

# Marine Futures

Integrated valuation and shared values  
in the Marine Ecosystems Research  
Programme

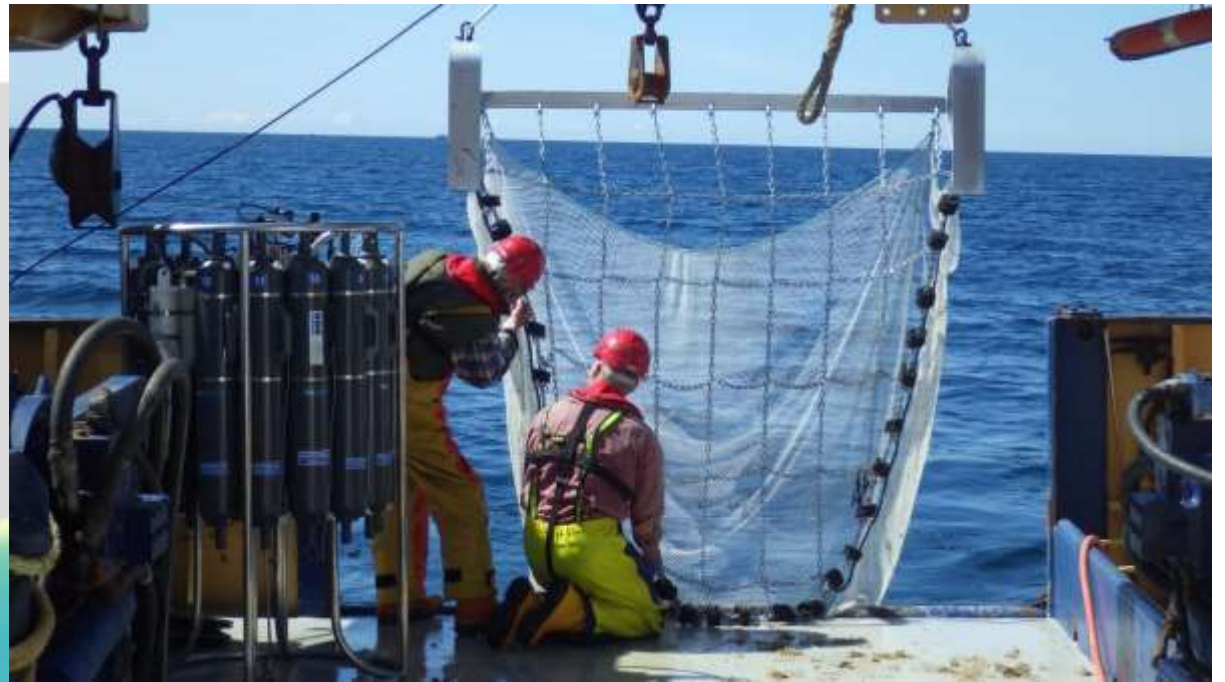
Jasper Kenter





# MERP: Marine Ecosystems Research Programme

- 5m, 5 year research programme
- Funded by the Natural Environment Research Council (NERC) and the Department for Environment, Food and Rural Affairs (DEFRA)
- Addressing key knowledge gaps in marine ecosystem research
- Involving over 50 UK scientists from 12 research organisation
- **Aim:** Integrating existing data and targeted new data with current models and knowledge of ecosystem services, in order to improve our understanding of the UK marine ecosystem







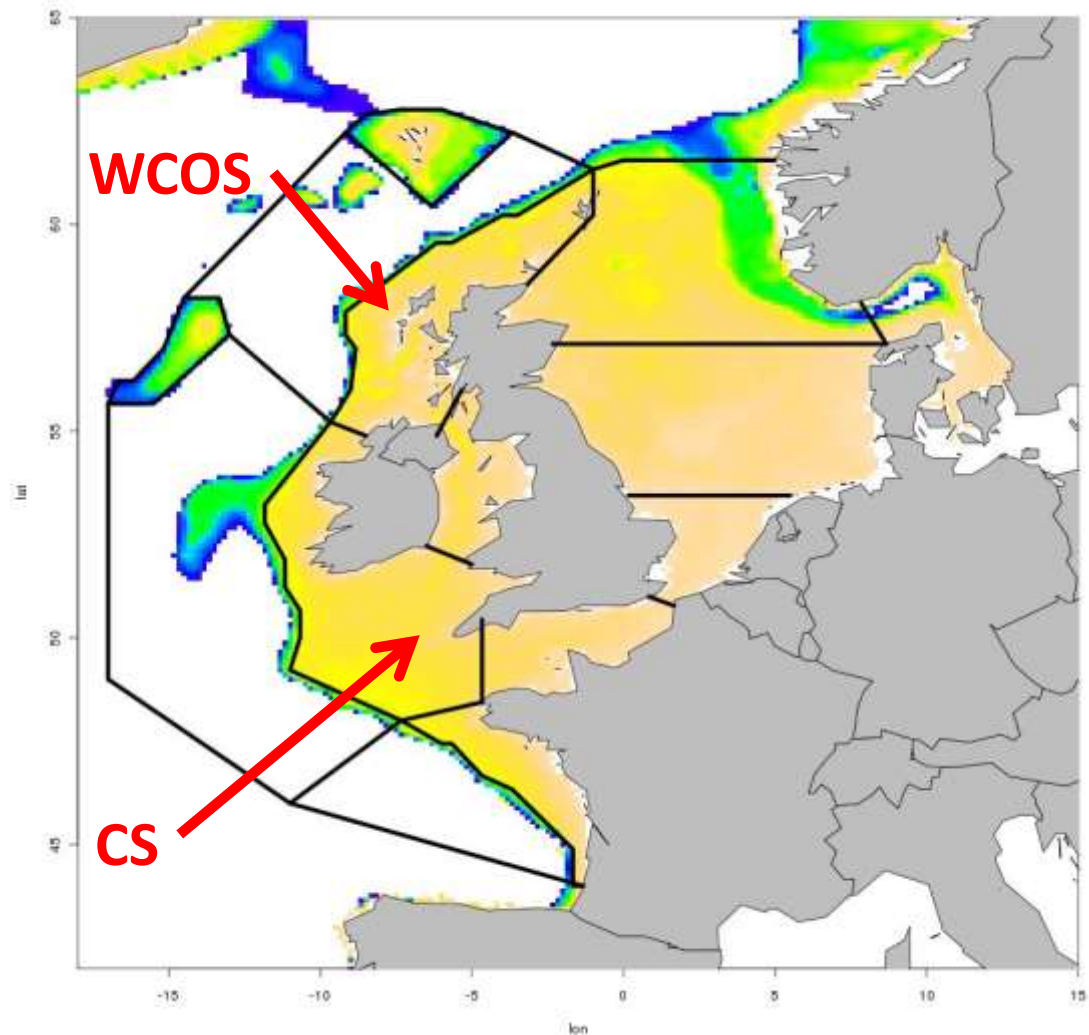
Marine Ecosystems  
Research Programme

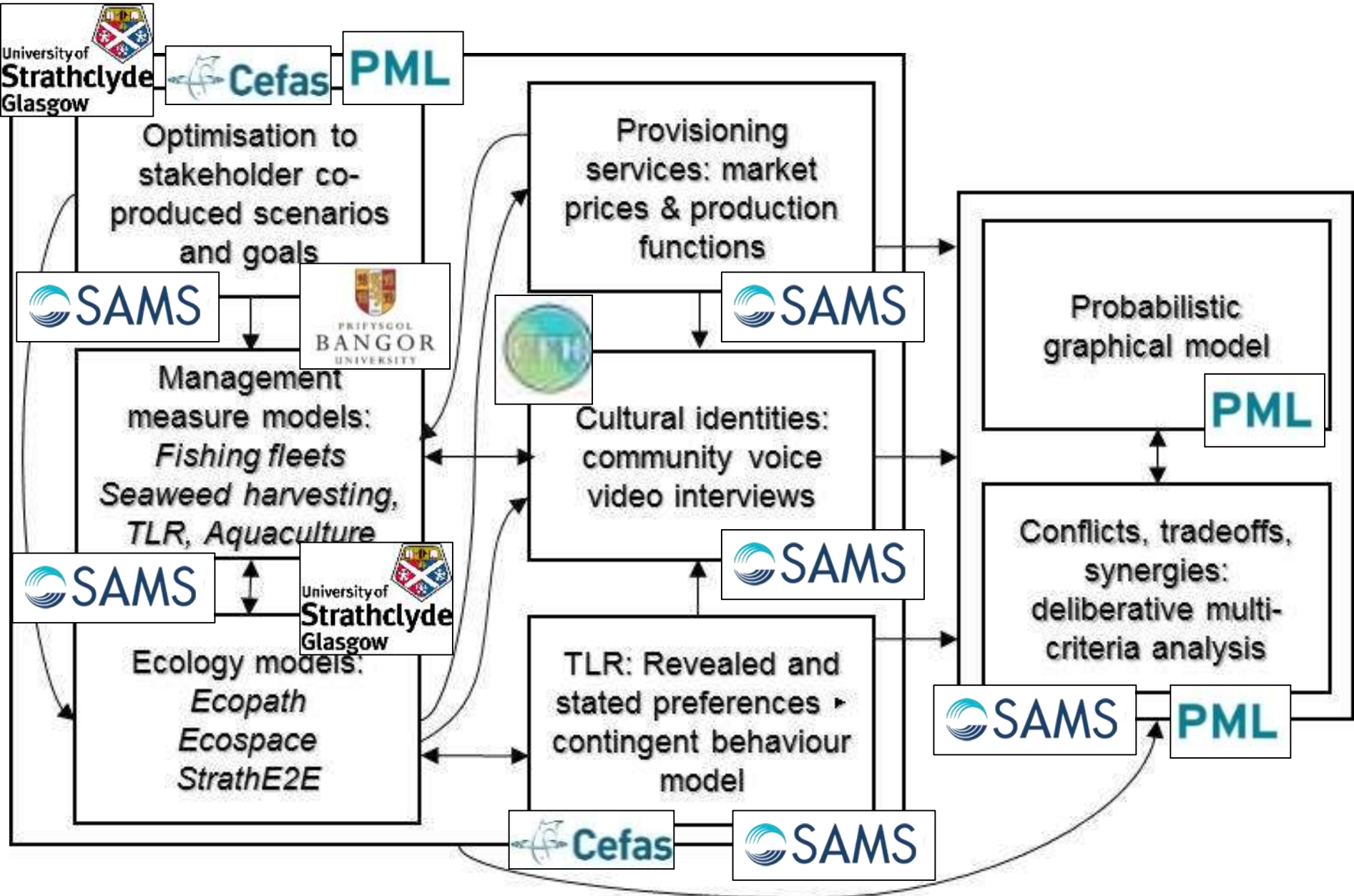
## Work Package 3

Understanding **conflicts, trade-offs and synergies** between different ecosystem services and values:

- Fisheries
- Aquaculture
- Seaweed
- Tourism, leisure and recreation
- Place & cultural identity

**Integrated valuation:** Integrating ecological, economic, cultural and deliberative approaches; Use, non-use, relational, intrinsic and shared values





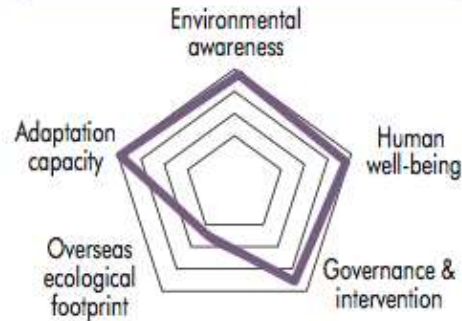
### Green and Pleasant Land

A preservationist attitude arises because the UK can afford to look after its own backyard without diminishing the ever-increasing standards of living.



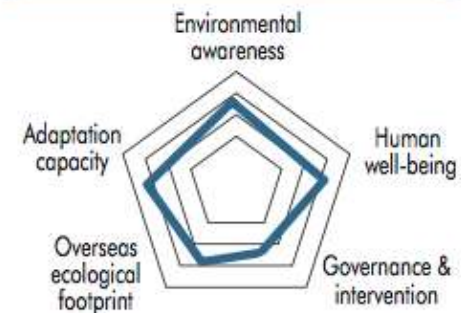
### Nature@Work

The belief that the promotion of ecosystem services through the creation of multifunctional landscapes is essential for maintaining the quality of life in the UK is widely accepted.



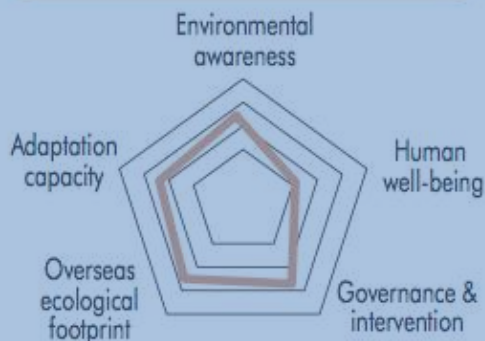
### Local Stewardship

This is a future where society is more concerned with the immediate surroundings and strives to maintain a sustainable focus on life within that area.



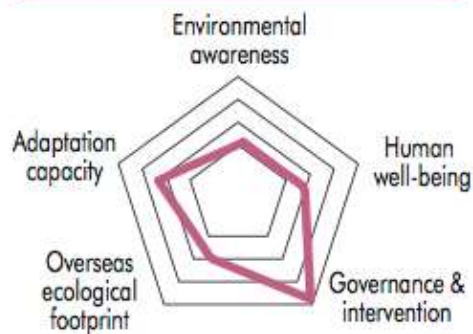
### Go with the Flow

This scenario is essentially a projection based on current trends and results in a future UK that is roughly based on today's ideals and targets.



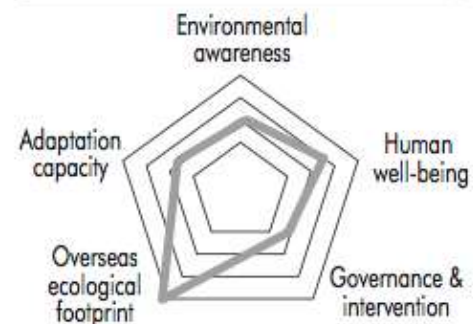
### National Security

Under this scenario climate change results in increases in global energy prices forcing many countries to attempt greater self-sufficiency (and efficiency) in many of their core industries.



### World Markets

High economic growth with a greater focus on removing barriers to trade is the fundamental characteristic of this scenario.





# Turning storylines into scenarios: drivers and implications



- Changes in shared transcendental and cultural values
- The demand for seafood (local, national, global markets)
- Changes in consumer behaviour (e.g. focus on price, healthy alternatives, sustainable alternatives)
- The expansion/creation of new markets (e.g. seaweed production)
- The strength of marine protection legislation
- Fisheries legislation (quotas, access rights)
- Actions on land (e.g. catchment management)
- Demand for marine recreation
- Expansion of other industries requiring marine space (e.g. marine renewable energy)
- Technological changes

**Workshops with  
>50 stakeholders**

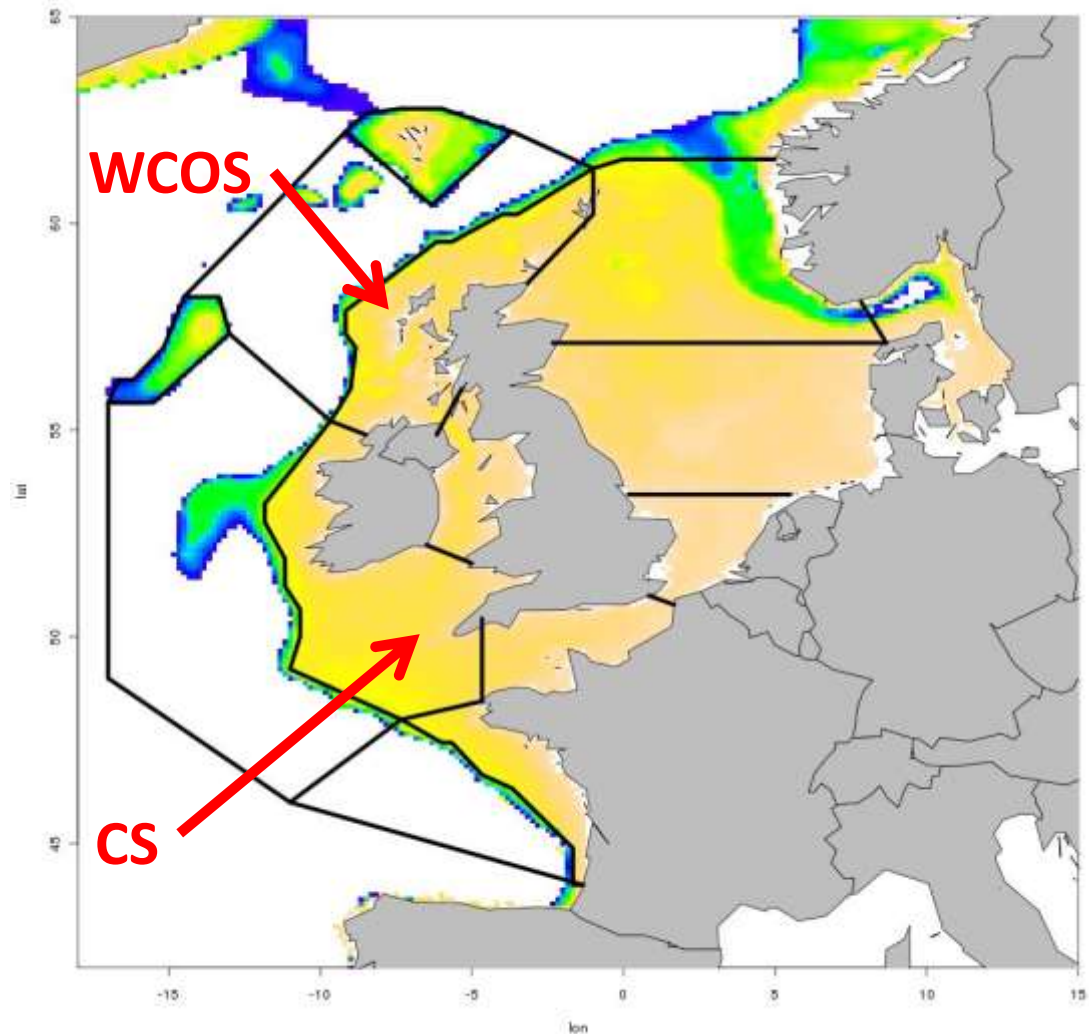
# Ecological modelling

## Consider:

- Nutrients
- Plankton
- Seabed invertebrates
- Pelagic fish
- Demersal fish
- Migratory fish
- Birds
- Marine mammals

Coupled to spatial fishing fleet model (12 different gears with discard and selectivity patterns)

Connect through to social and economic change





Environmental drivers  
(temperature, currents, etc.)

# Fishing management

environmental niches

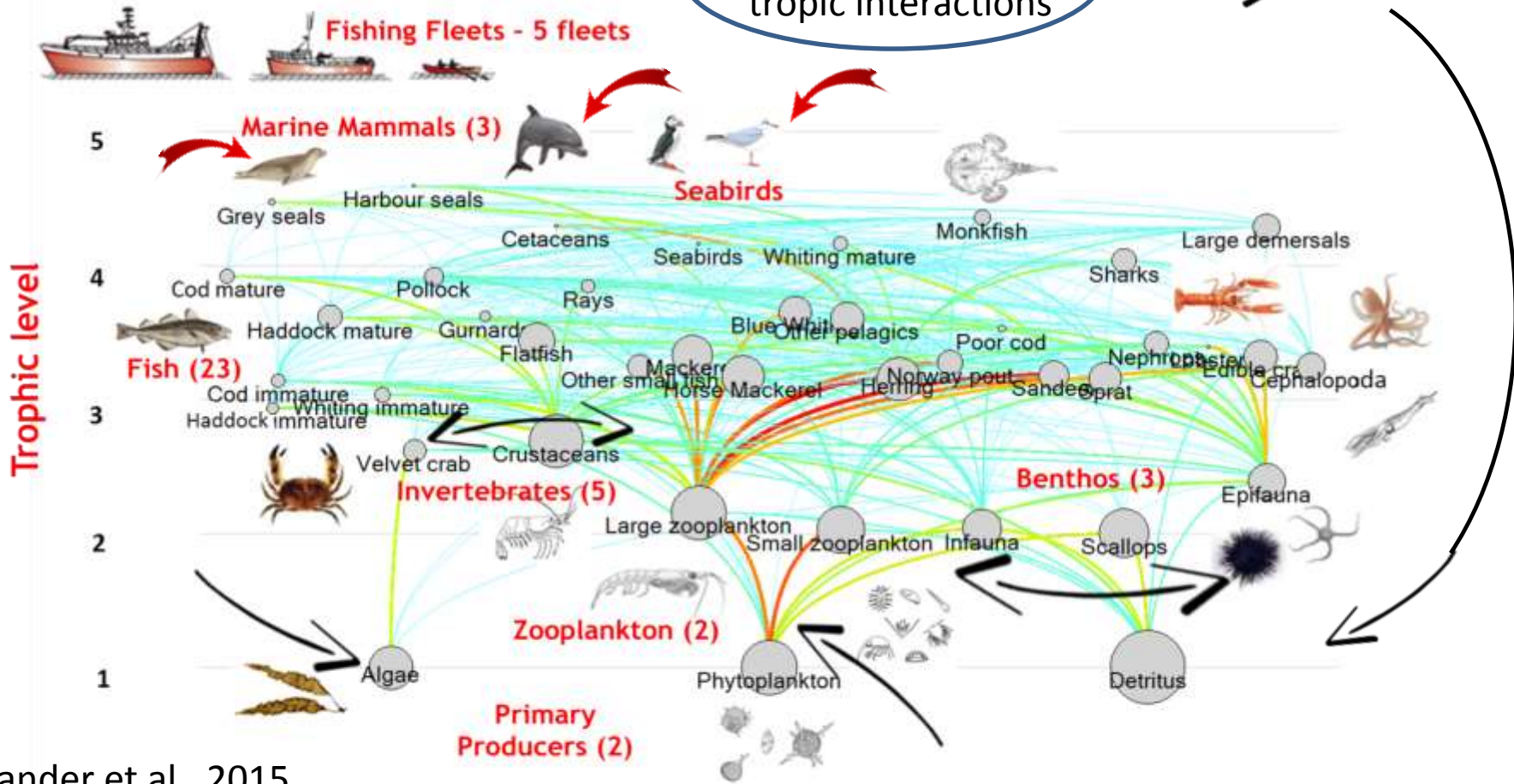
Both models included: fishing fleets (5) and 41 ecosystem functional groups:

mary tv

- invertebrates (23)
- cephalopods (1)
- benthos (3),
- zooplankton (2)

# Socio-economic impacts

trophic interactions







# Salmon aquaculture

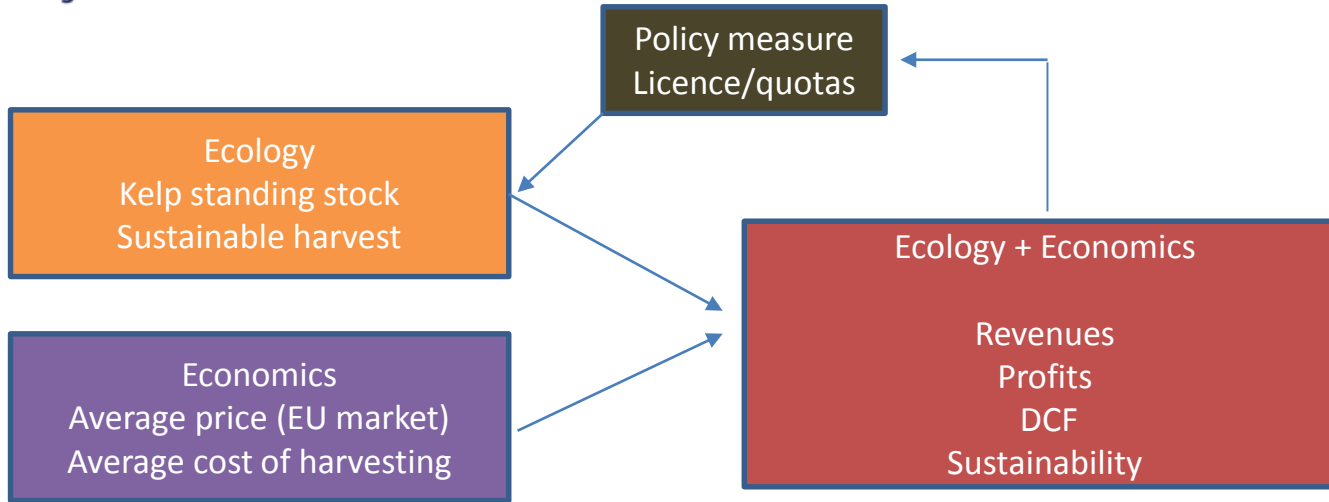
- Demand
  - Variation in quantity demanded as a function of price of salmon, income, price of substitutes
- Supply
  - Variation of price as a function of costs of production and industry concentration
- Variation of market price as a function of quantity supplied (simulation of an increase in supply)
  - Impacts on consumer welfare
  - Impacts on price of concentration in production
- Preliminary results: what happens if we upscale aquaculture?
  - No significant substitution between farmed and capture fish
  - Increased production does not reduce prices due to increasing marginal costs of production and rising global demand.





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# Seaweed harvesting



France



Norway



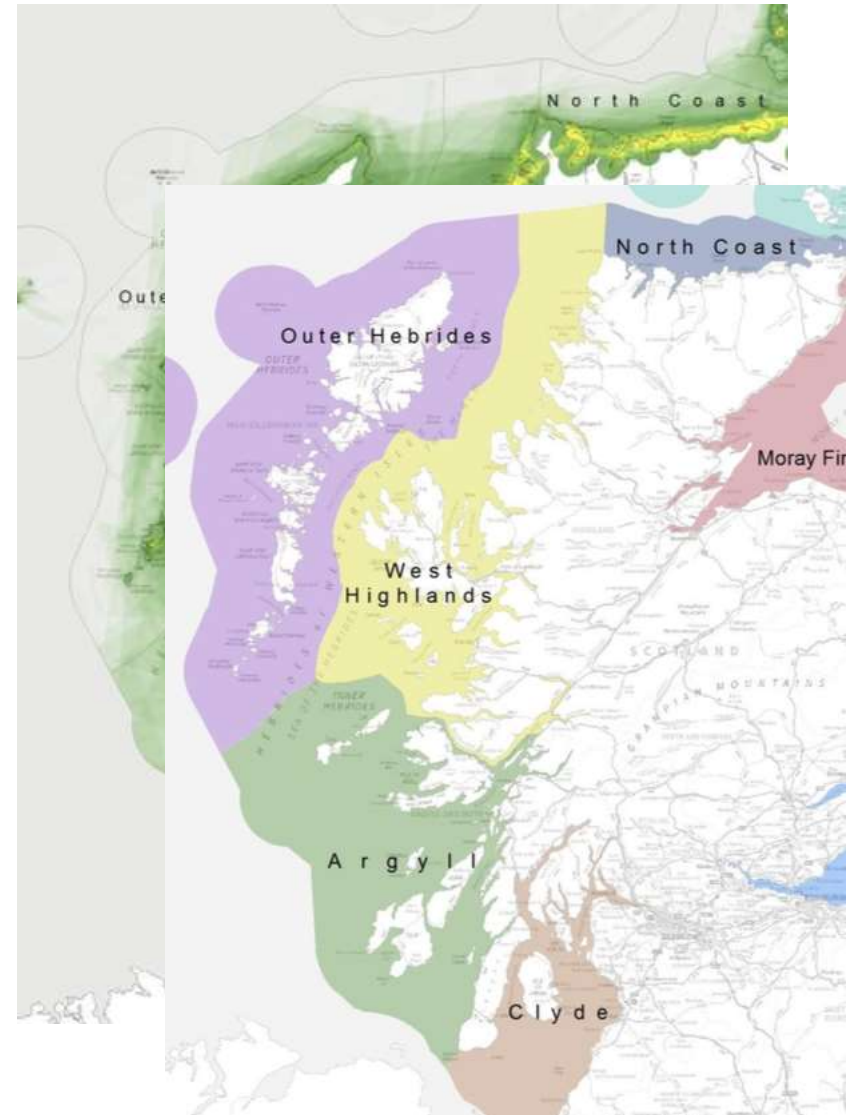
Marginal revenue  
£ 20 - £ 40 per tonne








Marginal cost  
£ 15 - £ 35 per tonne

# Tourism and recreation







- How will changes in ecosystems affect tourists and recreationalists' preferences?
  - More or less activity
  - Where will it take place
- Groups: diving, sea angling, wildlife watching
- Combining 'stated preferences' (hypothetical questionnaires) with 'revealed preferences' (current behaviour) to develop a 'contingent behaviour' model
- N=400 survey data gathered for wildlife watching currently under analysis



	Activity A	Activity B	Stay at home (no cost)
<b>Seals in local area (5 x 5 miles)</b>	30 	2 	
<b>Seabirds in local area (5 x 5 miles)</b> (e.g. kittiwake, fulmar, gannet, puffin, razorbill, guillemot)	500 	750 	
<b>Porpoises</b>	Almost no chance to see	3 in 4 chance to see 	
<b>Other dolphins and whales</b> (e.g. common dolphin, bottlenose, minke, orca)*	1 in 25 chance to see 	1 in 8 chance to see 	
Travel distance within local region	20 miles (one way) more than current trip	5 miles (one way) more than current trip	
<b>Number of opportunities out of 5:</b>			



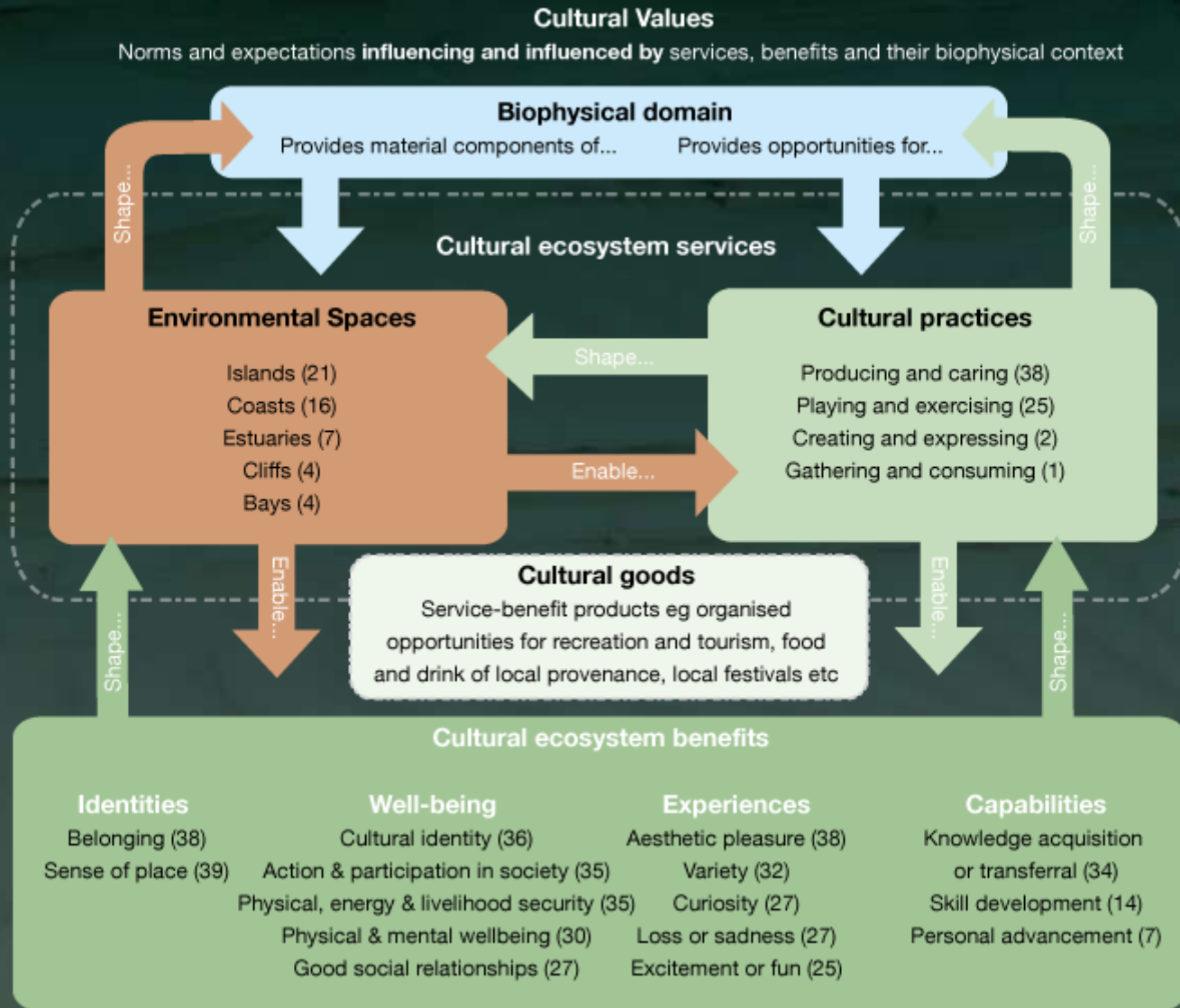
	<b>Expected effect of policy plan A</b>
<p><b>Seals in local area (5 x 5 miles)</b></p>	<p>Increase by 10% (22 instead of 20)</p> 
<p><b>Seabirds in local area (5 x 5 miles)</b></p> <p>(e.g. kittiwake, fulmar, gannet, puffin, razorbill, guillemot)</p>	<p>Increase by 30% (630 instead of 450)</p> 
<p><b>Porpoises</b></p>	<p>Increase by 10% (6,600 instead of 6,000)</p> 
<p><b>Other dolphins and whales</b></p> <p>(e.g. common dolphin, bottlenose, minke, orca)</p>	<p>Increase by 20% (3,600 instead of 3,000)</p> 
<p><b>Number of currently vulnerable species effectively protected</b></p>	<p style="text-align: center;">30</p> <p>(out of 40 species currently vulnerable across the UK)</p>
<p><b>Chances that the above changes take place instead of the present situation continuing</b></p>	<p style="text-align: center;">75%</p>

# Place and cultural identity



- Qualitative approach based on Community Voice method
- 40 video interviews across sectors compiled into documentary film
- Presented participants with scenarios: how do they think their activities, place, community and identity will be affected.
- Intrinsic values: traditionally defined as ‘non-instrumental’, by us as: ‘value without reference to humans’ (after O’Neill, 1992)

# Relationship between CES and human well-being



Adapted from Fish et al. (2016), building on NEAFO (Church et al. 2014)

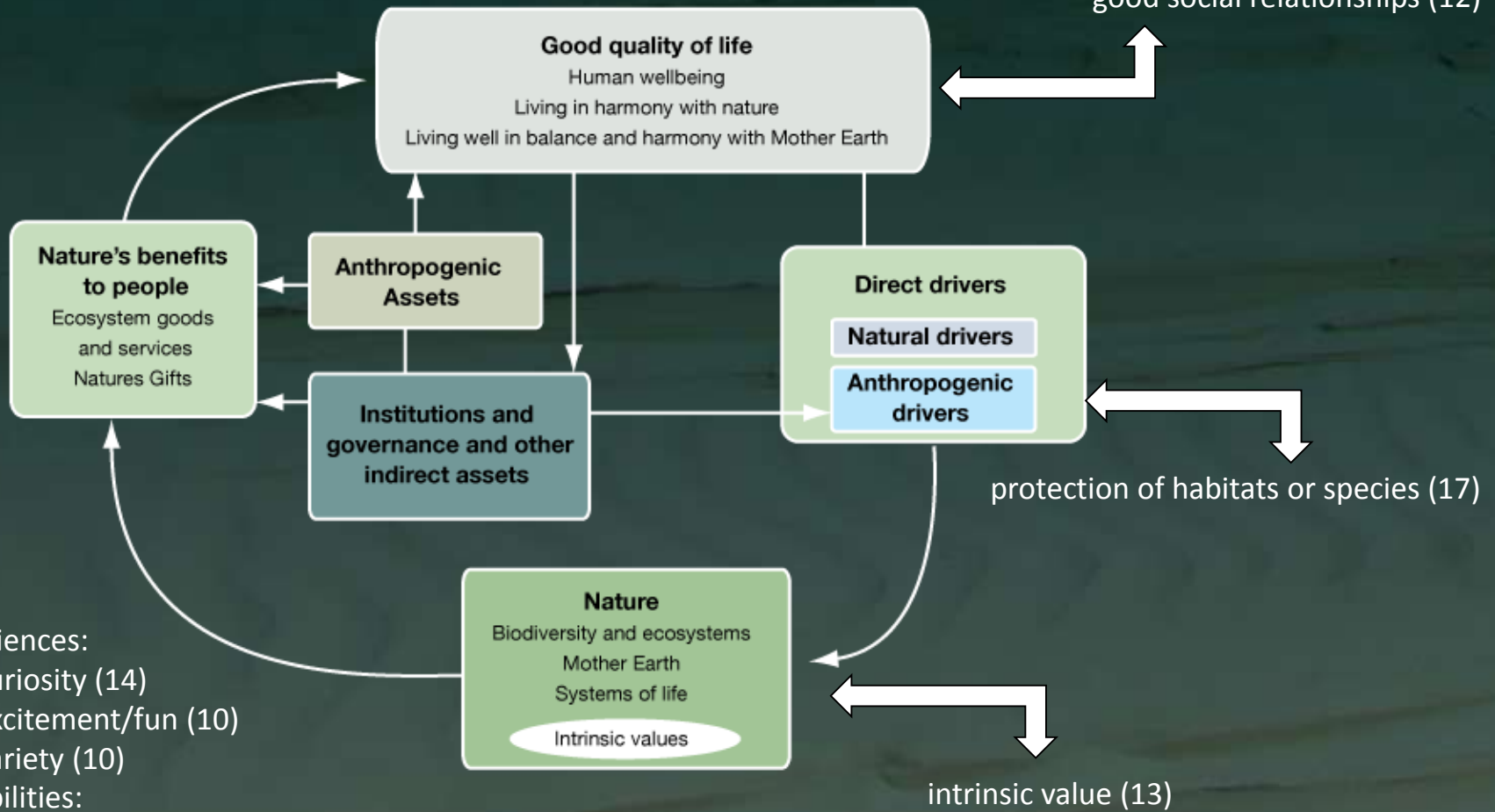
Understanding ecosystems as objects of cultural concern

(number of interviewees – total 40)



# Values for managing the marine environment

- interdependence between human beings, other living species, elements of nature (20)
  - relationship between humans and mother earth (18)
    - good social relationships (12)



## Experiences:

- curiosity (14)
- excitement/fun (10)
- variety (10)

## Capabilities:

- Knowledge acquisition/transferral (10)

IPBES Conceptual Framework (Diaz et al 2015)  
Complex relationship between nature and human society



## **Integration: Regional stakeholder multicriteria evaluation workshops**

- 40 minute documentary on stakeholder perceptions, cultural services and values
- Ecological and economic model forecasts for NEA+ scenarios
- Deliberation on shared values around policy options at multiple scales



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**THANK  
YOU!**



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