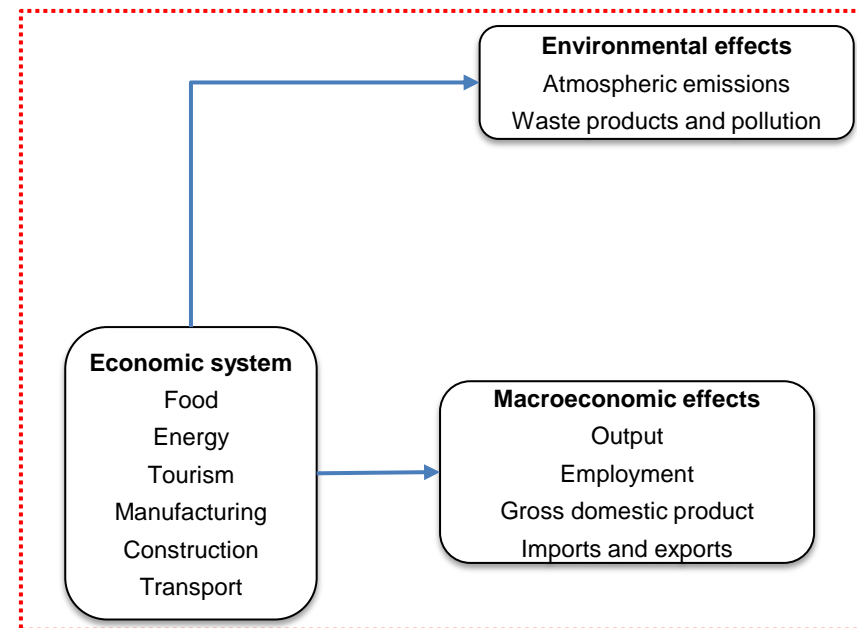
Macro-economic approaches

(Emily Stebbings and Eleni Papathanasopoulou)

Environmentally-extended Input Output (IO) analysis (EEIO)



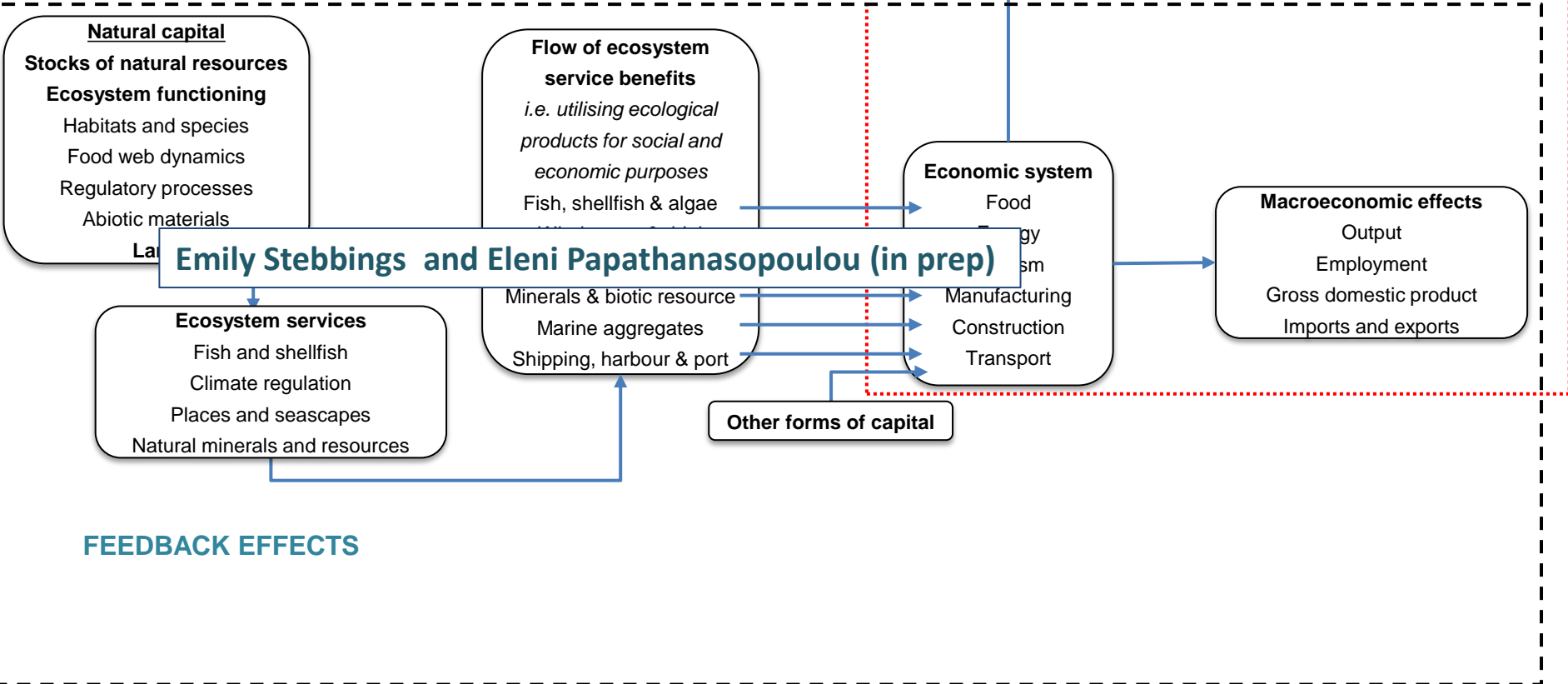
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More thoughts ...

- **Net environmental gain** should also apply to development and activities in the marine environment.
- **Fisheries policy**, including setting fishing catch targets, should be consistent with **the 25 Year Environment Plan** (- improving the marine environment; fish are one element of multiple services).
- Develop **Marine natural capital plans** that work with, and integrate with land-based natural capital plans.
- Review and re-orientate **Marine protected areas** towards protecting natural capital assets and flows of ecosystem services, including recovery and resilience.
- **Innovative sea management system** needed, (like the land management system).
 - Use public money or other incentives to empower and enable users of the sea to become the stewards of the marine environment and its biodiversity as public goods for all users.

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