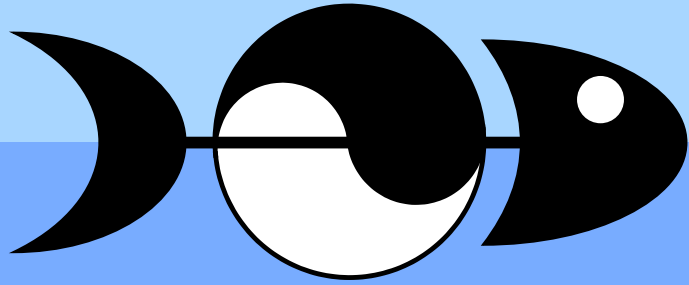


Making the European Fisheries Ecosystem Plan Operational





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Aims

How to make ecosystem-based fisheries management operational in Europe

- **Science (natural and socio-economic)**
- **Governance**

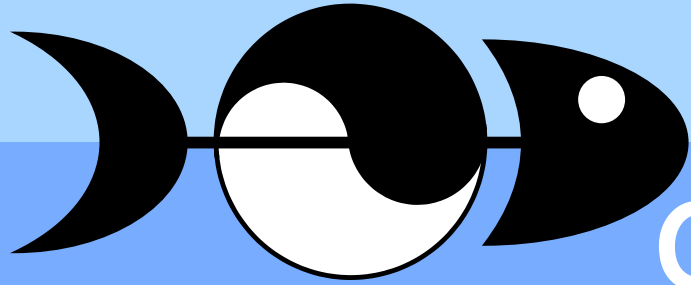
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Regions

RAC regions:

- North Sea (NS)
- North Western Waters (NWW)
- South Western Waters (SWW)

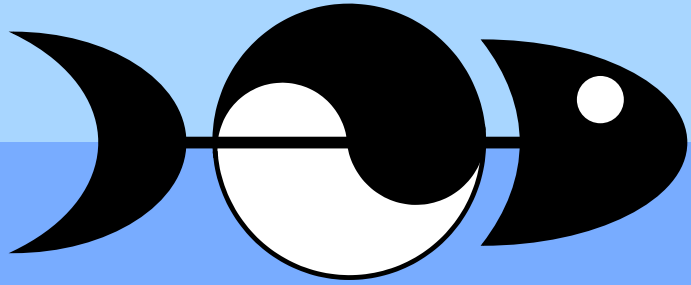




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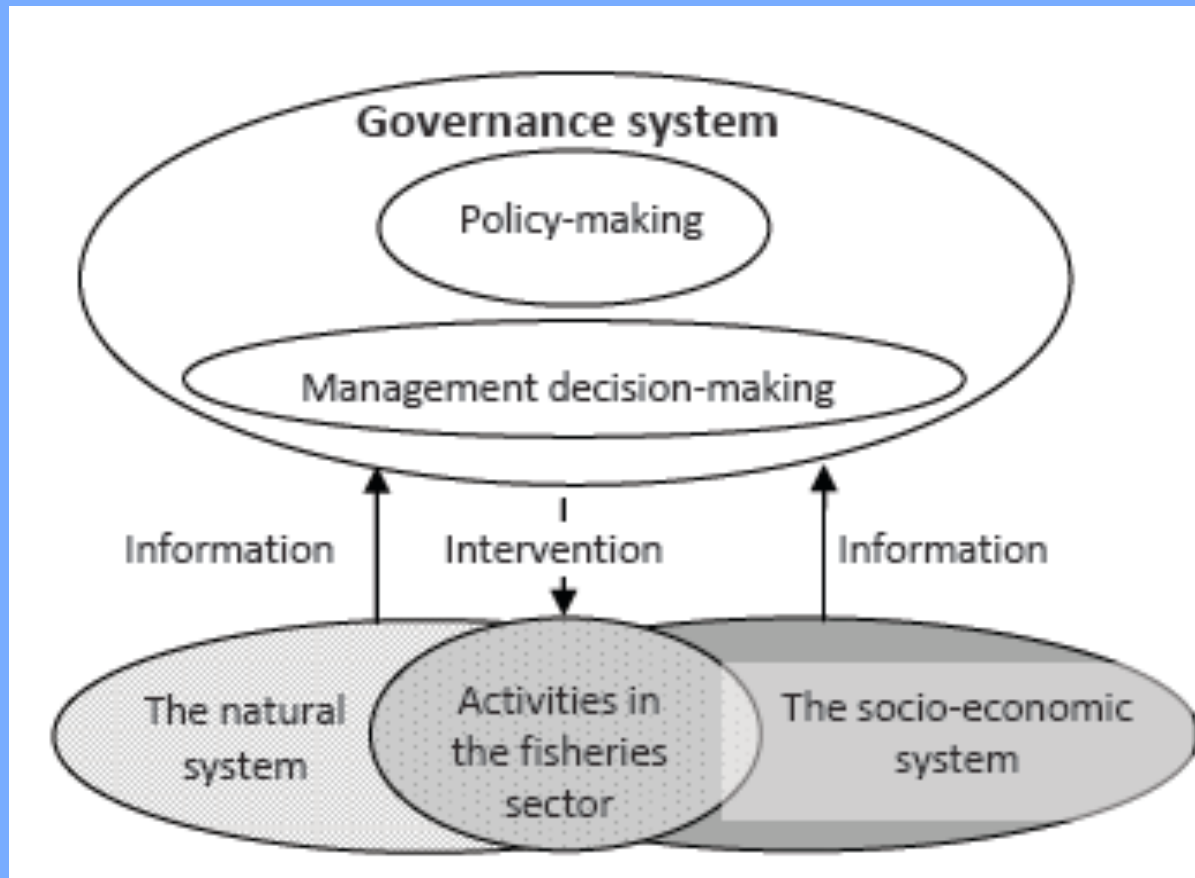
Case studies Approach

NS RAC region	NWW RAC region	SWW RAC region
Mixed flatfish beamtrawl	<i>Nephrops</i>	Mixed demersal trawl (including hake, <i>Nephrops</i> , horse mackerel)
Sandeel industrial	Western Mackerel	Sardines <i>et al.</i> purse seine
Herring pelagic	Mixed trawl fisheries (including hake, monkfish and megrim)	Mixed demersal lines
Mixed whitefish demersal (including cod)	Scallop dredging	

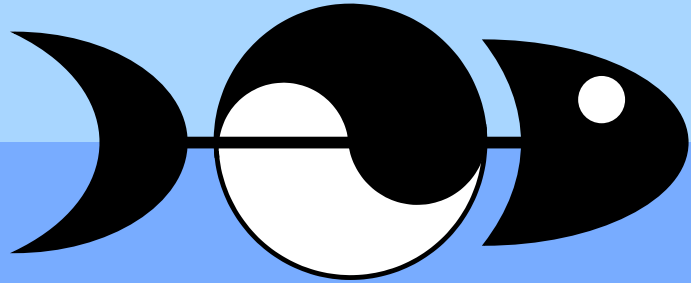


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Development of the 'Norse Matrix'



A more powerful way of providing data for management decision making is to **combine** the information from natural and socio-economic systems rather than having two separate avenues.



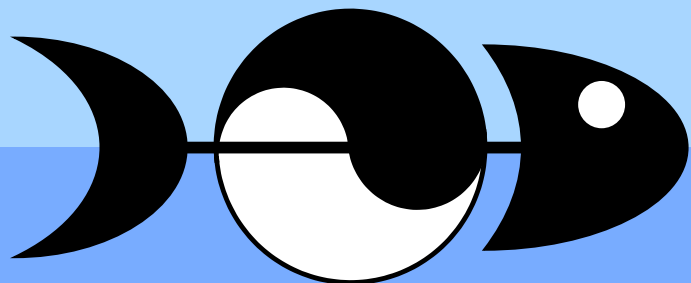
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‘Norse Matrix’

	Things we care about Ecological components			Central Spine Fishery	Things we care about Socio-economic components		
	x	y	z		x	y	z
Things we do.				X			
Things we manage within a governance system.							

Ecological components are based on the Marine Strategy Directive

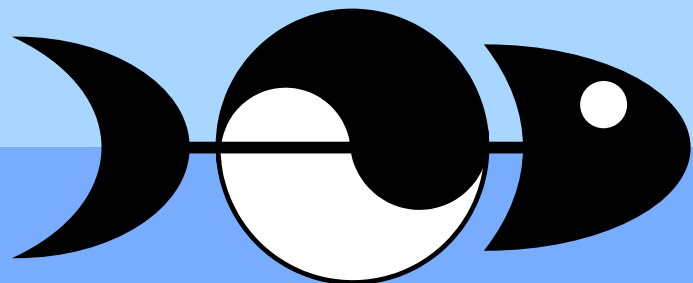
Socio-economic components are new (Margrethe and Jesper).



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Norse Matrix Rows

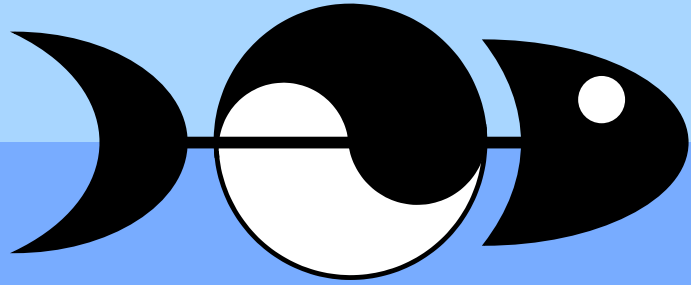
MSD Impact Themes	Impact Type (MSD & OSPAR)
Biological disturbance	Barrier to species movement
Biological disturbance	Community structure or species dynamics changes
Biological disturbance	Death or injury by collision
Biological disturbance	Introduction [spread] of non-indigenous species & translocations
Biological disturbance	Introduction of microbial pathogens
Biological disturbance	Removal of non-target species
Biological disturbance	Removal of target species
Biological disturbance	Removal of target species
Contamination by hazardous substances	Heavy metal contamination
Contamination by hazardous substances	Hydrocarbon contamination
Contamination by hazardous substances	Radionuclide contamination
Contamination by hazardous substances	Synthetic compound contamination
Interference with natural hydrological processes	Emergence regime changes (inc. desiccation) - local
Interference with natural hydrological processes	Emergence regime changes (inc. desiccation) (sea-level rise) - regional/national
Interference with natural hydrological processes	pH changes
Interference with natural hydrological processes	Salinity changes - local
Interference with natural hydrological processes	Salinity changes (rainfall; arctic ice melt) - regional/national
Interference with natural hydrological processes	Temperature changes - local
Interference with natural hydrological processes	Temperature changes - regional/national
Interference with natural hydrological processes	Water flow (tidal & ocean currents) rate changes - local
Interference with natural hydrological processes	Water flow (tidal & ocean currents) rate changes - regional/national
Interference with natural hydrological processes	Water flow (tidal currents) rate changes - local
Interference with natural hydrological processes	Wave exposure changes - local
No specific or single impacting activity	Changes in species or community distribution, size/extent or condition
Nutrient & organic matter enrichment	De-oxygenation
Nutrient & organic matter enrichment	Input of nitrogen & phosphorus
Other physical disturbance	Electromagnetic changes
Other physical disturbance	Litter
Other physical disturbance	Noise and visual disturbance
Other physical disturbance	Noise disturbance
Other physical disturbance	Visual disturbance
Physical damage	Habitat structure changes
Physical damage	Habitat structure changes - abrasion
Physical damage	Siltation (turbidity) changes
Physical loss	Habitat loss (to land)
Physical loss	Habitat transformation (by smothering or sealing)



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Norse Matrix Rows

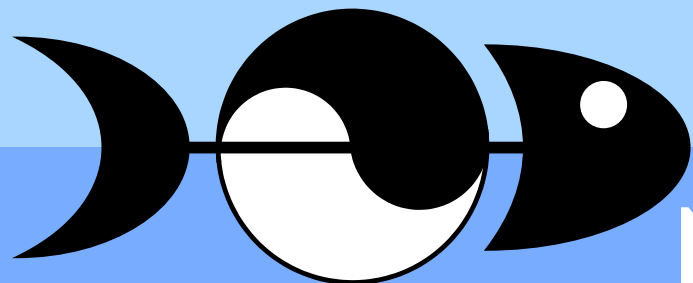
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Norse Matrix Rows

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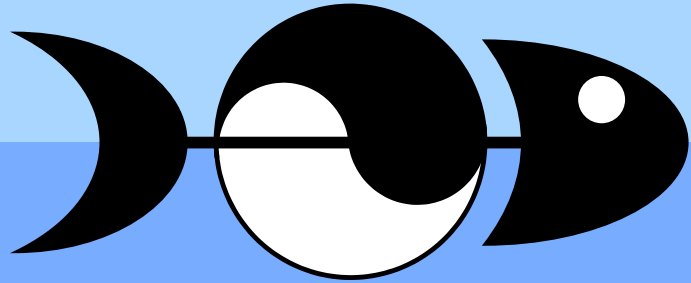
Norse Matrix Columns

Ecosystem Components

seafloor
watercolumn
protected habitats
special cases (areas/habitats)
phytoplankton
macroalgae
zooplankton
benthos
fish
mammals & reptiles
seabirds
other species of interest
non-indigenous & invasive

Socio-Economic Components

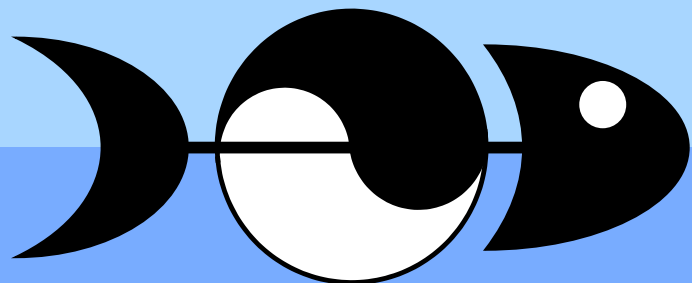
Catches measured in physical terms
Economic value of the catches
Employment and productivity



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'Norse Matrix'

	Things we care about Ecological components			Central Spine Fishery	Things we care about Socio-economic components		
	fish	benthos	habitats	NS Mixed flatfish beamtrawl	Catches measured in physical terms	Economic value of the catches	Employment and productivity
Things we do.							
Things we manage within a governance system.							



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Partners

UK	ULIV	<i>University of Liverpool</i>
Portugal	IPIMAR-INAP	<i>Instituto Nacional de Recursos Biologicos I.P. INRB</i>
Netherlands	IMARES	<i>Wageningen Institute for Marine Resources & Ecosystem Studies</i>
France	UBO	<i>Université de Bretagne Occidentale</i>
Ireland	MI	<i>Marine Institute</i>
Norway	UiT	<i>Universitetet i Tromsø</i>
UK	CEFAS	<i>The Secretary of State for Environment, Food and Rural Affairs</i>
Denmark	IFM-AAU	<i>Aalborg Universitet</i>
Portugal	IMAR/DOP	<i>IMAR - Instituto do Mar</i>
Spain	IEO	<i>Instituto Español de Oceanografía</i>