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Listen to the ocean

An Introduction to Natural Capital and Ecosystem Services

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Learning objectives

By the end of the workshop you should have a better understanding of:

- The **concepts of ecosystem services** and how they relate to natural capital
- How **you can use ecosystem services concepts** in your research activities
- How ecosystem service **concepts can support decision-making/management**
- The **meaning of economic value**

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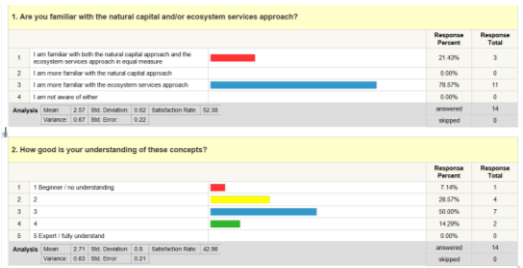
How much do you know about ES?



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What would you like to learn in this workshop?

- Get a better understanding so they can be used in projects
- Better understand classification systems such as IPBES
- Include other services not only provisioning
- Use our environmental data in a more applied way
- Use of indicators and metrics
- What instruments can be useful?
- Make management decisions that enhance ES and valuate possible outcomes
- Assign specific economic value to services in particular cultural ES

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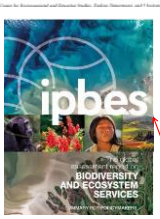
Ecosystem service concept

1997

UN, 2005



2017

UK National Ecosystem Assessment

UK, 2011

European Environment Agency
CICES

EU, 2013

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Various rather similar definitions of Ecosystem services:

'Ecosystem services' are the outputs of ecosystems from which people derive benefits. *(National Ecosystem assessment, 2011 and Millennium Ecosystem Assessment, 2005)*

"the aspects of ecosystems utilised (actively or passively) to produce human well-being" *(Fisher et al. 2009)*

"The direct and indirect contributions of ecosystems to human well-being. The concept of 'ecosystem goods and services' is synonymous with ecosystem services." *(The Economics of Ecosystems and Biodiversity: TEEB, 2010).*

Ecosystem services are made up of tangible goods (e.g. food and raw materials) and intangible services (e.g. the regulation of our climate and the remediation of waste). *(Hattam et al 2015)*

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Natural Capital Accounting

Natural capital: the elements of nature that directly and indirectly produce value or benefits to people, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions.

Natural capital assets are a series of stocks, from which flows of ecosystem services are generated

UK Natural Capital Committee

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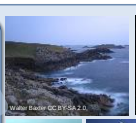
Defining Natural Capital & Ecosystem Services

Natural Capital

Our environmental **assets**: the ocean, land, freshwater, air, the species and habitats they contain..

.. the **processes and functions** that occur within them.

Stocks









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Defining Natural Capital & Ecosystem Services

Natural Capital

Our environmental **assets**: the ocean, land, freshwater, air, the species and habitats they contain..

.. the **processes and functions** that occur within them.

Ecosystem services

The components of the natural environment that are directly useful to us.

Flows

Ecosystem services are grouped into three categories:

Provisioning: Food and raw materials


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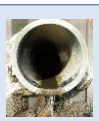
Ecosystem services are grouped into three categories:

Provisioning: Food and raw materials

Regulating: Protection from harm and extreme events (e.g. climate regulation, flood protection, waste removal)

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Ecosystem services are grouped into three categories:

Provisioning: Food and raw materials

Regulating: Protection from harm and extreme events (e.g. climate regulation, flood protection, waste removal)

Cultural: The way environmental interaction shapes our experiences (e.g. recreation, inspiration, heritage)




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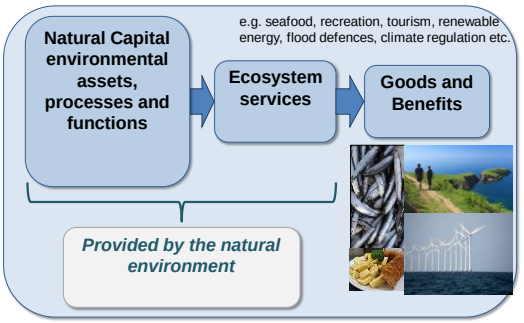
Natural Capital



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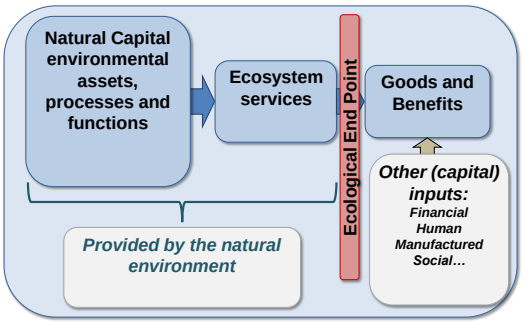
Natural Capital



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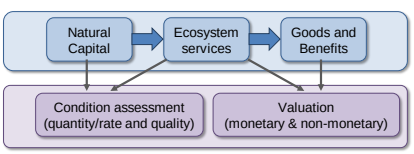
Natural Capital Accounts

*""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."*



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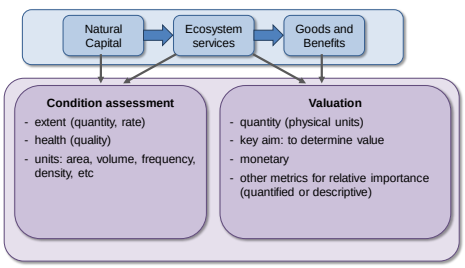
Why are the distinctions important?



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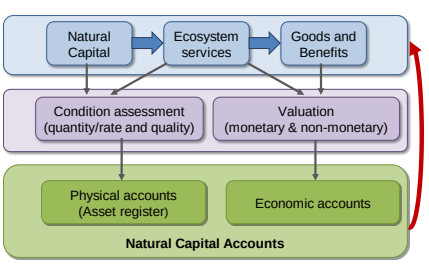

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Use of natural capital accounts

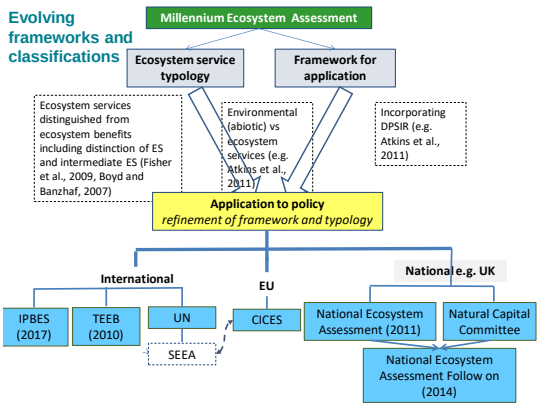
Natural capital accounts can complement other economic measures such as gross domestic product (GDP).

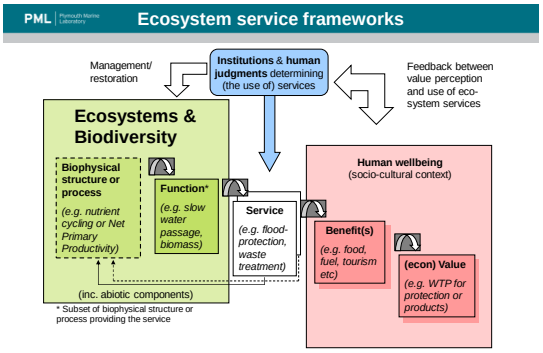
GDP traditionally excludes ecosystem services provided by nature.

A well-developed national set of natural capital accounts can:

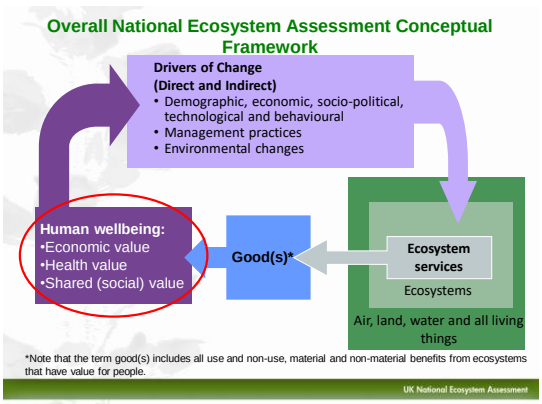
- monitor losses and gains in our natural capital over time
- identify priority areas for investment and inform resourcing and management decisions
- highlight links with economic activity and pressures on natural capital

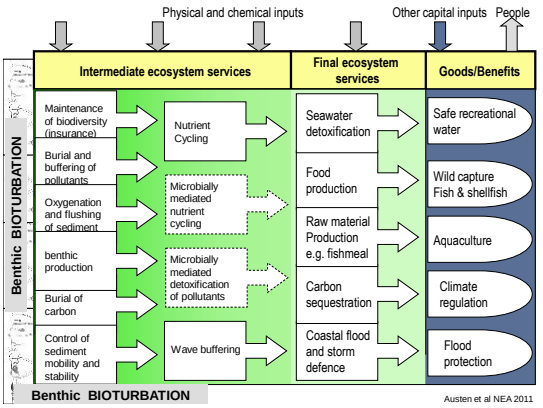
Principles of NCA, Office of National Statistics, UK, 2017

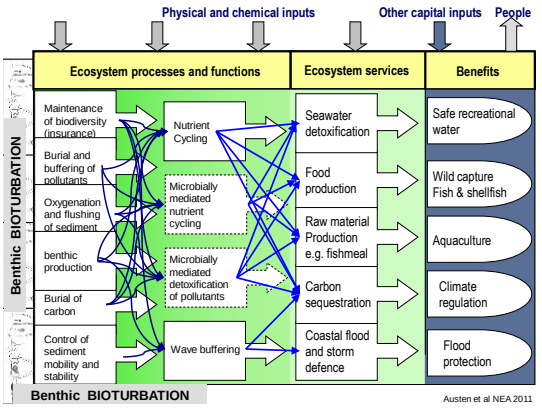


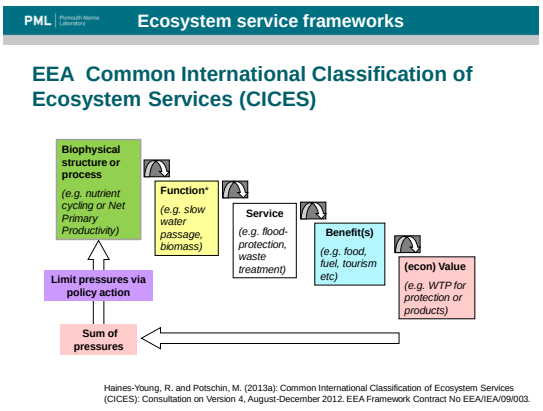


Modified from TEEB:
The Economics of Ecosystems and Biodiversity (2010)









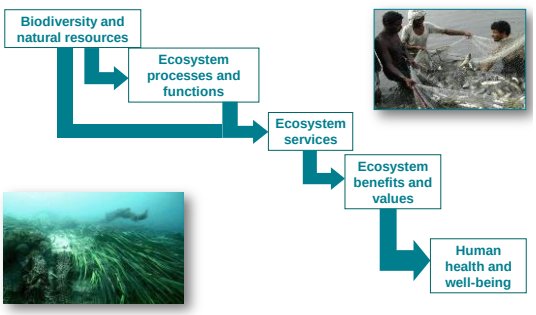
Are classifications important and why?

- **Continuous development of ideas (MEA was not hierarchical - double counting)**
- **Many classifications are based primarily on terrestrial (e.g. MEA)**
- **Need to incorporate marine specifically (for example, we talk about sediments not soils)**
- **Important to adapt a classification to make it useful for a particular study site**

- Choosing and modifying a classification is an important process in ES evaluation and should include stakeholders
- You may need to define the services to fit your case study and questions!

Marine ecosystem services

Marine ecosystem services



Why use an ecosystem service approach?

- Linking ecosystem and economic models, decision support tools
- Species may provide several services
- Interdisciplinary approach allows consideration of different aspects of the ecosystem
- Communicate with stakeholders and decision makers
- Help converge fisheries management and conservation

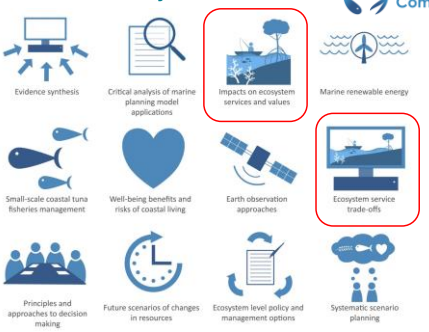
Approaches

- LITERATURE REVIEW – Understanding the system
  - What habitats provide which ES?
- CONCEPTUAL FRAMEWORKS – 'Mapping' the system
  - Using knowledge from different disciplines to create conceptual frameworks to clarify ES provision
- VALUATION METHODS – Valuing the system
  - What does valuation mean and entail?

Blue communities programme

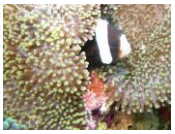
- Four case study partners:
  - Vietnam
  - Philippines
  - Indonesia
  - Malaysia
- Man and Biosphere Reserve Programme sites as case study sites

Structure – 12 Projects

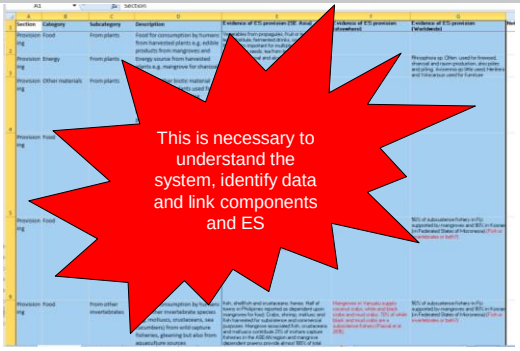


Literature search

- What ecosystem services do tropical habitats provide?
- 9 habitats (22 sub-habitats)
- 20 ES

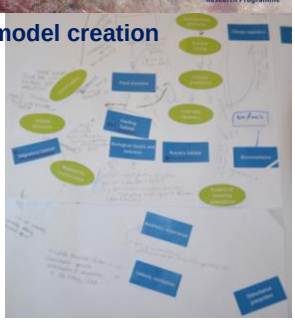


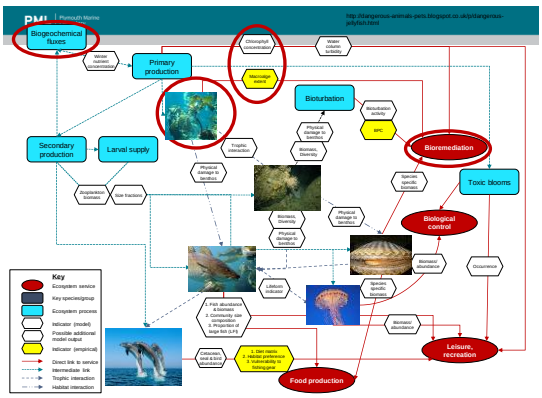
Example: mangrove habitat



Conceptual model creation

- Components of the ecosystems (charismatic megafauna, microphytes, fish)
- Key processes and their links to components
- Link to ES
- Key data sources and MSFD indicators





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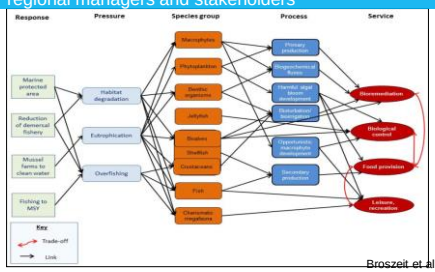
How can such models help us?

- Holistic view of the ecosystem
- Find indicators to assess the ecosystem services
- Discuss different management options with policy makers, regional managers and stakeholders



Broszeit et al. 2019

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Conceptual model (pressure management)

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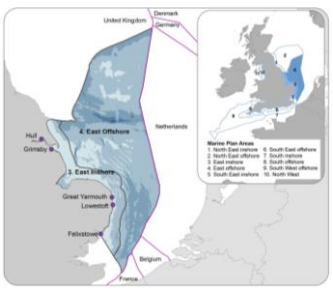
UK: East Coast Marine Plan Area

DEVOTES



Pressures

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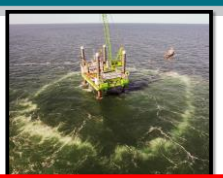

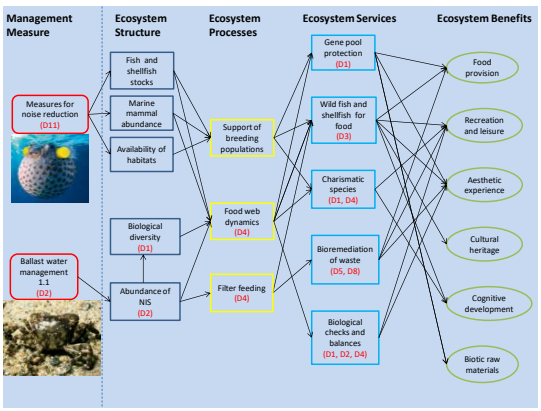

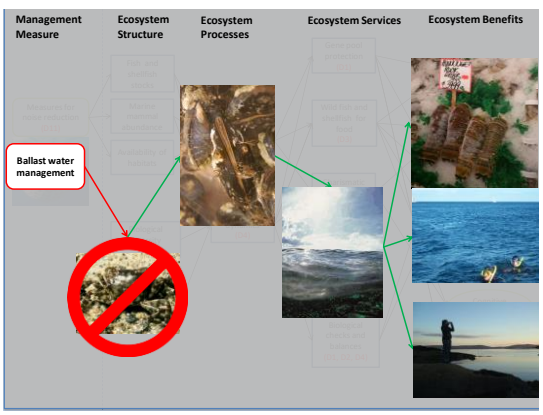

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Introduction to the case study sites

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Your case study site

- What data do you have for the ecosystem service assessment? (Species, habitat descriptions, environmental data….)
- Create a table listing the data and the services they may be used to assess
- What management is currently in place?
- What pressures are important in your case study site?

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Group work

- Create a conceptual model (roughly) to link services to components and processes
- Include all information you have at the moment
  - Relevant services
  - Species
  - Processes
  - Pressures?
  - Management options?

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Friday 10th of January

- Finish valuation
- Any questions from yesterday or this morning?
- Report back from case studies
- Natural capital approaches in sustainable marine management
- Case study frameworks
- Barriers to these approaches
- Alternative approaches
- Final discussion, wrap up and survey

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Other approaches and tools

- **EKN (ecosystems knowledge network): 14 tools currently available**
  - **ARIES**
  - **InVEST**
- **Mostly based on mapping ES using basic habitat information which is tricky in marine context**
  - **It is worth checking them sometimes to see if there are changes**
  - **Look for publications that have used a particular tool to see if it worked!**
- **Marine Ecosystem models at different spatial scales**
- **Fisheries models – well developed approaches**
- **Bio-economic models**

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Barriers to overcome

- **Confusion in terminology**
- **Not enough data (ecological and economic)**
- **Spatial, temporal and problem specificity**
- **Expense**
- **Poor understanding – particularly of uncertainties and aggregation issues**
- **Inflexible regulatory frameworks**
- **Application poorly documented**
- **Expectations**

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Thank you