

Impact of the use of offshore wind and other marine renewables on European fisheries



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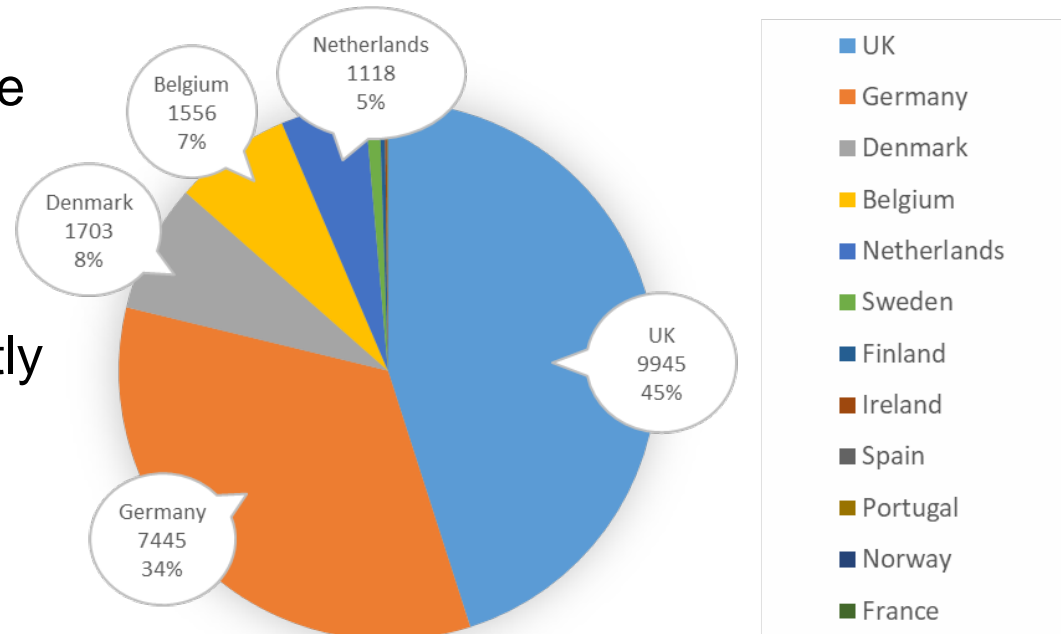
Outline

1. Conflict potential between European fisheries and renewable energies
2. Assessing the impact of the marine energy sector on fisheries
3. How to move on? Towards an integrated management of renewable energies and fisheries
4. Knowledge gaps and research needs to inform an integrated management
5. Policy recommendations to the European Parliament

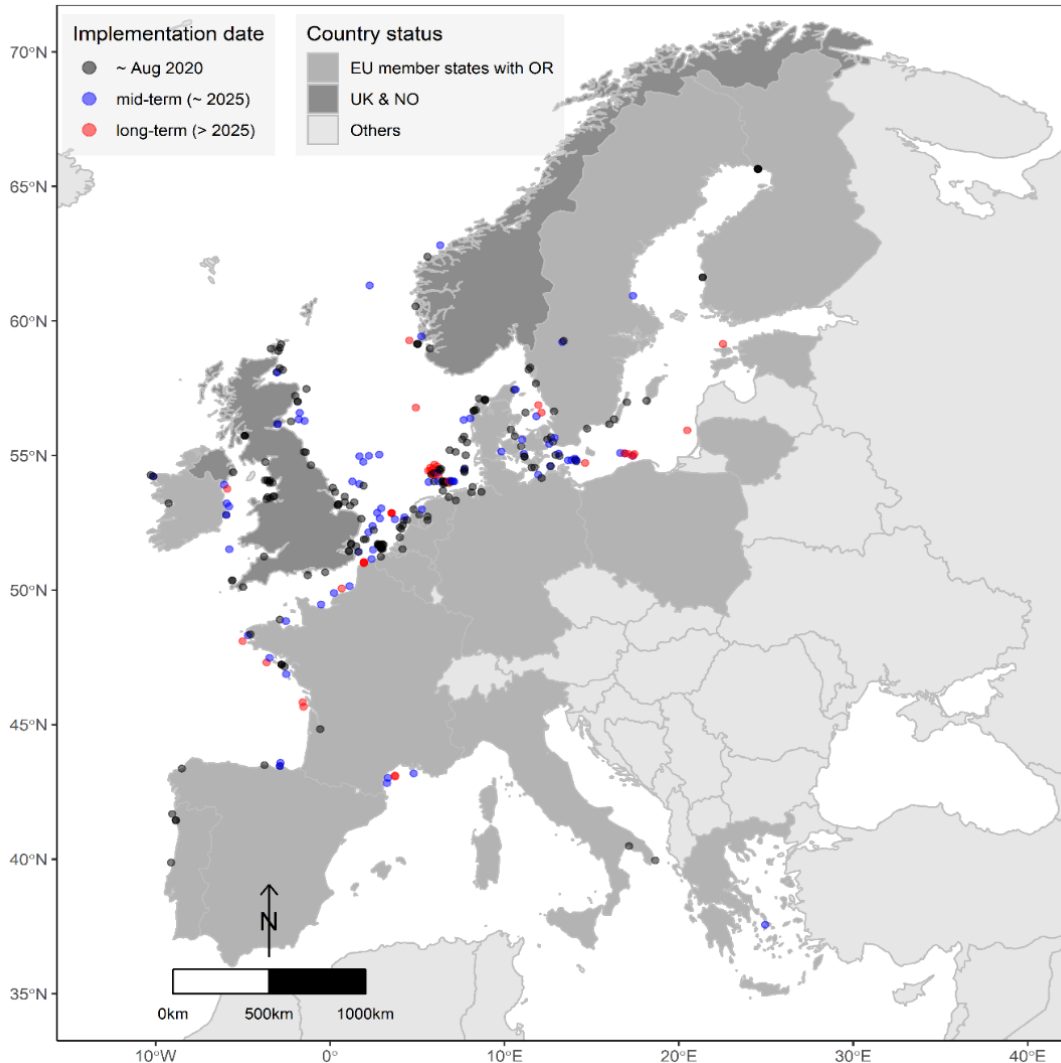
1. Conflict potential between European fisheries and renewable energies

Offshore renewables development

- Offshore renewables (OR) are a key pillar in the global transition to a carbon-free power sector
- OR development varies greatly across the European seas



Cumulative capacity (MW) of installed offshore wind power



- Spatial distribution of OR development:
 - Current
 - Mid-term (~2025)
 - Long-term (>2025)
- OR expansion is often regulated through Marine Spatial Planning (MSP) processes
- MSP allocates human activities in space and time according to planning objectives

General effects of OR development on fisheries



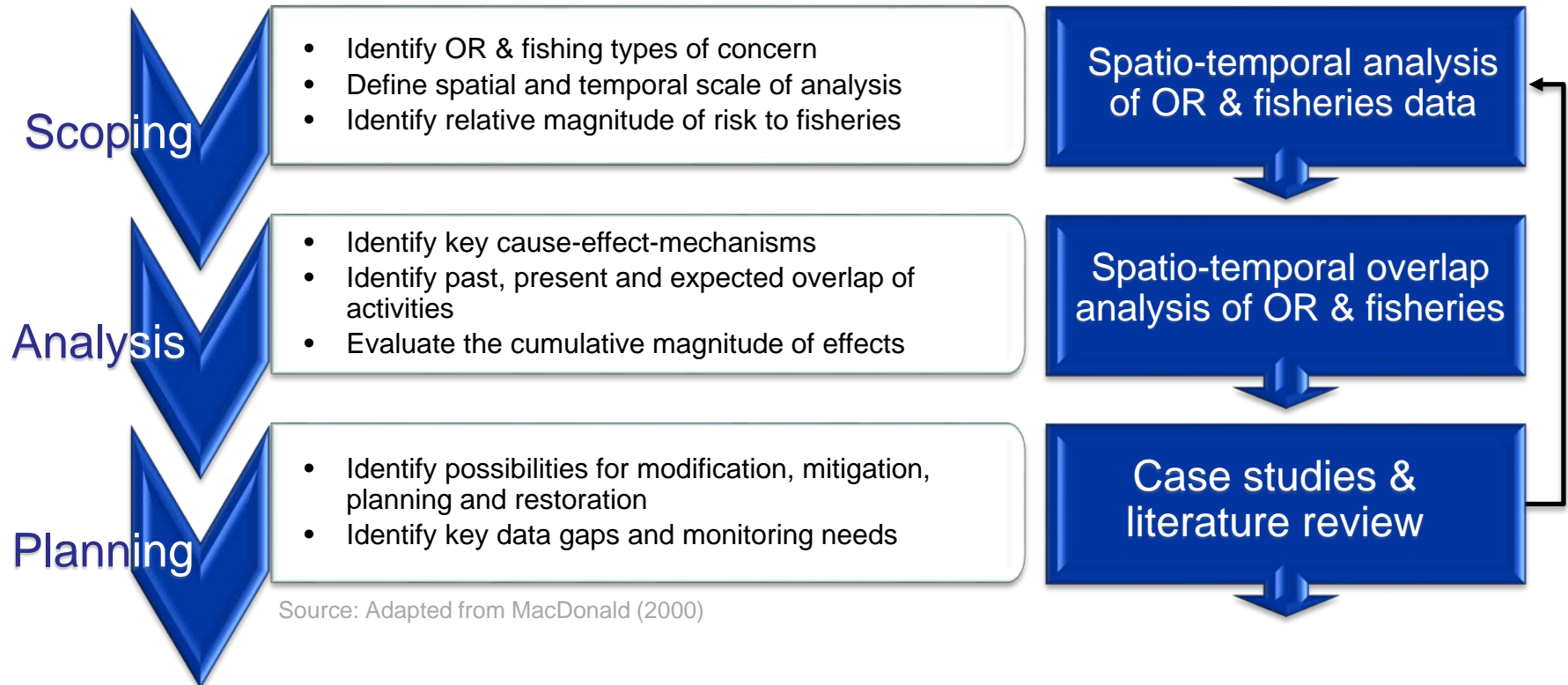
- Loss of fishing opportunities
- Economic losses
- Socio-cultural impacts on fishing communities



- Recovery of fisheries resources
- Fisheries benefits through restocking
- Availability of new resources
- Opportunities through synergies and/or co-location of sectors

- **Quantification of impact** of OR on fisheries requires an integrated (+/-) and transparent **assessment framework** as well as fit for purpose socio-economic and ecological **data**

Our assessment approach

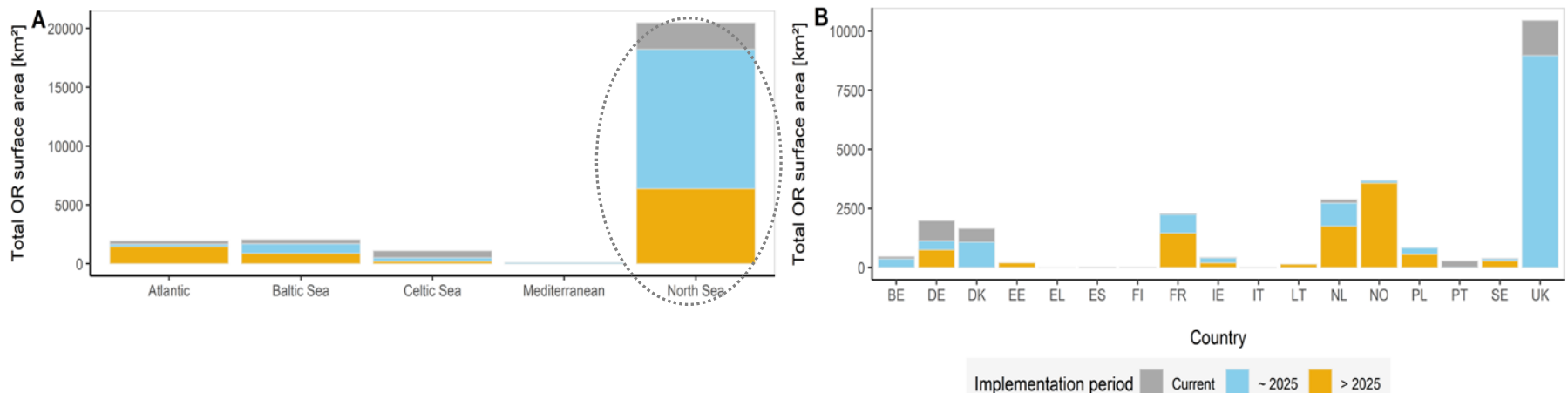


2. Assessing the impact of the marine energy sector on fisheries

DATA – OR in European sea basins

- Offshore **wind** energy
 - **Tidal** energy
 - **Wave** energy
 - Combined **wind and wave** energy
- } 4C Offshore (commercial) & EMODnet data (free available)

Spatio-temporal analysis of OR development



2. Assessing the impact of the marine energy sector on fisheries

DATA – Aquaculture and fishing activities in European sea basins

- Commercial aquaculture activities
 - Fisheries
 - Mediterranean, Black Sea and central-eastern Atlantic
 - Baltic and North Sea areas
 - German EEZ
- EMODnet
- Global fishing watch (GFW)
- OSPAR-HELCOM
- Vessel monitoring system (VMS)

Available data on fishing activities vary greatly in spatial and temporal resolutions

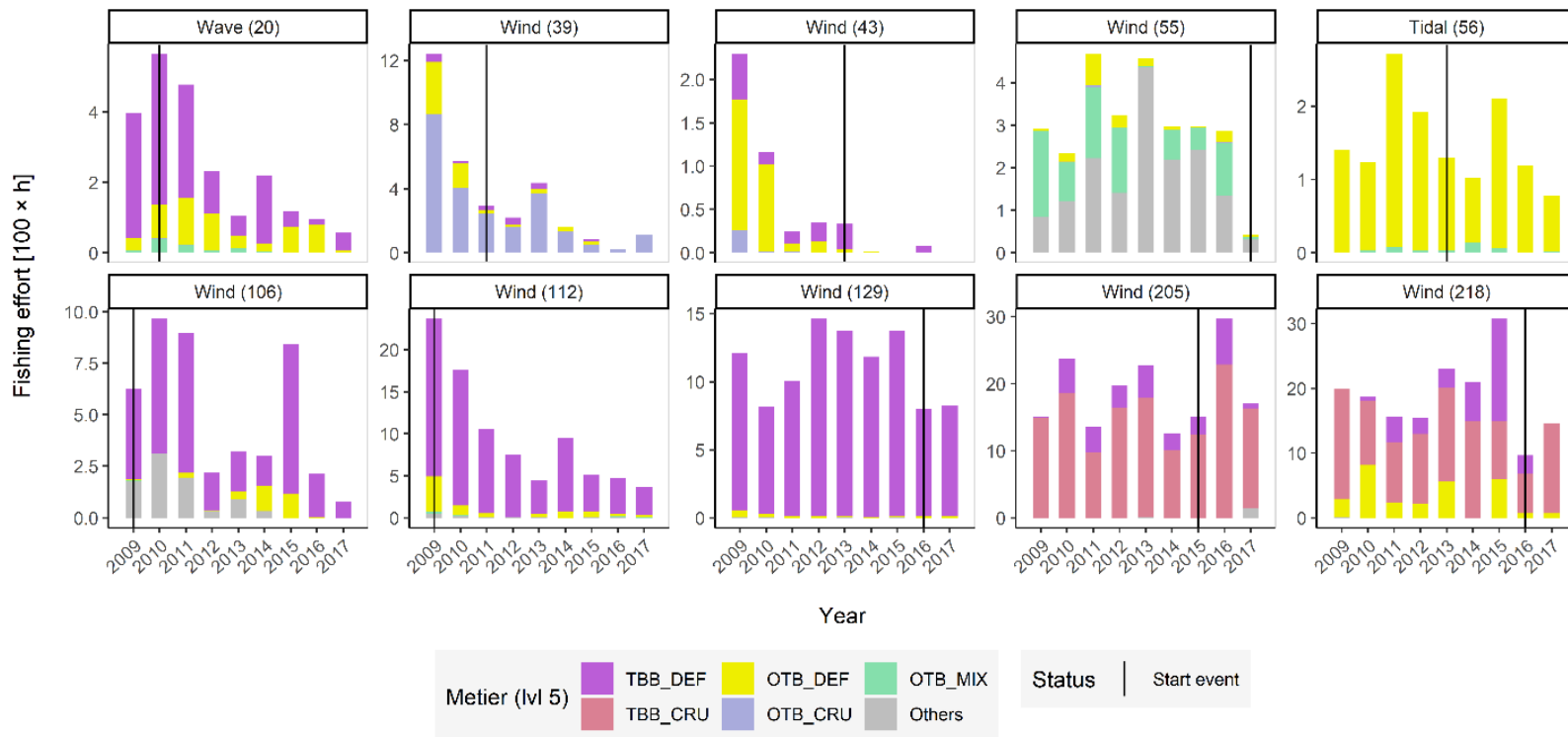
	Data source	Type of data	Grouping variables	Temporal scale	Spatial scale	Resolution		
Global	Global Fishing Watch (GFW)	Fishing effort [h]	Fishing gear	2012-18	Global	Daily; 0.01° × 0.01°	✓	
	Regional	OSPAR	Fishing effort of mobile bottom contacting gears [h]	Fishing metier level 5 (DCF)	2009-17	OSPAR region	Yearly; 0.05° × 0.05°	✓
		HELCOM	Fishing effort of mobile bottom contacting gears [h]	Fishing metier level 5 (DCF)	2009-16	HELCOM region	Yearly; 0.05° × 0.05°	✓
Small-scale	Vessel monitoring system (VMS)	Fishing effort of German vessels [h]	Fishing metier level 5 (DCF)	2012-19	German EEZ of the North Sea and Baltic Sea	Pings; 2 hrs frequency	✓	
	Data source	Type of data	Grouping variables	Temporal scale	Spatial scale	Resolution		
	Aquaculture	Aquaculture activities	Finfish and shellfish	NA	Global	Point data	✗	

Harmonised fishing fleet definitions at regional and local scales

Gear type	Target assemblage/species	Metier (level 5)
Beam trawl	Active fishing gear type Target species: Crustaceans, demersal fish, molluscs	TBB_CRU, TBB_DEF, TBB_MOL
Danish seine	Active fishing gear type Target species: Demersal fish, mainly European plaice (<i>Pleuronectes platessa</i>) and Atlantic cod (<i>Gadus morhua</i>)	SDN_DEF
Dredge	Active fishing gear type Target species: Scallops and mussels	DRB_MOL
Midwater otter trawl	Active fishing gear type Target species: Small pelagic fish	OTM_SPF
Otter trawl	Active fishing gear type Target species: Crustaceans, mainly Norway lobster (<i>Nephrops norvegicus</i>), demersal fish, and small pelagic fish, mainly European sprat (<i>Sprattus sprattus</i>) or sandeel (<i>Ammodytes</i>)	OTB_CRU, OTB_DEF, OTB_MIX_CRU_DEF, OTB_SPF
Pair trawl	Active fishing gear type Target species: Demersal fish	PTB_DEF
Pelagic pair trawl	Active fishing gear type Target species: Small pelagic fish	PTM_SPF
Scottish seine	Active fishing gear type Target species: Demersal fish, mainly Atlantic cod (<i>Gadus morhua</i>), Haddock (<i>Melanogrammus aeglefinus</i>), and flatfish species	SSC_DEF
Set gillnet	Passive fishing gear type Target species: Demersal fish	GNS_DEF

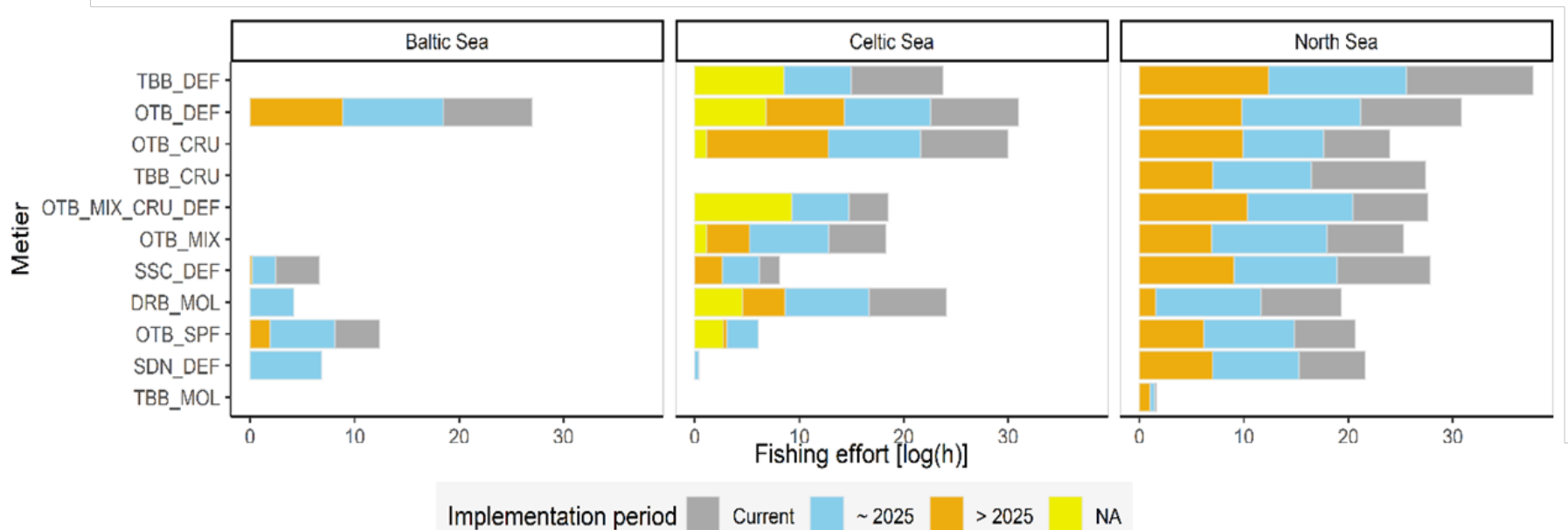
Spatio-temporal overlap analysis of OR development and European fishing activities

- **Absolute fishing effort at OR sites varied greatly between years as well as the composition of fleets affected**



Spatio-temporal overlap analysis of OR development and European fishing activities

- **Bottom contacting gears targeting demersal fish** are affected the most by OR development
- **Highest impact** across regions for **otter board** fleet targeting **cod and plaice**
- **Second highest** impact on **otter trawls** targeting **crustaceans** (e.g. Norway lobster)



Spatio-temporal overlap analysis of OR development and European fishing activities

Current (~ Aug 2020)

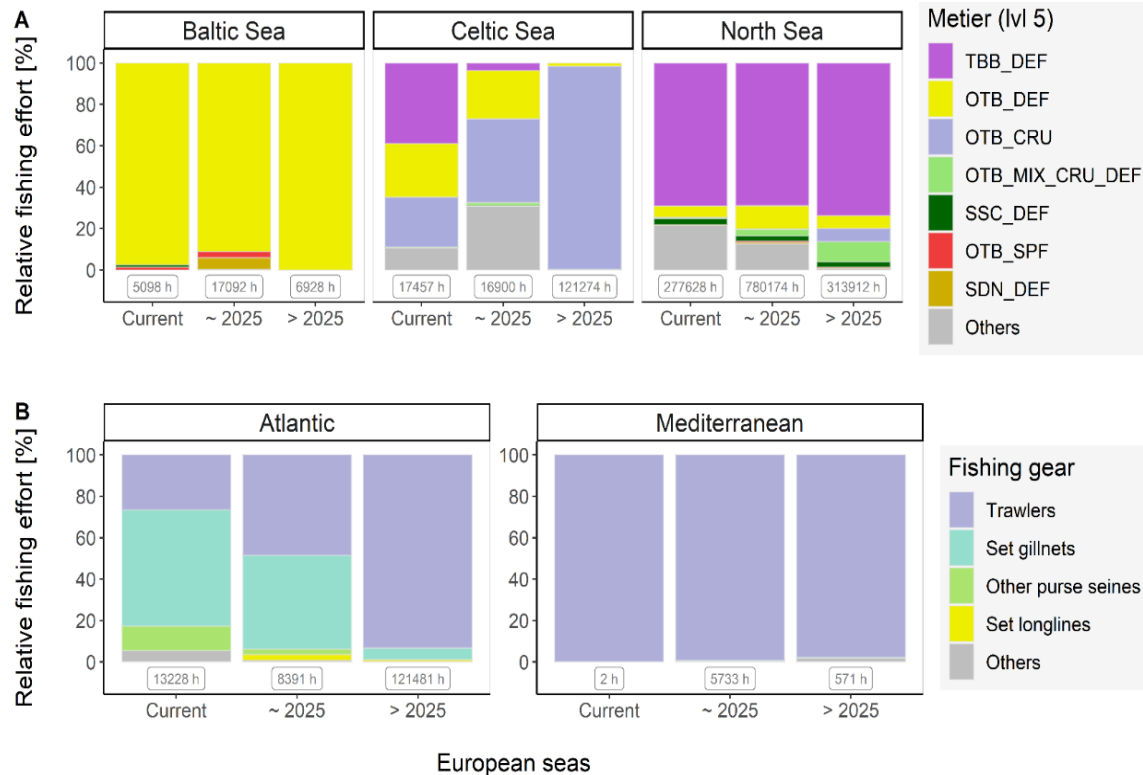
- Greatest **spatial overlap** (hours fished) in the **North Sea** region, followed by the **Celtic Sea**

Mid-term (~ 2025)

- Likely **increase of conflict potential** in the **North Sea**, **Baltic Sea** and **Mediterranean**

Long-term (> 2025)

- Likely **increase of conflict potential** in the **Atlantic** and **Celtic Sea** regions



3. How to move on?

Towards an integrated management of renewable energies and fisheries

Good practice case studies providing innovative conflict resolutions



- **UK and Denmark**

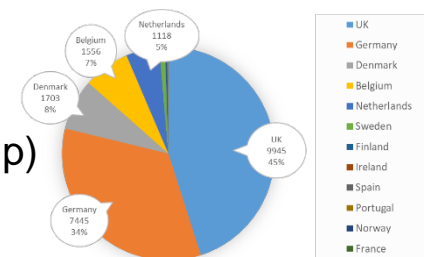
- Examples for **co-existence** (two activities exist at the same time and/or in the same place)
- Fisheries and offshore wind farms

- **Belgium**

- Example for **co-location** (at least two activities are actively managed together while sharing space at sea)
- Fisheries, aquaculture and offshore wind farms

- **Germany and the Netherlands**

- Examples for **co-operation** (two sectors benefit from their relationship)
- Fisheries and offshore wind farms



3. How to move on?

Towards an integrated management of renewable energies and fisheries

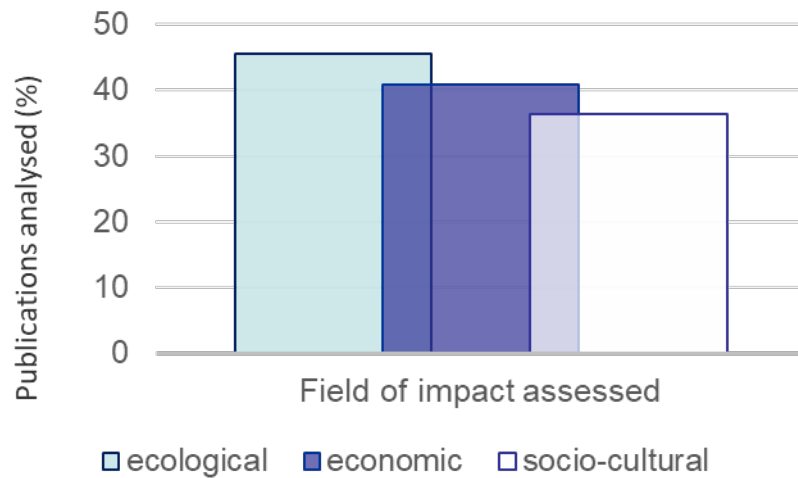
Identified conflict mitigation measures

1. **Early stakeholder** consultation
2. **Independent third parties** and the creation of **guidelines** can facilitate negotiation processes
3. **Compensation payments** can reduce the impact potential
4. **Co-design approaches** for the **co-location of OR** with other uses can reduce the impact potential on fisheries, strengthen the relationship of the sectors of concern and even enable **beneficial co-operation** between them
5. **Promotion of co-operation examples** allows for **mutual learning** and informs Marine Spatial Planning regarding acceptable **mitigation measures**

4. Knowledge gaps and research needs to inform an integrated management

Current knowledge on the impact of OR on fisheries

- Standardised **literature review**
- **Key-word** search and filtering led to **21 empirical studies**
- Review according to **defined criteria**



- **Current knowledge** on the impact of OR on fisheries is focused on **ecological and environmental** impacts
- Assessment of **economic and socio-cultural impacts are lacking** in recent empirical studies

Essentials for economic impact assessments

- **Economic impact assessments for fisheries** need to address
 - direct and indirect **costs** of the loss of **fishing opportunities**
 - the **socio-cultural effects** on the fishing sector, **local communities** and **economic activities onshore**

Need for data availability and monitoring strategies

- **Freely available data** on OR development sites and **standardised fishing effort data** with information on fishing gear, target assemblages and target species are a prerequisite to assess cumulative effects of OR development and a subsequent **economic impact analysis**
- **EU scale monitoring strategies** are needed to collect fit for purpose data to conclude on **integrated impact assessment** of offshore renewables on aquaculture and fisheries

5. Policy recommendations to the European Parliament

“Holistic assessment of the impacts of the expansion of marine energy on fisheries are hampered due to the lack of fit for purpose data”

R1: Standardised monitoring programmes and **harmonisation of fishing effort data** are needed to enable **cumulative** ecological and socio-economic environmental **impact assessment** of the expansion of marine energy

“Fisheries benefits of OR expansions are not well understood”

R2: More research is required to gain a comprehensive understanding of the **effects of OR on fisheries** and enable **guidance for Marine Spatial Planning** to plan with fisheries



5. Policy recommendations to the European Parliament

“Economic impact assessments of OR expansion need to address direct and indirect costs for the fishing sector as well as socio-cultural effects”

R3: Additional data are needed to unfold the **impacts of investments** in **renewable energy**, especially OWF, on the **fishing** sector, local **communities**, and economic **activities onshore**

“The regulation of co-location of human activities through MSP is still in its infancy”

R4: MSP processes should put **more emphasis** on the assessment of **co-location options**

R5: Best practice guidance for MSP on the implementation of mitigation measures to **ease conflict potential** between fisheries and OR development and to **promote co-operation** between sectors

Thank you!

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