



Marine Ecosystems

# Cultural values of marine ecosystem services in the UK

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Marine Ecosystems Research Programme

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Project and Knowledge Exchange Office hosted by Plymouth Marine Laboratory

Funded by the Natural Environment Research Council and the Department for Environment, Food and Rural Affairs

www.marine-ecosystems.org.uk/Home

# Integrated science to support decisions

The Natural Environment Research Council (NERC) / Department for Environment, Food and Rural Affairs (Defra) - funded Marine Ecosystems Research Programme set out to integrate existing marine data and target new data with current models and knowledge of marine ecosystem services, in order to improve our understanding of the whole UK marine ecosystem.

The 5 year, £5 million programme has brought together more than [50 scientists](#) from 12 research institutes and a large number of supporting organizations that have made data and expertise available to achieve MERP's aim.

[How the programme answers key policy questions](#)

## Research outcomes



Fish, Fisheries and Fishing



Natural Capital



Modelling



Top Predators

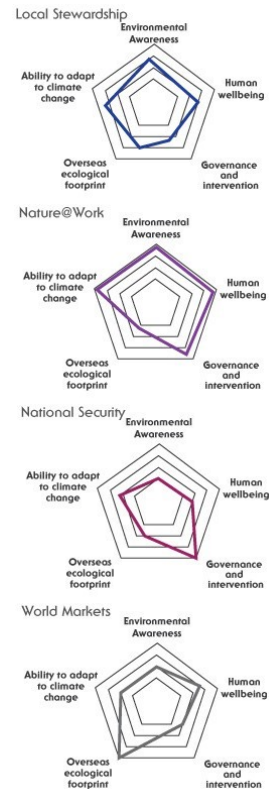
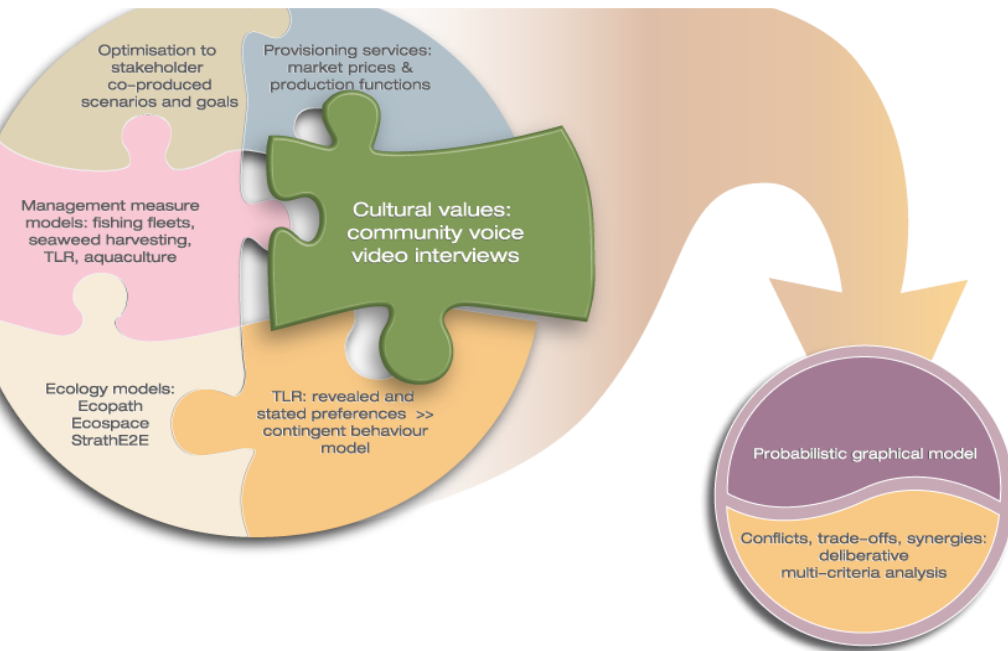
[Addressing policy questions](#)

[Interactive modelling guide](#)

# WP3 Topic 1: Understanding trade-offs in managing marine activities



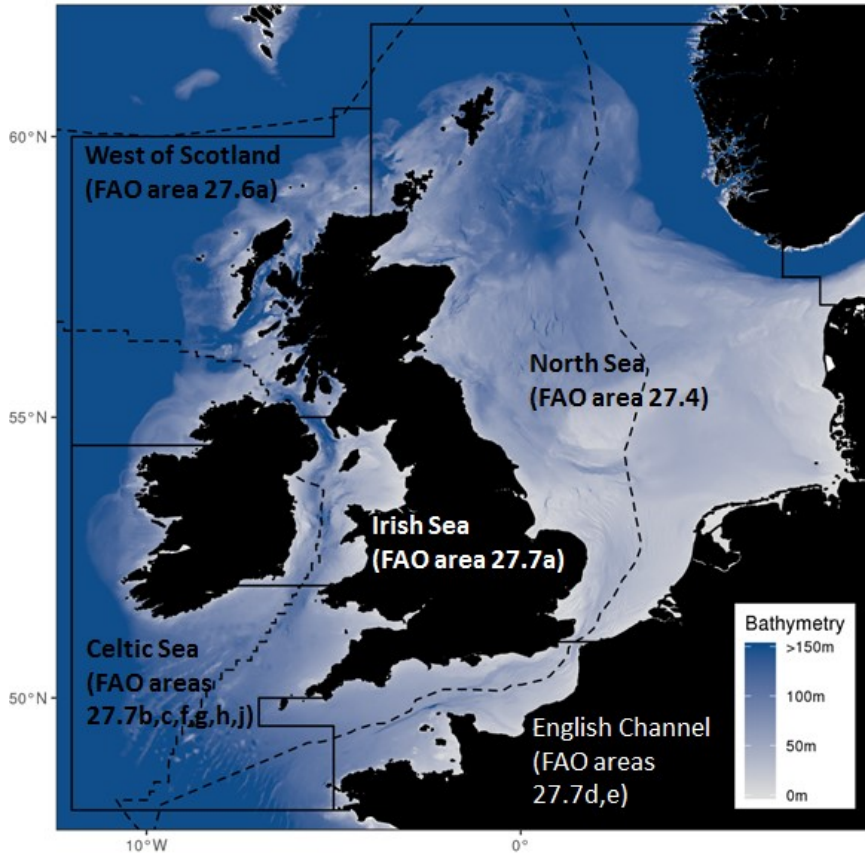
Goal: expose 'big-picture' outcomes of management measures for fisheries, aquaculture, conservation regarding ecological properties and monetary and non-monetary values



[https://marine-ecosystems.org.uk/Research\\_outcomes/Understanding\\_trade-offs](https://marine-ecosystems.org.uk/Research_outcomes/Understanding_trade-offs)

UK NEA. 2014. UK National Ecosystem Assessment follow-on phase: Synthesis report

# Case study areas



West of Scotland

Southwest England

Marine ecosystem services:

- provisioning
- tourism/leisure/recreation
- regulatory

Management challenges

## Background and objectives



### **Cultural Ecosystem Services (CES):**

(Intangible) benefits people receive from their interactions with the natural environment that contribute to individual and collective human wellbeing:

- spiritual enrichment, cognitive development, reflection, recreation, aesthetic experiences

### **Project aims:**

Advance understanding of values relating to marine and coastal CES and derived benefits, particularly in response to management interventions

### **Knowledge gaps and research priorities:**

- integrated valuation approaches
- relationship between CES and human wellbeing
- synergies and trade-offs: CES - human-related activities via four NEAF scenarios

# Community Voice Method

a new approach  
to public consultation

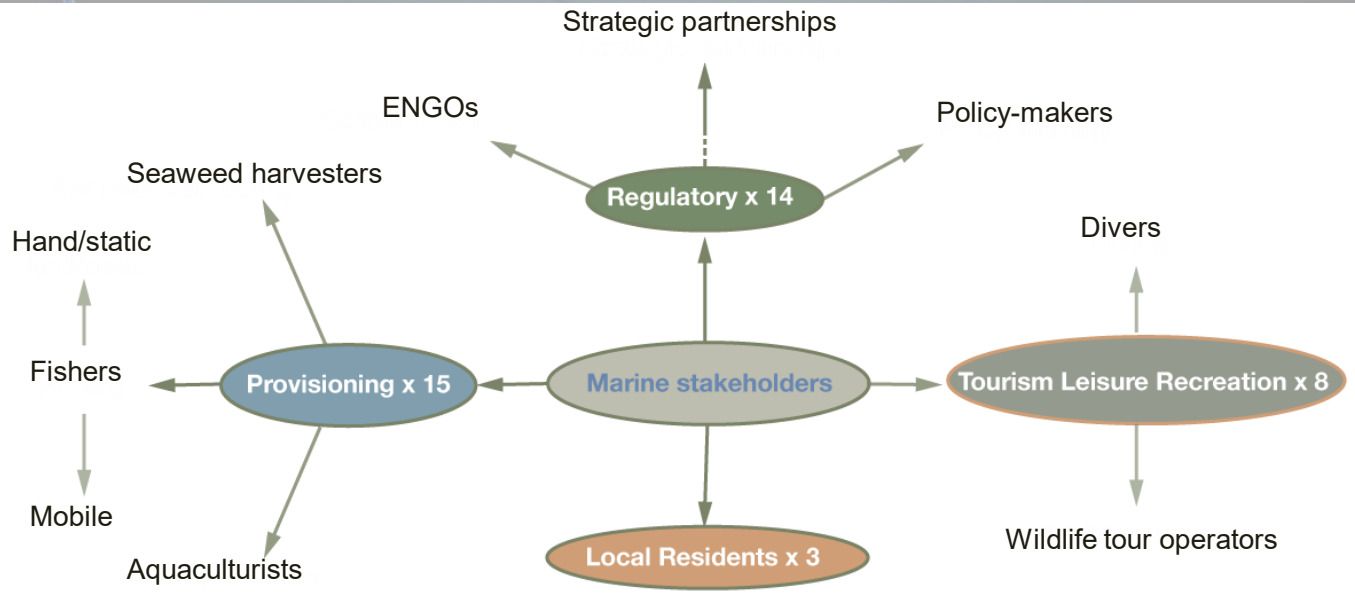
Forming shared values in conservation management: an interpretive-deliberative-democratic approach to including community voices (Ranger et al. 2016)



1: film stakeholder interviews

2: develop management measures and evaluation criteria

3: multi criteria analysis stakeholder workshop



WP2 stakeholder analysis (289 individuals) + snowball sampling

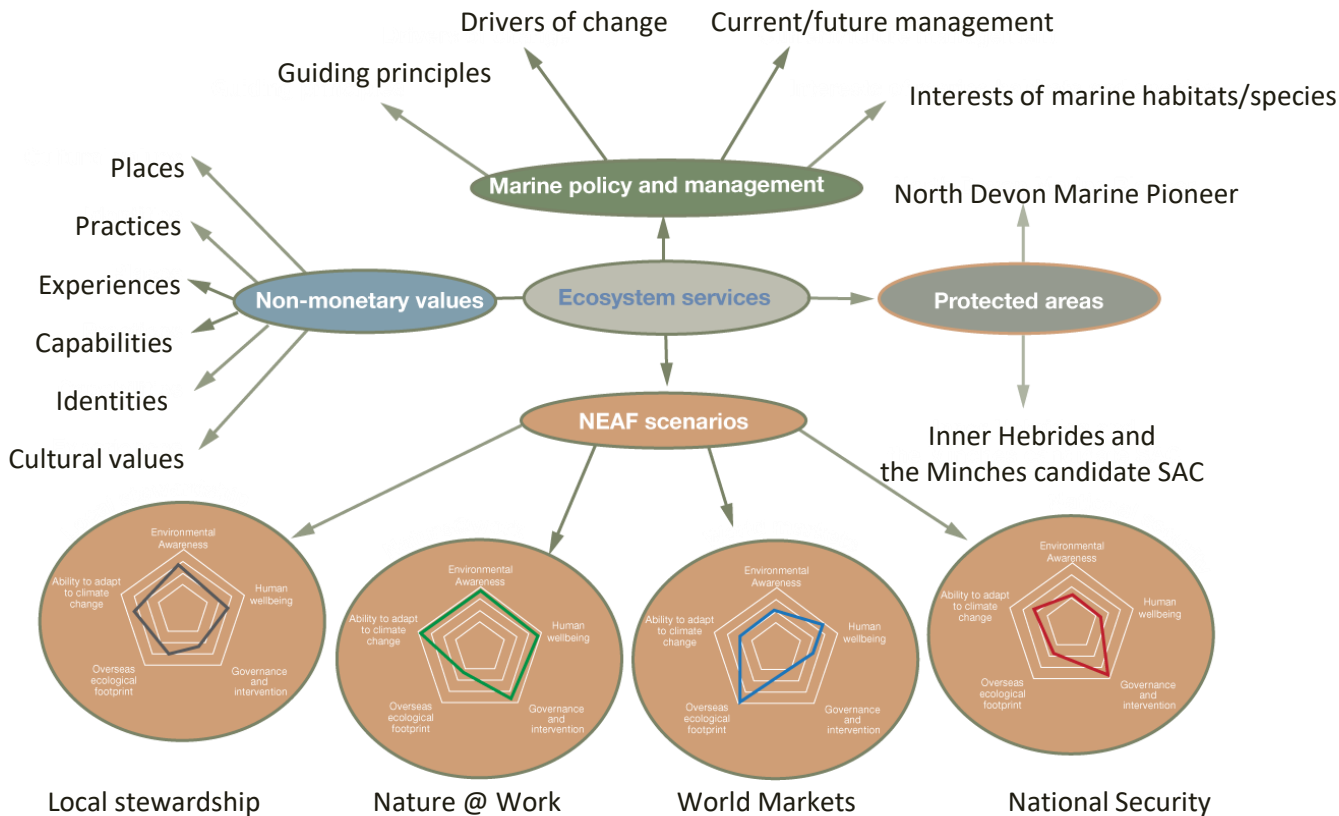
40 filmed stakeholder interviews, June 2017

West Coast of Scotland: Argyll, Isle of Mull, Wester Ross

Southwest England: Cornwall, Devon, Somerset



# Investigation

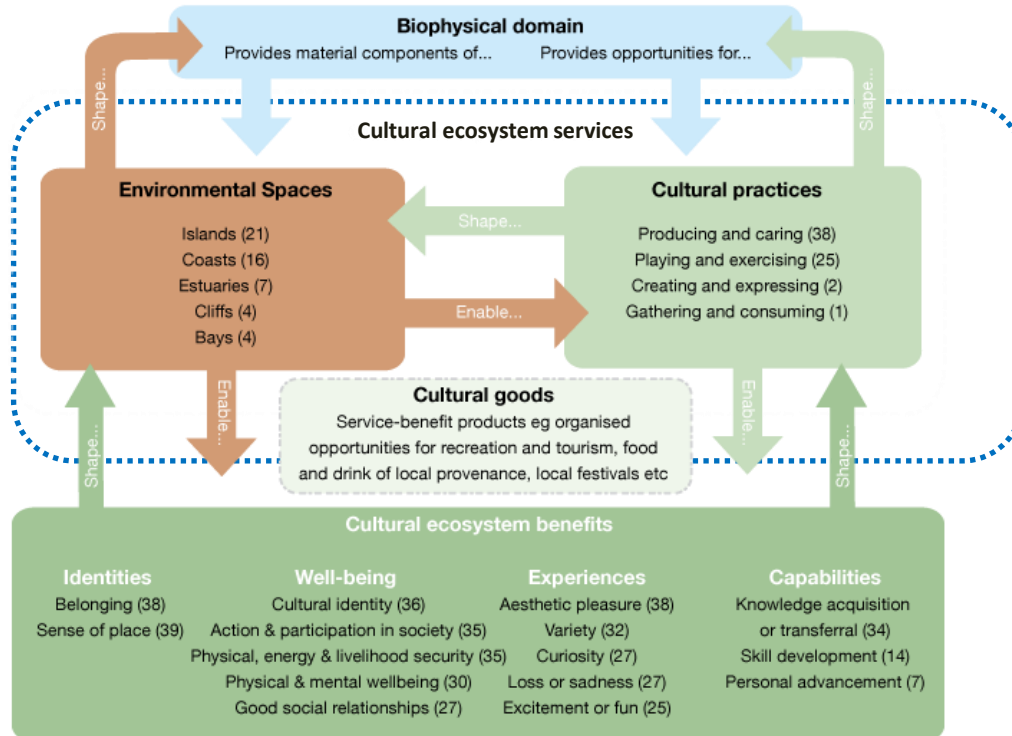


# Relationship between CES and human wellbeing:

## Understanding ecosystems as objects of cultural concern

### Cultural values

Norms and expectations **influencing and influenced by** services, benefits and their biophysical context

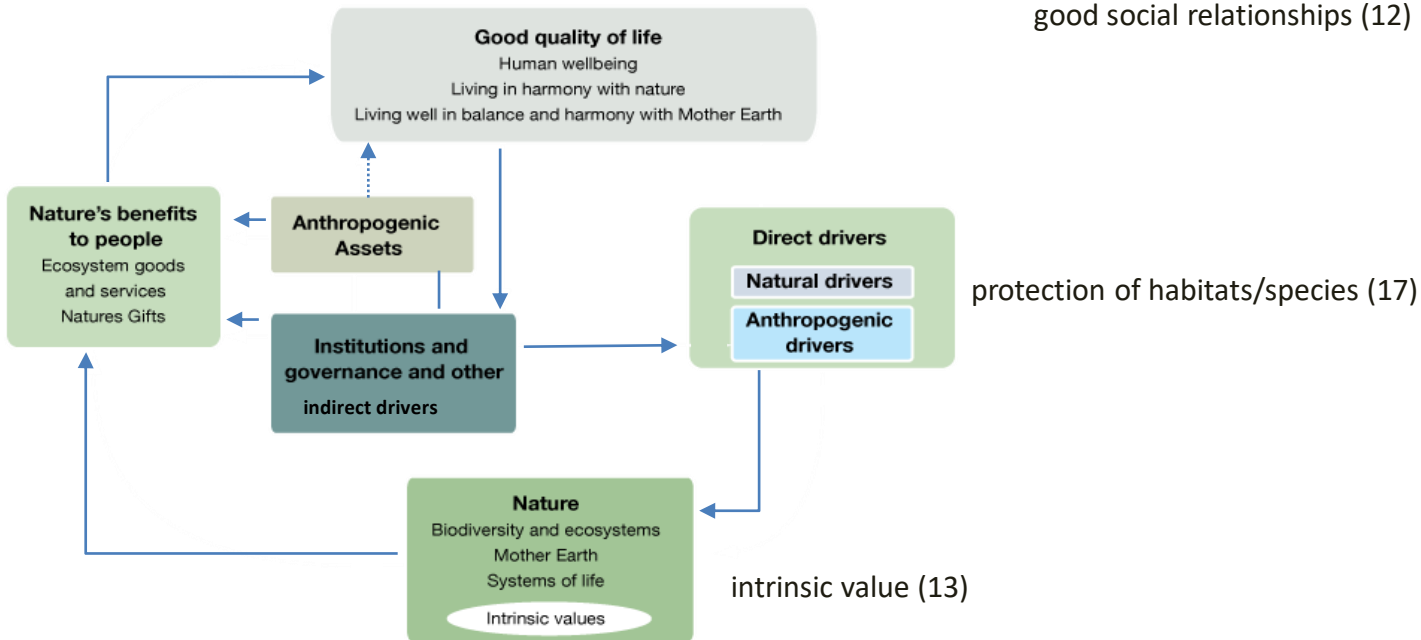


(number of interviewees = 40)







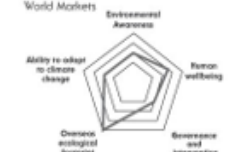

Adapted from Fish et al. (2016)

# Values for managing the marine environment: Complex relationship between nature and human society

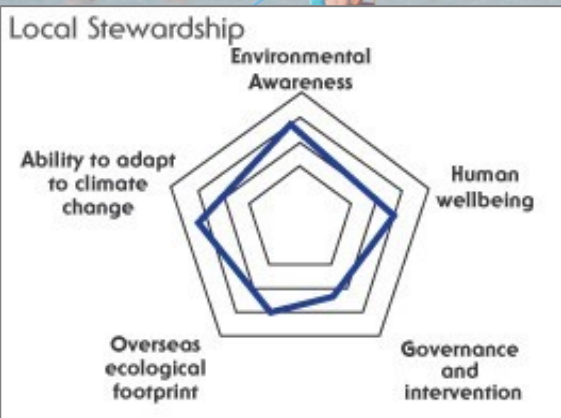
interdependence between human beings, other living species, elements of nature (20)  
relationship between humans and mother earth (18)  
good social relationships (12)



# National Ecosystem Assessment Follow-on (NEAF) management scenarios

Attributes	 <b>Nature@Work</b>	 <b>Local Stewardship</b>	 <b>World Markets</b>	 <b>National Security</b>
				
GDP	High	Low	Moderate/high	Low/moderate
Population	Moderate	Low	High	Moderate
Investment capital available	High	Low	High	Moderate
Leisure & tourism	<ul style="list-style-type: none"> <li>• outdoor activities more popular;</li> <li>• countryside attractive, well used;</li> <li>• sense of place important to well-being.</li> </ul>	<ul style="list-style-type: none"> <li>• local service provision is key;</li> <li>• environmental settings strongly influential;</li> <li>• fewer people travel far for leisure;</li> <li>• pride in local landscapes high.</li> </ul>	<ul style="list-style-type: none"> <li>• huge decline in internal &amp; overseas tourism;</li> <li>• UK losing out as tourism destination;</li> <li>• recreation in UK more home-based;</li> <li>• 'high quality' rural recreation expensive.</li> </ul>	<ul style="list-style-type: none"> <li>• decreases significantly;</li> <li>• less time (&amp; resources) to visit countryside;</li> <li>• rural UK less attractive;</li> <li>• beautiful/iconic landscapes remain popular.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• highly protected.</li> </ul>	<ul style="list-style-type: none"> <li>• diverse, different regional characteristics.</li> </ul>	<ul style="list-style-type: none"> <li>• more homogenous &amp; industrial.</li> </ul>	<ul style="list-style-type: none"> <li>• homogenous, production prioritised.</li> </ul>
Capture fisheries	<ul style="list-style-type: none"> <li>• fisheries more productive because better managed and mostly at maximum sustainable yield;</li> <li>• trawl and dredge fleet effort reduced.</li> </ul>	<ul style="list-style-type: none"> <li>• locally caught sustainable fish species more popular, managed by local quotas, number of small vessels increases, but some over-exploitation in coastal waters;</li> <li>• national quotas for transboundary fish populations.</li> </ul>	<ul style="list-style-type: none"> <li>• Common Fisheries Policy removed, little sustainable management, fish stocks over-exploited, some species locally extinct;</li> <li>• trawl and dredge fleet effort increases;</li> <li>• most seafood imported from Asia.</li> </ul>	<ul style="list-style-type: none"> <li>• fish stocks in UK waters protected from foreign vessels &amp; exploited sustainably by UK vessels through national quota system;</li> <li>• non-UK and boundary fish-stocks not managed sustainably.</li> </ul>
Aquaculture	<ul style="list-style-type: none"> <li>• some increase;</li> <li>• better environmental stewardship &amp; development of fish feeds from non-marine sources;</li> <li>• use of some non-native species.</li> </ul>	<ul style="list-style-type: none"> <li>• greater emphasis on integrated farming – aquaculture practices &amp; cultivation of herbivorous fish &amp; shellfish at local level.</li> </ul>	<ul style="list-style-type: none"> <li>• significant increases, focused on production volumes/value, for consumption &amp; export;</li> <li>• produced at expense of natural environment &amp; wild fish stocks;</li> <li>• increasing use of non-native species.</li> </ul>	<ul style="list-style-type: none"> <li>• increases to supplement wild fisheries production within limits set by availability of finance;</li> <li>• environmental pollution, depletion of wild forage species to support fish feed industry.</li> </ul>
Marine energy	<ul style="list-style-type: none"> <li>• UK's resources developed considerably, some energy exported;</li> <li>• widespread networks of wind/wave energy;</li> <li>• marine habitats around energy farms increase = no fishing grounds.</li> </ul>	<ul style="list-style-type: none"> <li>• renewable marine energy supported by government;</li> <li>• wave &amp; tidal energy sources common but do not conflict with biodiversity;</li> <li>• energy prices high.</li> </ul>	<ul style="list-style-type: none"> <li>• dependency on nuclear power &amp; fossil fuels continues;</li> <li>• renewable energy little used, but large tidal barrage schemes = ~5% UK's energy;</li> <li>• energy prices high.</li> </ul>	<ul style="list-style-type: none"> <li>• offshore wind &amp; wave energy increase to meet demands for self-sufficiency;</li> <li>• tidal barrage schemes = ~5% UK's energy;</li> <li>• energy prices very high.</li> </ul>
Other maritime industries	<ul style="list-style-type: none"> <li>• marine biotechnology spin-offs develop from increased research &amp; development for aquaculture.</li> </ul>		<ul style="list-style-type: none"> <li>• marine aggregate extraction increases;</li> <li>• shipping increases due to greater trade with other countries.</li> </ul>	
Species diversity & protection	<ul style="list-style-type: none"> <li>• marine/coastal margin habitats protected;</li> <li>• biodiversity conservation boosted &amp; many species' populations in better health;</li> <li>• some trade-offs between biodiversity, food provision &amp; energy.</li> </ul>	<ul style="list-style-type: none"> <li>• intensive land management &amp; landscape heterogeneity = fairly healthy biodiversity;</li> <li>• climate change still a threat, but a 'softer' landscape aids species' migration &amp; diversity.</li> </ul>	<ul style="list-style-type: none"> <li>• most habitats decline due to climate change, land use change, pollution;</li> <li>• increases in invasive species reduce native species diversity.</li> </ul>	<ul style="list-style-type: none"> <li>• biodiversity suffers from climate change, land use change, pollution.</li> </ul>
Water quality	<ul style="list-style-type: none"> <li>• vastly improved everywhere;</li> <li>• polluters heavily fined so few mistakes;</li> <li>• sustainable land management technologies = less risk of fertilizer/pesticide pollution.</li> </ul>	<ul style="list-style-type: none"> <li>• significantly improves due to more sustainable agricultural practice &amp; tighter environmental legislation.</li> </ul>	<ul style="list-style-type: none"> <li>• declines to mid-1980s levels - lower environmental standards for industry &amp; agriculture.</li> </ul>	<ul style="list-style-type: none"> <li>• declines to mid-1980s levels – increased pesticides, fertilisers &amp; arable area.</li> </ul>

# NEAF scenarios: management worldviews



“We're going in the right direction... through both legislation and through collaboration... also to do with the population feeling that they're involved, that it's not just top down management from government.”

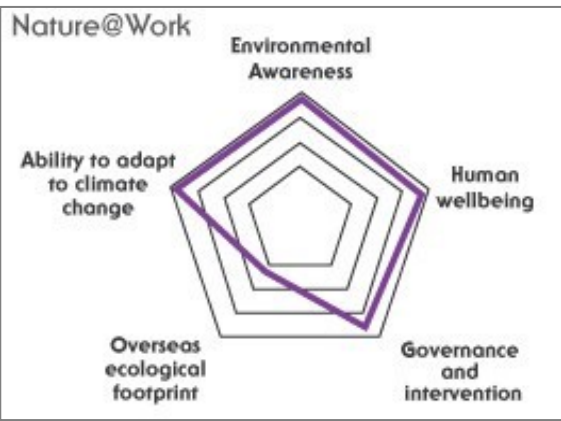
(Regulatory stakeholder Southwest England)

Scale of operation

Legitimacy and voice

Systems of property and access rights

Rules, norms, legislation, treaties



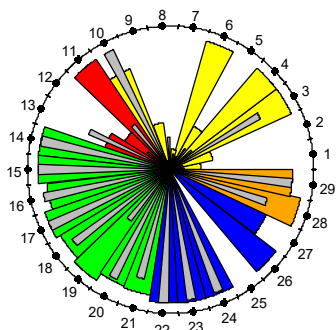
“...there is a higher value placed on environmental awareness, sustainability and there are...more areas that are protected and industries managed in a stronger way. So, I think that strategy fits closest to my vision for what I would like to see.”

(Regulatory stakeholder West Coast of Scotland)

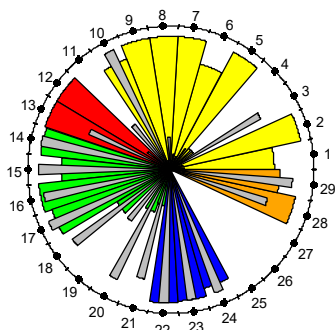
# Models of the marine ecosystem (NEMO-ERSEM, StrathE2E, EWE)

Appendix 1, MERP Final Report January 2019, <https://marine-ecosystems.org.uk/Resources/Reports>

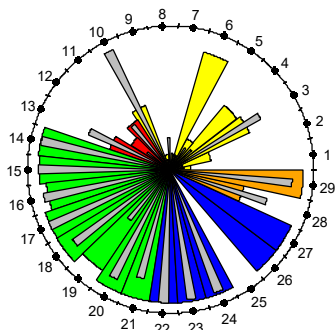
**National Security**



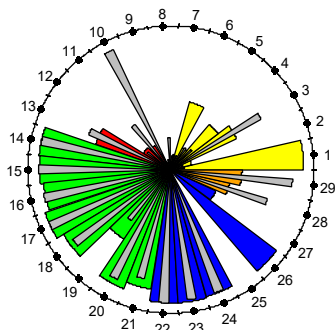
**World Markets**



**Nature@Work**



**Local Stewardship**



Label	Description
1	Mobile pelagic gear effort
2	Mobile demersal gear effort
3	Static gear effort
4	Planktivorous fish landings
5	Migratory fish landings
6	Demersal fish landings
7	Shellfish landings
8	Total discards
9	Fishery revenue
10	Fishery profit margin
11	Top-predator bycatch
12	Seabed abraded area ratio
13	Ratio of Inshore:total area abraded
14	Winter surface nitrate
15	Mud porewater ammonia
16	Total Primary Production
17	Benthos biomass
18	Finfish biomass
19	Ratio of planktivorous: total finfish biomass
20	Top-predator biomass
21	Ratio of top-predator production : primary production
22	Number of anglers
23	Number of divers
24	Number of wildlife watchers
25	Welfare of anglers
26	Welfare of divers
27	Welfare of wildlife watchers
28	Consumption of aquaculture produce
29	Aquaculture profits

# Scottish multi criteria analysis workshop

[https://marine-ecosystems.org.uk/Research\\_outcomes/Understanding\\_trade-offs](https://marine-ecosystems.org.uk/Research_outcomes/Understanding_trade-offs)



**40 minute film: stakeholders' shared values, competing interests, opinions about 4 NEAF scenarios**

**Economic and ecological modelling simulations representing consequences of 4 NEAF scenarios on ecosystem services**

**Management measures: fisheries regulation, gear restrictions, technical measures, salmon aquaculture**

**Conflict around role of MPAs to protect key features versus no-take zones**

## Cultural values: future impact and policy relevance



### **Southwest England & West Coast of Scotland:**

leisure and tourism  
landscapes  
capture fisheries  
aquaculture

marine energy  
other maritime industries  
species diversity and protection  
water quality

### **Spatial planning for marine protected areas:**

North Devon Marine Pioneer  
Inner Hebrides & Minches candidate SAC

### **Marine ecosystem management and policy:**

shared values  
competing interests  
potential trade-offs: marine ecosystem services and cultural values (NEAF scenarios)



# Major outputs from the Community Voice Method project



## 2 Films:

8 minute trailer and 40 minute documentary: Cultural values of UK Seas:

<https://www.ceh.ac.uk/news-and-media/blogs/valuing-benefits-marine-ecosystem-services>

## 3 Publications:

Ainsworth et al. 2019. "A fulfilled human life: Eliciting **sense of place and cultural identity** in two UK marine environments through the Community Voice Method." *Ecosystem Services* 39:100992.

- thematic codebook of marine cultural ecosystem benefits

Ainsworth. 2019. A whale of a time: **stakeholder views on managing the marine environment** in the Southwest of England. A report of the Marine Ecosystems Research Programme. Edinburgh, UK: Centre for Ecology & Hydrology.

O'Connor & Kenter. 2019. "Making **intrinsic values** work; integrating intrinsic values of the more-than-human world through the Life Framework of Values." *Sustainability Science* 14 (5):1247-1265.

Thank you

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