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Regional ecosystem-based fisheries management: Key concepts and recent developments

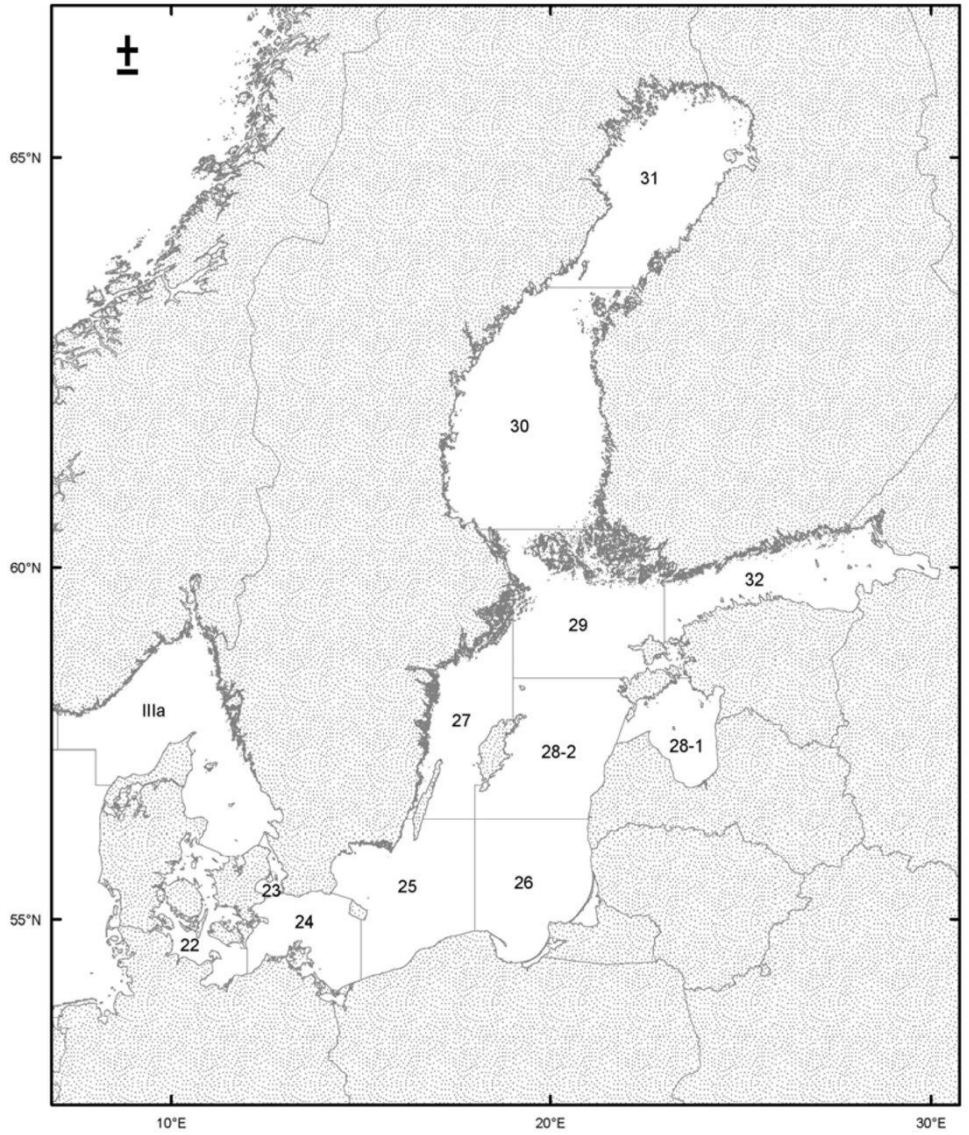
Eva Papaioannou

Ecosystem Based Management WS
03.04.2025
Stockholm, Sweden

- **AWZ Fish Project** “Ecosystem Based Fisheries Management in the German Exclusive Economic Zone”

Funded by:

Bundesamt für Naturschutz



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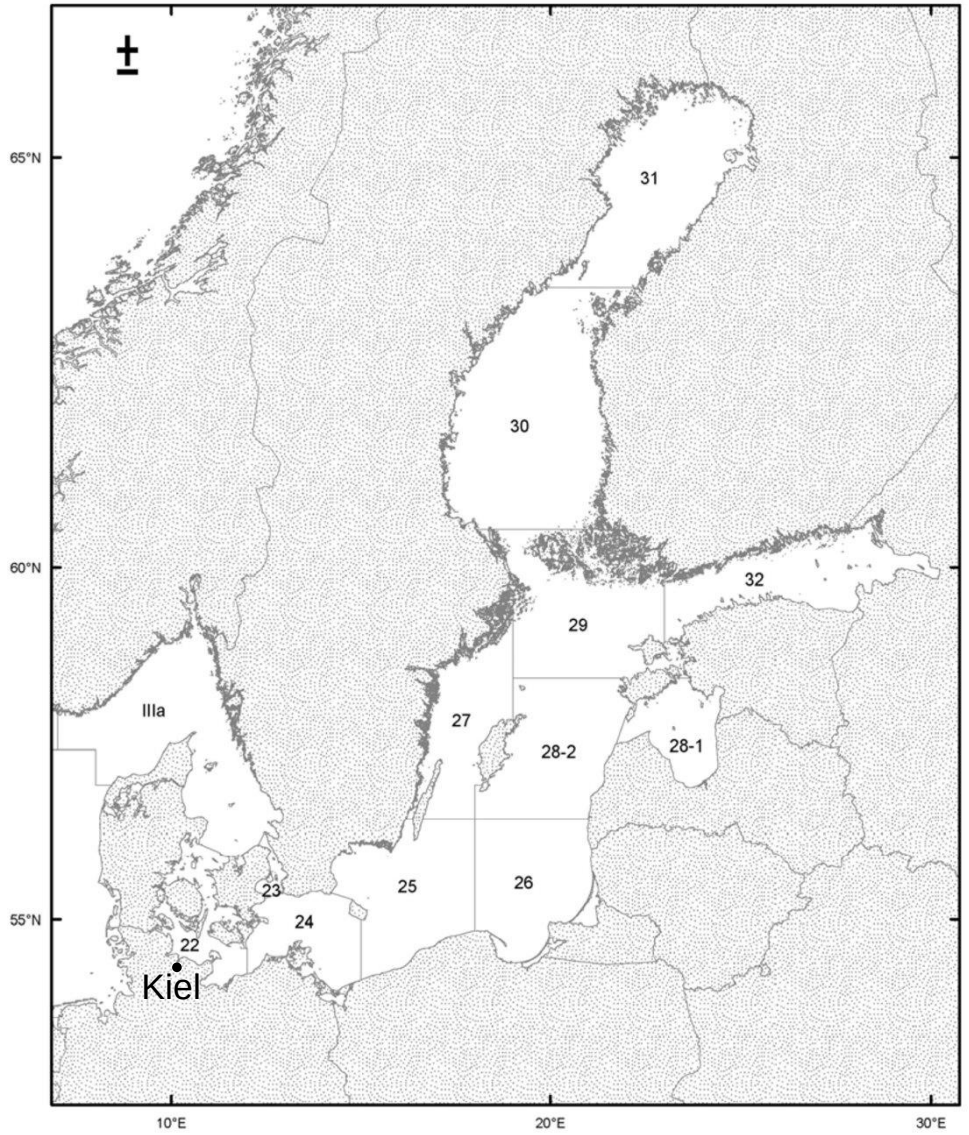

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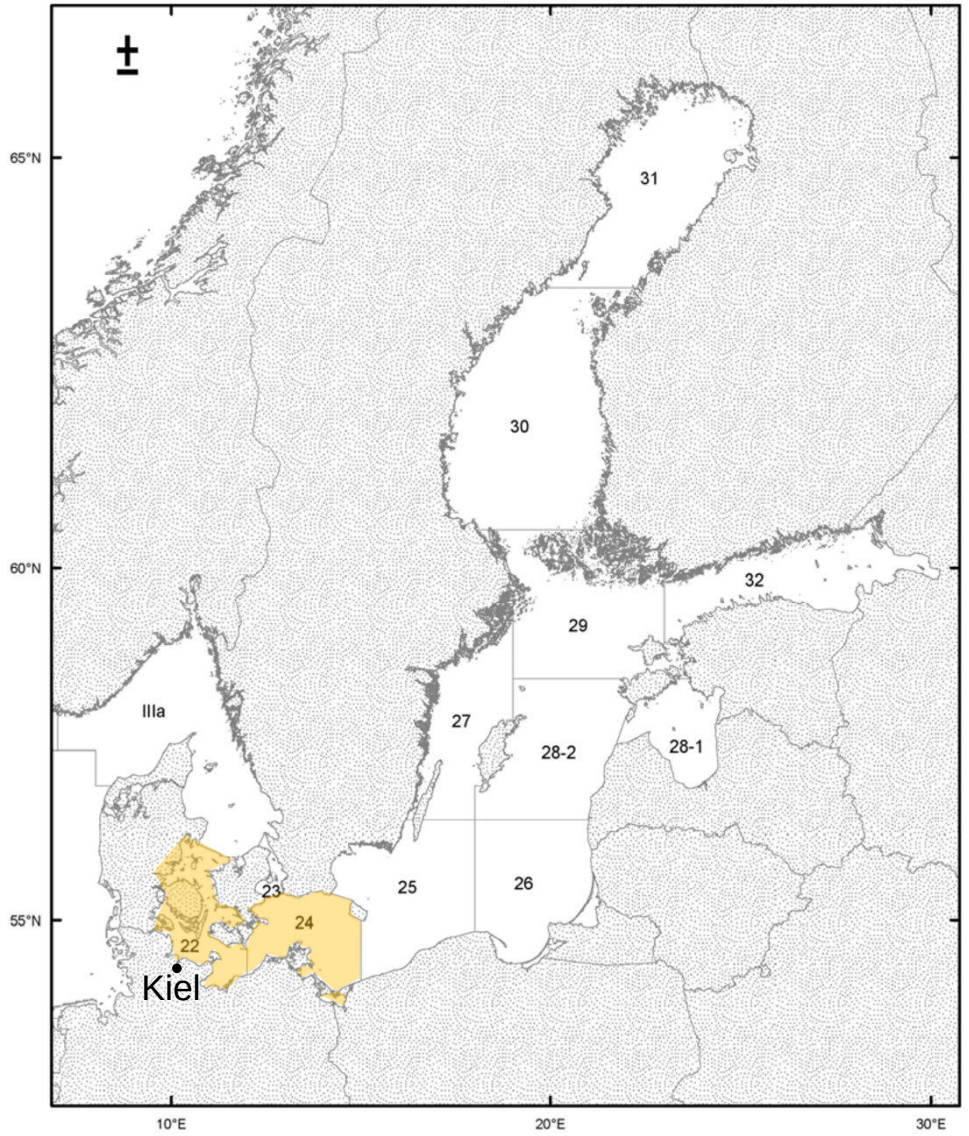

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- HELCOM WG Fish

Convention on Biological Diversity

***Ecosystem* approach**

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

***Ecosystem-based* adaptation**

European Commission

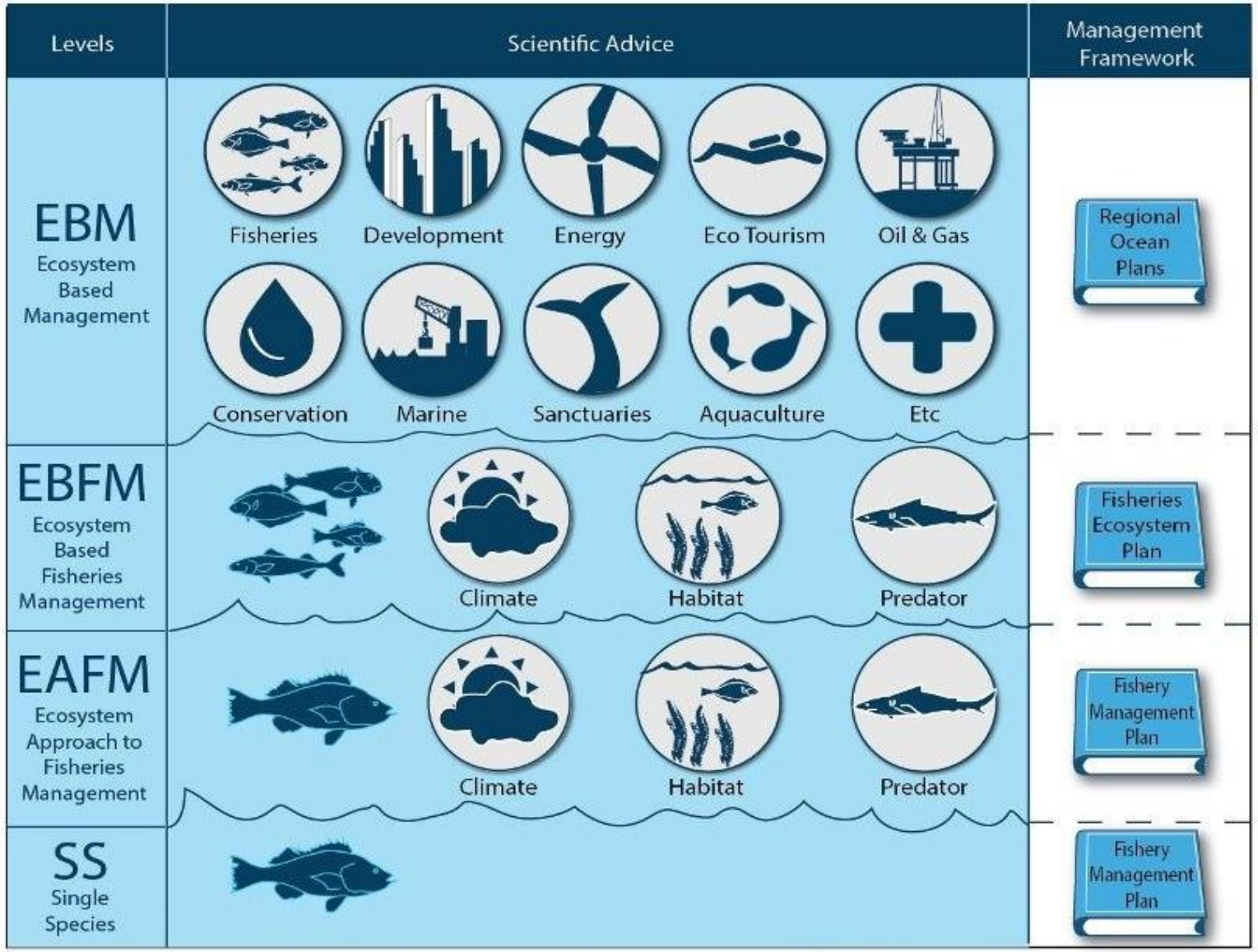
***Ecosystem-based Approach* (MSFD)**

NOAA FISHERIES

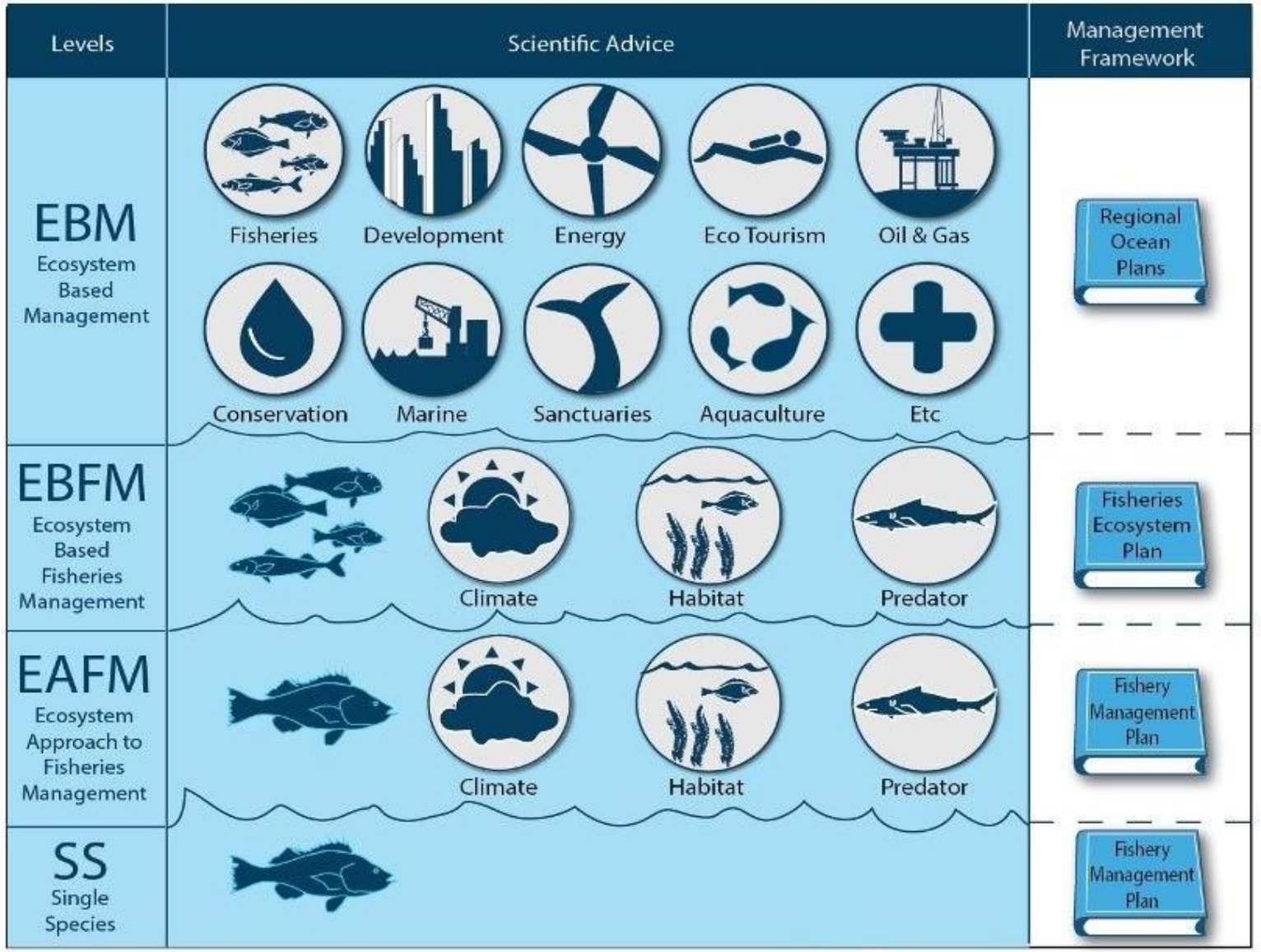
***Ecosystem-based approach to fisheries' management* (CFP)**

Ecosystem-based fisheries' management

- **No overarching definition**
- **Terms used interchangeably**



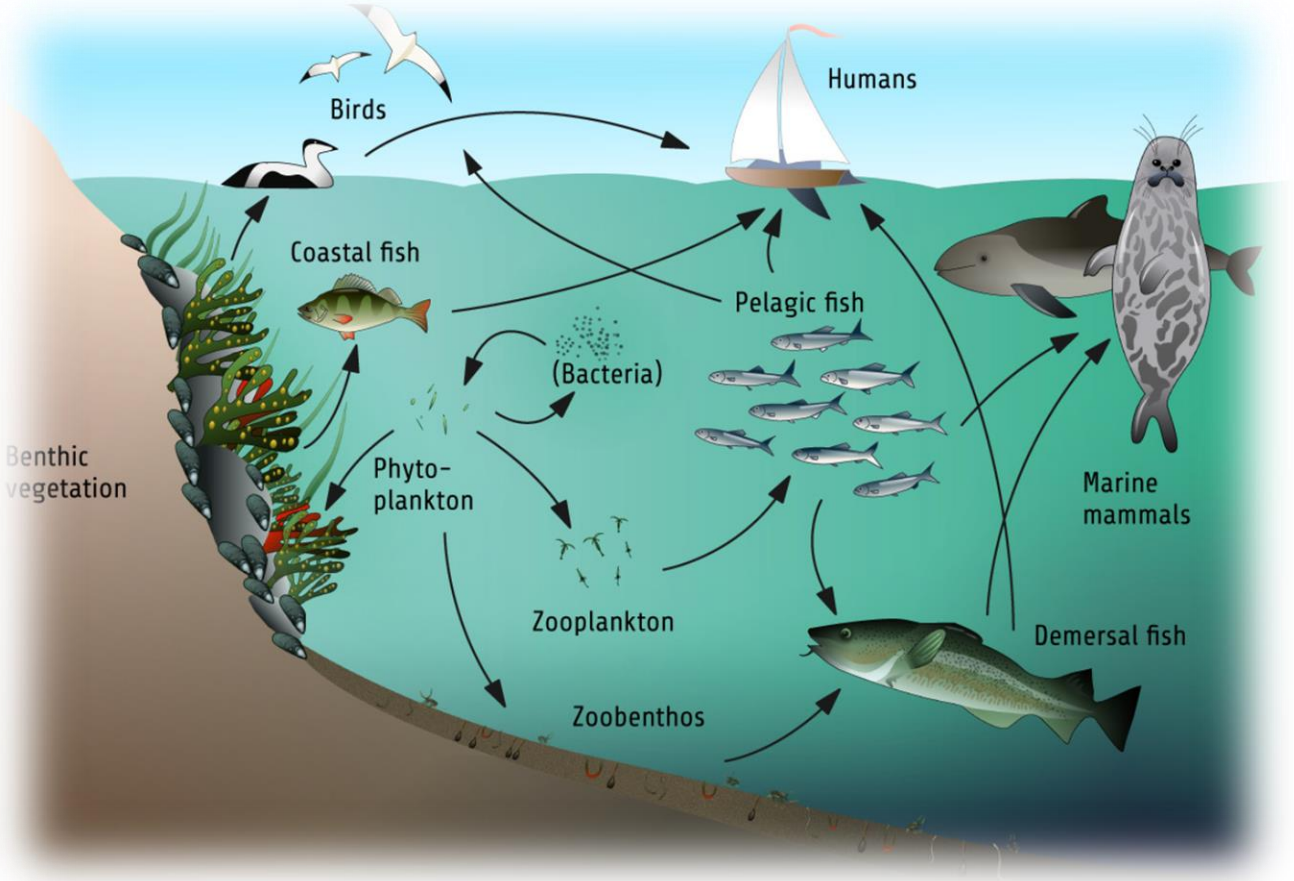
NOAA FISHERIES



Lacking actual implementation

NOAA FISHERIES

HELCOM vision



A **healthy Baltic Sea environment** with diverse biological components functioning in balance, resulting in a good ecological status and supporting a wide range of sustainable economic and social activities

(HELCOM BSAP 2021)

HELCOM HOLAS III

HELCOM vision

Ecosystem Based Fisheries Management

supports the goals of the BSAP 2021

HELCOM BSAP 2021

HELCOM Work towards EBFM

- HELCOM nominated **FISH WG** *„Working Group on Sustainable Ecosystem-based Fisheries Management”* to work on EBFM concept
- HELCOM IC WS EBFM Workshop with the aim of getting a **common understanding of EBFM** (04.03, WG Fish Meeting 05 – 06.03)

Purpose of the EBFM document

WHY?

A common understanding is important to facilitate **practical work of HELCOM** related to EBFM

HELCOM assessments of ecosystem health form an important basis to consider in EBFM

A fragmented policy framework leads to contradictory views and perceptions on fisheries, and the environment. A common understanding will allow for collective actions.

WHO SHOULD BE INCLUDED ?

Authorities with a competency on fisheries management, fisheries stakeholders, notably European Union, BALTFISH and BSAC

HELCOM common understanding of Ecosystem-Based Fisheries Management – Ongoing process

Four main objectives (* Draft!)

1. **Fish stocks are healthy** in terms of abundance, distribution, condition, recruitment and population structure, and fulfil their ecological functions. Exploited fish stocks have a possibility to recover, and the long-term sustainability of stocks is ensured

2. Incidental **harm from fishing activity** on sensitive or protected species and habitats and the marine ecosystem **is minimized**

3. **Carbon footprint of fisheries is minimized** and the function of the Baltic Sea as a carbon sink is ensured, contributing to limit the effects of climate change

4. Fisheries are **economically, socially and ecologically viable**

EBFM principles and measures

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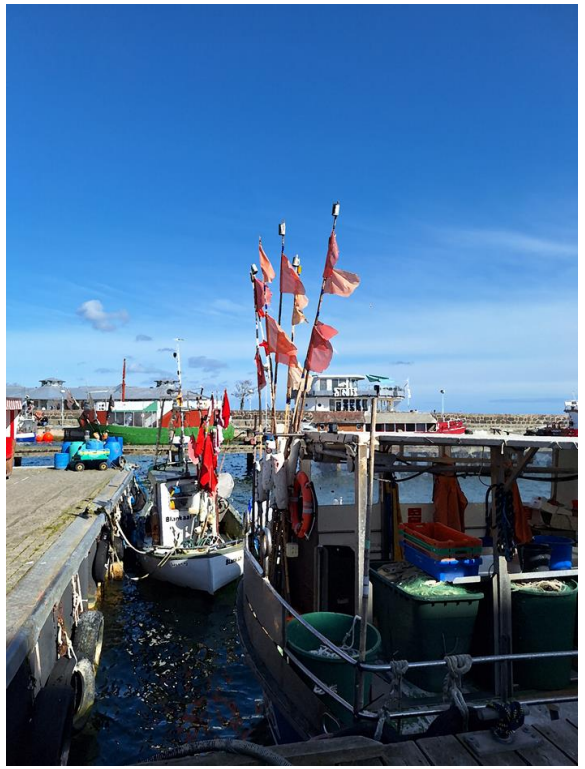
Principles and goals of EBFM	Measures	References
1. Rebuild and keep the **abundance and biomass** of all spp. above levels required for fundamental ecosystem processes	- Forage spp. > 75% and - Predator spp. > 60% natural abundance - Fishing only for direct human consumption	UN SDGs EU CFP, EU MSFD, EU Baltic MAP, Other Refs.
2. Rebuild and preserve **age and size** distributions indicative of healthy populations	- No fishing for juveniles or spawners - No fishing in nursery or spawning areas - Start selective fishing > 90% of the larger sex has reproduced and where mean length in the catch is close to 2/3 of maximum length	EU MSFD, Baltic MAP, Other Refs.
3. Minimize impacts on habitats and non target spp., limit carbon footprint, and help natural carbon sequestration	- Do not employ destructive fishing gears such as dredges or bottom trawls - Avoid by-catch of non-target species	UN SDGs, EU CFP, Baltic MAP, Other Refs.
4. Provide **no-take areas** for conservation and undisturbed evolution of genetic diversity for resilience and adaptation against environmental change	Designate sufficiently large no-take areas with suitable habitat, sufficient food and oxygen, including deeper areas with cooler waters	UN SDGs EU CFP, Other Refs.

After: Froese et al. 2025 (under review)

Kiel Bight fishers' project research objectives:

- Understand difference in resilience to climate change of cod and herring (low) and flatfish (high) in the WBS
- Understand natural strategies of fish to deal with warming waters
- Identify management measures for helping fish* to adapt to the impacts of climate change



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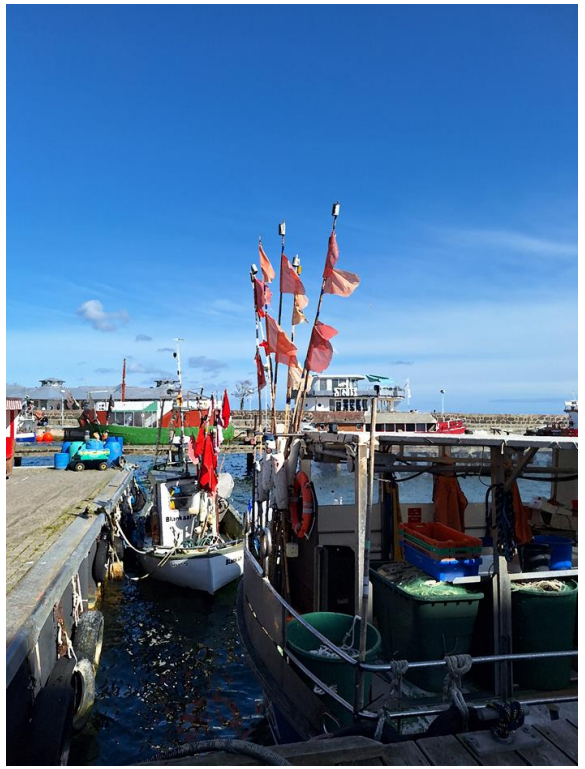

Fischkutter: _____ **Kapitän:** _____ **Fanggebiet:** _____

Fangtag: ausgesetzt am 22.02.22 um 11³⁰ Uhr **Wassertiefe:** 9 m **Koordinaten:** 54° ____ ' N 10° ____ ' E

eingeholt am 28.02.22 um 17⁰⁰ Uhr **PAL:** (ja) nein **Fanggeschirr:** 25 MW 200 m Länge

Beobachtungen: _____

Art	Länge in cm	Gewicht in g	m/w	Gewicht Magen in g	Hauptnahrung Magen	Gewicht Gonaden g	Ablaichen: vor, aktiv, nach	Bemerkungen
Steinbutt	27,1	407	W	18	–	13	vor	
Dorsch	55,3	1867	W	69	Jungfisch, Garnelen	17	nach	Leber weiß 58g FCO96
Scholle	38,2	432	W	23	Muscheln	14	vor	
Scholle	37,6	481	W	29	Muscheln	11	vor	
Scholle	29,0	254	W	8	–	3	vor	

Extract of data collection protocol

Summary:

- Five years of research
- > 531 commercial stations
- Gillnets, trawls, fyke nets
- Oxygen measurements
- 2024: Hydrophones

Measurements taken:

Cod (Torsk)(G. morhua)	1,382
Plaice (Rödspätta) (P. platessa)	2,465
Flounder (Skrubba) (P. flesus)	604
Dab (Sandskädda) (L. limanda)	1,181
Turbot (Piggvar) (S. maximus)	173
Brill (Slätvar) (S. rhombus)	69
Lemon sole (Bergskädda) (M. kitt)	85
Herring (Sill) (since 2022)	329

Rainer Froese

Felix Mittermayer

Chris Monk

Anne Eirlich

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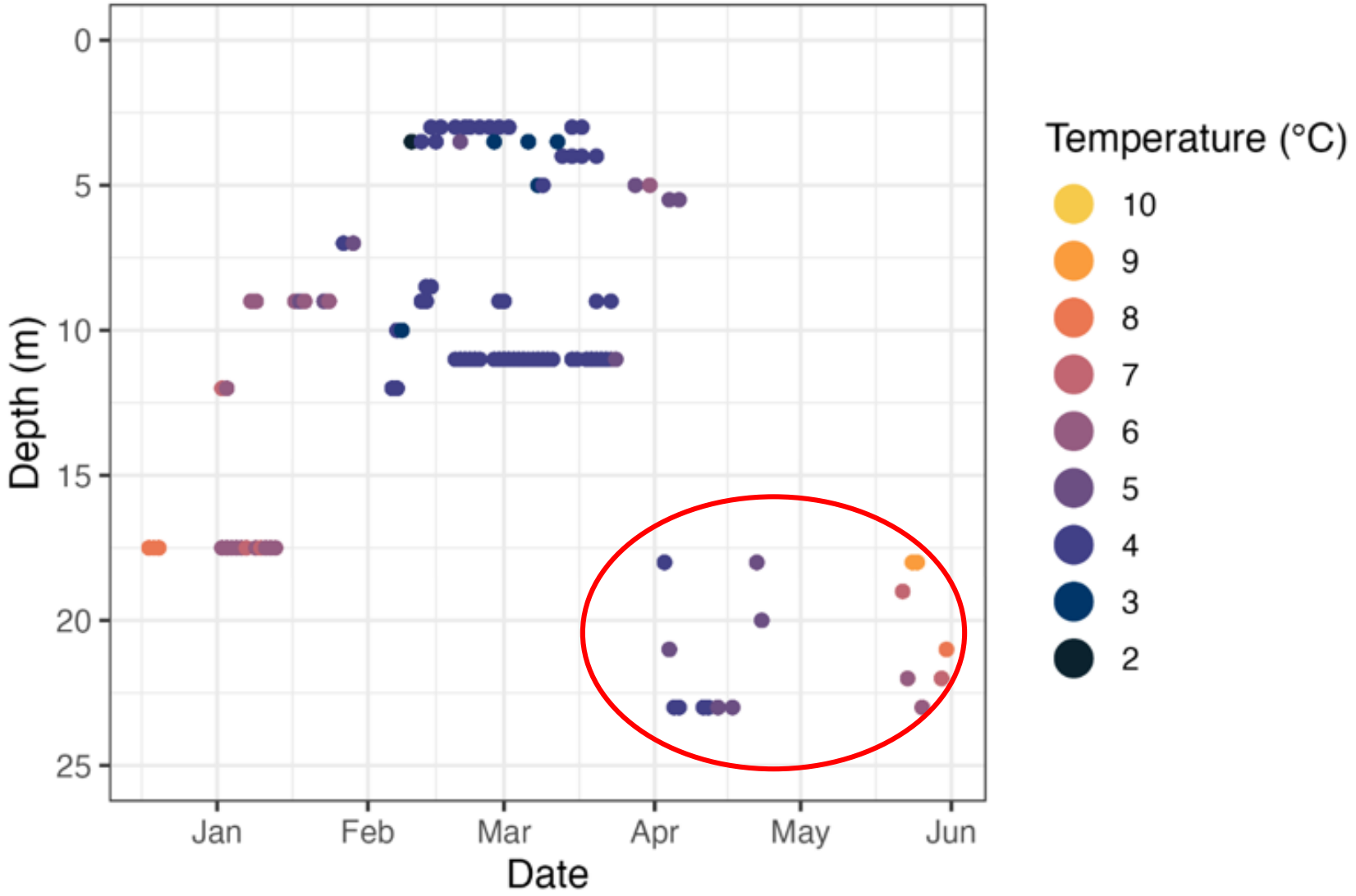
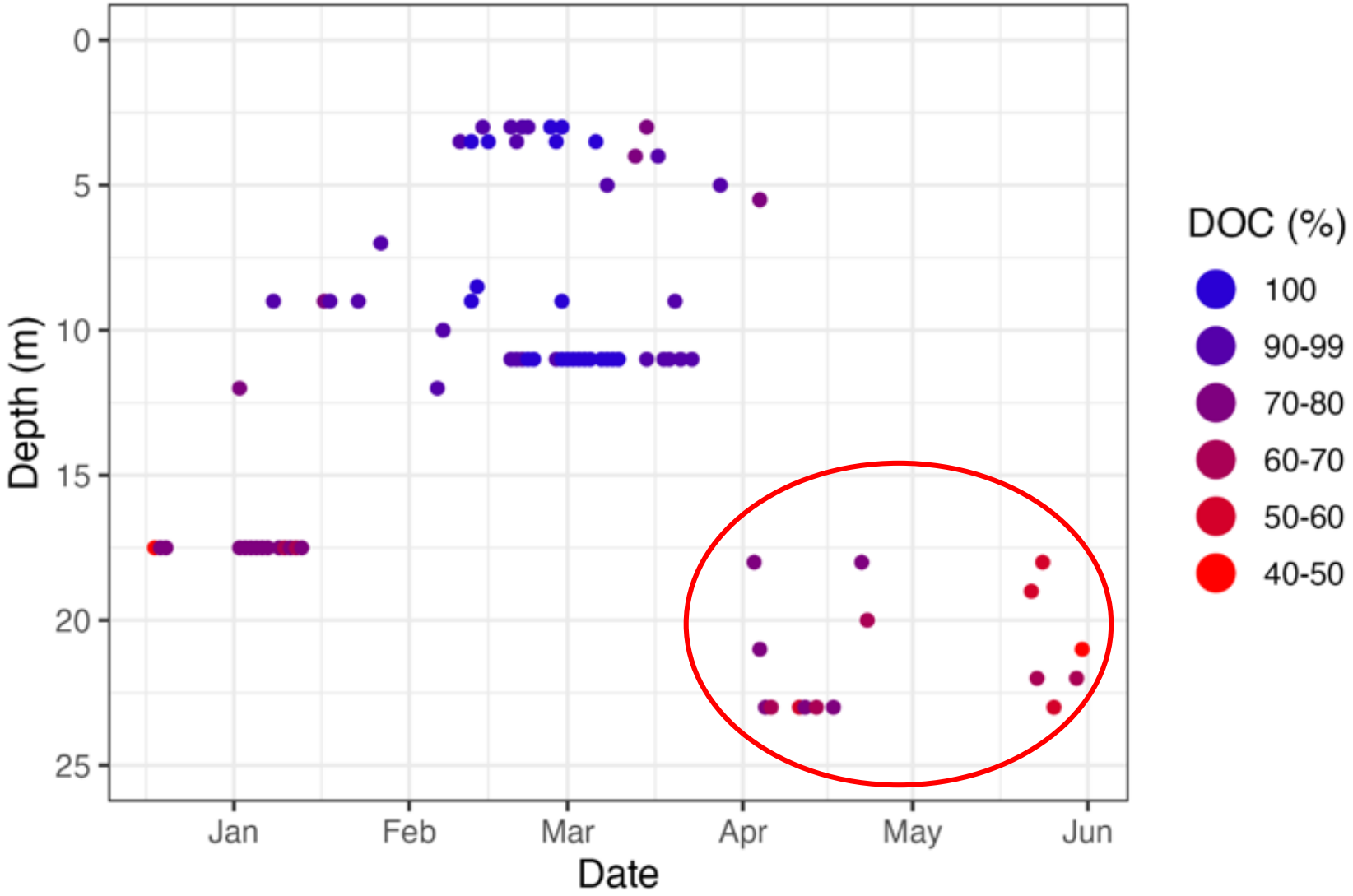
Temperature at depth in Kiel Bight

- In April-May, shallow waters are getting too warm for adult commercial fish
- Fish and fishers move to deeper waters



Oxygen at depth in Kiel Bight

- However, below about 12 m depth oxygen levels drop by about 50% compared to surface values, too little for successful growth



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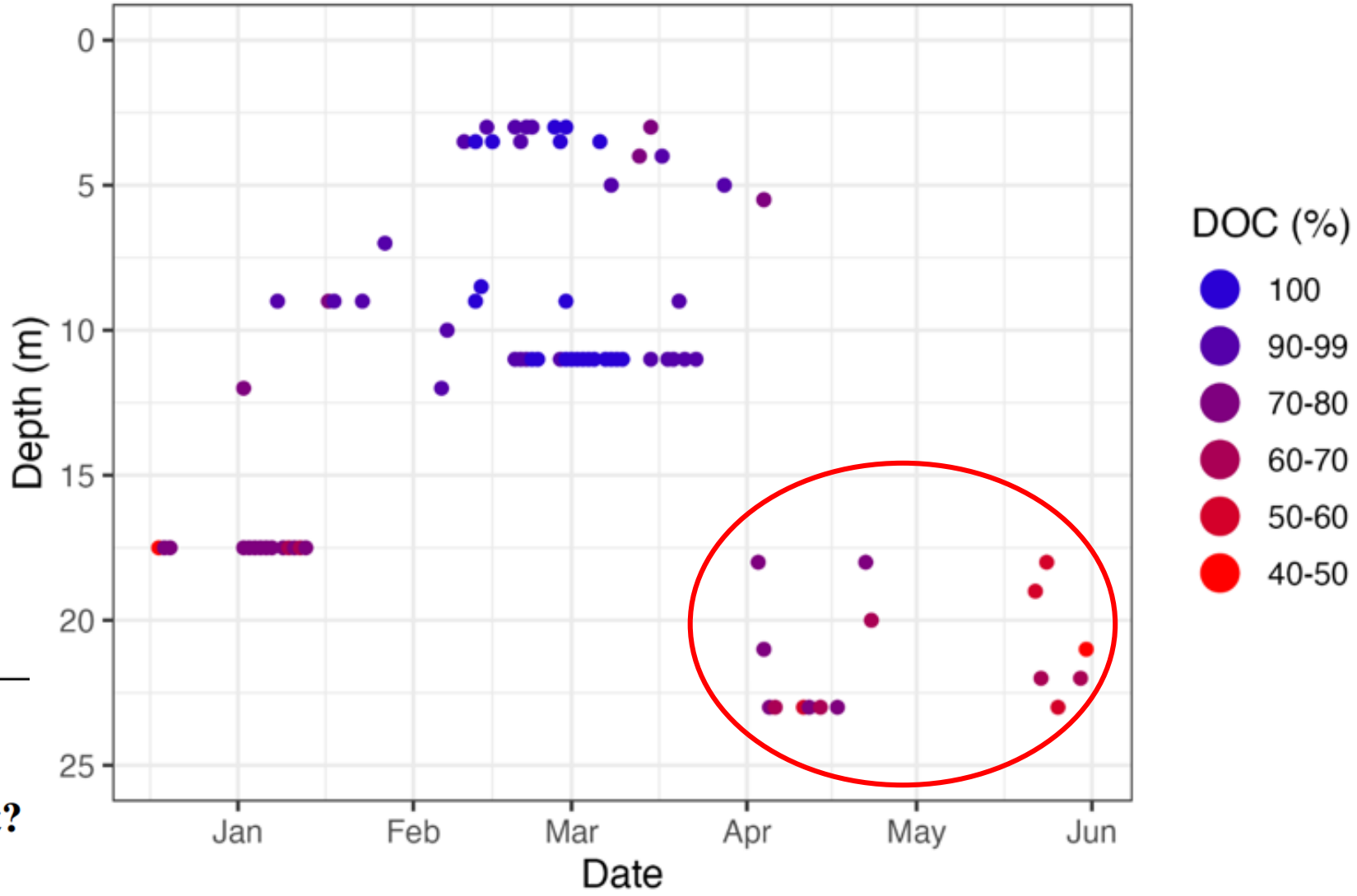

Environ Biol Fish
https://doi.org/10.1007/s10641-021-01209-1

Climate change or mismanagement?

Rainer Froese · Eva Papaioannou · Marco Scotti

To recap / Conclusions

- Lack in EBFM implementation (legal provisions)
- *Context dependent* - ensure EBFM **is** ecosystem-based
- **Healthy stocks**: precondition for sustainable fisheries (and fishers)
  - TACs set at EBFM levels
- Measures **not to be lifted** as soon as things become slighlty better
  - Maintain closure of cod (W,E) and herring (W) fisheries
- EBFM principles: fundamental for **adapting to climate change**
  - Minimise nutrient load in the Baltic
  - Designate climate refugia esp. when considering low O2

Tack så mycket!

Eva Papaioannou
epapaioannou@geomar.de

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GEOMAR
Helmholtz-Zentrum für Ozeanforschung Kiel

Tack så mycket!

Eva Papaioannou
epapaioannou@geomar.de


Rainer Froese


Marco Scotti


Thorsten Reusch


Liam MacNeil


Marcela Nascimento


Maysa Ito


Chris Monk


Felix Mittermayer

BfN Bundesamt für Naturschutz