

# Valuing the Humber's Natural Capital using a Participatory Mapping Approach

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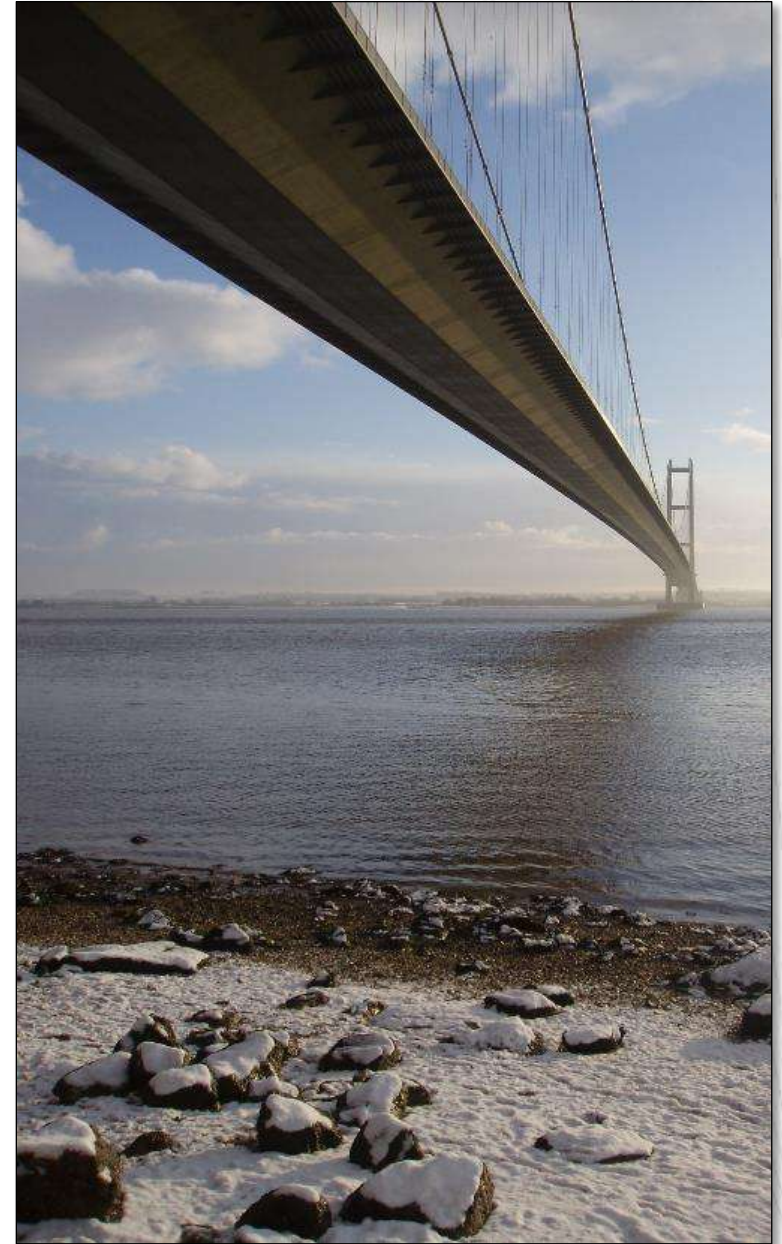
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Humber Conference 2018, Thursday 29 November, The Guildhall, Hull, UK



# Presentation Structure

- Natural Capital & Ecosystem Services
- Participatory Mapping Workshops
- Next Steps & Future Research



# Natural Capital & Ecosystem Services



“We need to understand the **full value of the marine environment** and incorporate that into the decisions we take: this is key to the **‘natural capital’** approach...”

“...set gold standards in protecting and growing **natural capital** – leading the world in using this approach as a tool in decision-making”.

“Oceans ....are critical for biodiversity and **ecosystem services.**”

“Our environment underpins our **well-being** and prosperity...”

# Natural Capital & Ecosystem Services

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

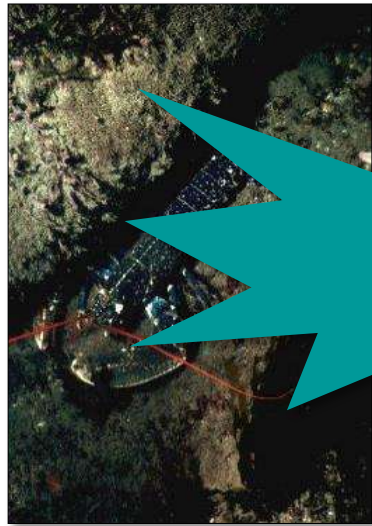
**Ecosystem Services:** “Functions and products from nature that can be turned into benefits with varying degrees of human input”.

**Benefits:** “Changes in human welfare (or well-being) that result from the use or consumption of goods, or from the knowledge that something exists”.



*Natural Capital Committee, 2017. How to do it: A natural capital workbook.*

# Natural Capital & Ecosystem Services



**Food to eat**



**Regulate  
our climate**



**Education &  
research**



**Breakdown our  
waste**



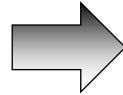
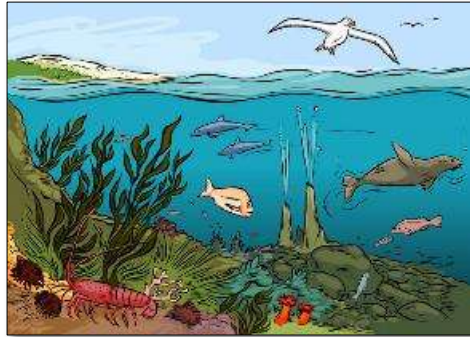
**Provide  
natural flood  
defence**



**Leisure & recreation**



# Natural Capital & Ecosystem Services

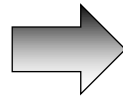
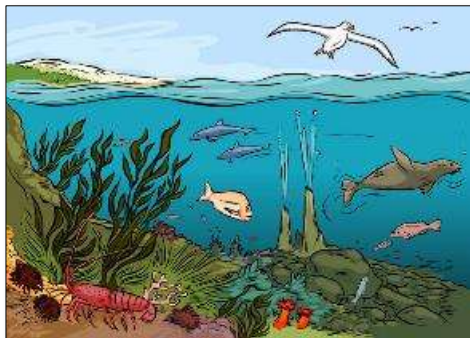


**Natural Capital**  
(Stock)

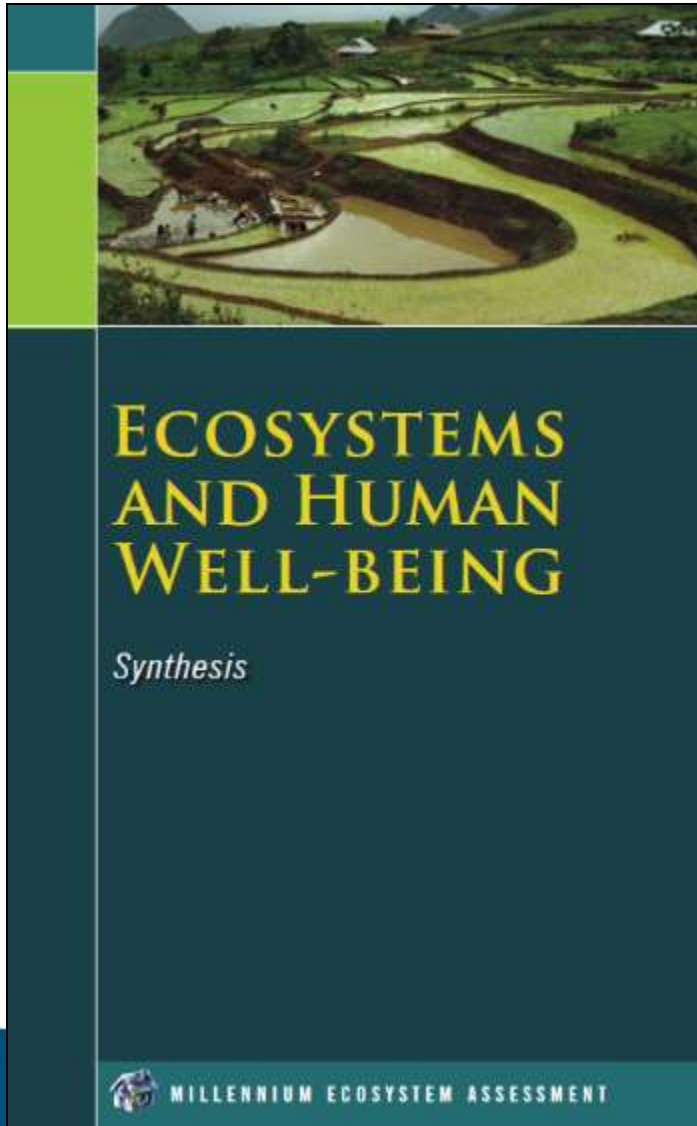
**Ecosystem Services**  
(Flows)

**Input of Capital**  
(Built, Human or  
Social Capital)

**Societal Benefits**  
(Well-being)



# Natural Capital & Ecosystem Services



## Millennium Ecosystem Assessment (2005)

- **Provisioning services** are the products obtained from the ecosystem;
- **Regulating services** are the benefits obtained from the regulation of ecosystem processes;
- **Cultural services** are the nonmaterial benefits people obtain from ecosystems; and
- **Supporting services** are those that are necessary for the production of all other ecosystem services, but do not yield direct benefits to humans.

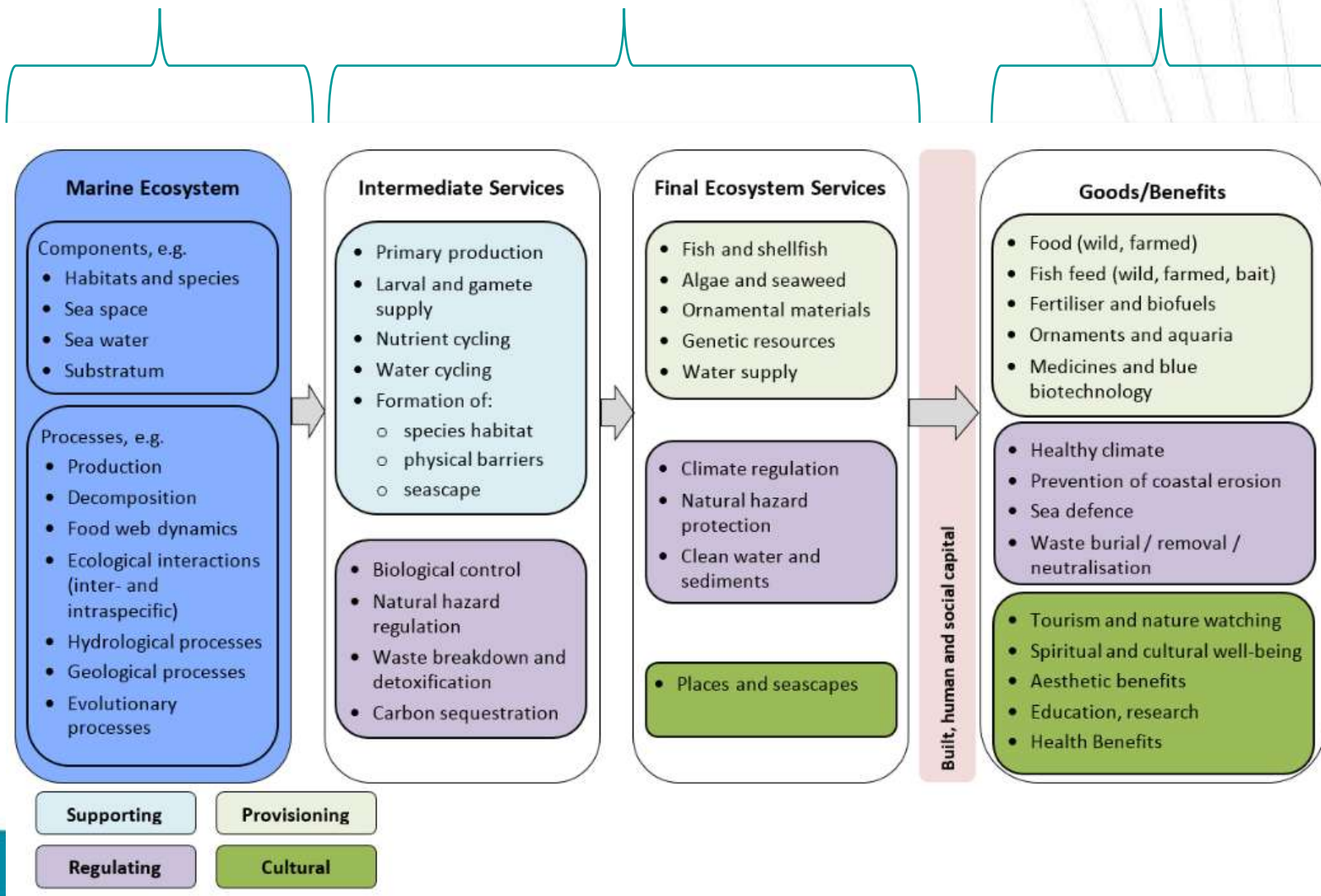
# Natural Capital & Ecosystem Services



## Natural Capital (Stock)

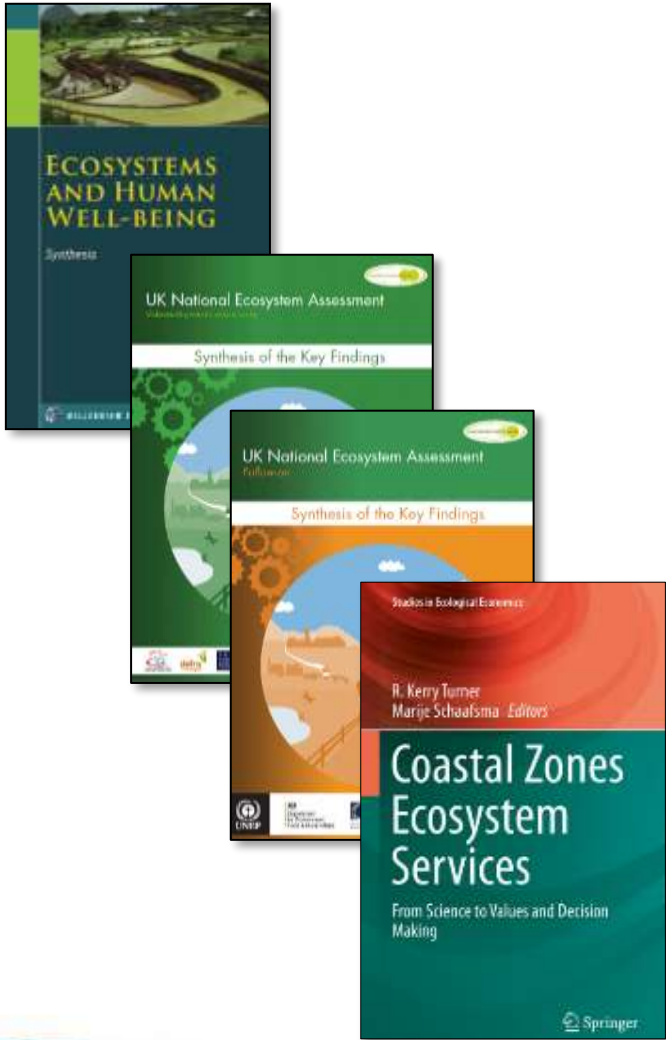
## Ecosystem Services (Flows)

## Societal Benefits (Well-Being)





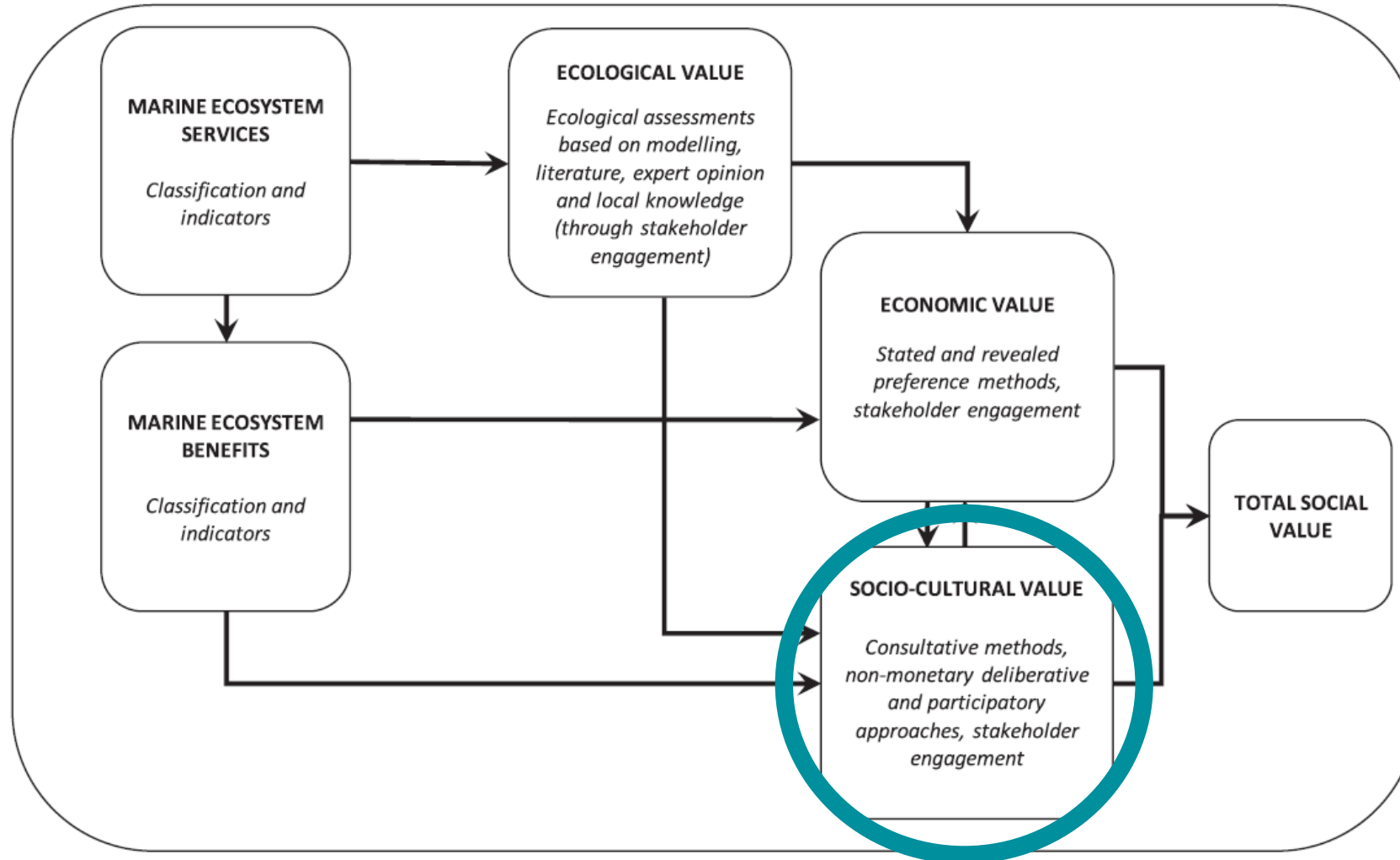
# Natural Capital & Ecosystem Services



- How are services identified at the local scale?
- Where are benefits provided and to whom?
- What are the trade-offs in development decisions?
- How do benefits support well-being?

# Natural Capital & Ecosystem Services

*D. Burdon et al. / Estuarine, Coastal and Shelf Science 201 (2018) 234–247*



**Fig. 4.** Total social value comprising ecological value, economic value and socio-cultural value.

# Participatory Mapping Workshops



- Four workshops focussing on MPAs.
- Co-produced by Local Coastal Partnerships.
- Identify and map:
  - Activities
  - Features/Sub-features
  - Ecosystem Services & Benefits



The Wash and  
North Norfolk  
Marine Partnership

Protecting Nature and Culture

# Participatory Mapping Workshops

## Aberdeen Bay: 15 participants

- East Grampian Coastal Partnership
- Aberdeen City Council
- Royal Society for the Protection of Birds
- Scottish Natural Heritage
- University of Aberdeen
- Vattenfall Windfarms Ltd.

## East Caithness: 10 Participants

- Moray Firth Coastal Partnership
- Caithness Seacoast Ltd.
- Independent participant
- The University of the Highlands and Islands
- The Highland Council
- The Wick Society

## Stakeholder Engagement

## The Wash: 17 Participants

- WNNMP
- Eastern IFCA
- Environment Agency
- Graziers and land owners
- Lincolnshire Wildlife Trust
- Natural England
- Wildfowlers

## The Humber Estuary: 18 Participants

- Humber Nature Partnership
- East Riding Council
- Environment Agency
- Lincolnshire Wildlife Trust
- Marine Management Organisation
- Natural England
- North East IFCA
- North East Lincolnshire Council
- Royal Society for the Protection of Birds
- University of Hull
- Yorkshire Wildlife Trust

# Participatory Mapping Workshops

Series of  
Introductory  
Presentations

Identification and  
Mapping Exercises

Deliberation,  
Discussion &  
Feedback





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# Humber Natural Capital Workshop

Tuesday 22 May 2018  
Water's Edge Visitors Centre, Barton

Investing in Natural Capital  
Creating the right environment  
for economic investment

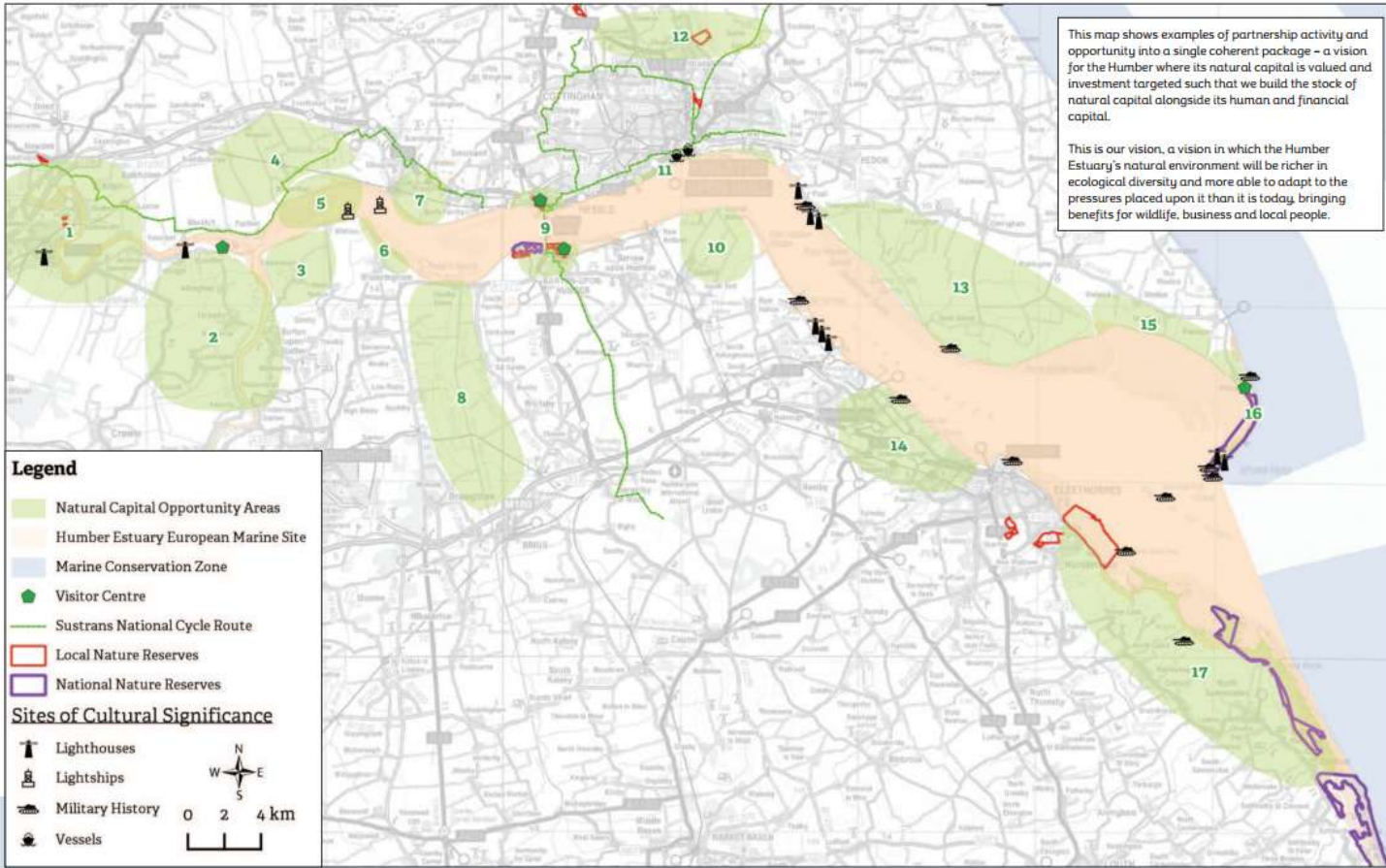


# Investing in Natural Capital

Creating the right environment  
for economic investment

## 3. A natural capital vision for the Humber

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June 2017



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# Participatory Mapping of Benefits



	Supporting Services
	Regulating Services
	Provisioning Services
	Cultural Services
	Economic Benefits

Services & Benefits (Turner et al., 2015)	
01	Primary production
02	Larval and gamete supply
03	Nutrient cycling
04	Water cycling
05	Formation of species habitat
06	Formation of physical barriers
07	Formation of seascape
08	Biological control
09	Natural hazard regulation
10	Waste breakdown and
11	Carbon sequestration
12	Food (wild, farmed)
13	Fish feed (wild, farmed, bait)
14	Fertiliser and biofuels
15	Ornaments and aquaria
16	Medicines and blue
17	Healthy climate
18	Prevention of coastal erosion
19	Sea defence
20	Waste burial / removal /
21	Tourism and nature watching
22	Spiritual and cultural well-being
23	Aesthetic benefits
24	Education, research
25	Physical health benefits
26	Psychological health benefits
	Economic

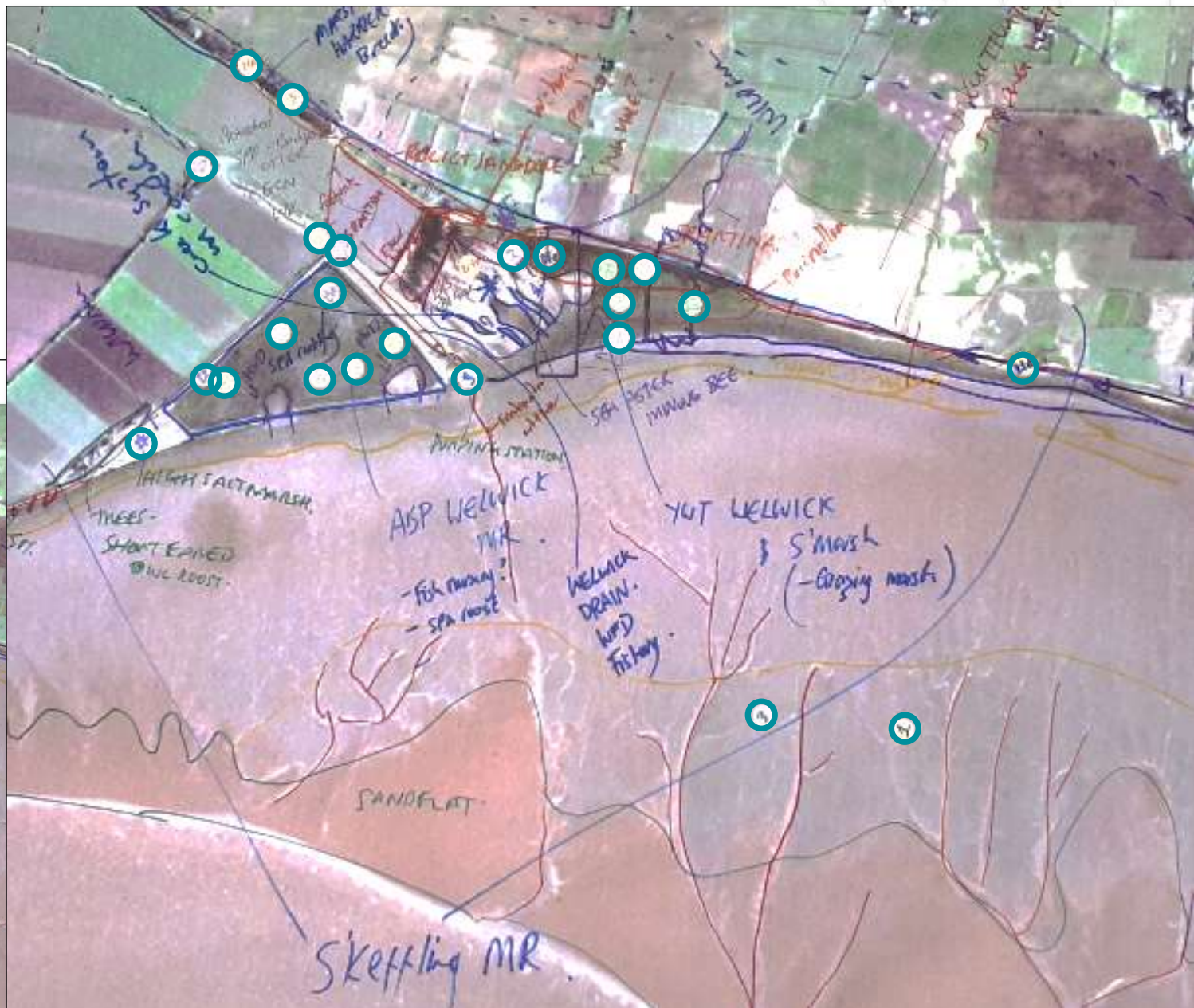
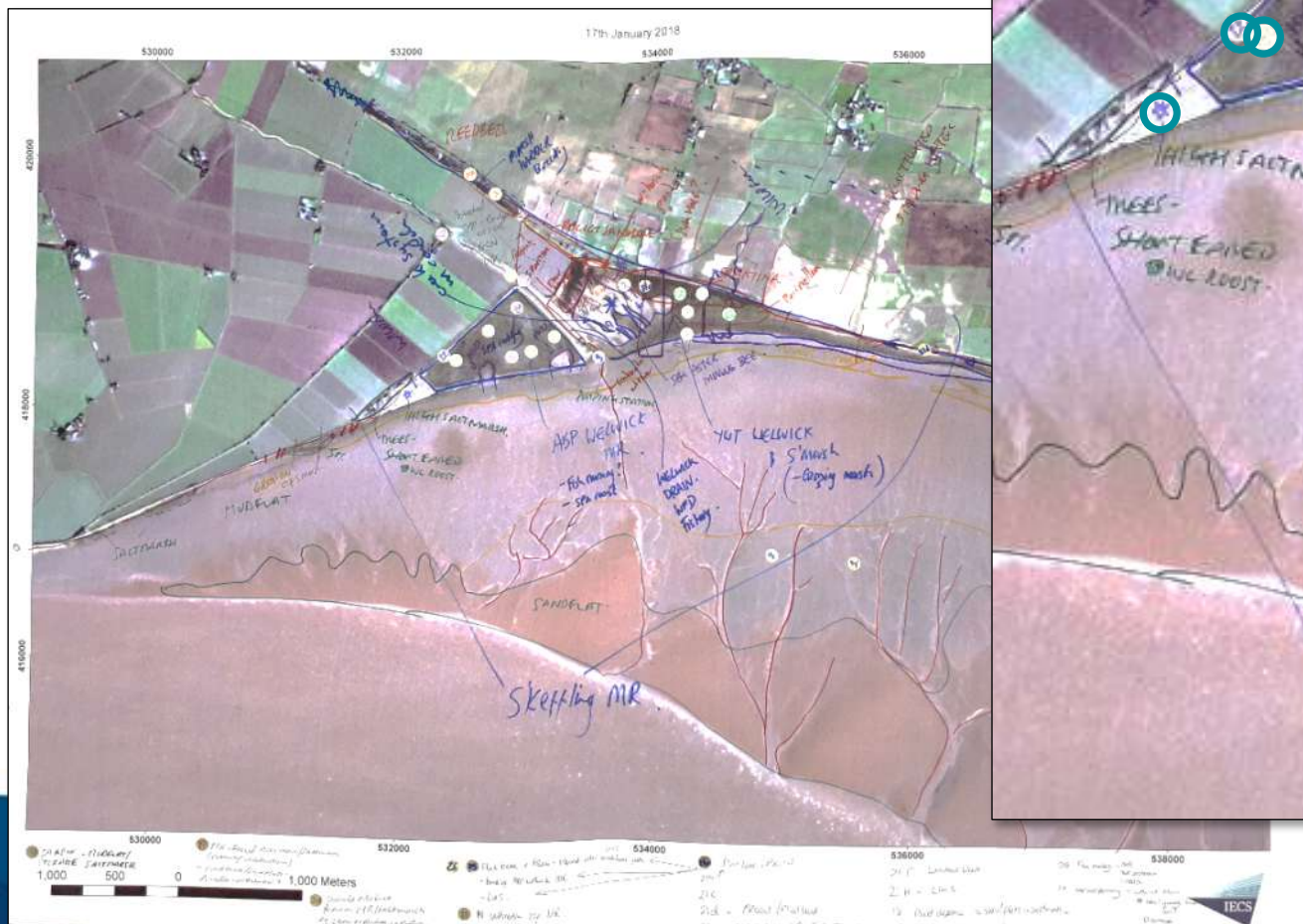
Group 1: Spurn	Group 2: Welwick	Group 3: South Bank
	Primary production (1)	Primary production (1)
	Nutrient cycling (3)	Water quality (3 & 10)
Animal refuge (5)	Fish nursery (5)	Bird feeding (5)
		Habitat (5)
		Flood defence (6, 9, 19)
		Aesthetic (7 & 23)
		Flood defence (6, 9, 19)
		Water quality (3 & 10)
Carbon sequestration (11 & 17)	Carbon storage (11)	Carbon storgae (11)
Food (12)	Grazing (12a)	Food production (beer) (12 & 13)
Farming (12a)	Wildfowling (12b)	
Fishing (12b)	Salicornia (12c)	
Lobster Shellfishing (12c)		
		Nursery function for fish (13)
		Fishing (13)
		Food production (beer) (12 & 13)
Biofuels (14)		
		Medicines (16)
Carbon sequestration (11 & 17)		Healthy climate - cooling (17)
Flood risk management (18 & 19)	Physical barrier to reduce erosion	Reduction in energy (18)
Flood risk management (18 & 19)	Flood defence (19)	Flood defence (6, 9, 19)
		Waste burial (20)
Recreation (21) & Tourism (21)	Walking/dog walking (21a)	Tourism/bird watching (21)
Bait digging (21a)	Cycling (21b)	
	Wildfowling (21c)	
	Horse riding (21d)	
	Bird/Nature watching (21e)	
	Fishing (21f)	
	Bait digging (21g)	
	Ecotourism (21h)	
	Photography (21i)	
Cultural heritage (22)	Historic interest (22)	Well-being (22)
		Aesthetic (7 & 23)
Science (24)	Research/Science/Knowledge (24)	Education (24)
Education (schools, adults, etc.) (24a)		
	Health - exercise (25)	Walking (25)
		Yachting (25)
		Physical well-being (25)
Mental health (26)	Health - mental (26)	Mental well-being (26)
Emergency Services (27a)	Improved farming (27)	Legal requirements (27)
Shipping (27b)	Local economy (28)	Renewables (28)
Energy Production (27c)		Shipping (?)





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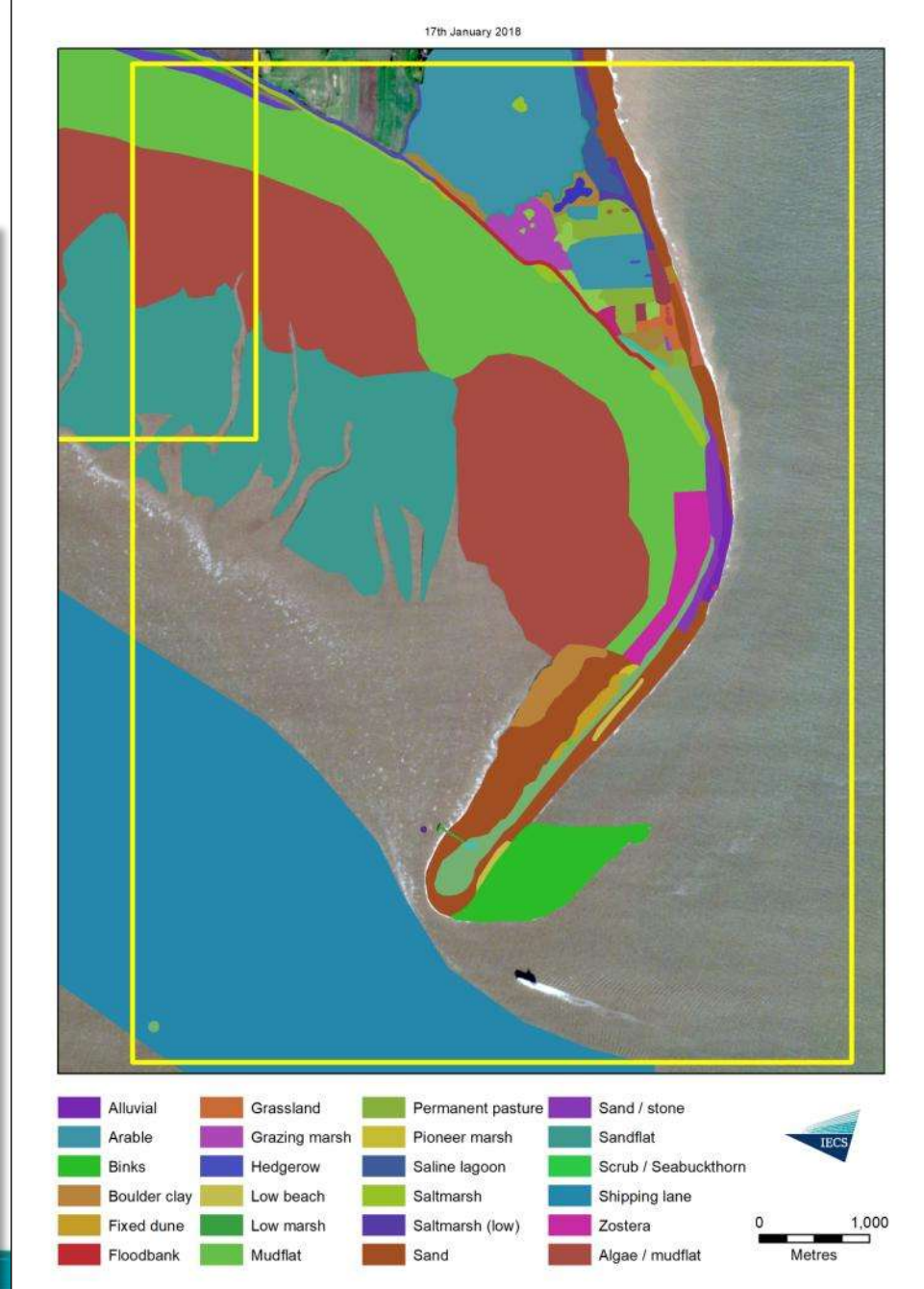
Example: Welwick



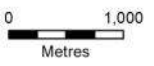


# Digitised Outputs

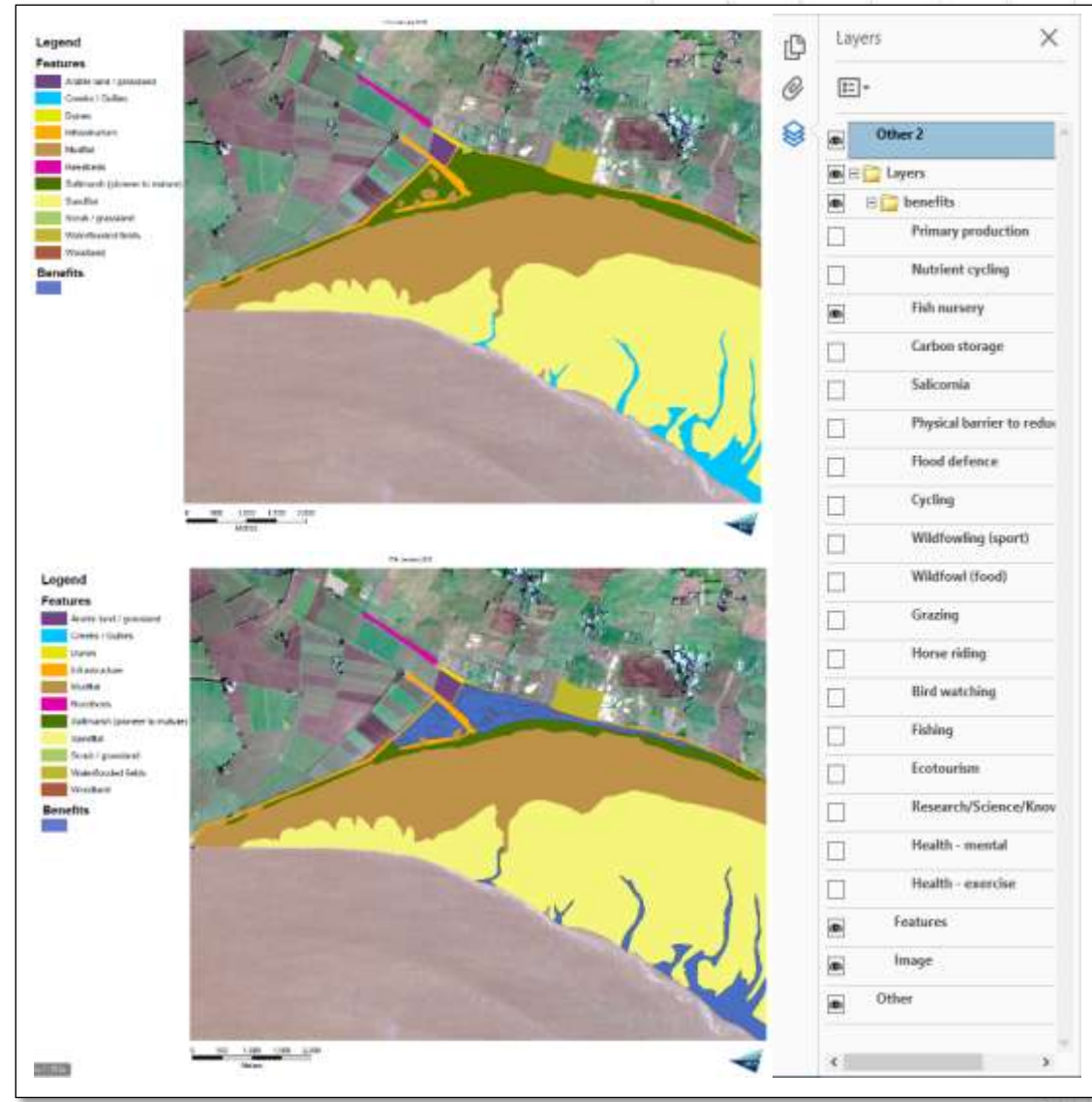
- Legend**
- Features**
- Arable grassland / Arable land
  - Creeks / Gullies
  - Dunes
  - Mudflat
  - Reedbeds
  - Saltmarsh/Saltmarsh (pioneer to mature)
  - Sandflat
  - Scrub / grassland
  - Waterflooded fields
  - Woodland
- Infrastructure**
- Drains/Pumping station
  - Floodbank (old and current)
  - Managed realignment site / breach



- |              |               |                   |                      |
|--------------|---------------|-------------------|----------------------|
| Alluvial     | Grassland     | Permanent pasture | Sand / stone         |
| Arable       | Grazing marsh | Pioneer marsh     | Sandflat             |
| Binks        | Hedgerow      | Saline lagoon     | Scrub / Seabuckthorn |
| Boulder clay | Low beach     | Saltmarsh         | Shipping lane        |
| Fixed dune   | Low marsh     | Saltmarsh (low)   | Zostera              |
| Floodbank    | Mudflat       | Sand              | Algae / mudflat      |



# Participatory Mapping Workshop Outputs



Aerial Image (Sentinel-2)



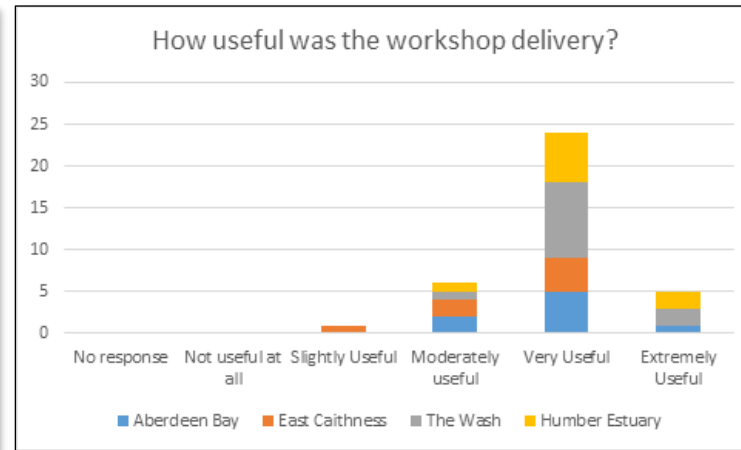
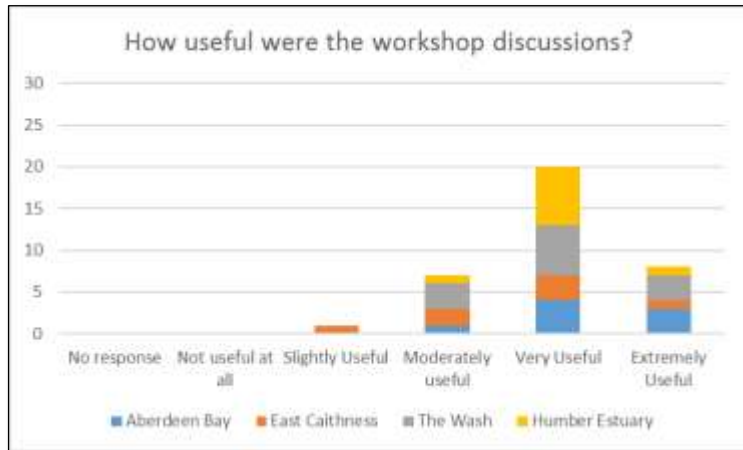
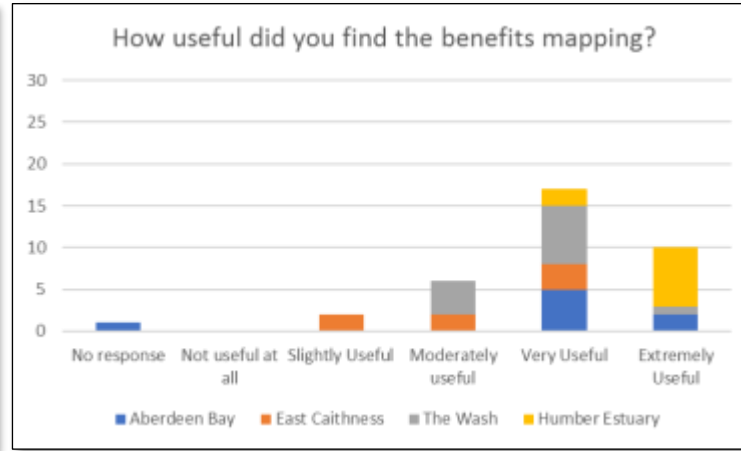
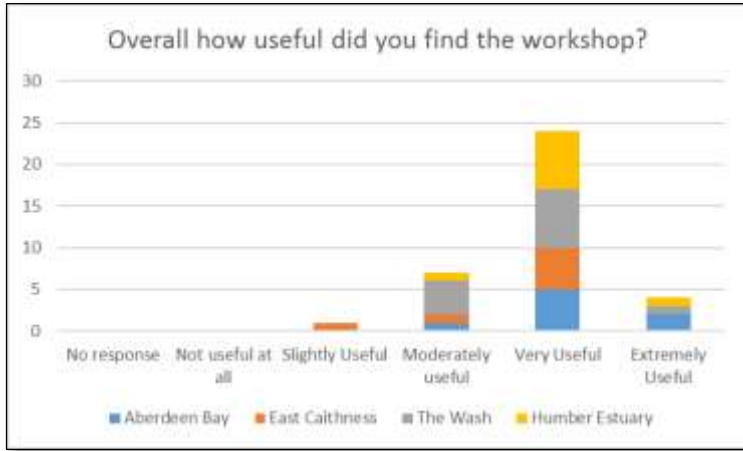
Workshop Outputs



Digitised Outputs & Interactive pdf



# Participatory Mapping Workshops: Stakeholder Feedback



*“Interesting hands on exploration of natural capital at a local scale and expressing the benefits of these”*

*“The benefits mapping really opened my eyes to the natural resources and the benefits of saltmarsh”*

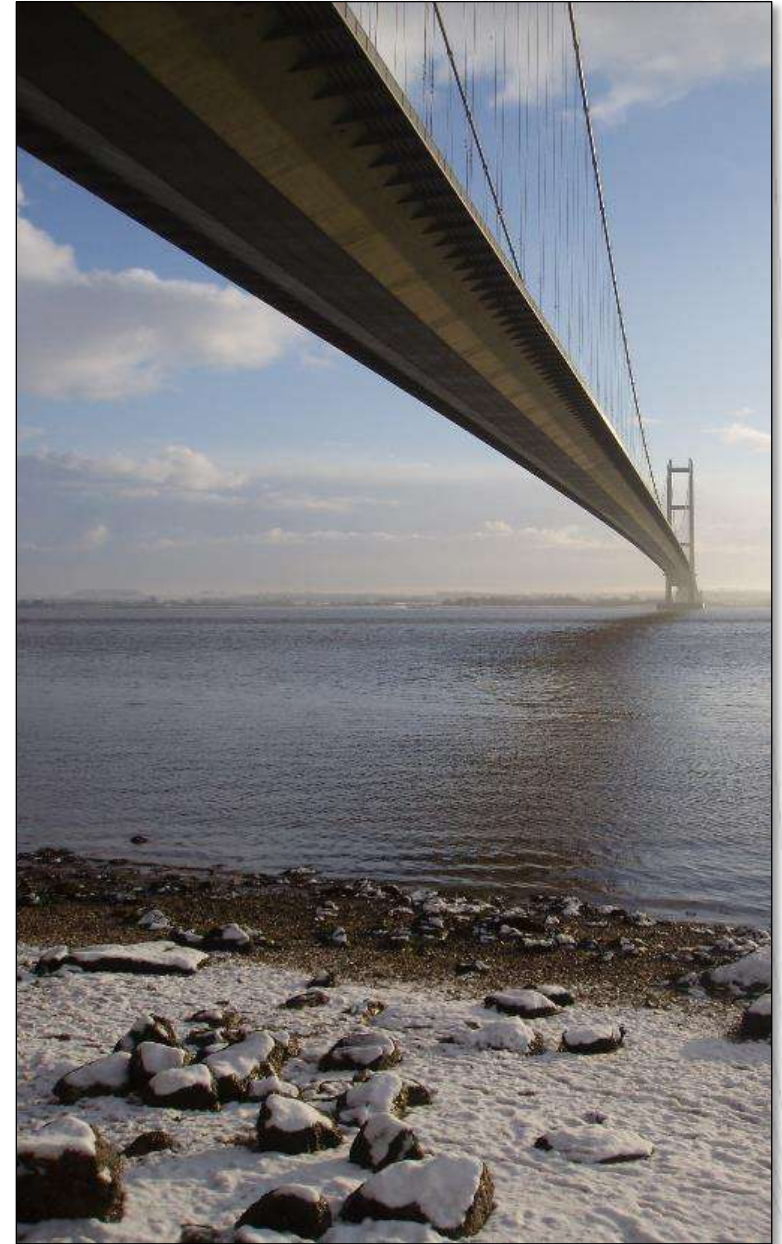
*“Demonstrates the broader non consumptive value of coastal space and the complexity and depth of use”*

*“The approach may have a useful role in strategic planning and policy”*

*“Very useful for providing info on the local area and the services and goods provided by the local ecosystems”*

## Next Steps & Future Research

- Refine workshop methodology based on stakeholder feedback.
- Produce a flexible framework for bespoke use in coastal and marine management.
- Finalise a manuscript to submit to *Ecosystem Services*.
- Applying for a RCUK to applying method across the UK and Overseas Territories.





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# Thank you

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visit [www.hull.ac.uk](http://www.hull.ac.uk)



University of Aberdeen (Impact Knowledge Exchange and Commercialisation Award 2017), NERC (Valuing Nature Placement Scheme 2017/18), the University of Hull (Impact Acceleration Pilot Fund 2017/18) and EU H2020 DCS4COP project.

