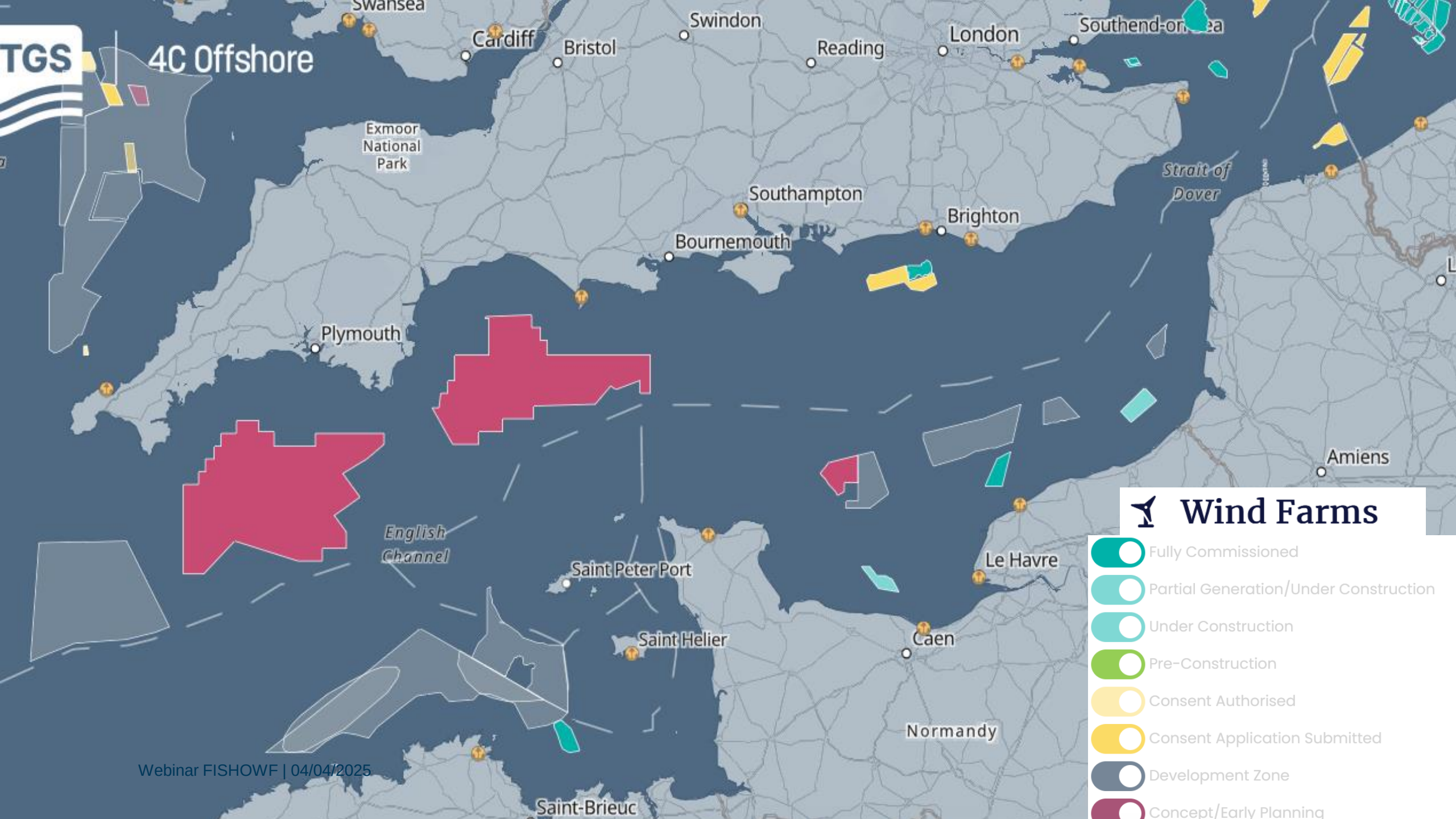
Acoustic telemetry to track fish movements at EU scale in a context of OWF development

Jan Reubens, VLIZ


TGS
4C Offshore
Swansea
Cardiff
Bristol
Swindon
Reading
London
Southend-on-Sea
Exmoor National Park
Strait of Dover
Southampton
Brighton
Bournemouth
Plymouth
Amiens
English Channel
Saint Peter Port
Le Havre
Saint Helier
Caen
Normandy
Saint-Brieuc
Wind Farms
Fully Commissioned
Partial Generation/Under Construction
Under Construction
Pre-Construction
Consent Authorised
Consent Application Submitted
Development Zone
Concept/Early Planning

Key facts

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23%

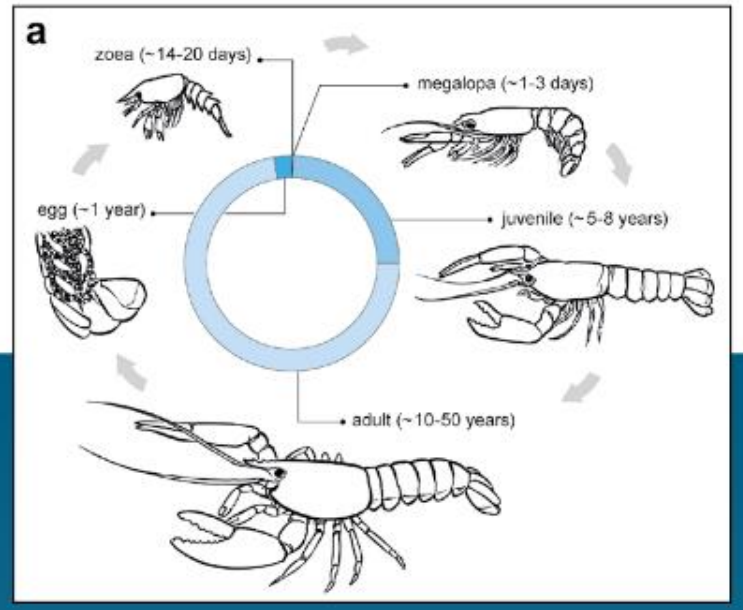
share of renewables in EU energy consumption 2022

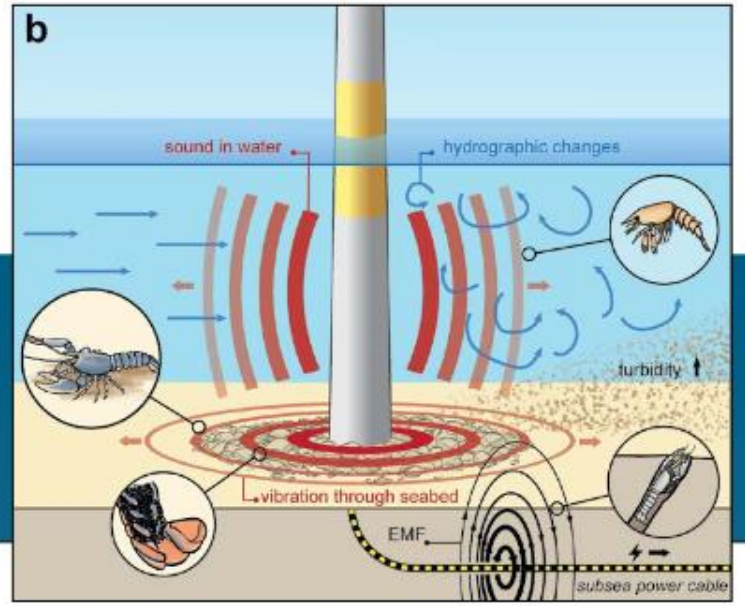
32%

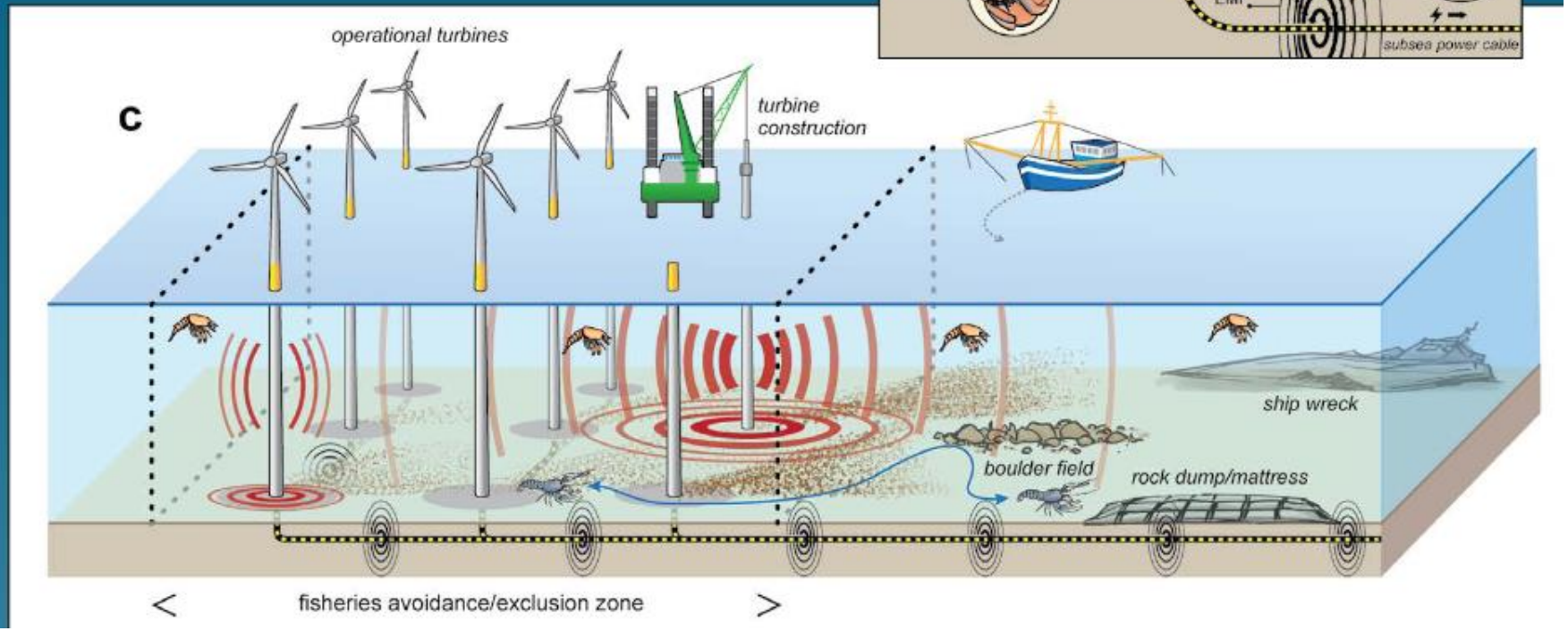
2030 target set in 2018

at least 42.5%

new binding target for 2030, but aiming for 45%

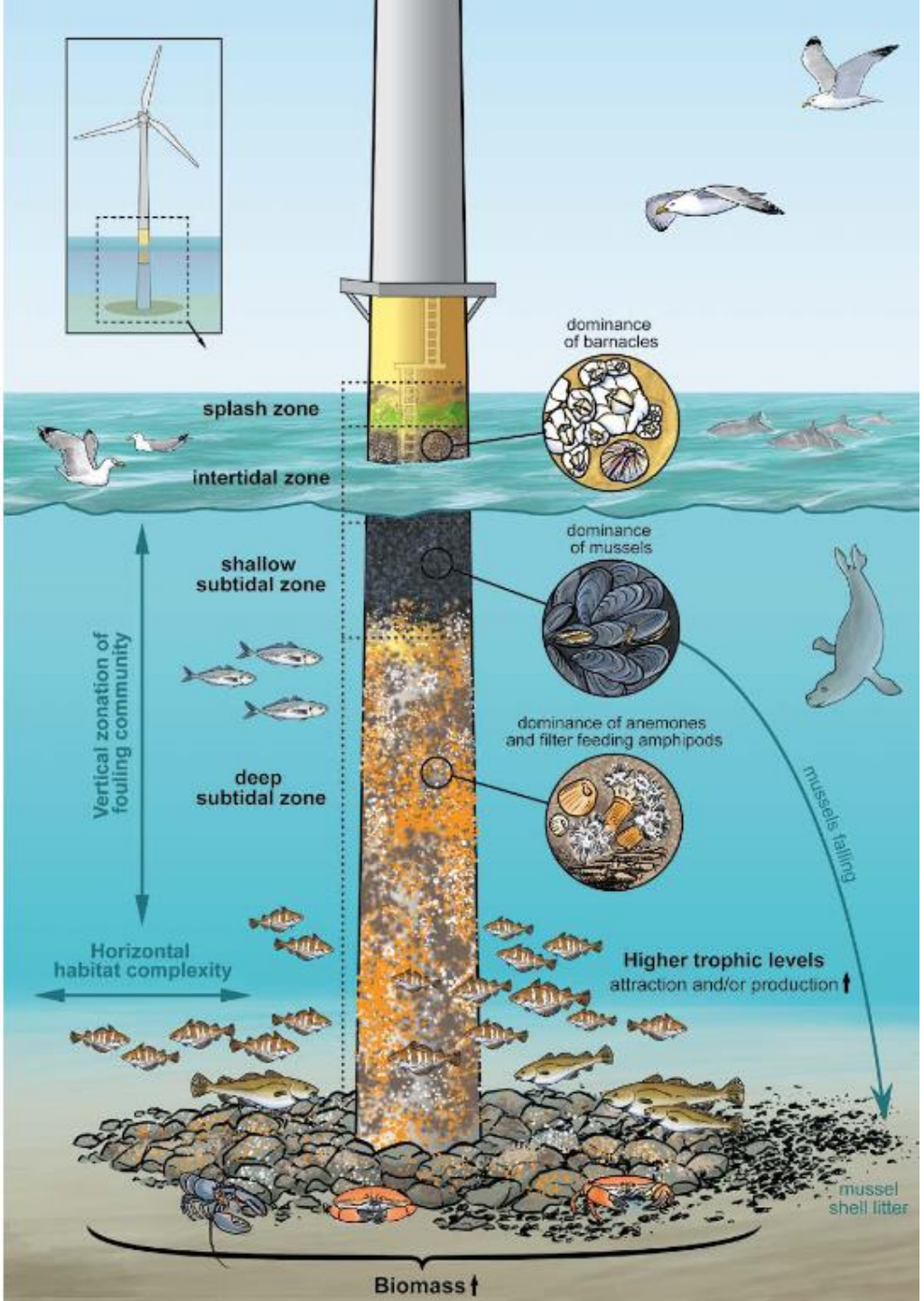






	Construction	Operation	Decommissioning
Artificial Reef Effect		X	(X)
Fisheries Exclusion Effect	X	X	(X)
Fisheries Displacement Effect	X	X	(X)
Energy Landscape Effects*	X	X	X

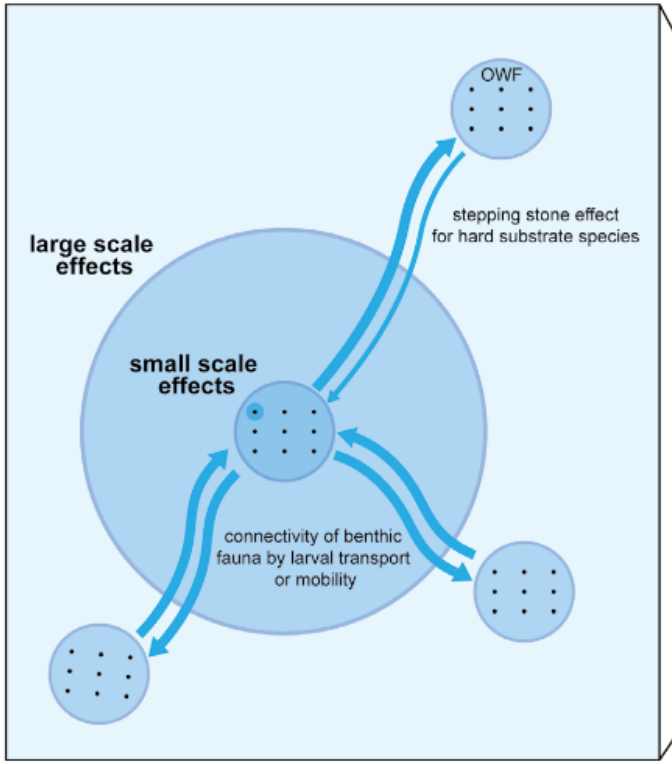
Gill et al. 2020. Setting the context for offshore wind development effects on fish and fisheries. Oceanography 33(4):118–127

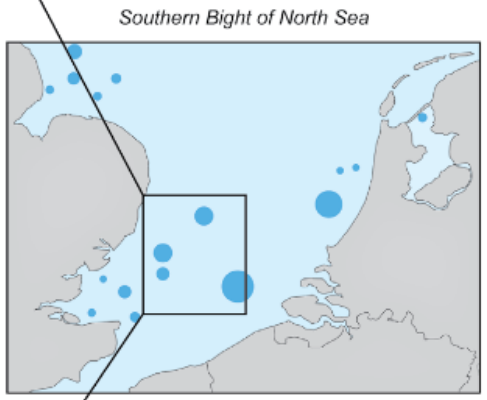


Pioneer stage
0-2 years

Intermediate stage
3-5 years

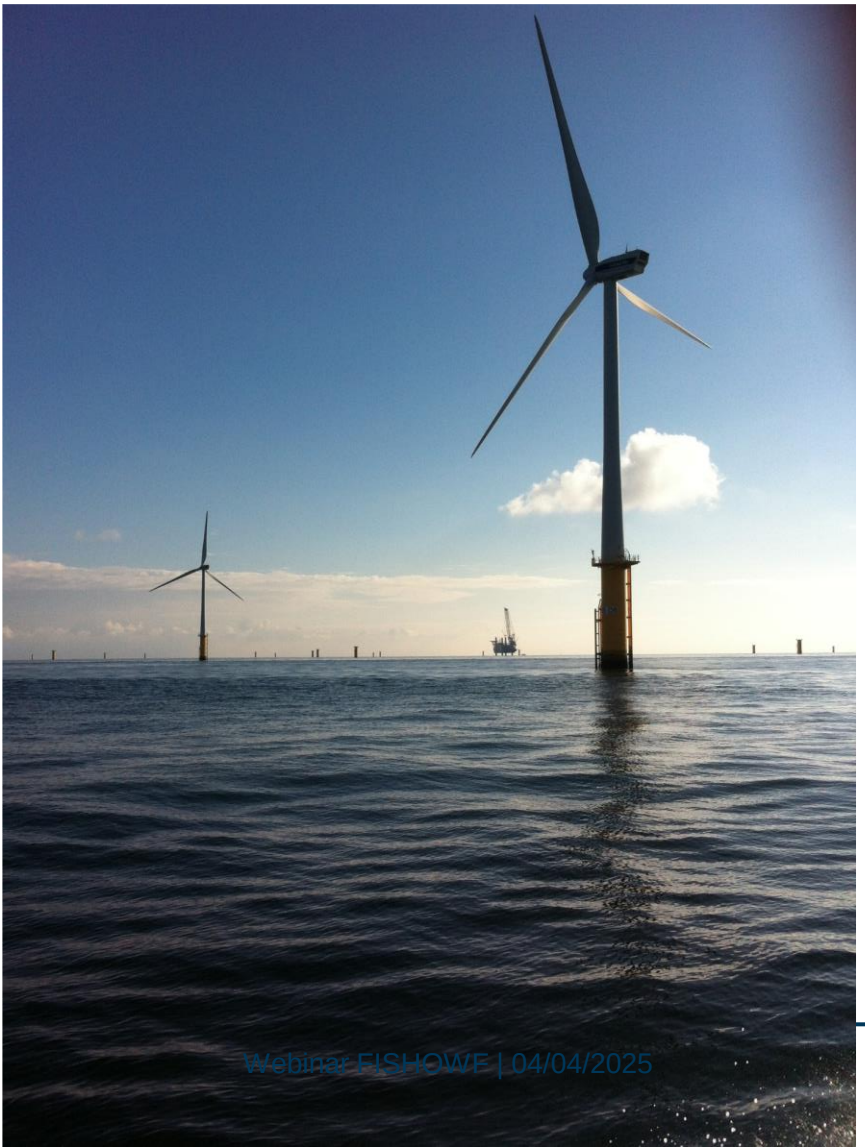
Climax stage
6+ years

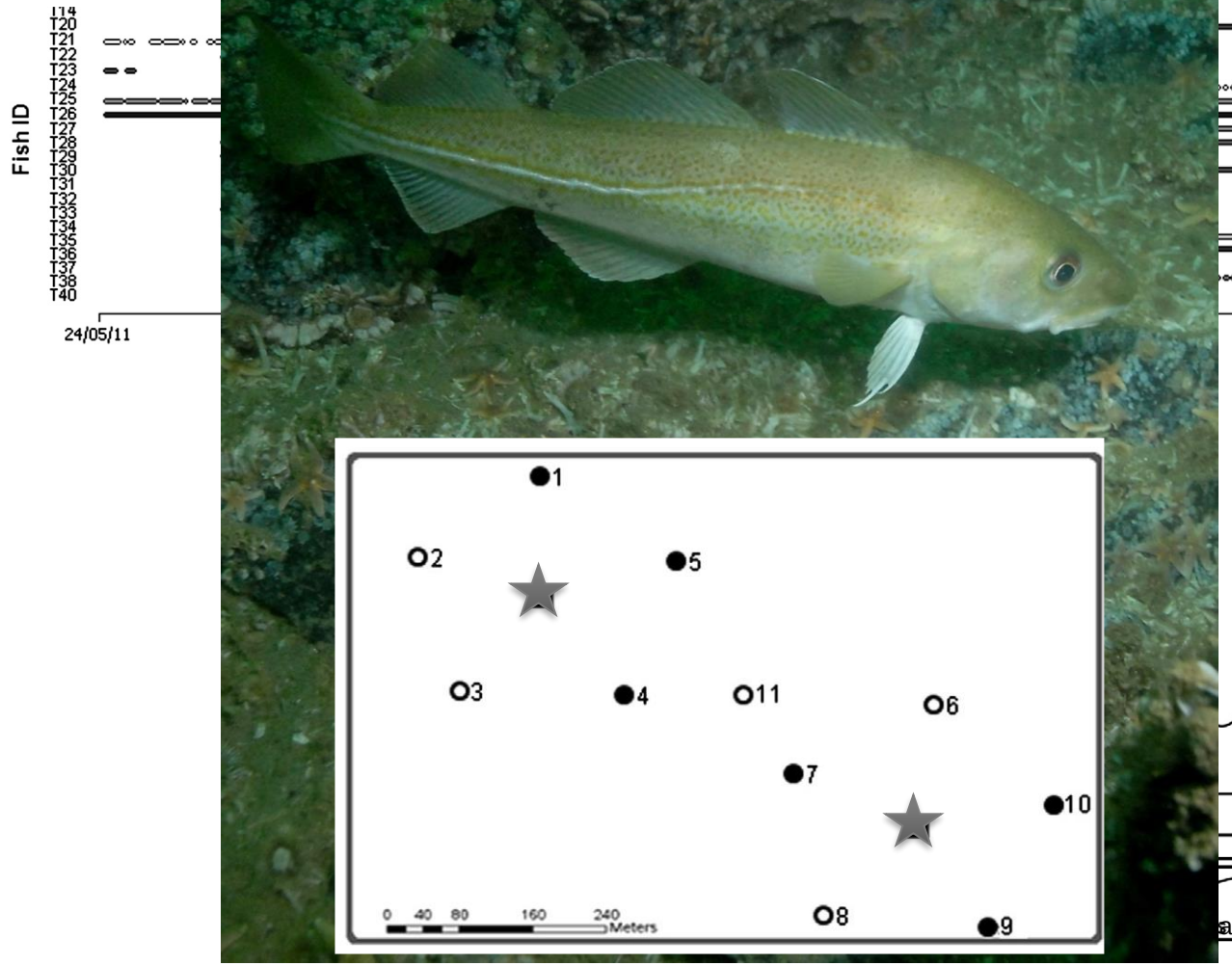




Degraer et al. 2020 Oceanography

Some background…





al. 2013, 2014

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Research

Cite this article: Berges BJP, Knaap Iv, van Keeken OA, Reubens J, Winter HV. 2024 Strong site fidelity, residency and local behaviour of Atlantic cod (*Gadus morhua*) at two types of

Strong site fidelity, residency and local behaviour of Atlantic cod (*Gadus morhua*) at two types of artificial reefs in an offshore wind farm

B. J. P. Berges[1], I. van der Knaap[2], O. A. van Keeken[1], J. Reubens[3] and H. V. Winter[1,4]

ICES Journal of Marine Science, 2023, **0**, 1–13
DOI: 10.1093/icesjms/fsad179
Original Article

European plaice movements show evidence of high residency, site fidelity, and feeding around hard substrates within an offshore wind farm

Jolien Buyse[1,*], Jan Reubens[2], Kris Hostens[1], Steven Degraer[3,4], Jolien Goossens[4], and Annelies De Backer[1]

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Effects of pile driving sound on local movement of free-ranging Atlantic cod in the Belgian North Sea☆

Inge van der Knaap[a,b,*], Hans Slabbekoorn[a], Tom Moens[b], Dries Van den Eynde[c], Jan Reubens[d]

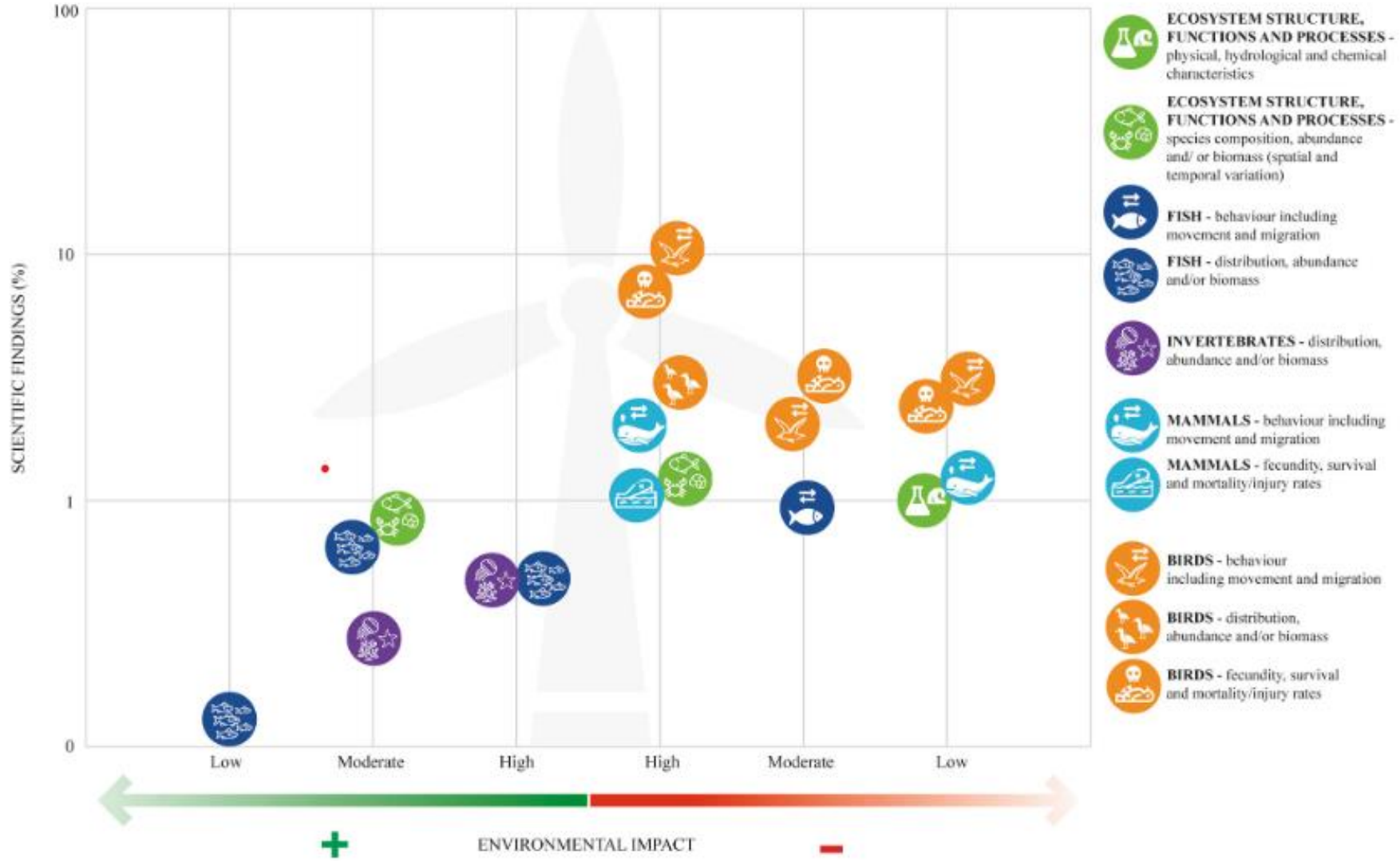
Current Biology

CellPress

Report

Effects of a seismic survey on movement of free-ranging Atlantic cod

Inge van der Knaap,[1,2,8,*] Jan Reubens,[3] Len Thomas,[4] Michael A. Ainslie,[5] Hendrik V. Winter,[7] Jeroen Hubert,[1] Bruce Martin,[5,6] and Hans Slabbekoorn[1]



Galparsoro et al 2022 Nature

Our mission is to track aquatic animals across Europe to better understand, protect and manage them

EU scale investigations


Kim Birnie-Gauvin - Communications Manager


Robert Lennox - Funding


Claudia Meneses - Data Management


Jan Reubens - Chair


David Villegas-Rios - Theoretical & Applied Research


David Abecasis - Theoretical & Applied Research


Josep Alós - Theoretical & Applied Research


Danielle Orrell - Integration & Embedding


Inge van der Knaap - Integration & Embedding


Pedro Afonso - Integration & Embedding


Kim Aarestrup - Infrastructure & Tech Development


Ross McGill - Infrastructure

EU scale investigations

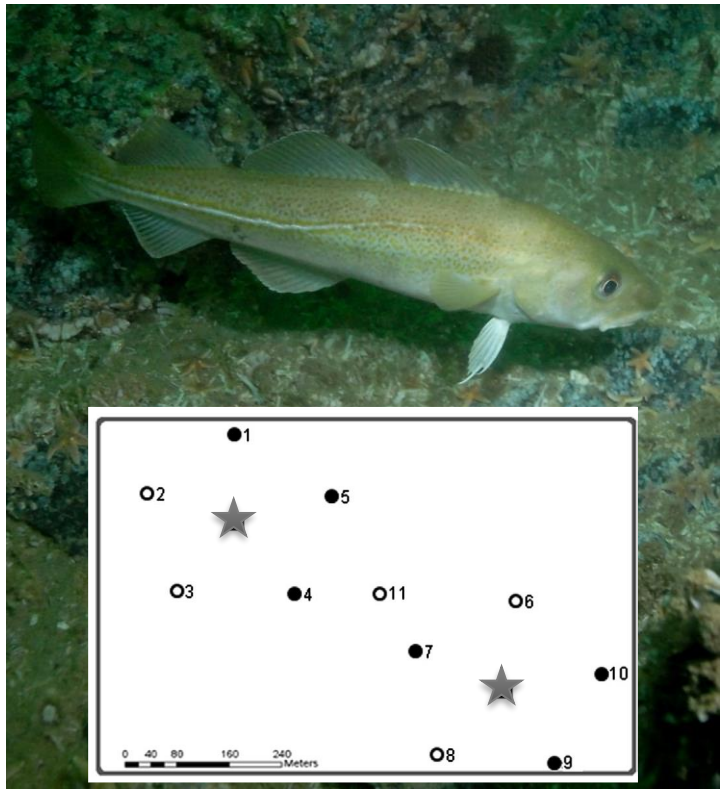
Main Objective

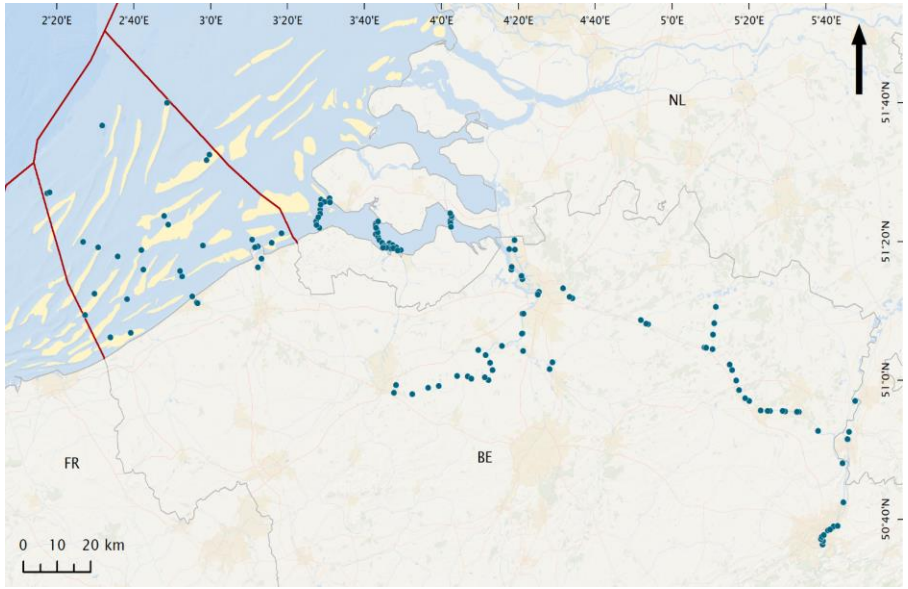
Development of a pan-European telemetry network to track aquatic animals across Europe to better understand, protect and manage them, in support of

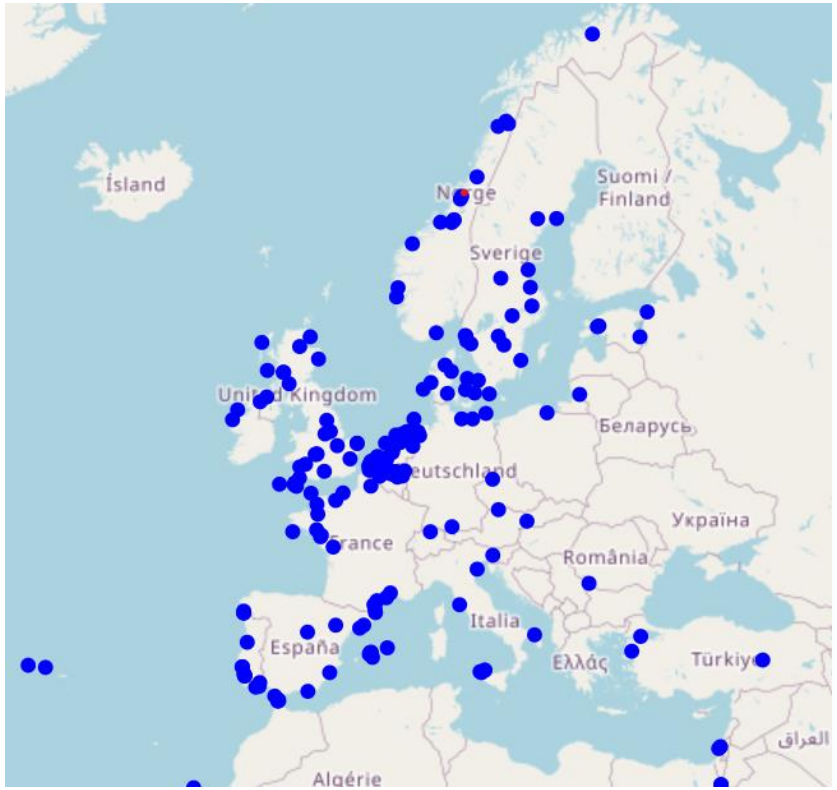
1) *European policy priorities and initiatives* in relation to biodiversity, nature conservation/restoration, food security and blue economy

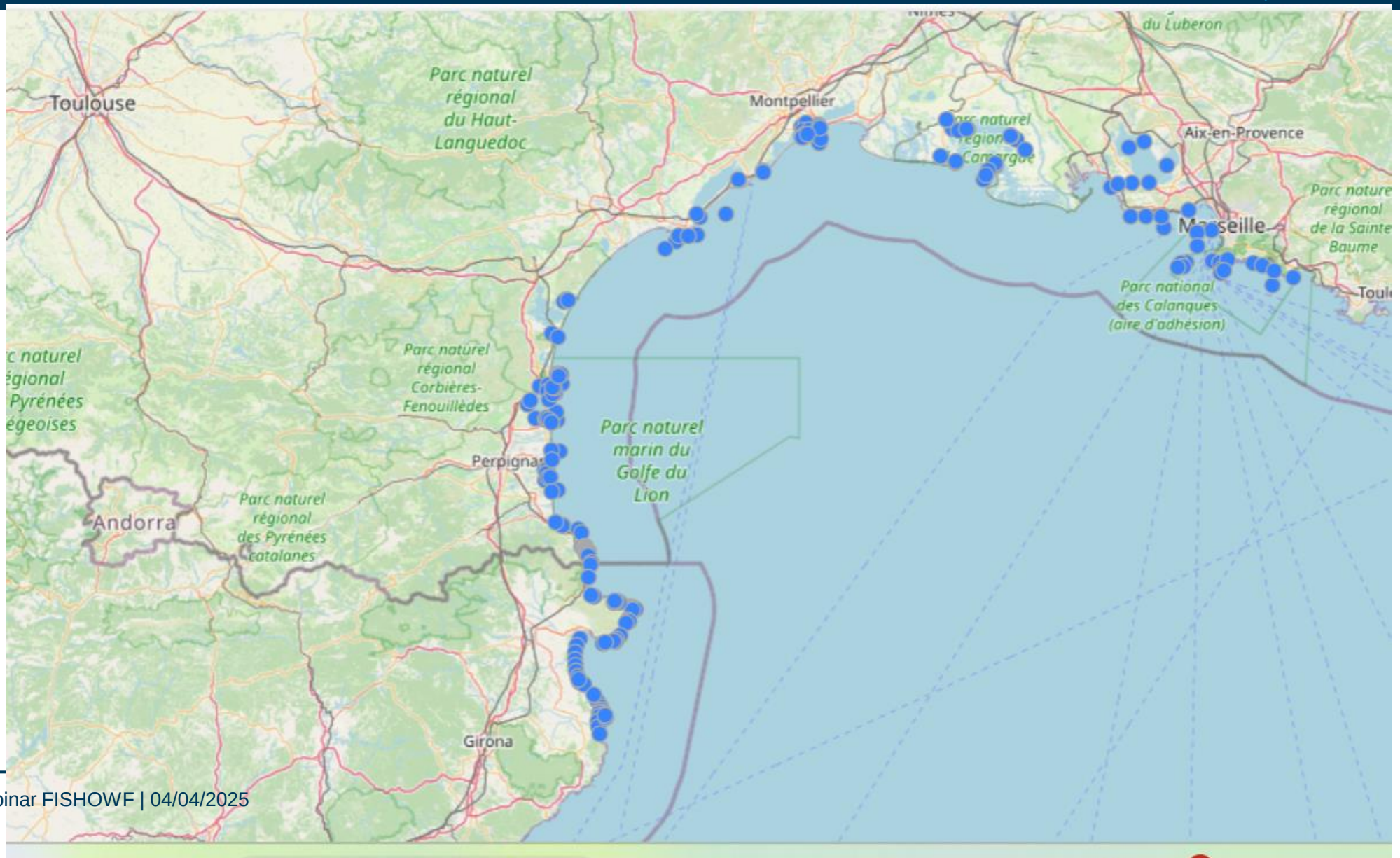
2) breakthrough science and cutting-edge technological innovation.

Evolution in monitoring networks








Toulouse
Montpellier
Aix-en-Provence
Marseille
Perpignan
Andorra
Girona
Parc naturel régional du Haut-Languedoc
Parc naturel régional Corbières-Fenouillèdes
Parc naturel marin du Golfe du Lion
Parc naturel régional des Pyrénées catalanes
Parc national des Calanques (aire d'adhésion)
Parc naturel régional de la Sainte Baume
du Luberon

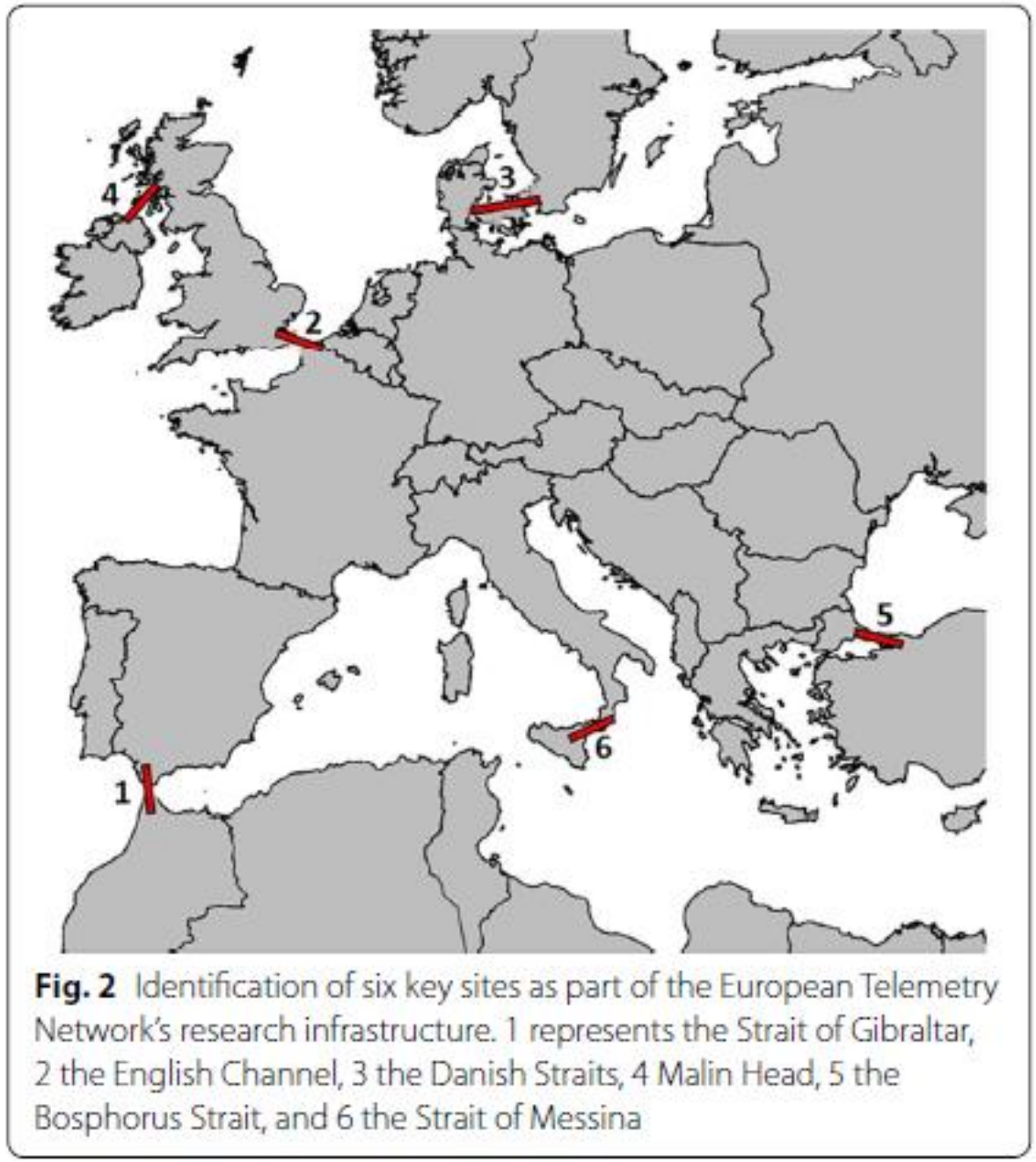
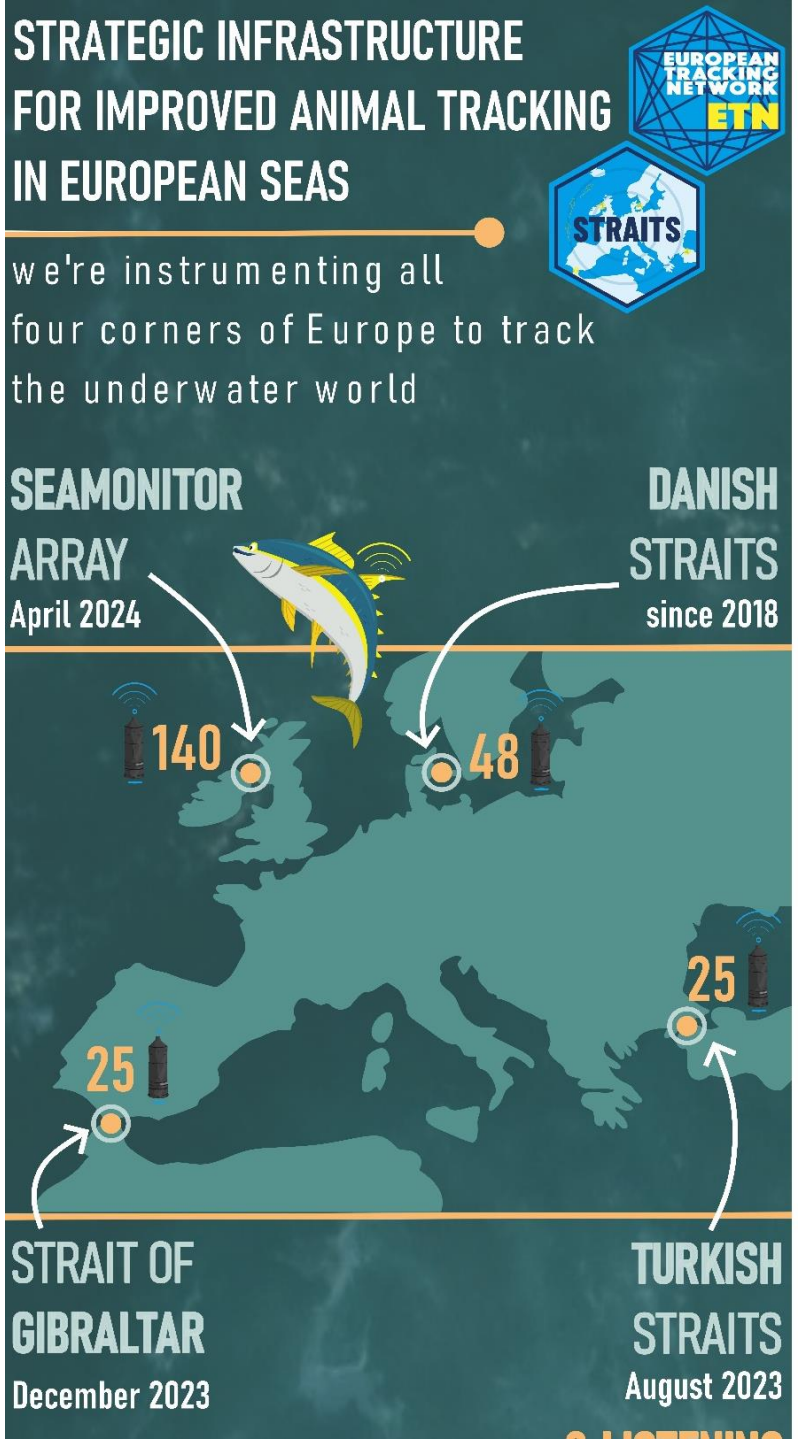
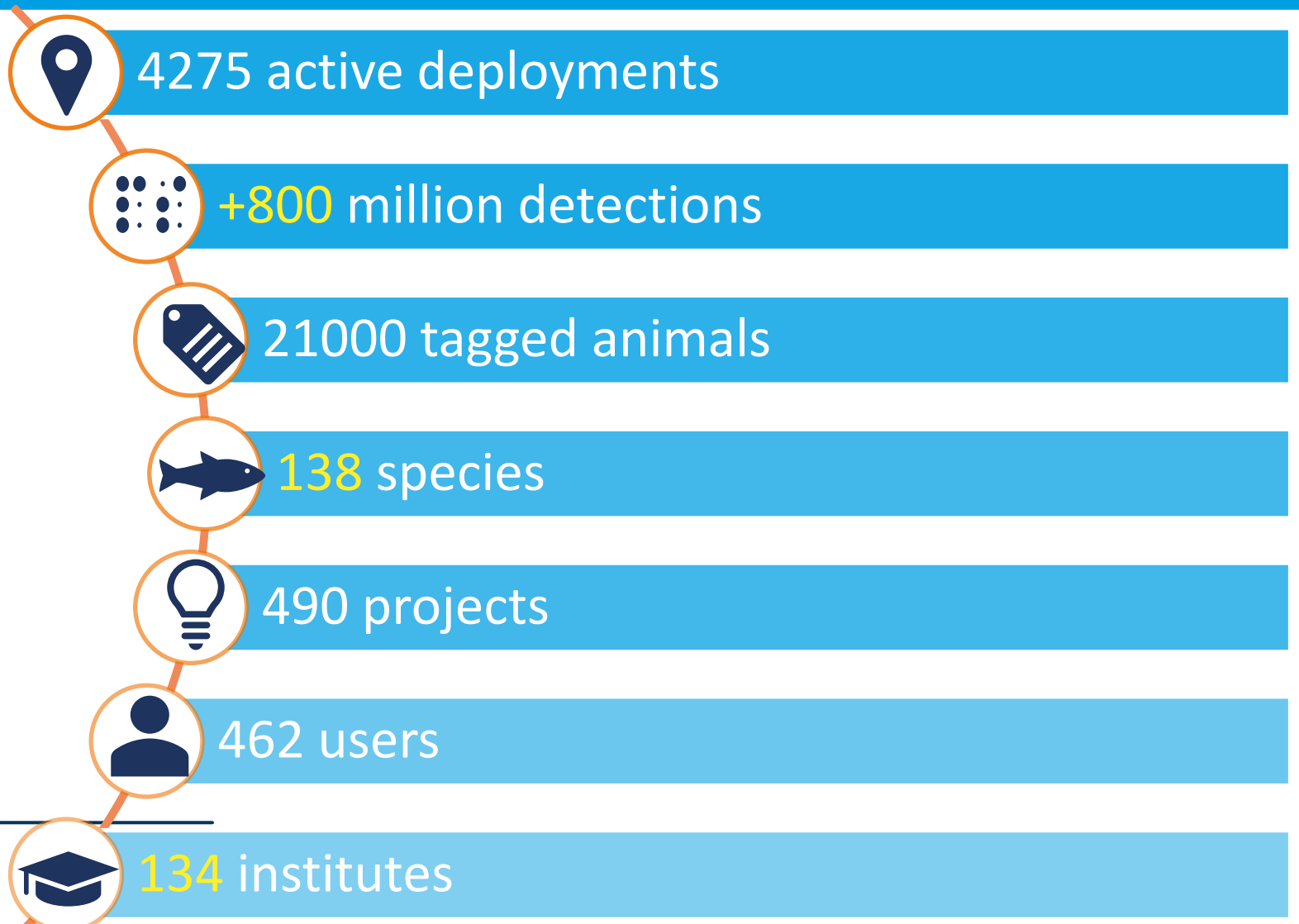


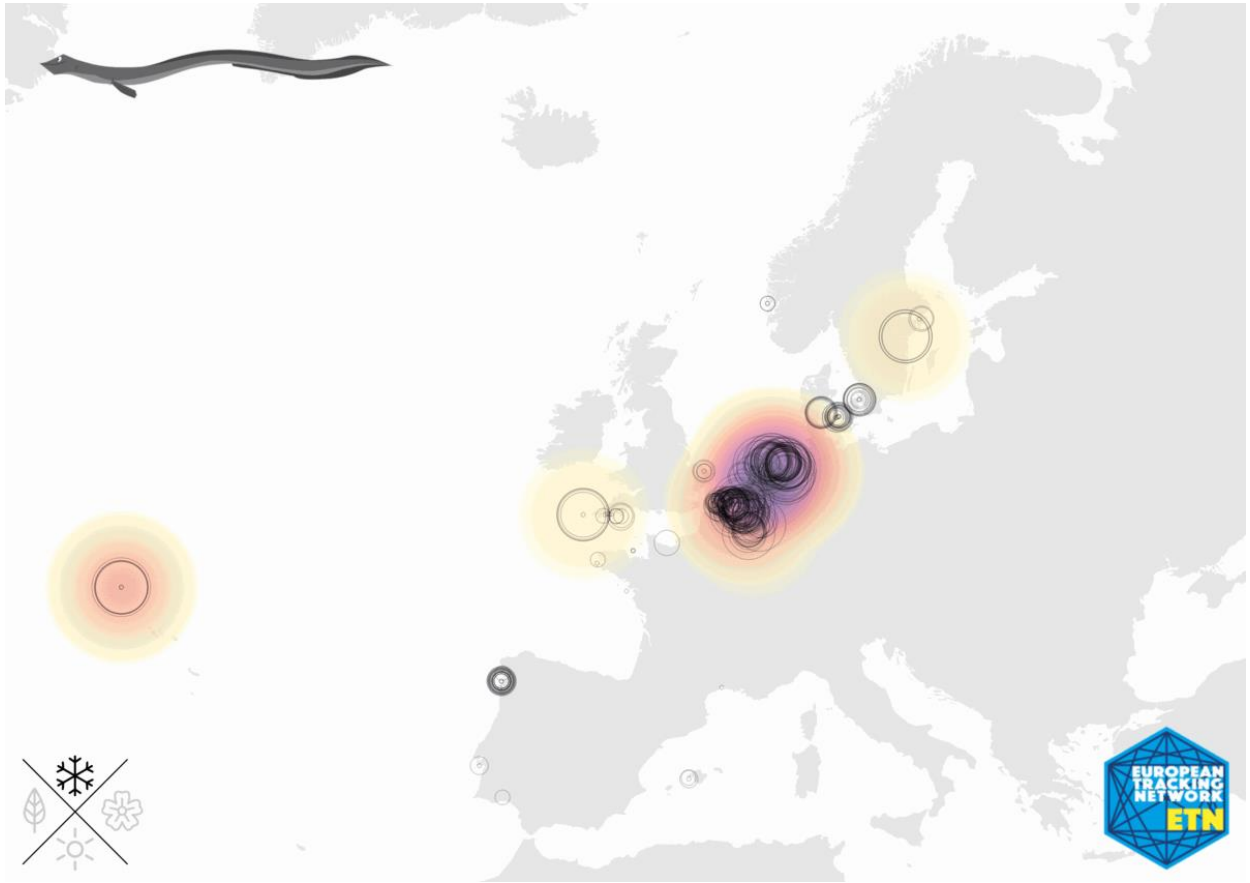
Fig. 2 Identification of six key sites as part of the European Telemetry Network's research infrastructure. 1 represents the Strait of Gibraltar, 2 the English Channel, 3 the Danish Straits, 4 Malin Head, 5 the Bosphorus Strait, and 6 the Strait of Messina

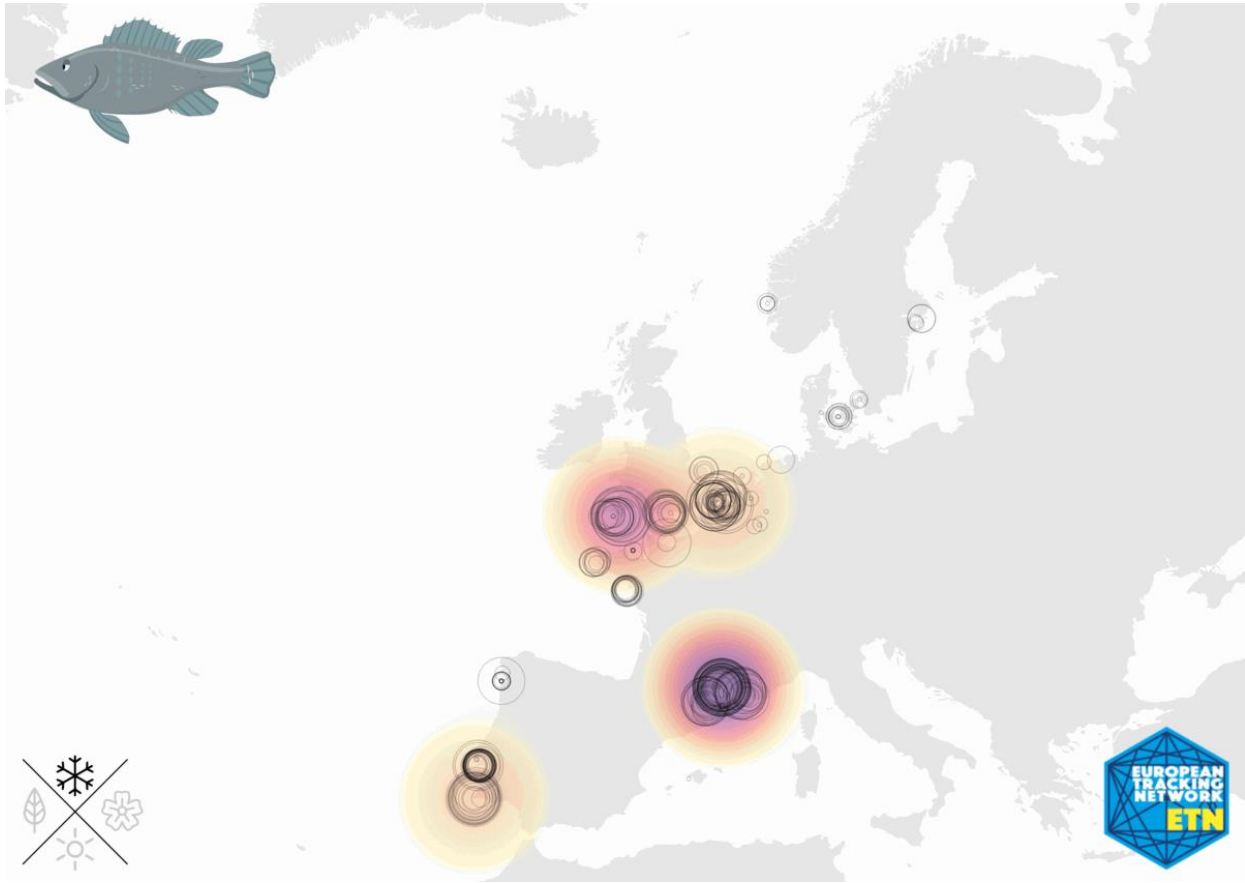
Abecasis et al. 2018



Some Statistics of ETN







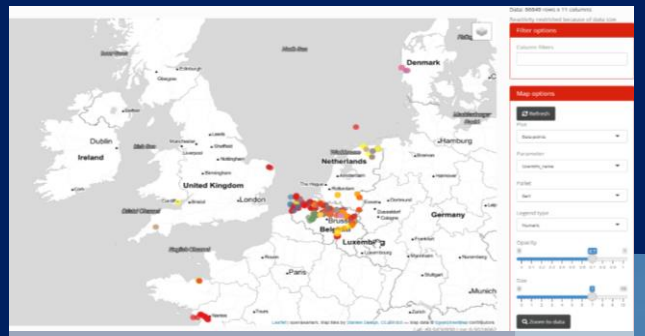
HOW DOES ETN WORK?

CREATE AN ETN PROJECT

DATA IMPORT

Into ETN platform
CSV Templates

DATA VISUALIZATION



LifeWatch data explorer

UPLOAD DATA & METADATA

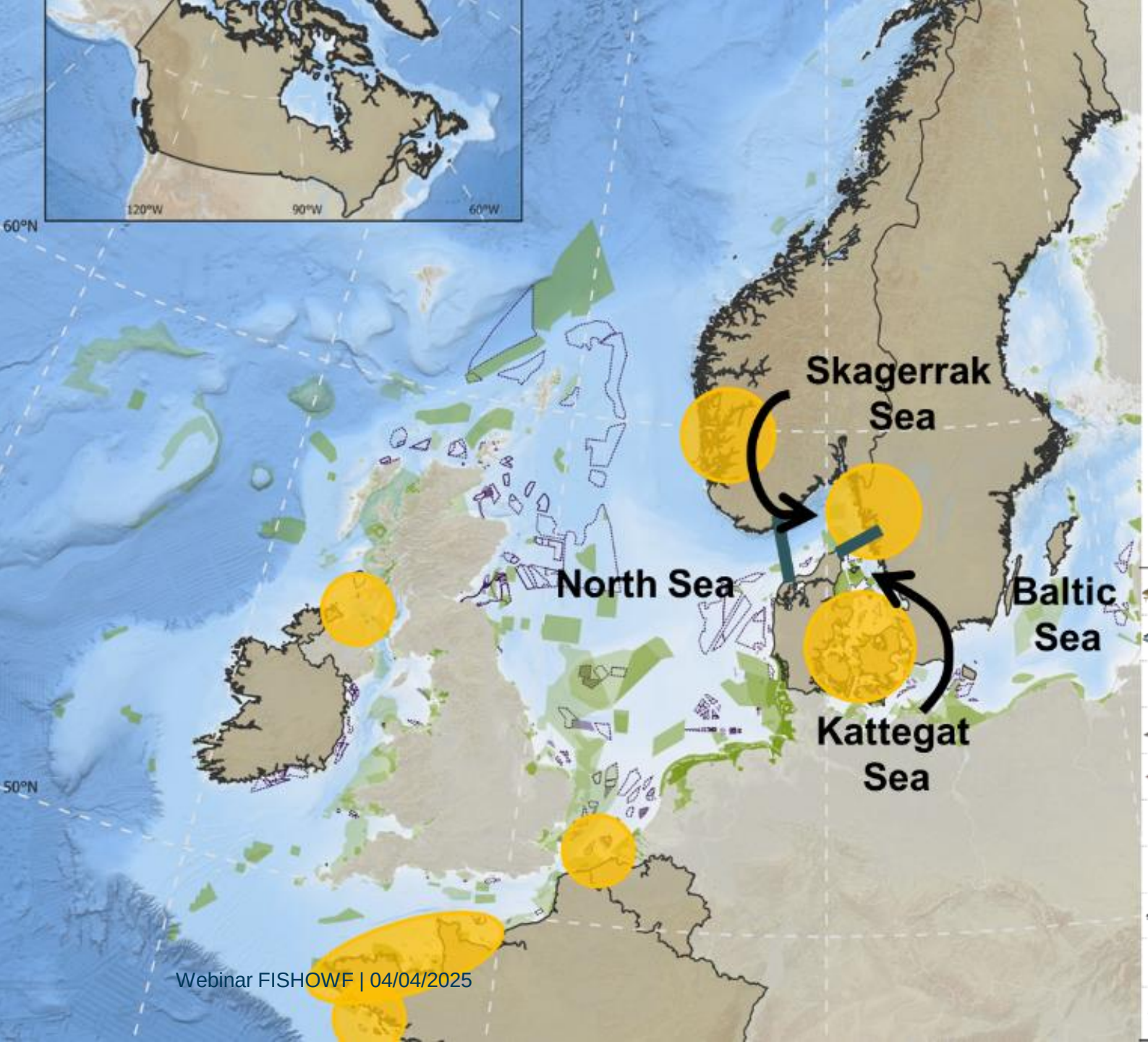
DATA STORAGE

Marine Data Archive

DATA ANALYSIS

Rstudio server

ETN R package



NorTrack

The Northeast Atlantic Marine Tracking Network
January 2024 – December 2026

	LA	DTU	SLU	NORCE	VLIZ	FEM	IFREMER
Atlantic cod		■	■	■	■		■
Mackerel		■		■			■
Thornback ray		■	■	■	■	■	
Starry smooth hound			■			■	
Spiny dogfish		■		■		■	
Twaite shad		■			■		
Seabass					■		■
Atlantic salmon	■	■		■			
European eel	■	■			■		
Porbeagle						■	

Making waves for biodiversity monitoring in the North

1. When and where are essential habitats & biodiversity hotspots in the NEA?
2. How are aquatic animals in the NEA responding to climate change?
3. How can animal movement data be adapted to stakeholder needs?

NorTrack

the Northeast Atlantic Marine Tracking Network

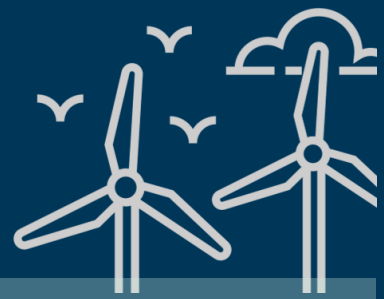
NorTrack – animal tagging WGs

Because you kinda need to have tags in the water...

Mapping mating/pupping areas for thornback rays in the North Sea

Comparative analysis of geolocation trajectories of atlantic cod across the North Sea

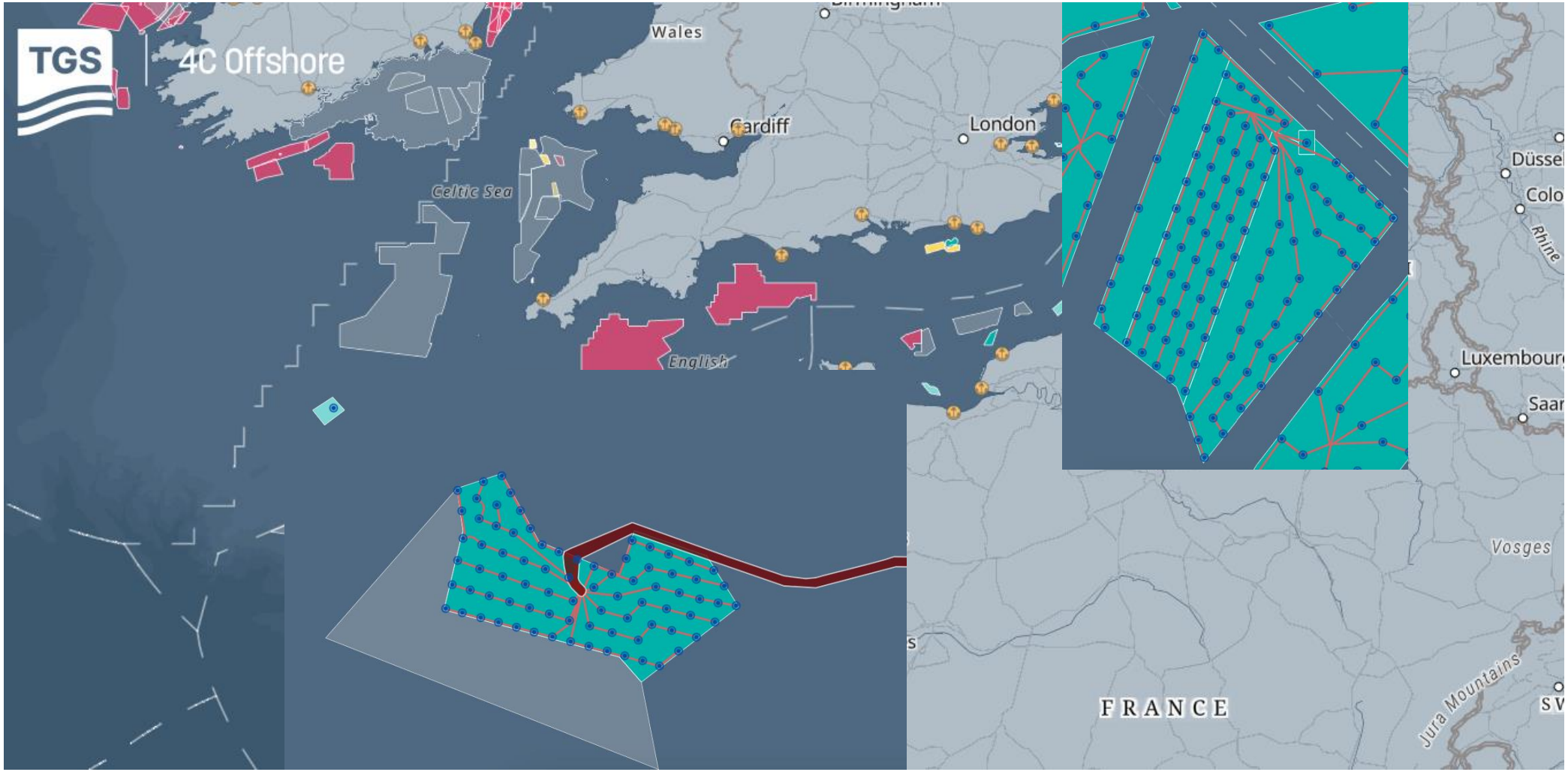
Comparative study on habitat use and niche overlap between starry smooth hound and spiny dogfish



Spatio-temporal presence and movement behaviour of NEA mackerel in the North Sea basin

Replicated analysis in offshore wind farms of shark/ray species exposure to electromagnetic fields

Collaborative studies

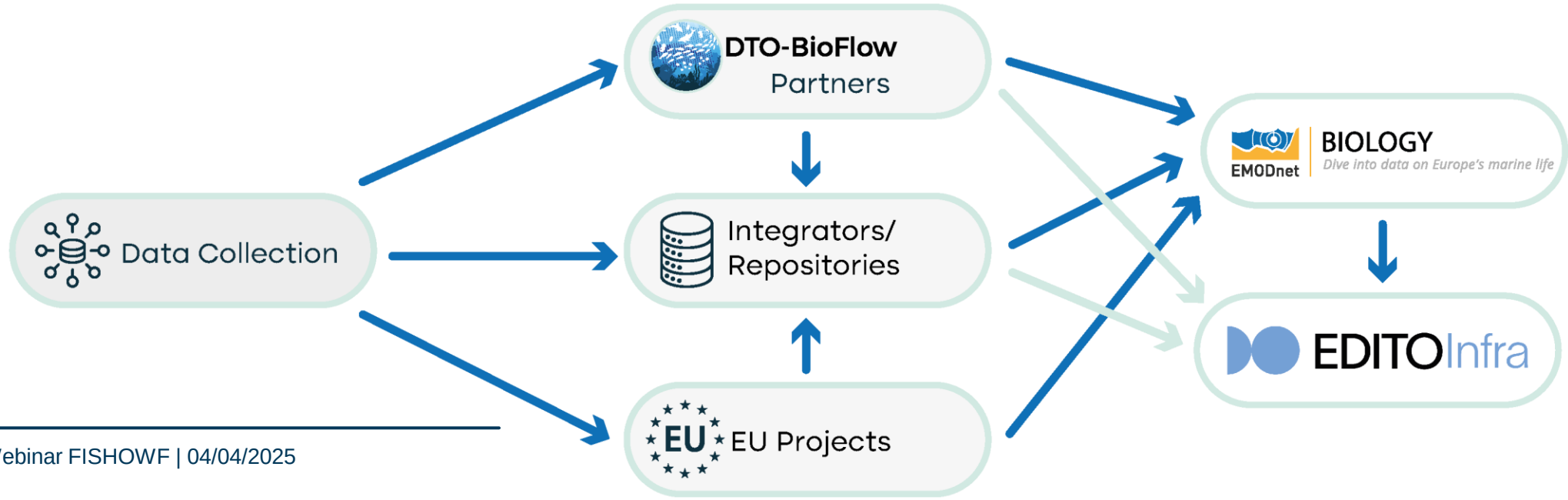



Socioecology
Marine Species ecosystems
Biogeochemistry
Physics
EDITO
DATA LAKE
ENGINE
AI
EMODnet

DTO-BioFlow

Integration of biodiversity monitoring data into the Digital Twin Ocean

GENERAL

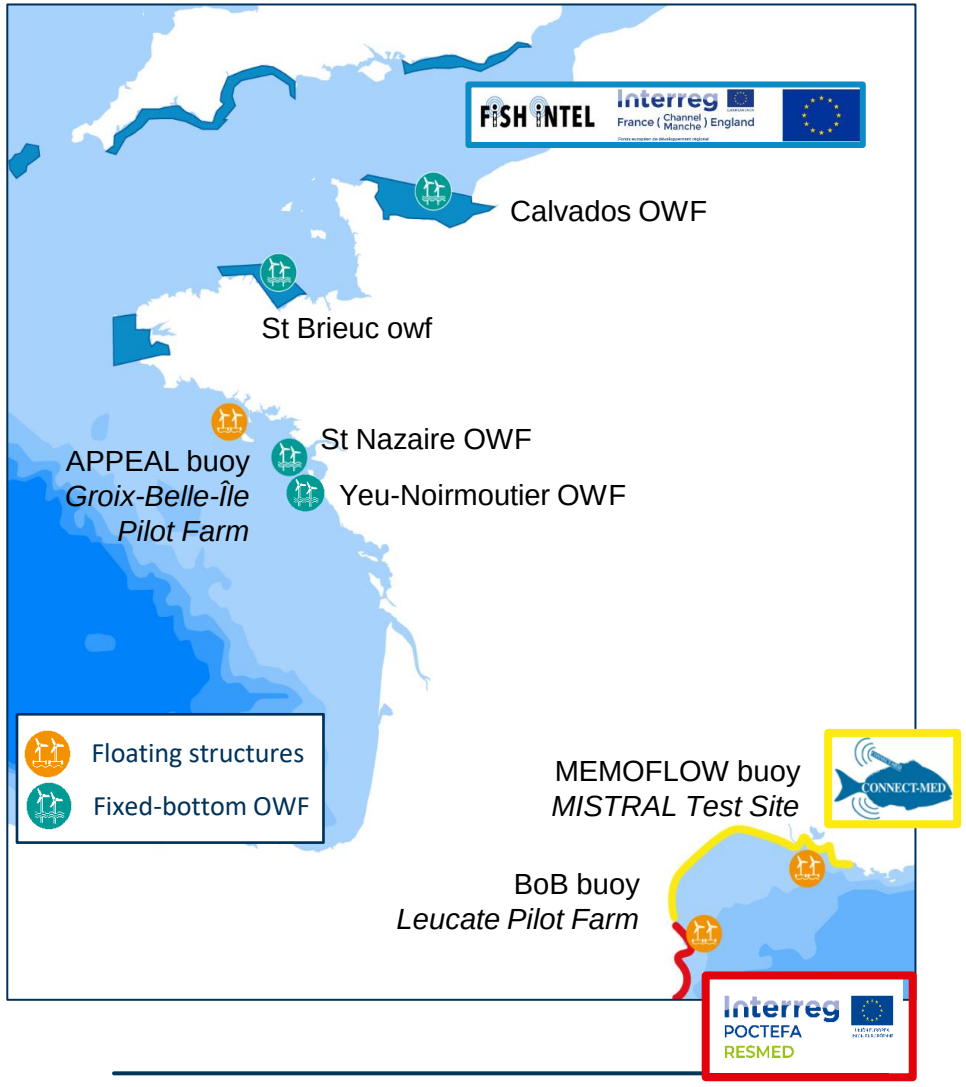


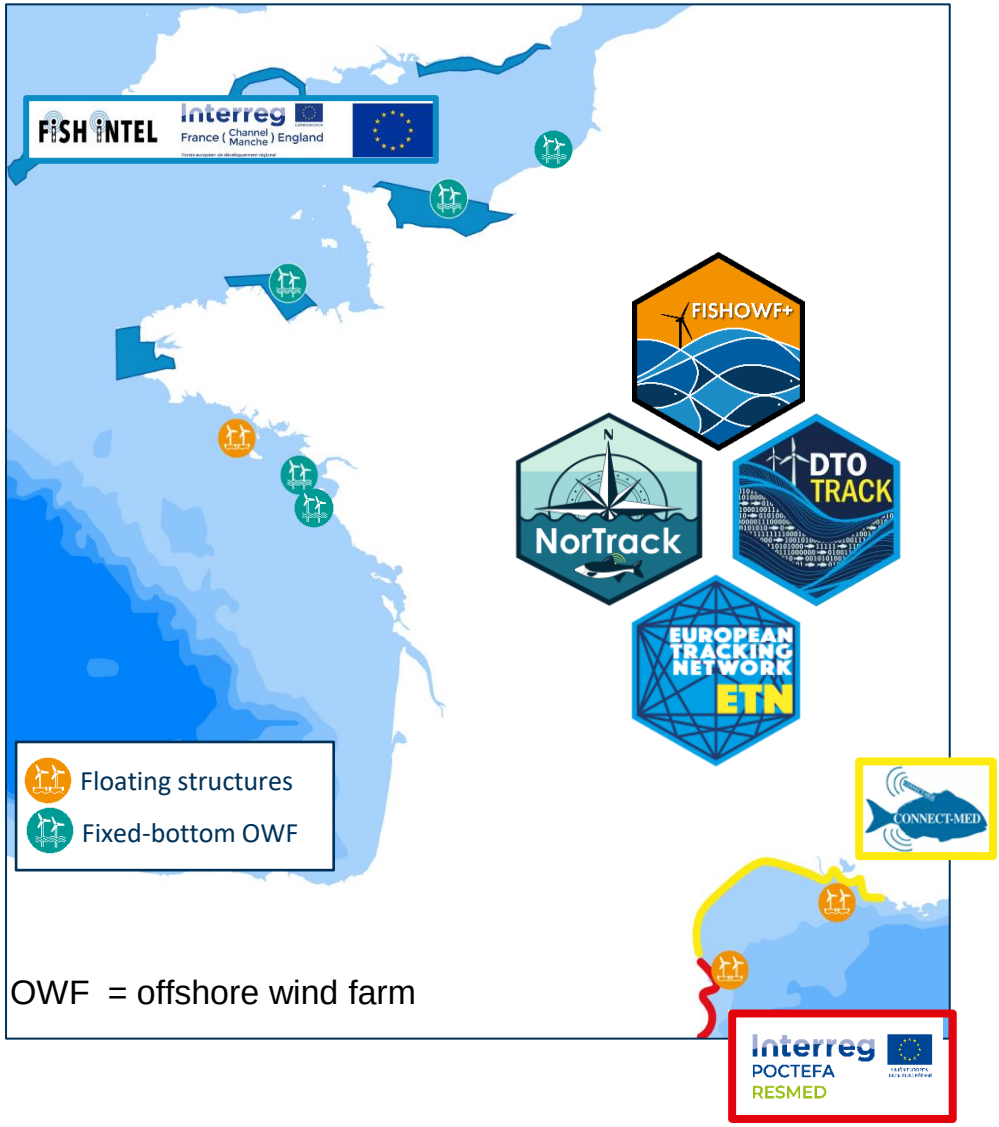
Digital Twin of the Ocean
ANIMAL TRACKING

1. Coordinate tracking efforts for highly migratory species to understand drivers of inter-basin movements in the North Sea;
2. Map the movements of species & ocean developments (e.g., oil rigs, wind farms, fish farms) in the North Sea;
3. Develop tools & methods to operationalize animal movement in the North Sea as a digital twin.

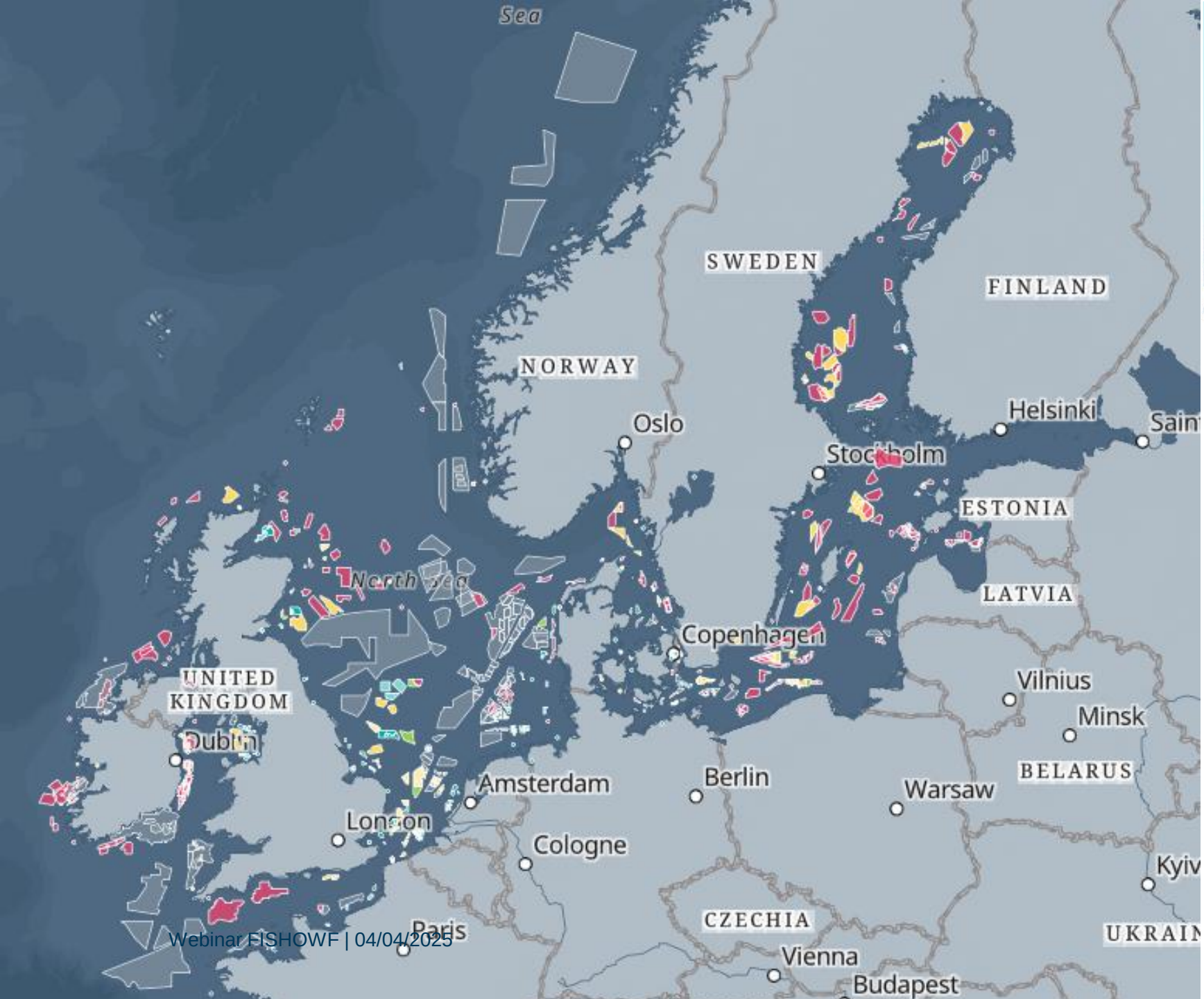
FISHOWF

FISHOWF+





OWF = offshore wind farm



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Wind Farms

- Fully Commissioned
- Partial Generation/Under Construction
- Under Construction
- Pre-Construction
- Consent Authorised
- Consent Application Submitted
- Development Zone
- Concept/Early Planning

FRANCE ENERGIES MARINES

Thank you for your attention!