

Listen to the ocean

## The Natural Capital Approach for the Marine Environment

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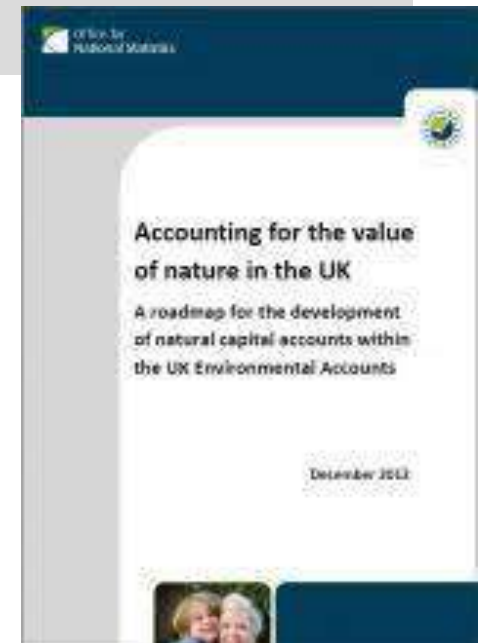
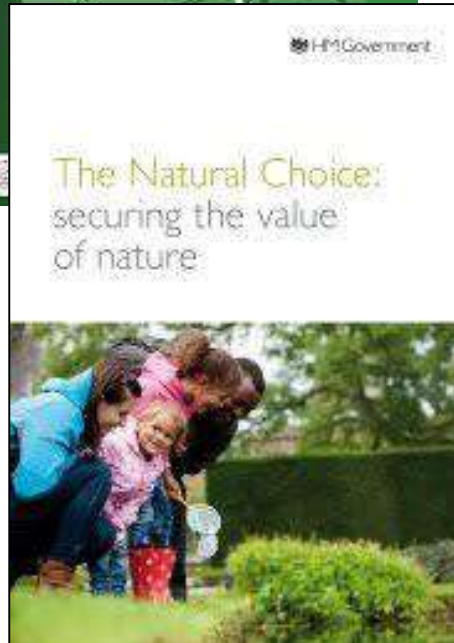
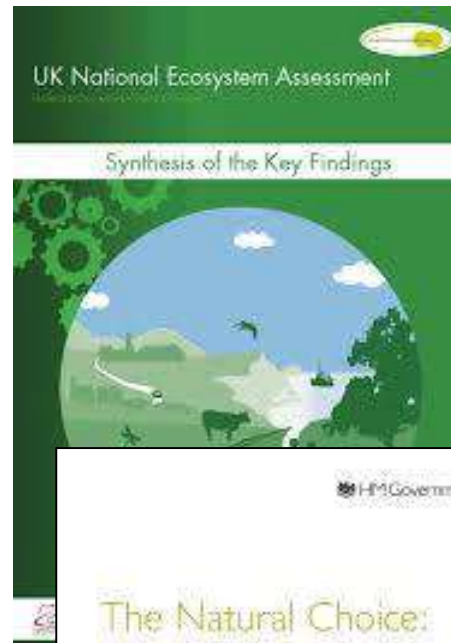
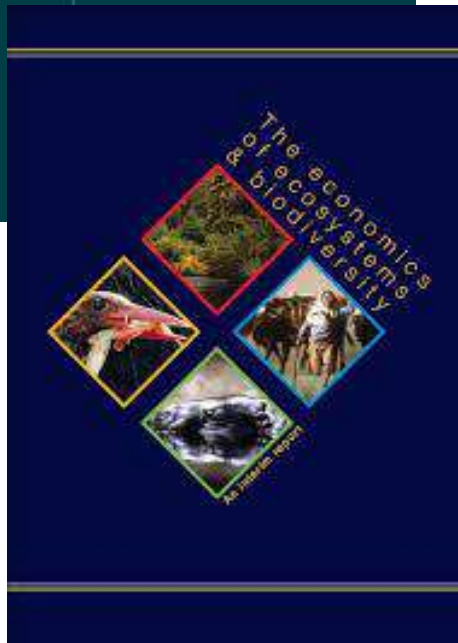
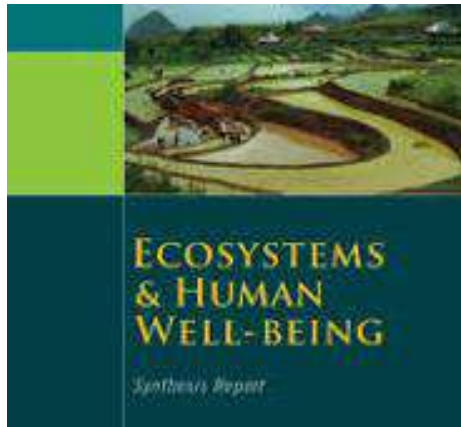
Uni Plymouth: Olivia Langmead, Sian Rees

Uni Stirling: Tobias Borger





# From Academic Ideas to National Policy



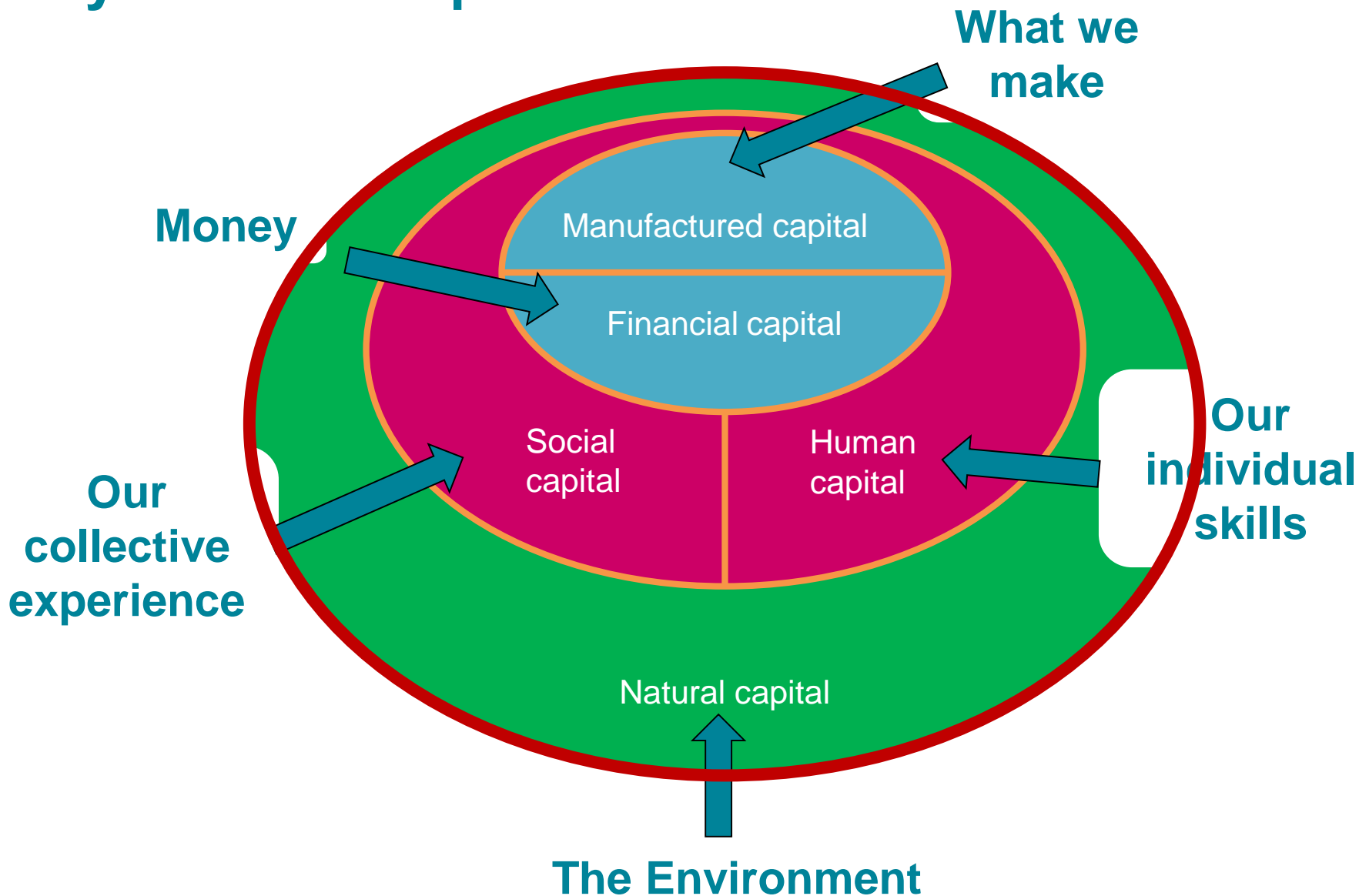
# Strong policy driver



“Over the coming years the UK intends to **use a ‘natural capital’ approach** as a tool to help us make **key choices and long-term decisions**”.



# Why “Natural Capital”?



# 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.



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# Defining Natural Capital & Ecosystem Services

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## Ecosystem services

The components of the natural environment that are directly useful to us. Ecosystem services are grouped into three categories:

**Provisioning**: Food and raw materials

Flows



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## Goods and Benefits

Products we take from nature, and the increase in our welfare that results from using and enjoying it.

**Other inputs:**  
*Producing goods and realising benefits from ecosystem services requires human input.*

*Provided by the natural environment*



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## Ecological End Point

## Goods and Benefits

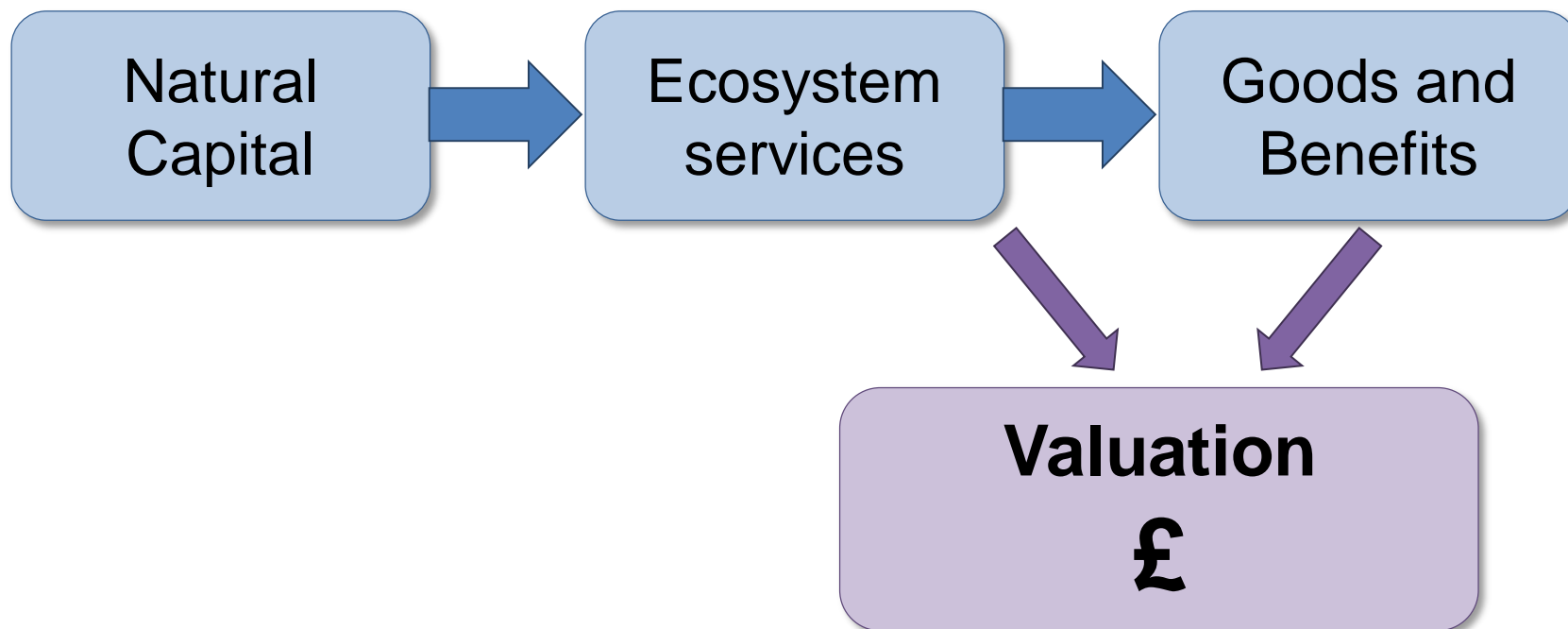
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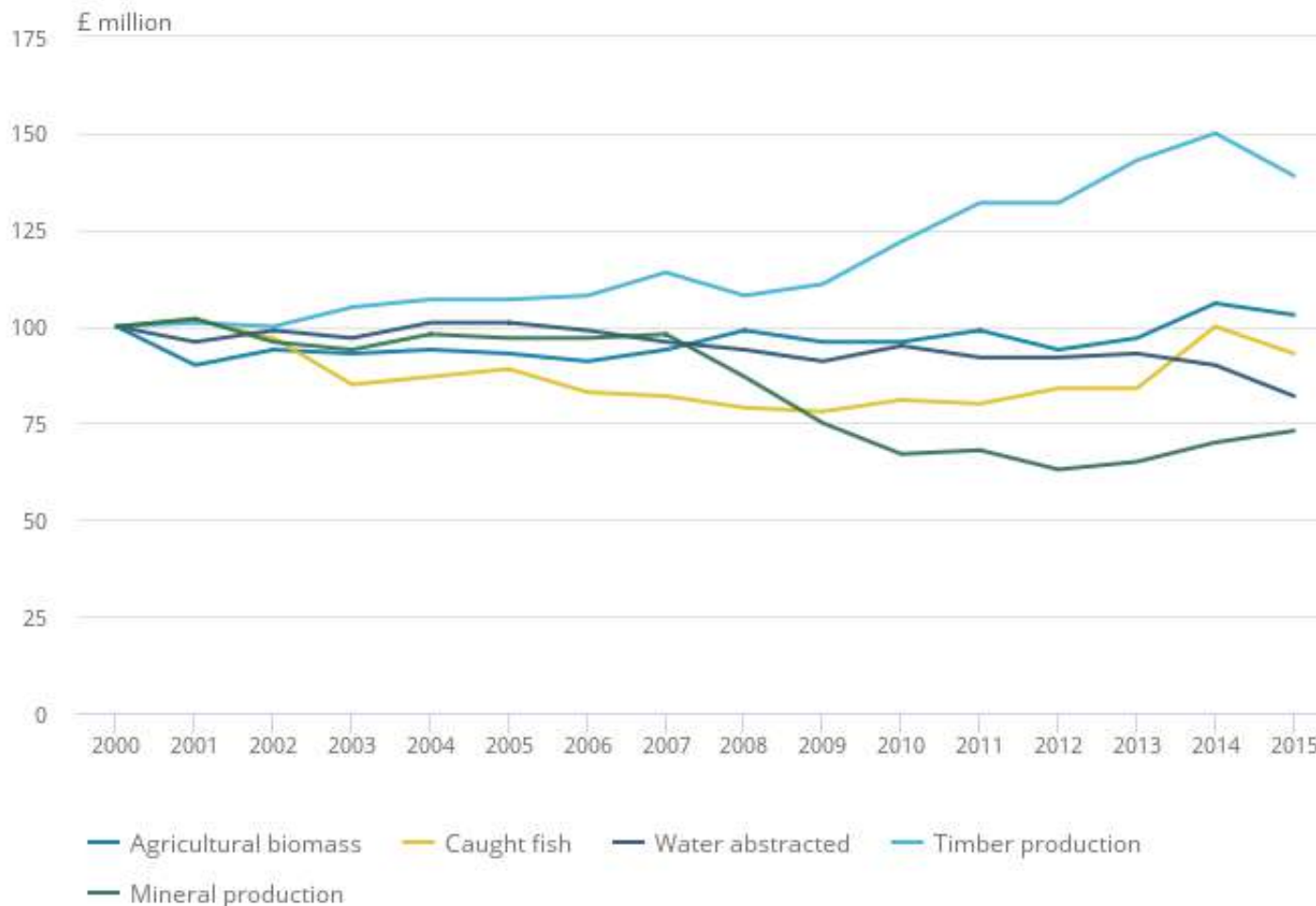
*Provided by the natural environment*

*Human input possible here (e.g. fertilizer) but rarely in marine.*

# Using the approach in decision support



# Natural Capital Accounts



Source: Office for National Statistics, Environment Agency, MENE survey, British Geological Survey, Defra, Forestry Commission, FAO

# Nature Reserves Balance Sheet



The discounted sum of benefits provided by the asset in perpetuity

2016/17 (PV £m)	Value to the organisation		Value to others		Total value
	Private value		External value		
<b>Assets</b>					
Baseline value (00/01) ①	(73)		681		608
Cumulative gains/losses ②	–		170		170
Additions/disposals ③	21		26		47
Revaluations and adjustments ④	93		155		248
Gross asset value	41		1,031		1,072

The discounted sum of costs of maintaining the Natural Capital asset to the specified minimum condition in perpetuity

<b>Liabilities</b>					
Legal maintenance obligations	–		–		–
Other maintenance provisions	(448)		(80)		(528)
Total net maintenance provisions	(448)		(80)		(528)
<b>Total net Natural Capital Assets</b>	<b>(407)</b>		<b>951</b>		<b>544</b>

Note: Following accounting convention, negative values are reported in parentheses

# Cost Benefit Analysis and Justifying Investment

## Box 5.2: Medmerry realignment project in the Solent Estuary

The Environment Agency recently undertook a 450ha managed realignment project at Medmerry on the south coast. This scheme was undertaken primarily for flood protection and to provide compensatory habitats for losses of marshes elsewhere in the Solent estuary.

The project created 183ha of saltmarsh and large areas of extra transitional, newly created habitat (i.e. not compensation for losses elsewhere). The project saves on recurring coastal protection expenditure (which averaged £300,000 per annum), and is likely to have helped avoid considerable damage to the surrounding area during the 2013/4 winter storms. The project has estimated benefits of over £90m, compared with project costs of £28m.



# Subsidy reform



“We will move to a system of paying farmers **public money for public goods**. The principle good we want to invest in is **environmental enhancement**.”

## Fisheries Bill

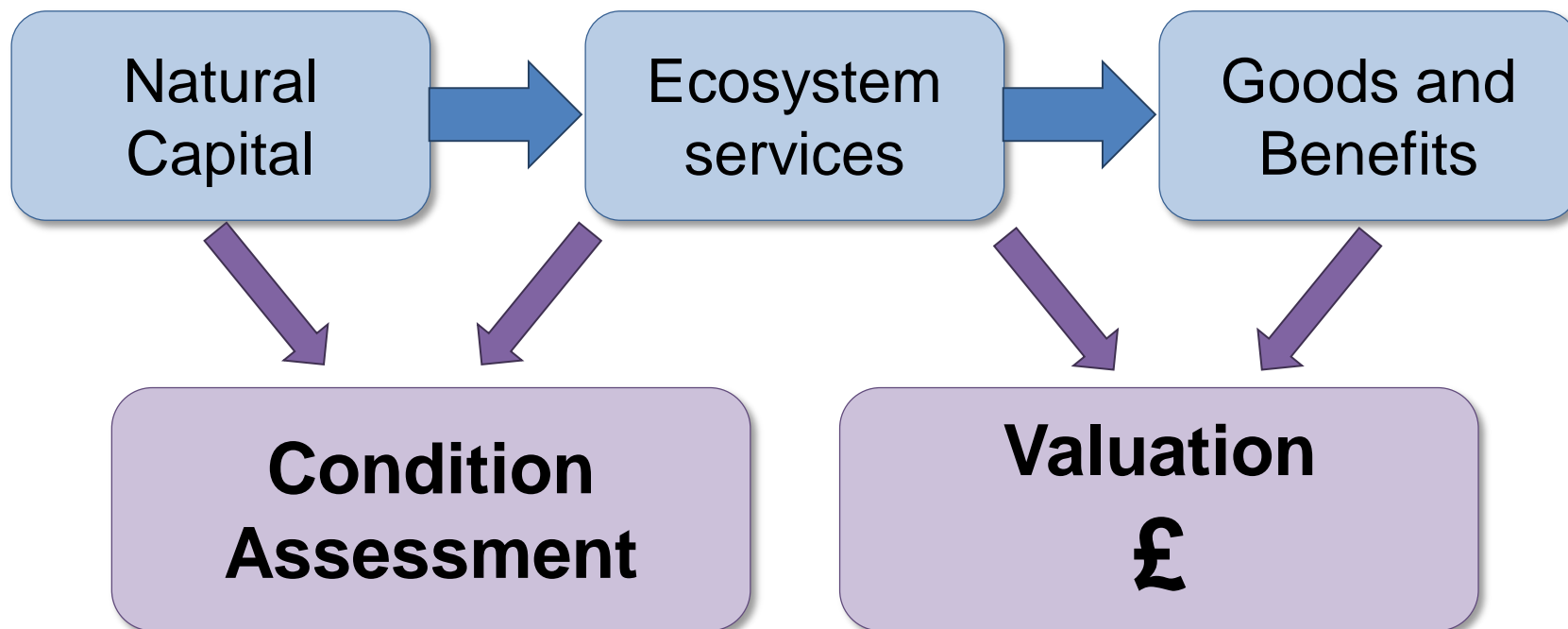
[AS AMENDED IN PUBLIC BILL COMMITTEE]

### CONTENTS

#### *Fisheries objectives and fisheries statements*

- 1 Fisheries objectives
- 2 Fisheries statements
- 3 Preparation and coming into effect of fisheries statements
- 4 Amendment of fisheries statements
- 5 Deadline for first fisheries statements and obligation to review
- 6 Effect of statements

# More than monetary value



# Asset register

Natural Capital Asset: Habitats in North Devon Marine Pioneer (EUNIS level 3)	Area (ha)	Area (% of Pioneer )	Likely Relative Condition (LRC) inferred by sensitivity/pressure information - Full Pioneer				
			LRC 1 'Poor' area, ha (% of Pioneer)	LRC 2 area, ha (% of Pioneer)	LRC 3 area, ha (% of Pioneer)	LRC 4 area, ha (% of Pioneer)	LRC 5 'Good' area, ha (% of Pioneer)
A5.1: Sublittoral coarse sediment	284,521.56	51.46			74212.1 (13.42158 %)	195513.21 (35.35942 %)	14689.32 (2.65663 %)
A5.2: Sublittoral sand	169,003.27	30.56		48602.01 (8.78989 %)	81902.68 (14.81246 %)	34715.5 (6.27845%)	3715.01 (0.67188 %)
A5.3: Sublittoral mud	1,085.29	0.20	202.96 (0.03671 %)	280.74 (0.05077 %)	223.92 (0.0405%)	20.26 (0.00366%)	356.7 (0.06451 %)

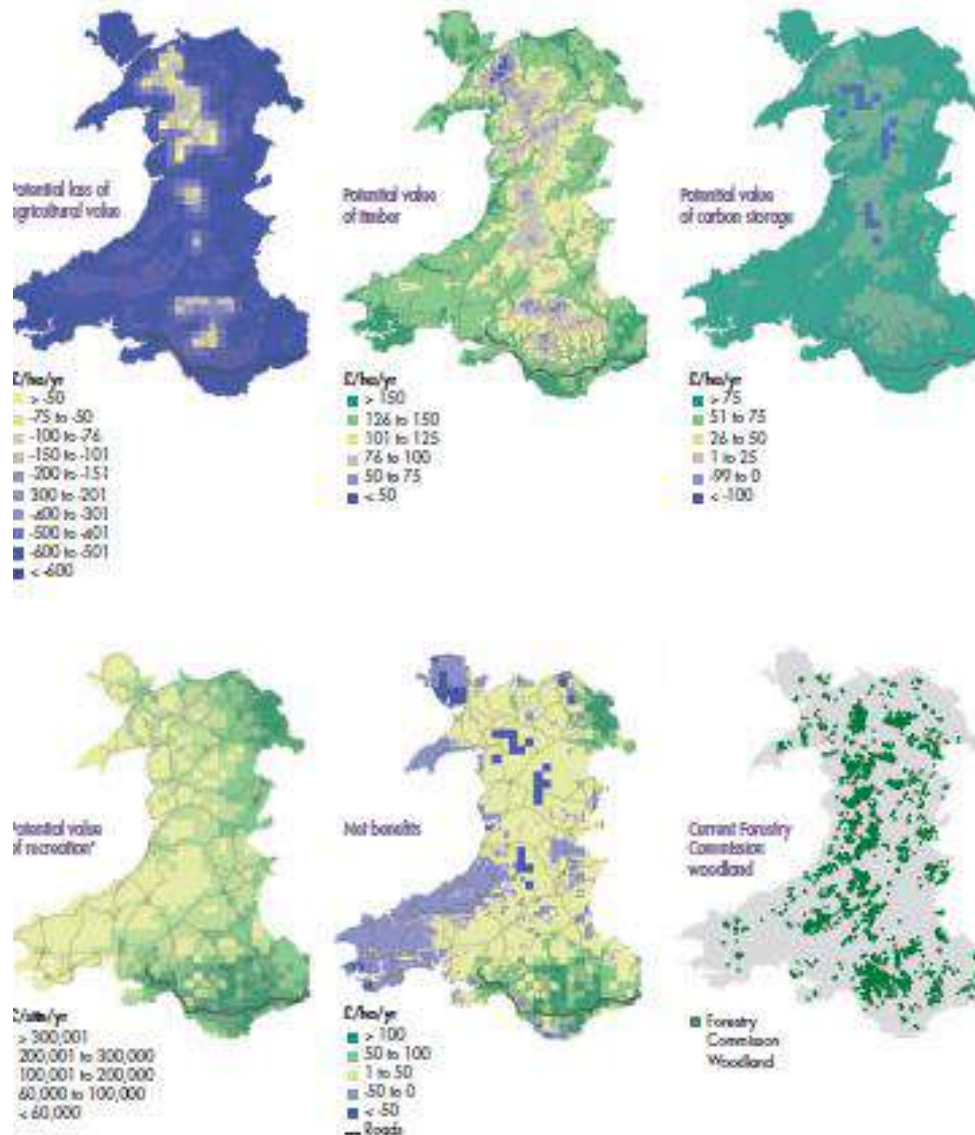
Rees, S.E., Ashley, M., Cameron, A. 2019. North Devon Marine Pioneer 2: A Natural Capital Asset and Risk Register. A SWEEP/WWF-UK report

# Risk register

Asset	Saltmarsh			Littoral rock			Littoral coarse sediments			Littoral sand and muddy sand			Littoral mud			Littoral mixed sediments			Littoral biogenic reefs			Infralittoral rock			Circalittoral rock		
Risk category policy	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.	Qun	Qal	Sp.
Risk cat. Community	Risk: Local community			Risk: Local community			Risk: Local community			Risk: Local community			Risk: Local community			Risk: Local community			Risk: Local community			Risk: Local community			Risk: Local community		
Food (Wild Food - fish and shellfish).	B (4)	C (4)	C (8)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	C (4)	C (4)	C (8)	B (4)	B (4)	C (8)	B (4)	B (4)	C (8)	C (4)	C (4)	B (4)	C (4)	C (4)	C (4)
Food - local																											
Healthy climate (carbon sequestration).	B (4)	C (4)	C (8)										C (4)	C (4)	C (8)				B (4)	B (4)	C (8)	C (4)	C (4)	B (4)			
Climate -local																											
Sea defence. (natural hazard regulation / flood prevention).	B (4)	C (4)	C (8)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)	B (4)				B (4)	B (4)	B (4)	B (4)	B (4)	C (8)	C (4)	C (4)	B (4)			

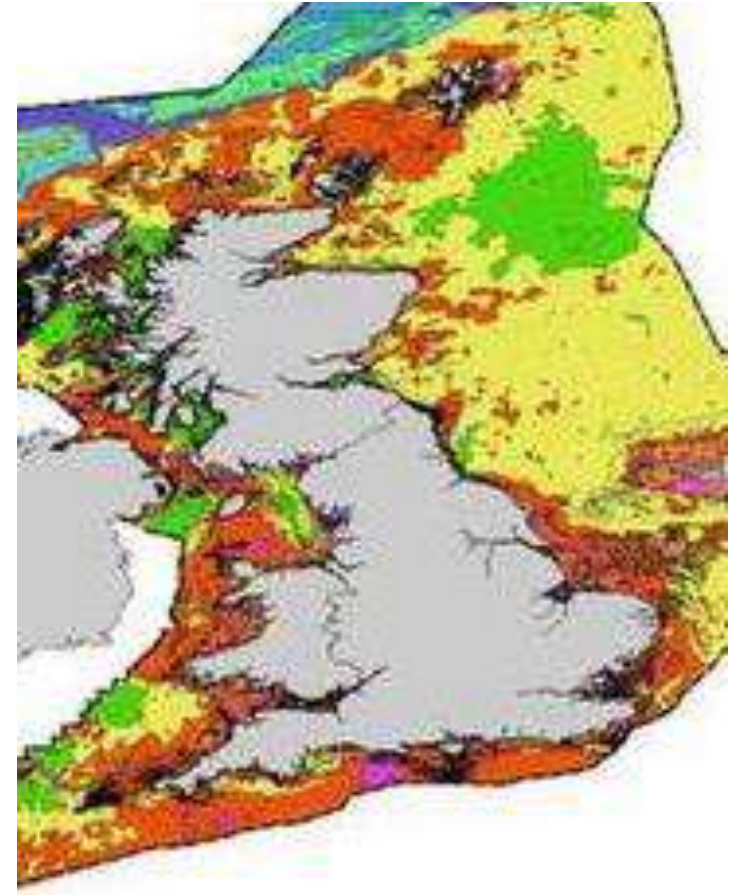
Rees, S.E., Ashley, M., Cameron, A. 2019. North Devon Marine Pioneer 2: A Natural Capital Asset and Risk Register. A SWEEP/WWF-UK report

# Marine Challenges: Spatial mapping



# Marine Challenges: Spatial mapping and data

- High quality habitat maps from surveys are only available for 6% of the seabed
- Modelled habitat maps use physical and oceanographic parameters
- Condition of many marine ecosystems is unknown



# Marine Challenges: Lack of valuation data

<b>Title:</b> Designation of the second tranche of Marine Conservation Zones in waters for which the Secretary of State has responsibility (English inshore, English, Welsh and Northern Irish offshore)			<b>Impact Assessment (IA)</b>	
<b>IA No:</b> Defra 1810			<b>Date:</b> [08 <sup>th</sup> October 2014]	
<b>Lead department or agency:</b> Department for Environment, Food and Rural Affairs			<b>Stage:</b> Consultation	
<b>Other departments or agencies:</b>			<b>Source of intervention:</b> Domestic	
			<b>Type of measure:</b> Secondary Legislation	
			<b>Contact for enquiries:</b> MCZ Consultation Inbox <a href="mailto:mcz@defra.gsi.gov.uk">mcz@defra.gsi.gov.uk</a>	
<b>Summary: Intervention and Options</b>			<b>RPC Opinion:</b> Green	
<b>Cost of Preferred (or more likely) Option</b>				
<b>Total Net Present Value</b>	<b>Business Net Present Value</b>	<b>Net cost to business per year (EANCB on 2009 prices)</b>	<b>In scope of One-In, Two-Out?</b>	<b>Measure qualifies as</b>
£-31.87m	£-3.40m	£0.18m	Yes	IN

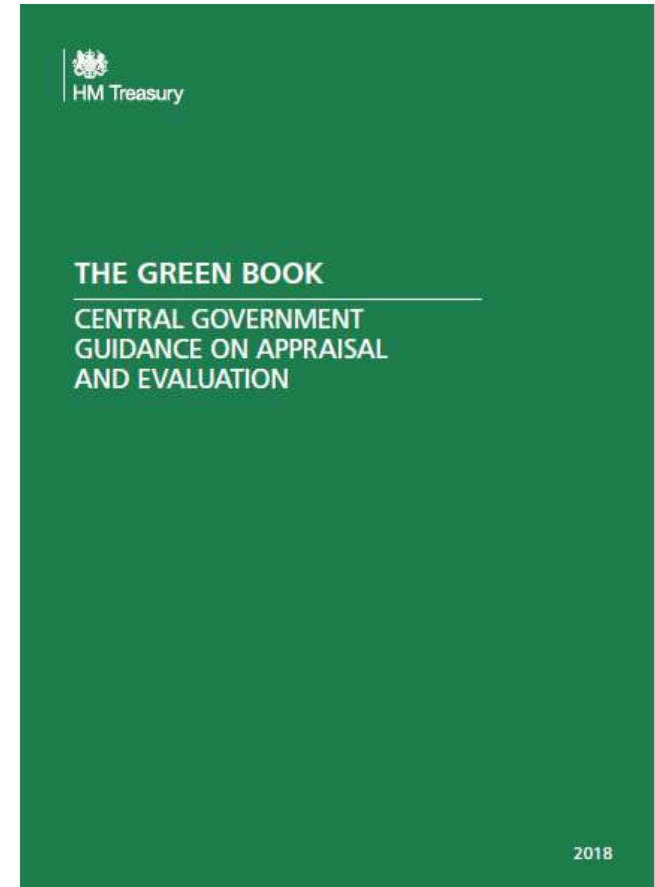
# Marine Challenges: Lack of valuation data

<b>COSTS (£m)</b>	<b>Total Transition</b> → (Constant Price) → Years		<b>Average Annual</b> (excl. Transition) (Constant Price)	<b>Total Cost</b> (Present Value)
Low	7.6	6	1.7	30.3
High	12.9		2.8	51.4
Best Estimate	7.6		1.8	31.9

<b>BENEFITS (£m)</b>	<b>Total Transition</b> → (Constant Price) → Years		<b>Average Annual</b> (excl. Transition) (Constant Price)	<b>Total Benefit</b> (Present Value)
Low	Optional		Optional	Optional
High	Optional		Optional	Optional
Best Estimate	Unquantified		Unquantified	Unquantified

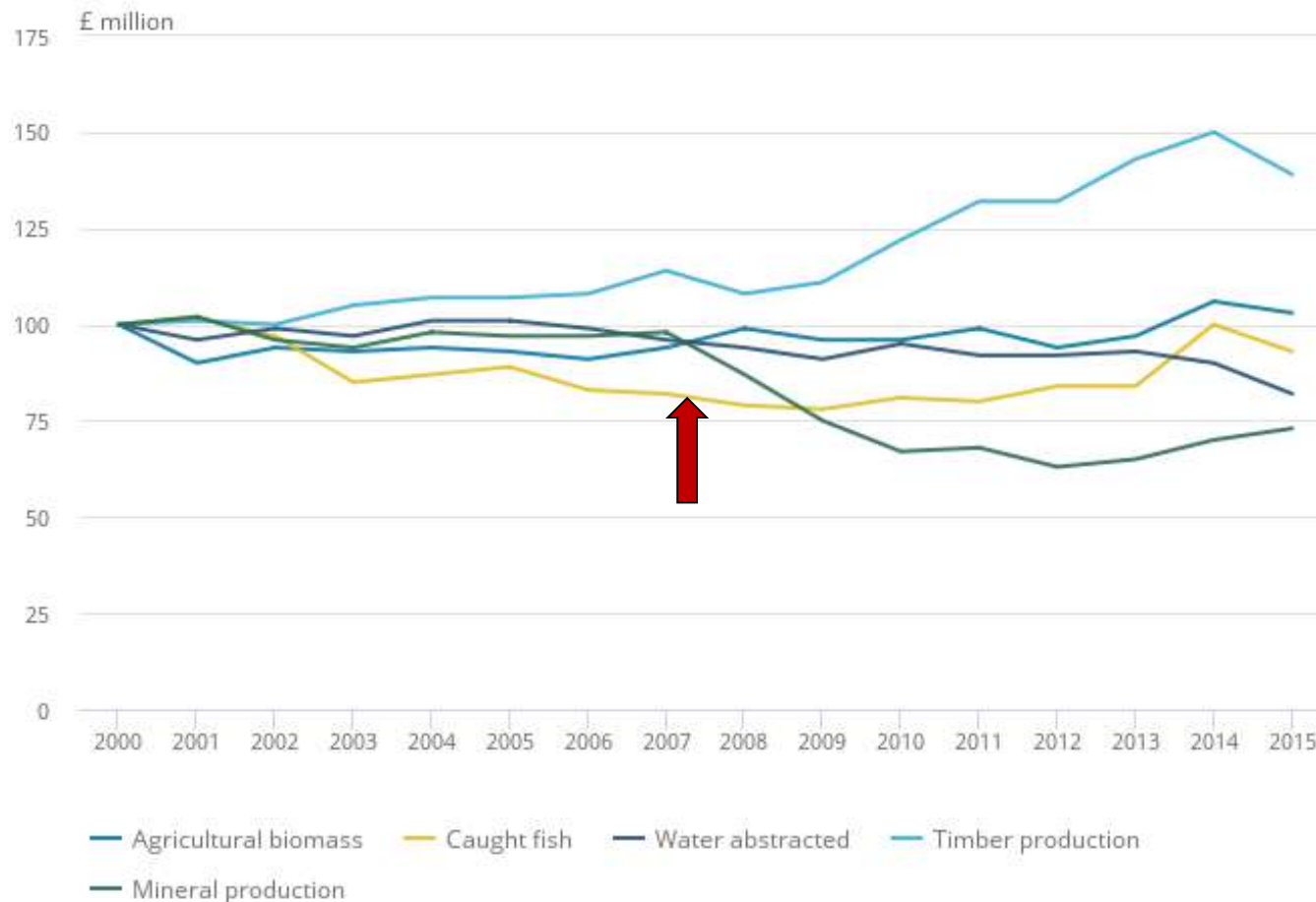
# General Challenges: Poor Practice

- Half of 249 Impact Assessments fitting sustainable development criteria ignored or undertook inadequate treatment of social and environmental impacts
- Only 16% were judged to have treated economic information with similarly low rigour



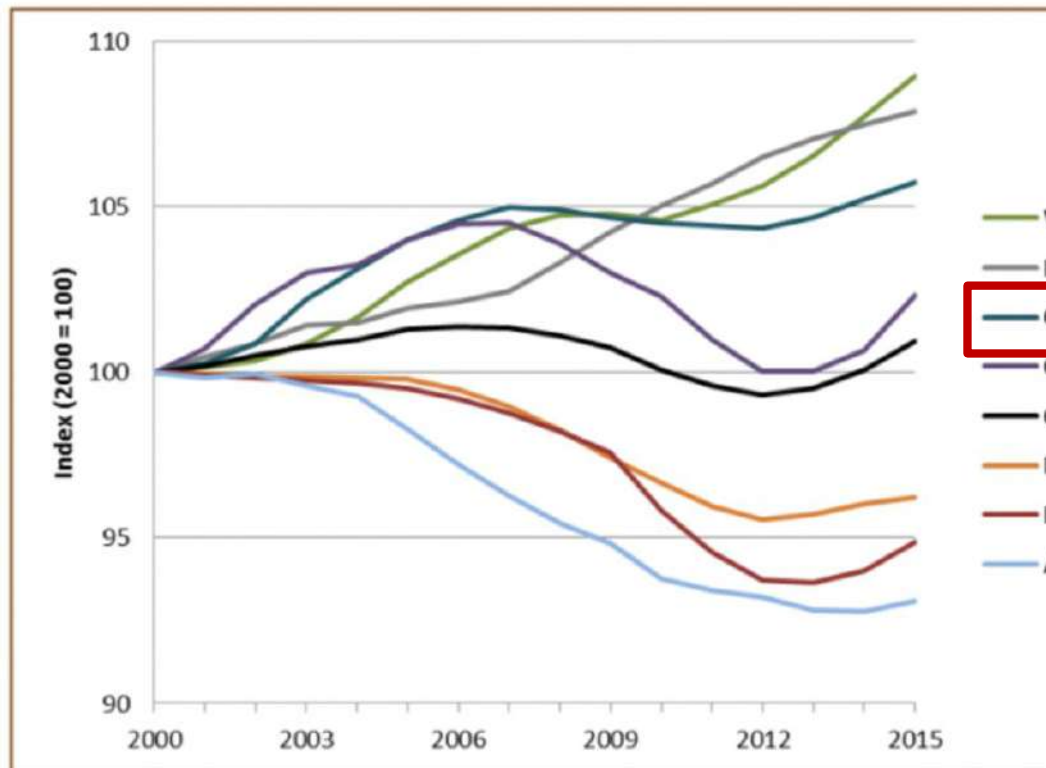
Tinch, R., et al. (2014). *Baseline evaluation of environmental appraisal and sustainable development guidance across Government*. Report for Defra

# Marine Challenges: Lack of examples



Source: Office for National Statistics, Environment Agency, MENE survey, British Geological Survey, Defra, Forestry Commission, FAO

# Marine Challenges: Lack of examples



Natural Capital Asset Index 2000 - 2015 by habitat type. Copyright SNH

Scottish Natural Heritage  
Research Report No. 1071

## Feasibility study for a Marine Natural Capital Asset Index for Scotland



# Marine Challenges: Complex, dynamic and 3D



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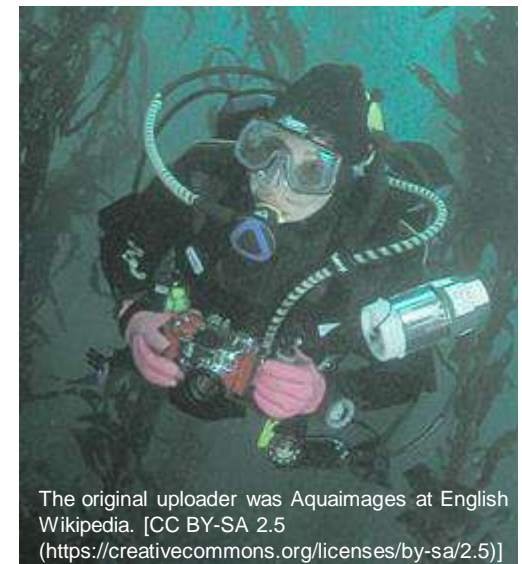
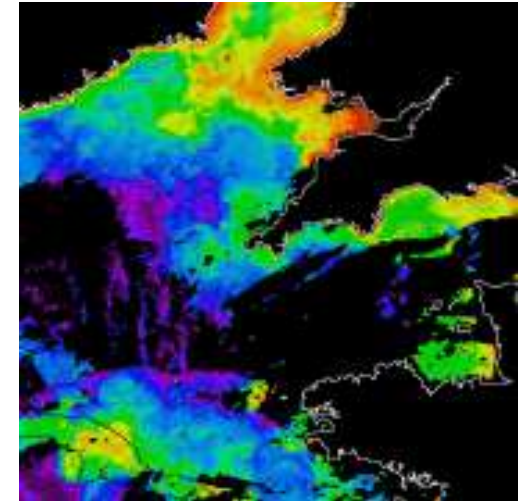
By Hans-Petter field" - Own work, CC BY-SA 2.5, [commons.wikimedia.org/w/index.php?curid=839948](https://commons.wikimedia.org/w/index.php?curid=839948)



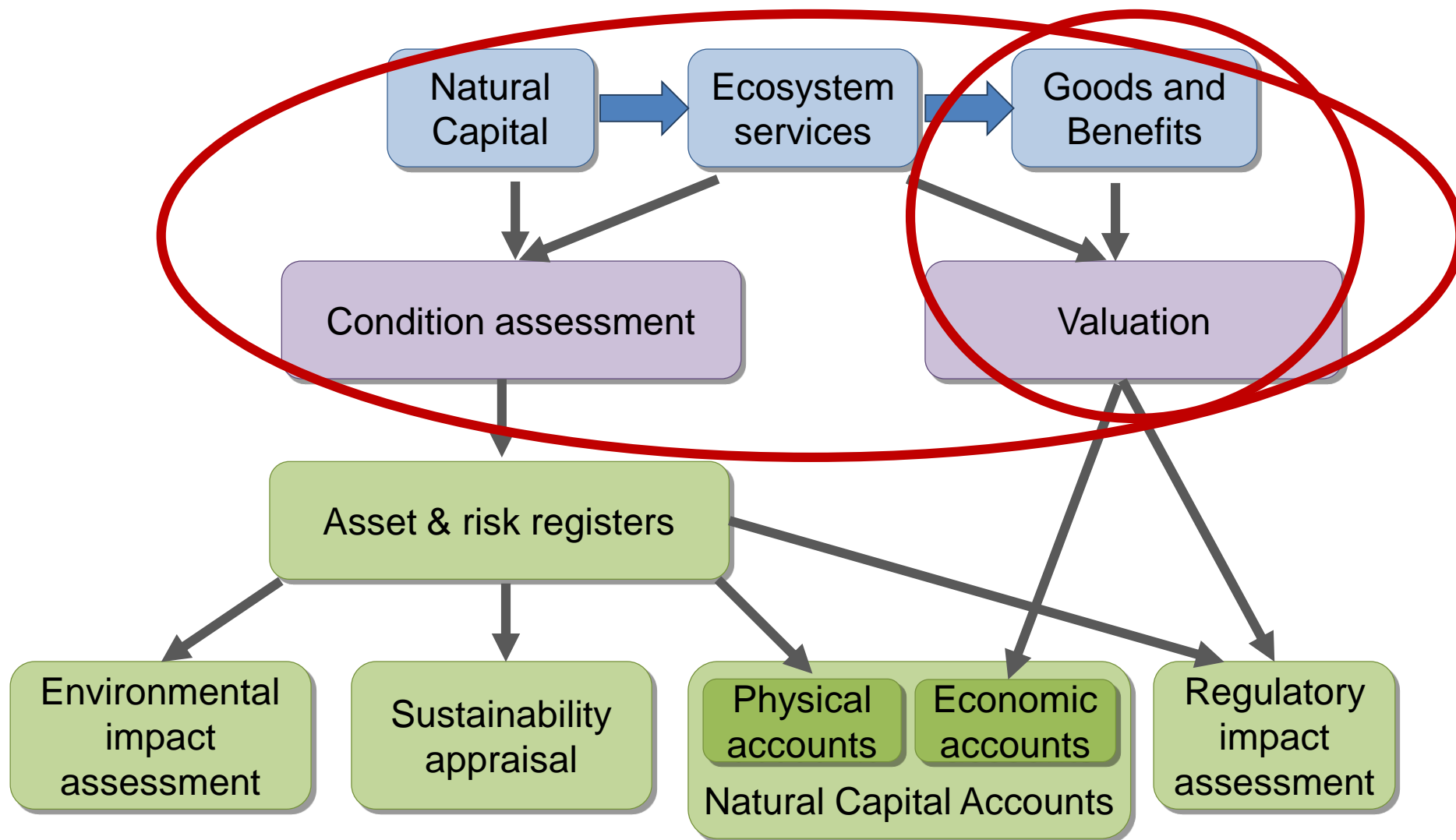
By KonradR - Own work, GFDL, <https://commons.wikimedia.org/w/index.php?curid=4401828>

# Recommendations

- Interdisciplinary, cross-sectoral **marine** programme
  - **Frameworks** for three dimensionality & interconnectedness
  - Marine-focussed **case studies**
  - **Proxies** for quality information, based on known pressures, their impacts, and habitat sensitivity
  - **Alternative data sources**, including remote sensing and citizen science



# Coherent, connected approaches



# For more information

## Application of the natural capital approach to the marine environment to aid decision-making



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PHASE 1 FINAL REPORT

February 2019

## Marine Natural Capital Report

<http://randd.defra.gov.uk/>

Search: “marine natural capital”

- Final Report Phase 1: Main report
- Non-tech Summary: Very simple explainer

## Natural Capital Asset Index

<https://www.nature.scot>

Search: “marine natural capital”

## N. Devon Asset & Risk Register

<https://www.researchgate.net>

Search: “marine asset risk register”

**Thank you**  
**tarh@pml.ac.uk**