

Key anthropogenic threats in the western Baltic and North Sea



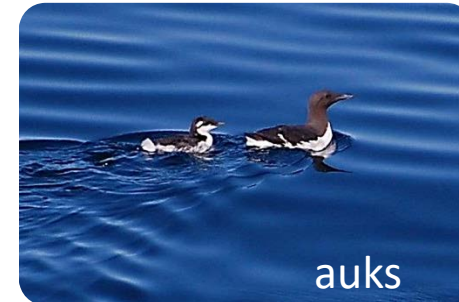
**Volker Dierschke, Nele Markones, Kai Borkenhagen
Federation of German Avifaunists (DDA)**

Key seabird species in the German waters

North Sea: ~19

Baltic Sea: ~17

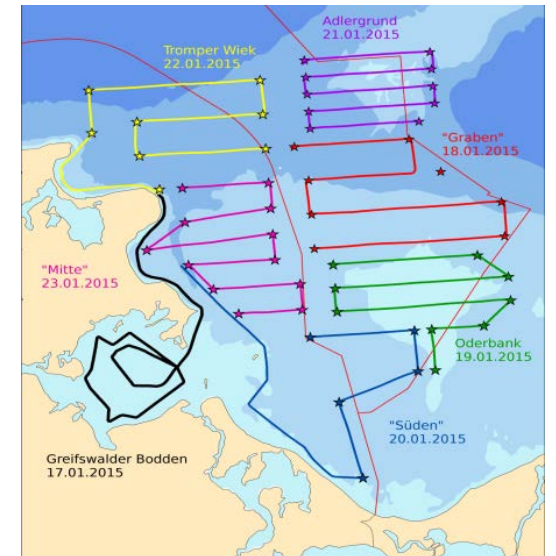
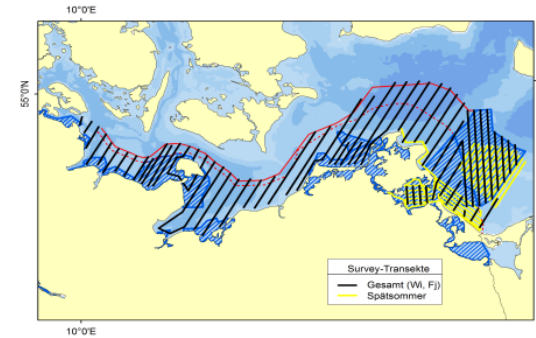
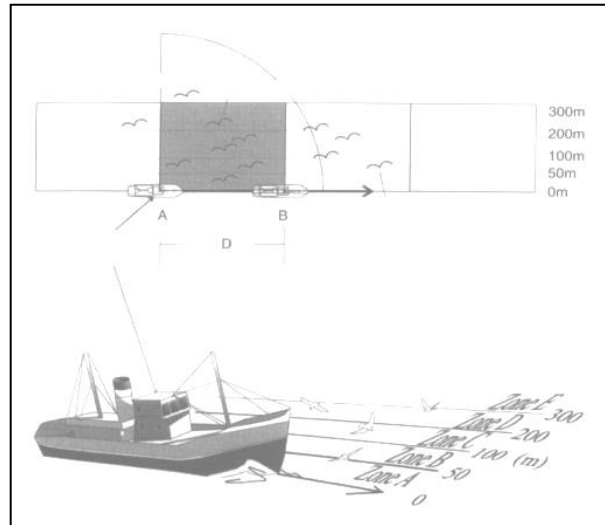
regularly occurring seabird species



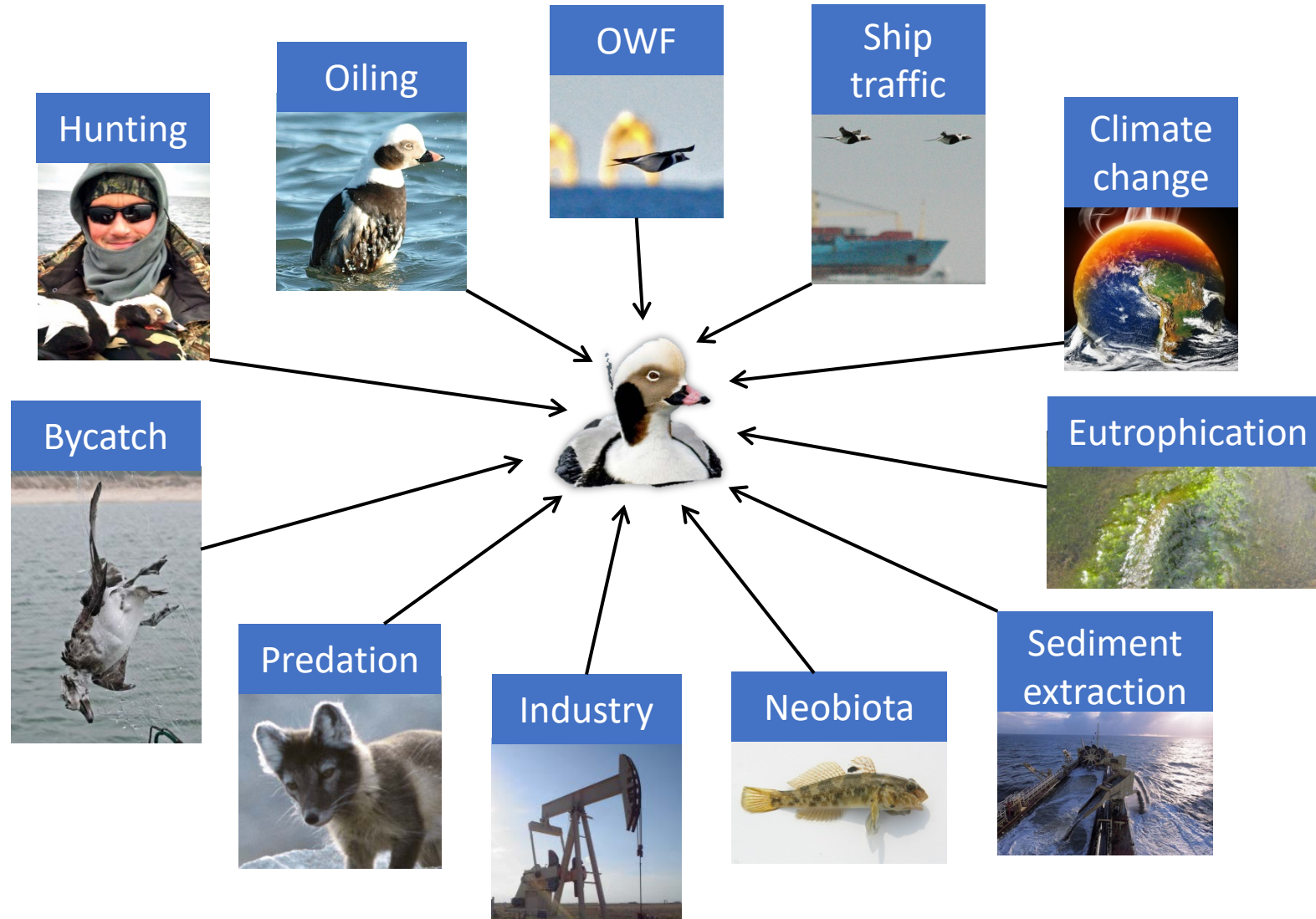
German seabird monitoring programme



- Ship-based surveys
- Aerial (observer)
- Aerial (digital)



Pressures acting on a Seabird



Activities and pressures acting on seabirds in German marine waters

Activity	Visual disturbance	Underwater noise	Extraction (collision)	Extraction (bycatch)	Extraction (prey species)	Disturbance of seafloor	barriers	Input of litter	Input of contaminants	Input of energy (light)	Turbidity plumes
Shipping (cargo etc.)	High importance	Medium importance	Low importance	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible	Low importance	Low importance	Medium importance	Low importance
Shipping (leisure)	High importance	Medium importance	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible	Low importance	no importance or negligible	Low importance	no importance or negligible
Fishery (bottom-trawling)	High importance	Low importance	no importance or negligible	Low importance	High importance	High importance	Low importance	Medium importance	no importance or negligible	Low importance	High importance
Fishery (pelagic trawling)	High importance	Low importance	no importance or negligible	Low importance	High importance	no importance or negligible	Low importance	Low importance	no importance or negligible	Low importance	no importance or negligible
Fishery (static nets, traps etc.)	Medium importance	Low importance	no importance or negligible	High importance	Medium importance	no importance or negligible	Low importance	Low importance	no importance or negligible	no importance or negligible	no importance or negligible
Fishery (angling)	Medium importance	Low importance	no importance or negligible	Low importance	Low importance	Low importance	Low importance	Low importance	no importance or negligible	no importance or negligible	no importance or negligible
Oil/gas production	High importance	Low importance	Low importance	no importance or negligible	no importance or negligible	Low importance	Low importance	Medium importance	High importance	Medium importance	no importance or negligible
Aggregate extraction	Medium importance	Low importance	no importance or negligible	no importance or negligible	High importance	High importance	Low importance	Low importance	no importance or negligible	Low importance	High importance
Pipelines and cables	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible	Medium importance	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible	no importance or negligible
Offshore wind farms	High importance	Low importance	High importance	no importance or negligible	no importance or negligible	Medium importance	High importance	Low importance	no importance or negligible	Medium importance	Medium importance
Removal of ammunition	Low importance	High importance	no importance or negligible	no importance or negligible	Low importance	Low importance	no importance or negligible	Low importance	High importance	no importance or negligible	Low importance
Research	Low importance	High importance	no importance or negligible	no importance or negligible	Low importance	no importance or negligible	no importance or negligible	Low importance	no importance or negligible	no importance or negligible	no importance or negligible

Bold: currently quantitatively important and considered further in this presentation

	High importance
	Medium importance
	low importance
	no importance or negligible

Ship traffic

- visual disturbance
- underwater noise (effects to be investigated)
- oil pollution (currently a minor problem in Germany)

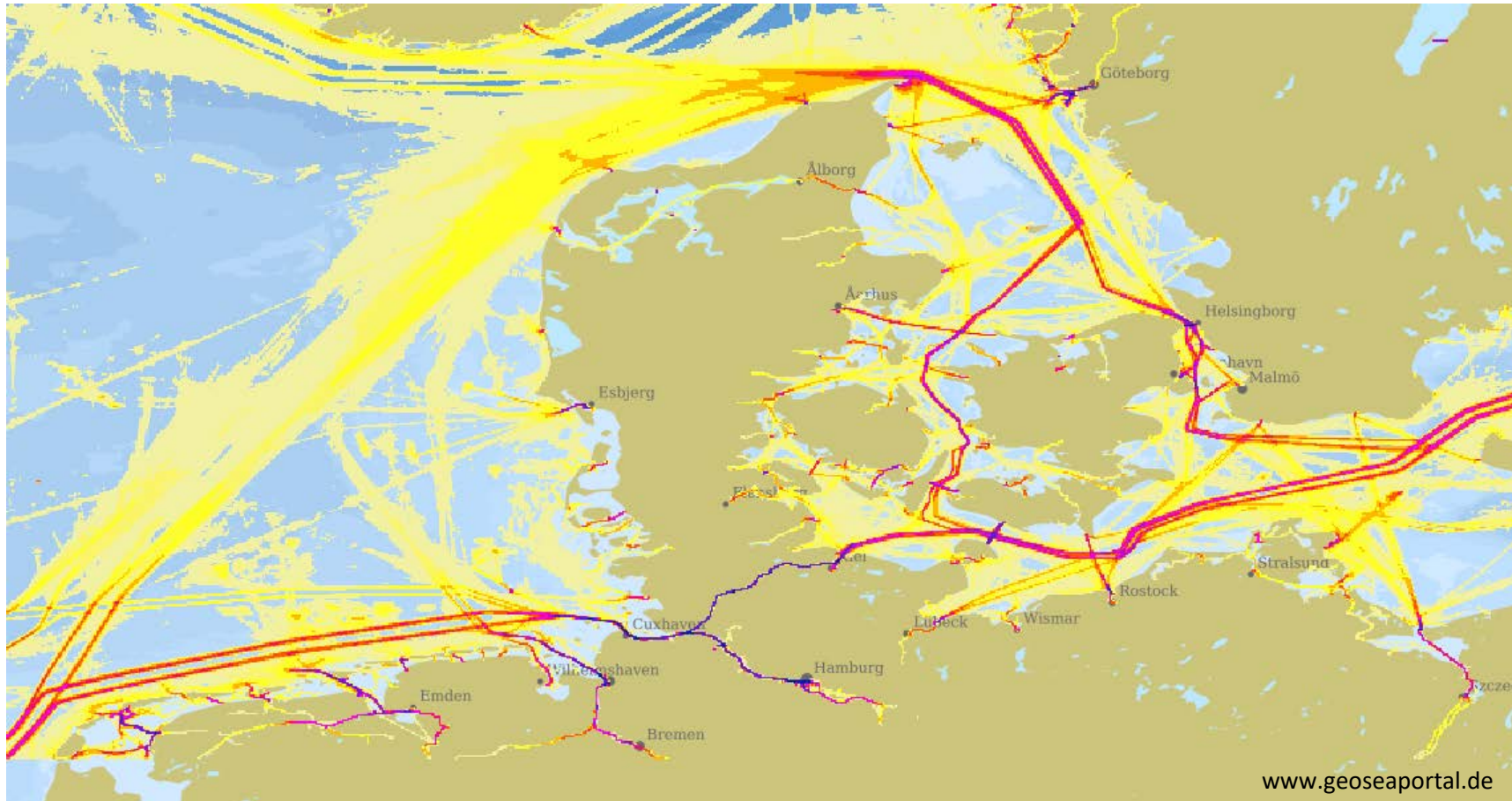


Photo: Kjell Larsson

Ship traffic: oil spills & chronic pollution

Seaducks particularly vulnerable

Spending most of their time
in contact with water body

Dense aggregations

Flocks of several 10,000 – 100,000
birds in one site

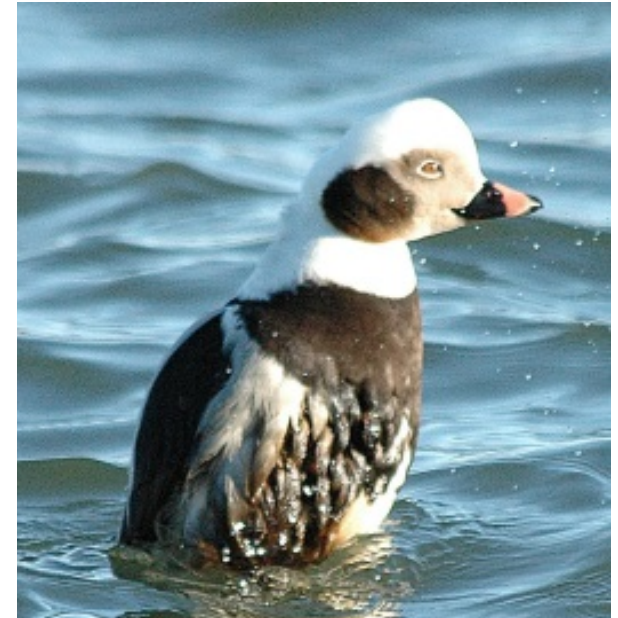
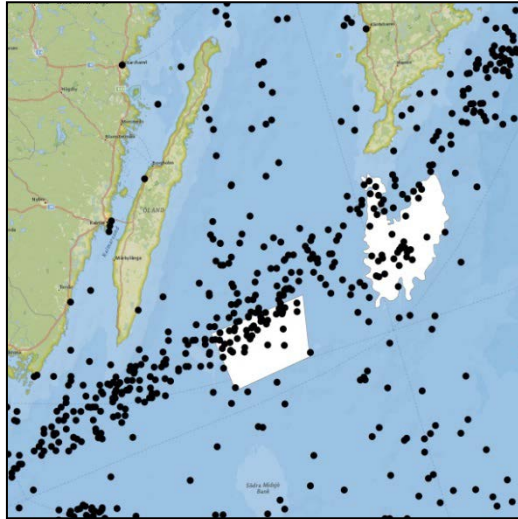
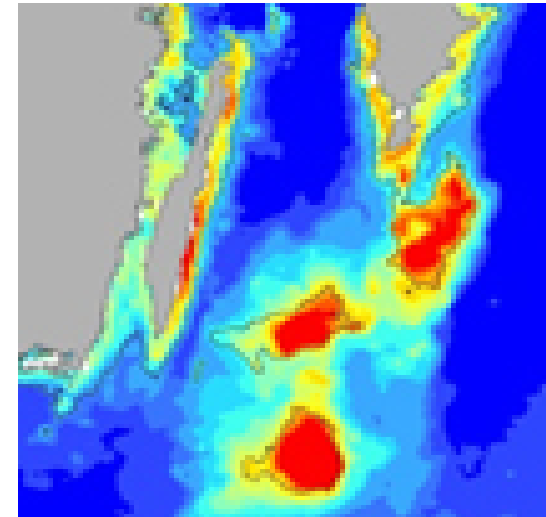


Photo: Kjell Larsson

Ship traffic: oil spills & chronic pollution



Locations of confirmed oil spills 1998 - 2012 in central Baltic Sea (HELCOM)
White areas = Natura 2000 sites Hoburgs Bank and Northern Midsjö Bank

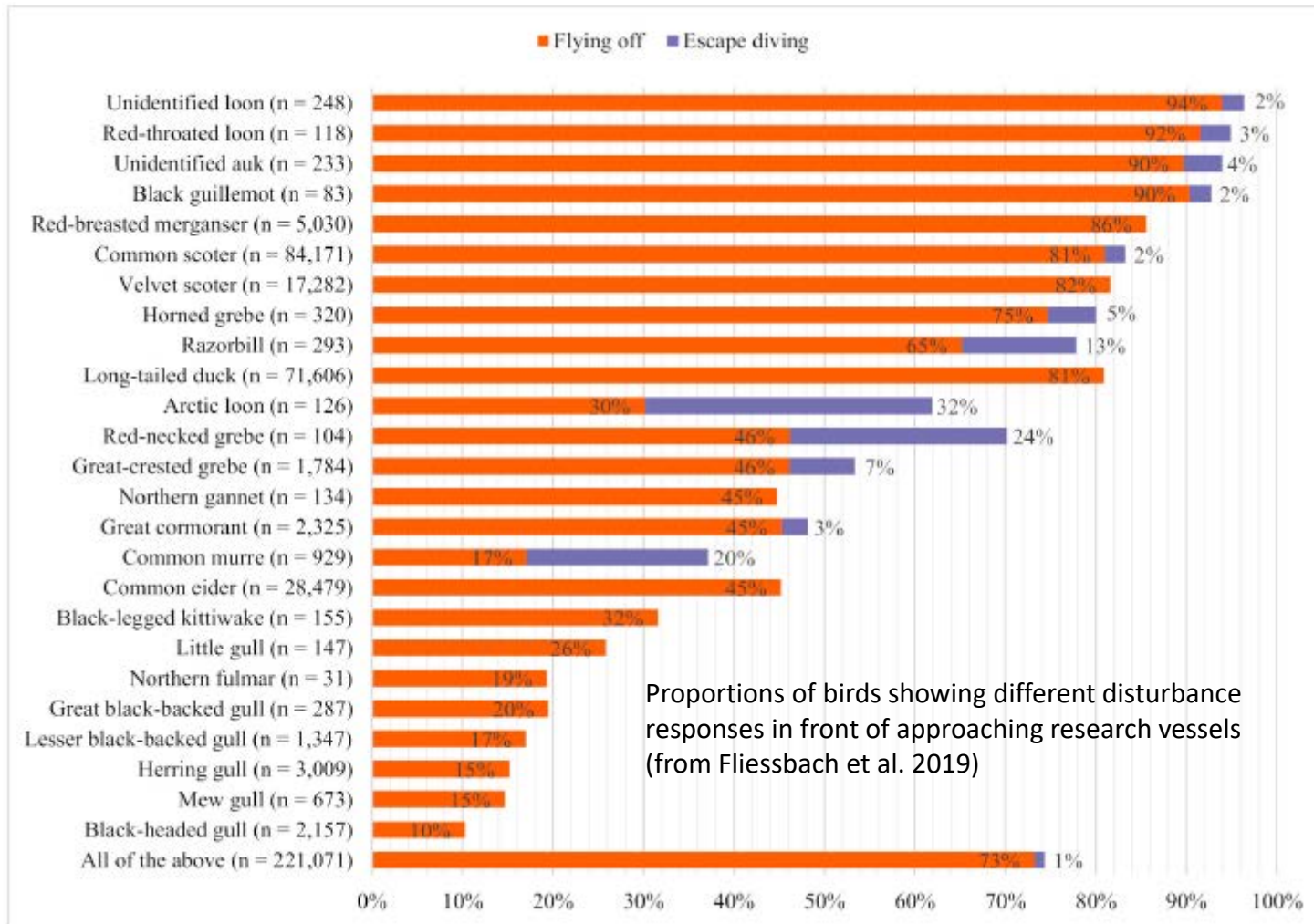


Distribution of wintering Long-tailed Ducks
red=highest densities
(Skov *et al.* 2011)

Hearn R D, Harrison A L, Cranswick P A 2015: International Single Species Action Plan for the conservation of the Long-tailed Duck *Clangula hyemalis*, 2016–2025. AEW Technical Series Report.

Ship traffic: visual disturbance

Extensive study on escape behaviour



Escape flights (and dives)

- increase energy consumption
- reduce feeding time
- displacement from feeding sites

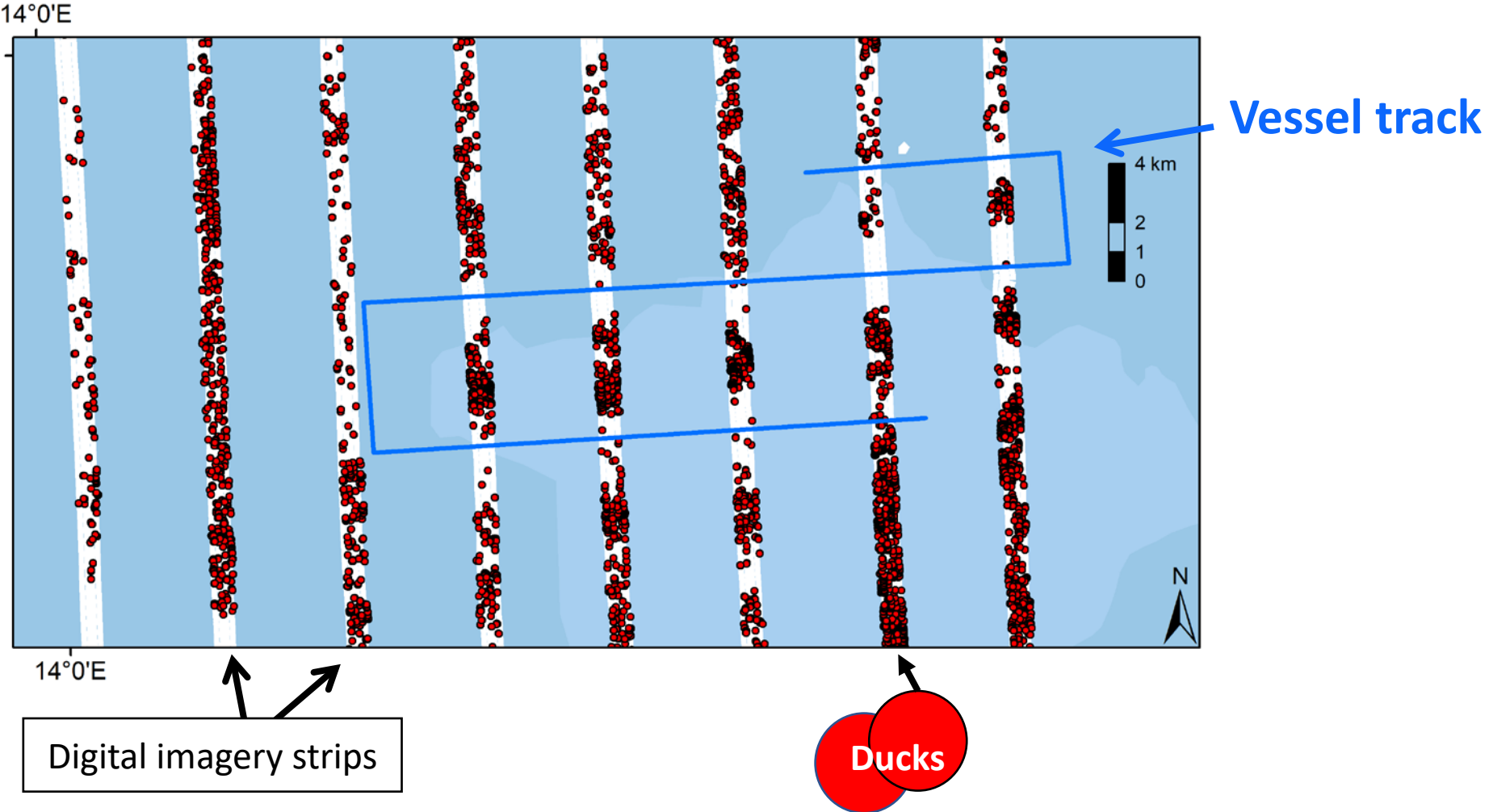
Most vulnerable species (top 10):

- common scoter
- red-breasted merganser
- red-throated diver
- black-throated diver
- velvet scoter
- black guillemot
- razorbill
- long-tailed duck
- Slavonian grebe
- great crested grebe

Suggested measures (MSFD, AMP):

- speed limits
- concentrating offshore service traffic

Ship traffic: visual disturbance



Ship traffic: visual disturbance

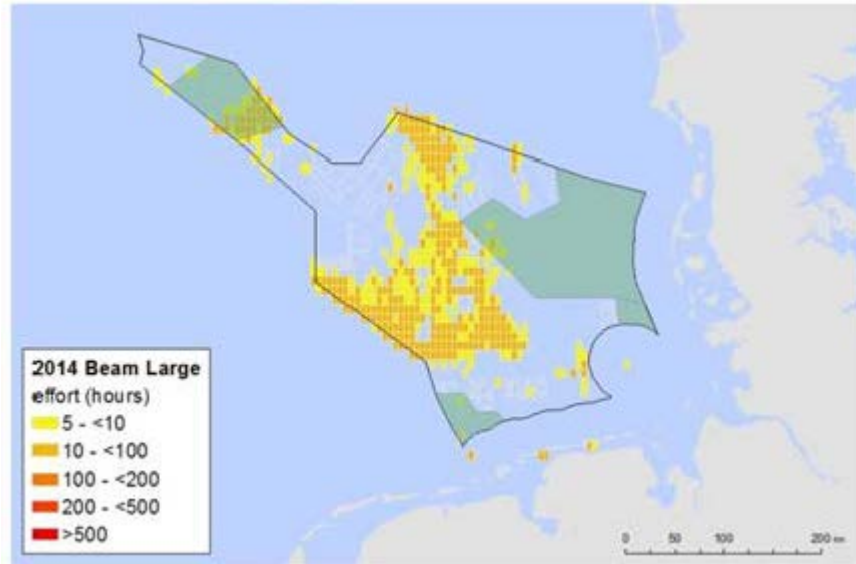
Duration temporary habitat loss:
Time until disturbed area is reoccupied

Common Eider:	within 2 nd h after disturbance incident
Long-tailed Duck:	within 3 rd h
Velvet Scoter:	in 3 rd h at 66 %
Common Scoter:	in 3 rd h at 13 %

Fisheries



Fisheries: bottom trawling



Physical disturbance of seafloor

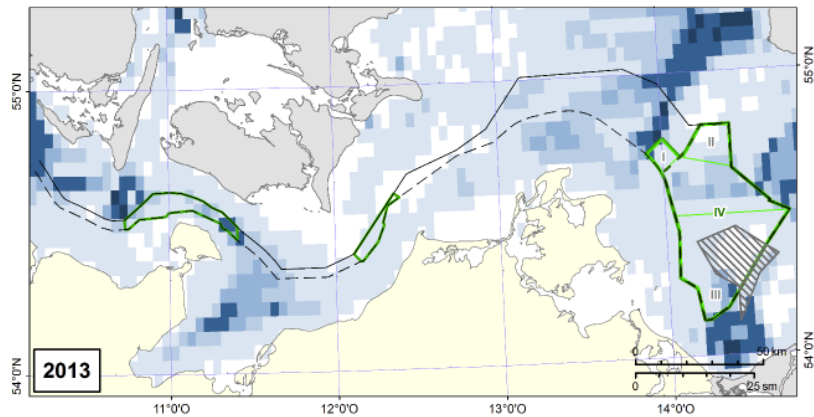
- deteriorating food supply (for months, years)

Species affected:

- benthic feeders (seaducks)
- sandeel specialists (kittiwake, auks and others)

Suggested measures (AMP):

- ecosystem-compatible management of fisheries along CFP
- (temporal) ban of bottom-trawling, to be aligned to CFP [in force in North Sea SPA west of Sylt since March 2023]



Naturschutzgebiete in der deutschen AWZ

- Außergrenze
- Bereiche I-III (nach FFH-RL)
- Bereich IV (nach VRL) im NSG "Pommersche Bucht – Rönnebank"

Nachrichtlich

- Fischereiverbotzone für aktive Fanggeräte

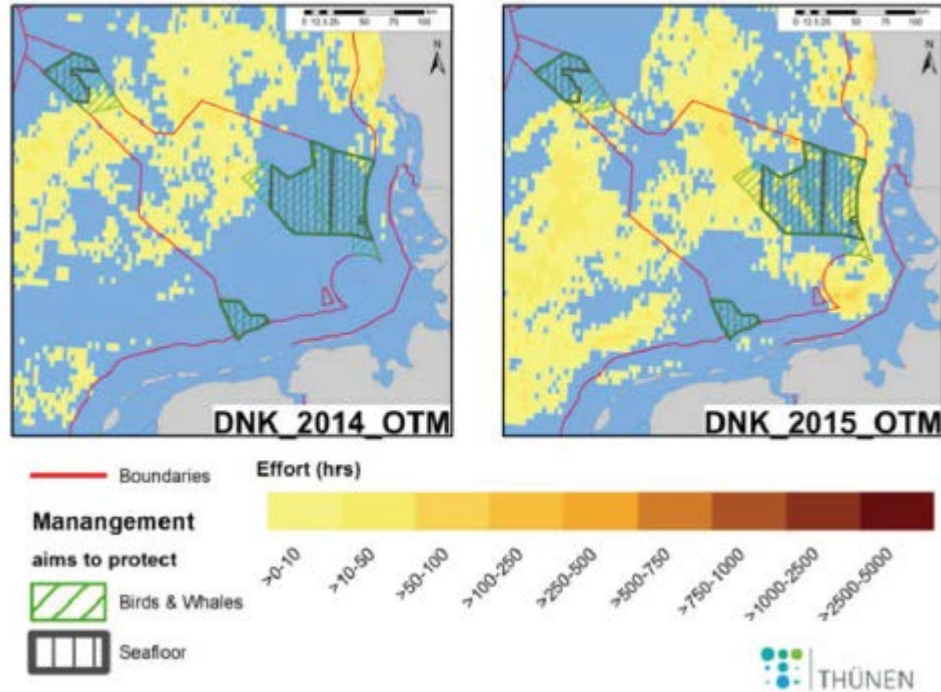
Fischereiaufwand 2012 und 2013

HELCOM effort year: mobile bottom-contacting gear VMS [hours/c-square]

- 0
- ≤ 50 h
- > 50 - 100 h
- > 100 - 150 h
- > 150 - 300 h
- > 300 h

*Vollständige Legende (Anrainerstaaten, See-
grenzen und Wassertiefen) siehe Abbildung 4*

Fisheries: pelagic trawling



Removal of target species (fish, including small-sized)

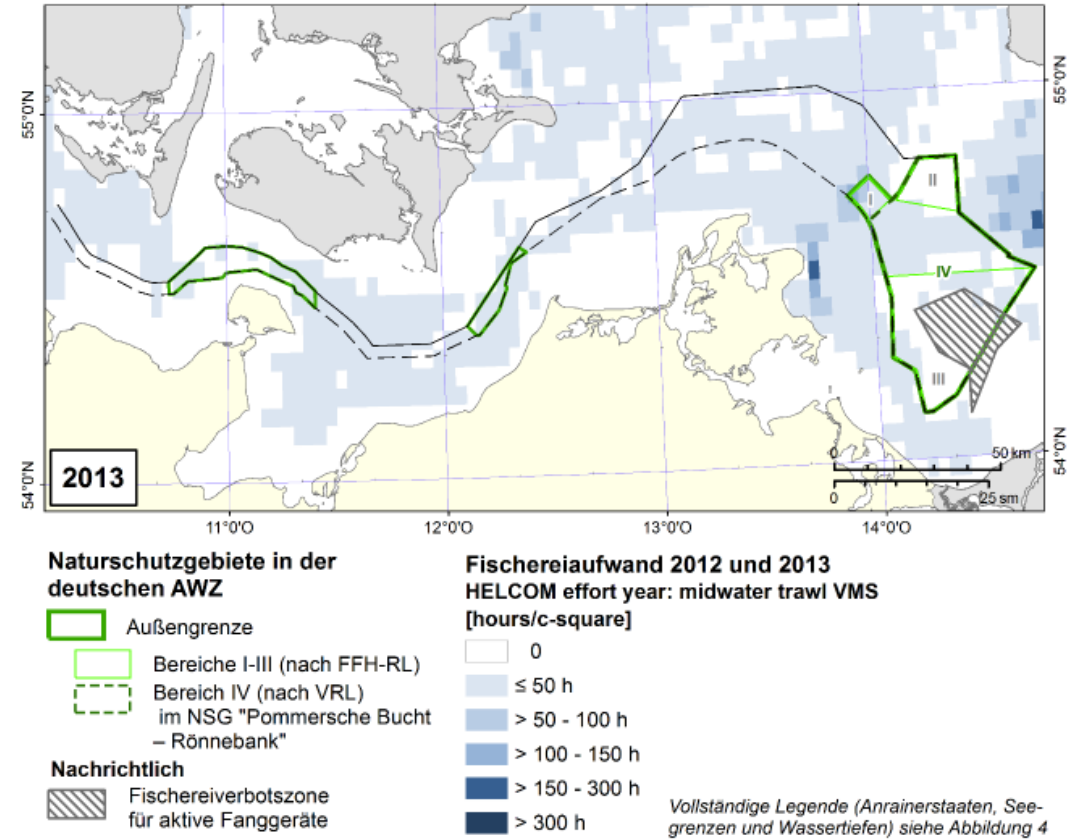
- reduction of food supply

Species affected:

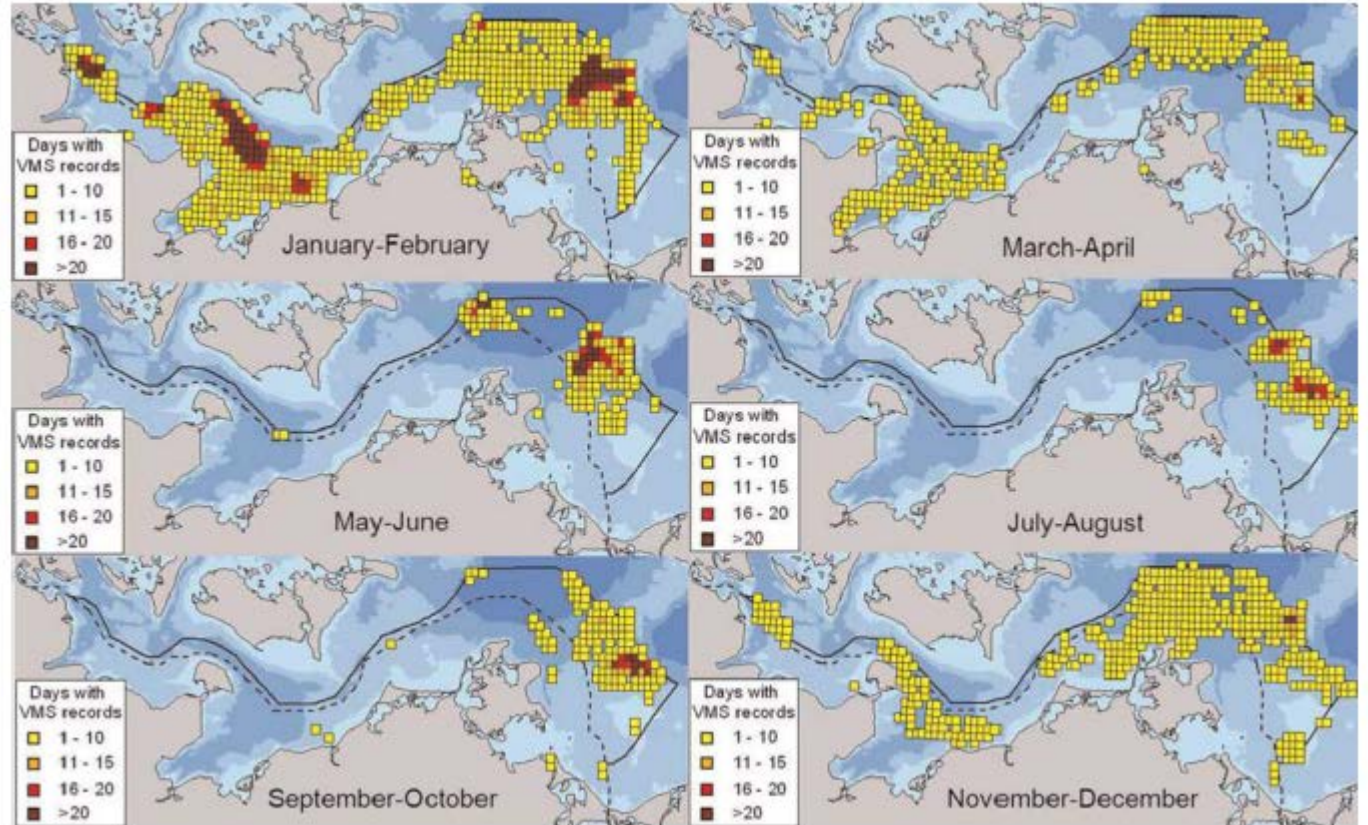
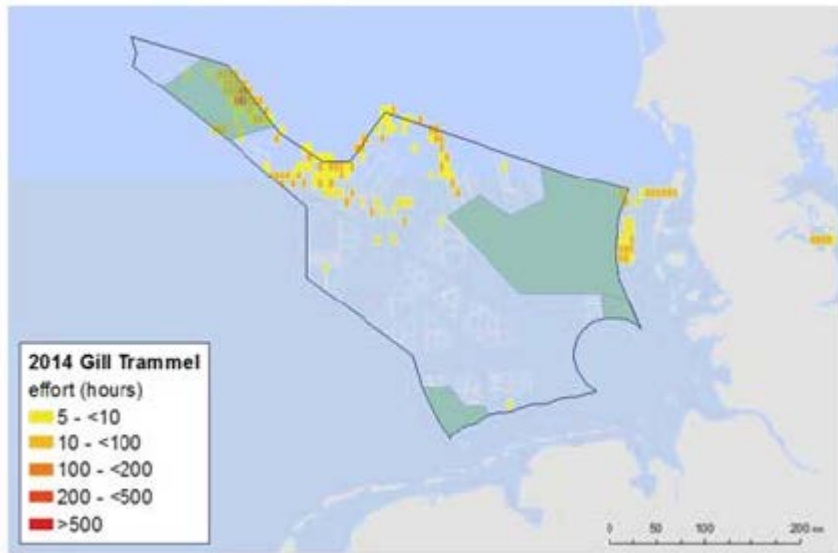
- fish feeding seabirds (incl. auks, divers, gulls, gannet)

Suggested measures (AMP):

- ecosystem-compatible management of fisheries along CFP



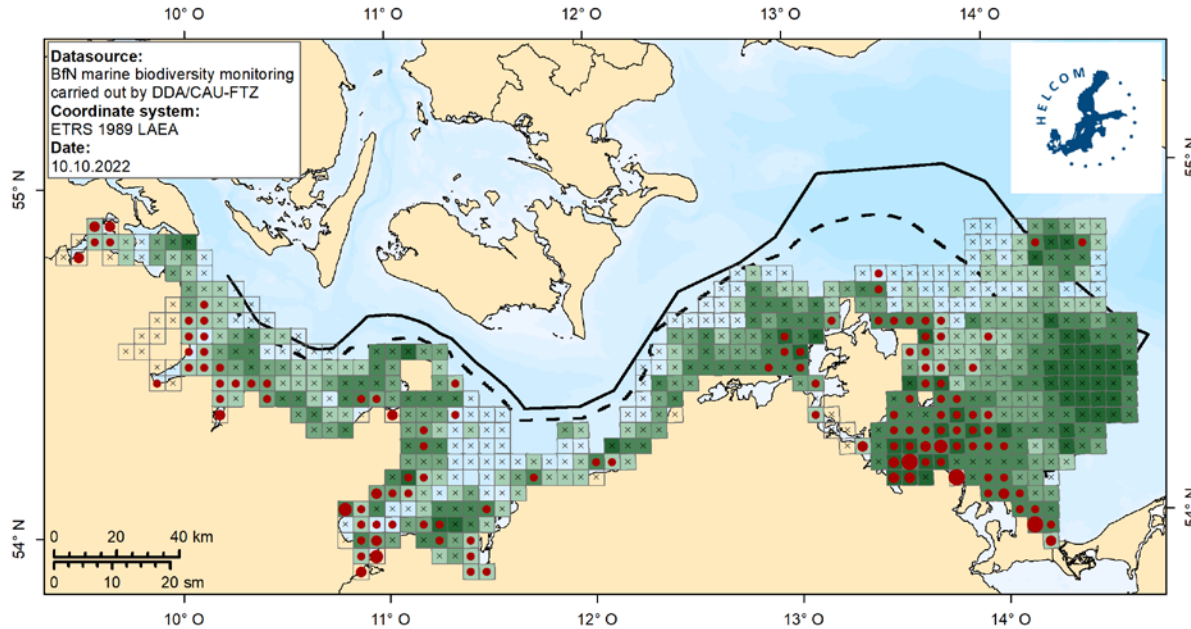
Fisheries: gillnet fishery



Based on VMS data, thus very incomplete!
Small vessels operating close to coast are not recorded.

=> recording of gillnet flags during ship-based and aerial bird surveys

Fisheries: gillnet fishery



Removal of non-target species (bycatch)

- extraction of individuals

Species affected:

- all diving seabirds (seaducks, divers, grebes, cormorants, auks)
- top 5 off Usedom 1989-2001:
long-tailed duck
great cormorant
common scoter
red-throated diver
red-necked grebe

Suggested measures (AMP):

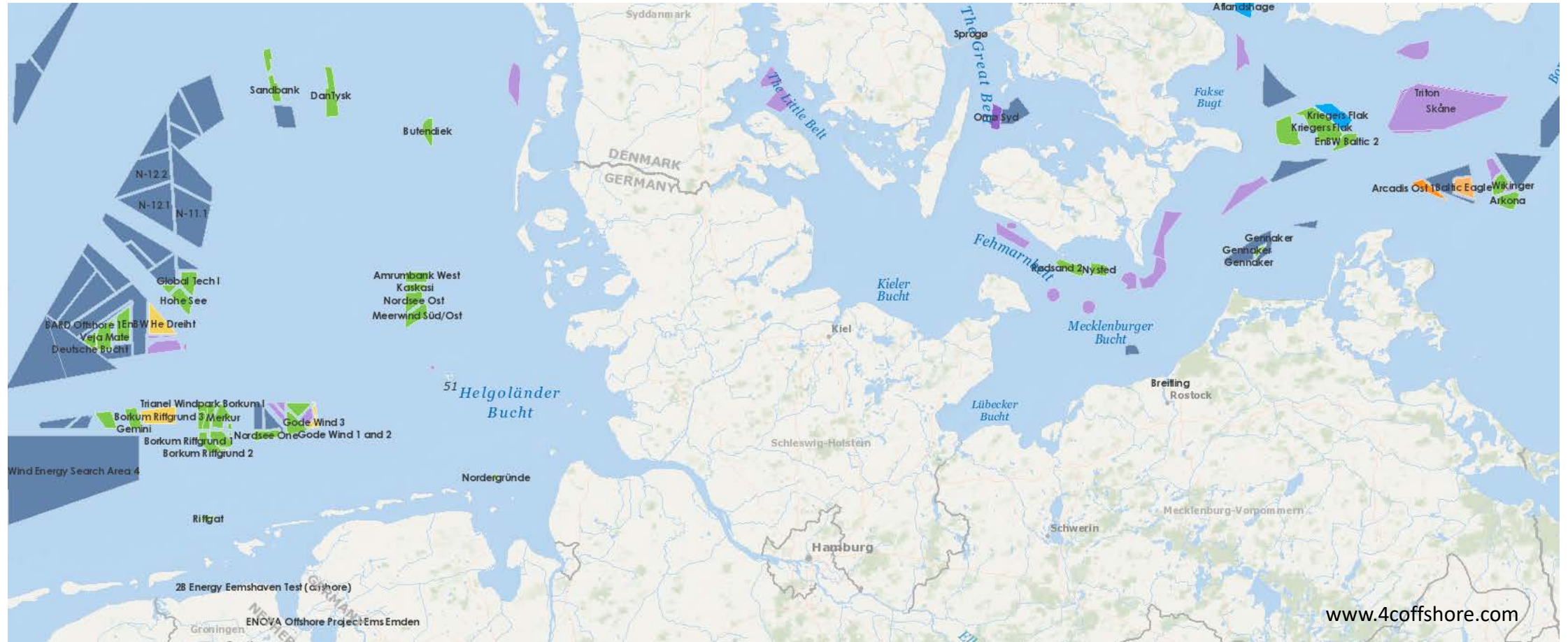
- ecosystem-compatible management of fisheries along CFP
- (temporal) ban of gillnets, to be aligned to CFP [in force in North Sea SPA west of Sylt since March 2023]
- development of alternative fishing methods

Offshore wind farms



Offshore wind farms

- Barrier effect
- Collision
- Visual disturbance
- Underwater noise (effects on birds?)
- Changes in ocean dynamics



Offshore wind farms: barrier effect

Barrier effect during migration

Example: Common Eider, DK

Effect on energy budget

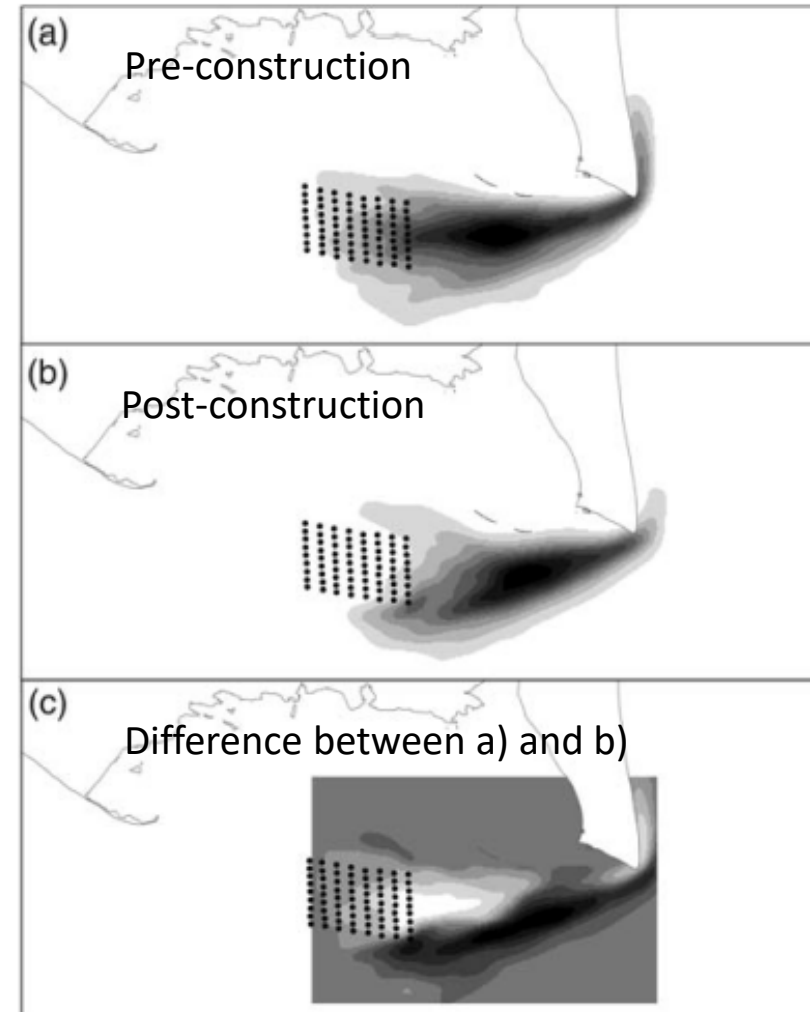
- modification of migration corridors
- detours while foraging

High impact expected for:

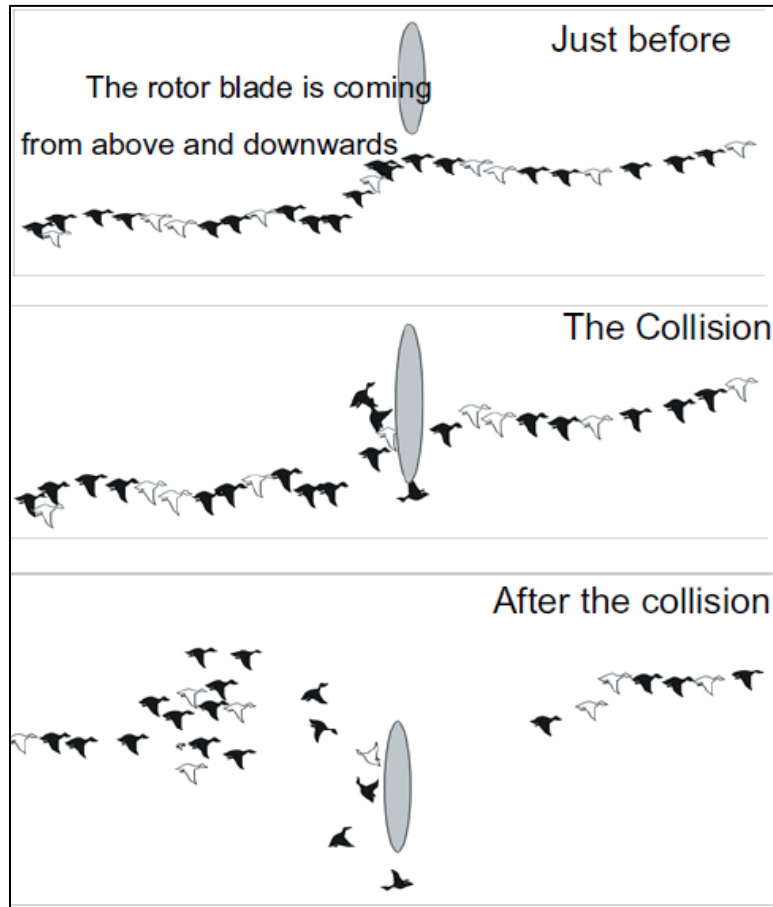
- migrating species
- colony breeders

Suggested measures (MSFD, Marine Spatial Planning):

- maintain corridors



Offshore wind farms: collision



Collision event (common eider) observed in Sweden
(taken from Pettersson 2005)

Impact on birds

- extraction of individuals

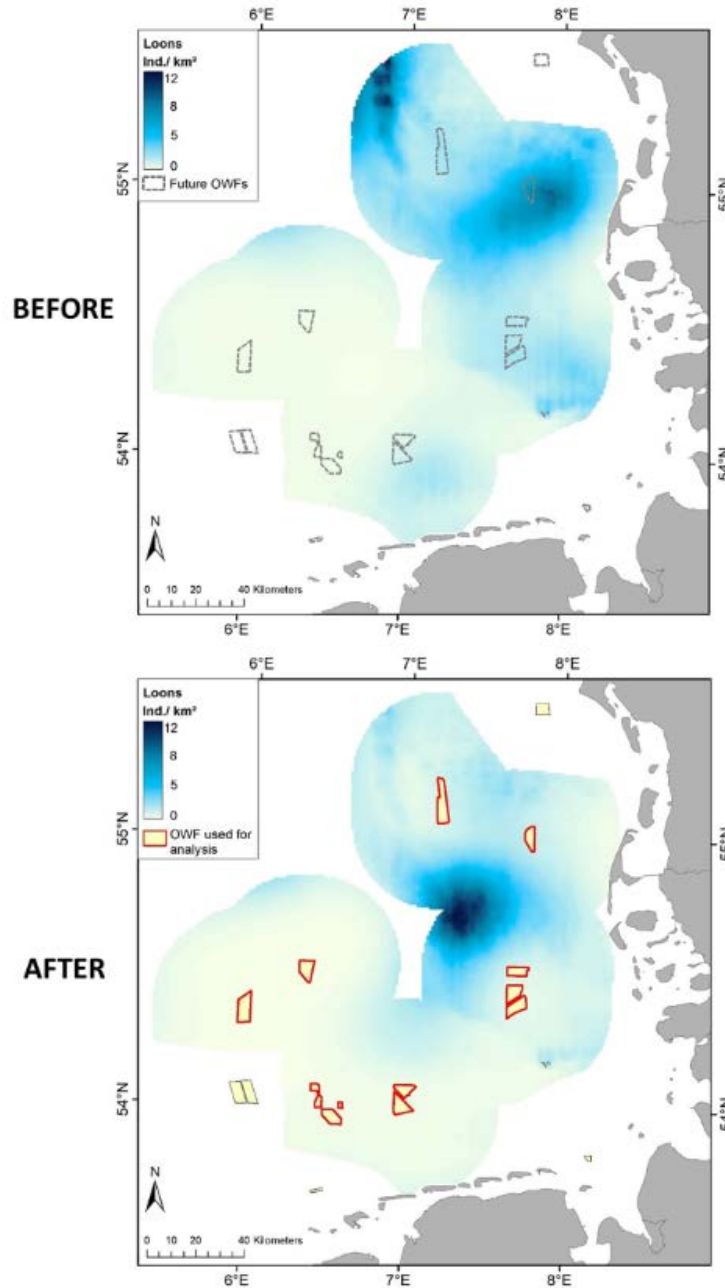
High collision risk expected for:

- great cormorant
- black-headed gull
- common gull
- great black-backed gull
- (and many nocturnal migrants)

Suggested measures (MSFD, Marine Spatial Planning):

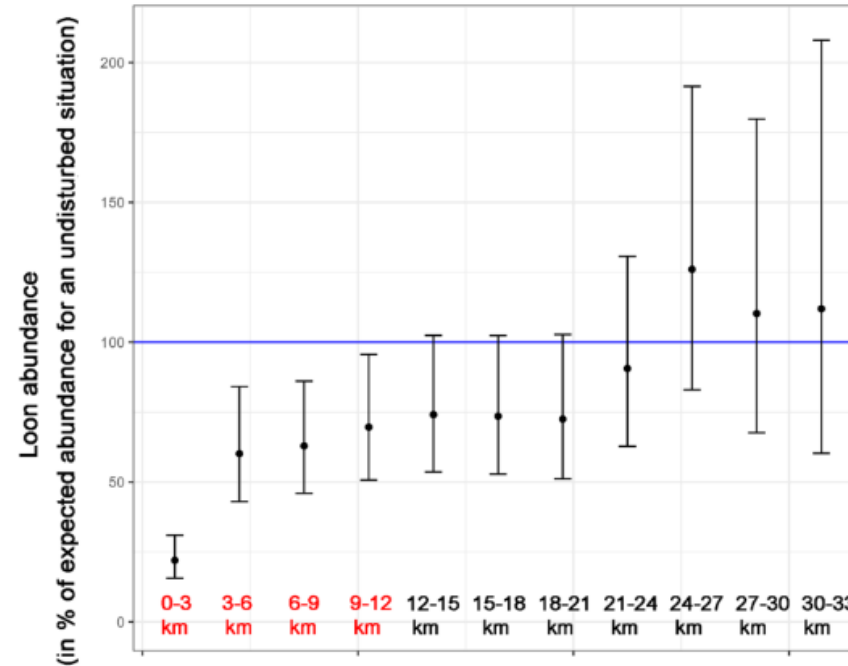
- maintain corridors
- temporal shutdown?

Offshore wind farms: displacement / habitat loss



Visual disturbance

- avoidance -> displacement -> habitat loss



Species affected:

- seaducks
- auks
- gannet
- fulmar
- kittiwake
- auks

Suggested measures (MSFD, AMP):

- ensuring the connectivity of SPAs with functional areas for protected species (e.g. permeable corridors)
- establishment of protected areas

Red-throated diver distribution before / after construction of wind farms, reduced abundance in different distances from wind farms (taken from Garthe et al. 2023, Scientific Reports, <https://www.nature.com/articles/s41598-023-31601-z>)

Offshore wind farms: changes in ocean dynamics

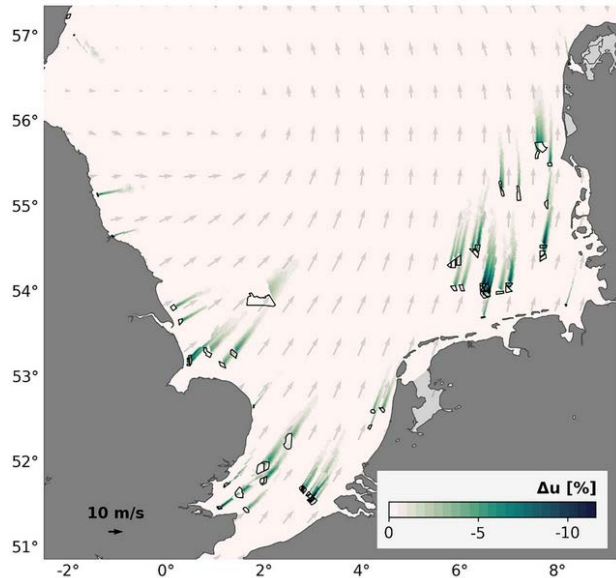
*Wake effects: decreasing sea surface wind speed on leeward side of OWF (several tens of kilometers)
=> alterations in local hydro- and thermodynamics
=> alterations of the temperature and salinity distribution in areas of wind farm operation
=> large-scale structural change in stratification strength
Potential impact on marine ecosystem processes (local primary production, nutrient balance)*

Changes to hydrological conditions
• reduced /altered food supply ?

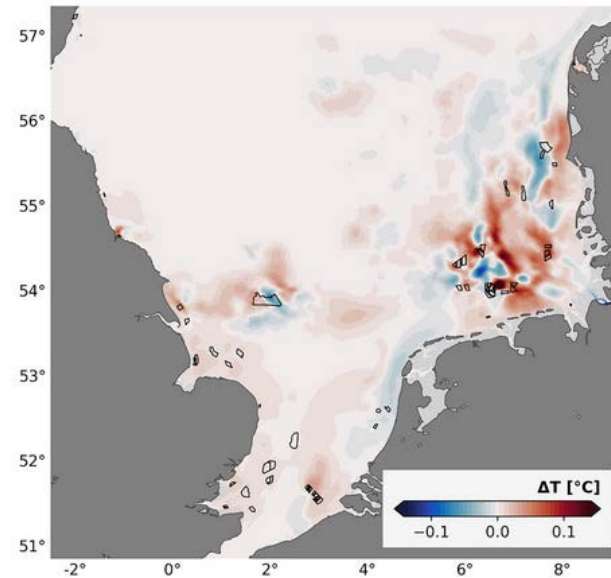
Relevant for all seabird species

No suggested measures

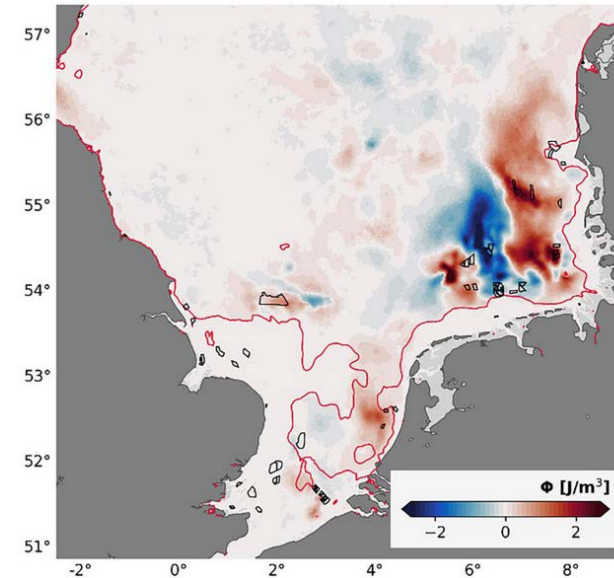
Instantaneous change of wind speed for a strong wind event on 10 May 2013



mean change in sea surface temperature (August 2013)



monthly mean change in stratification (July)



Removal of ammunition

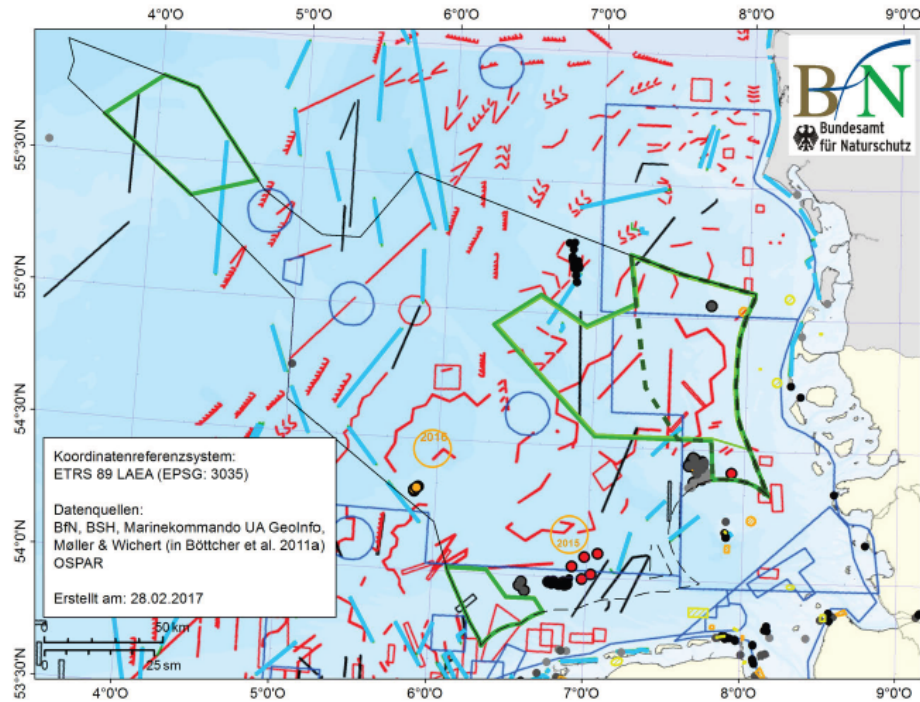
Input of energy: impulsive underwater noise

- damage / destruction of the hearing (?)
- disturbance / masking of acoustic signals (from prey)
- disturbance / displacement (?)

Relevant for all diving seabird species

Suggested measures (MSFD, AMP), for harbour porpoise:

- mitigation of hazards due to removal of ammunition (e.g. use of bubble curtains, acoustic displacement)



Ehemalige Minensperren

- deutsche Minensperren 1. Weltkrieg
- englische Minensperren 1. Weltkrieg
- deutsche Minensperren 2. Weltkrieg
- englische Minensperren 2. Weltkrieg

An OSPAR gemeldete Munitionsfunde und -sprengungen (2009-2013 und 2015)

- Meldungen 2015
- Meldungen 2013
- Meldungen 2012
- Meldungen 2011
- Meldungen 2010

Munitionsaltlasten

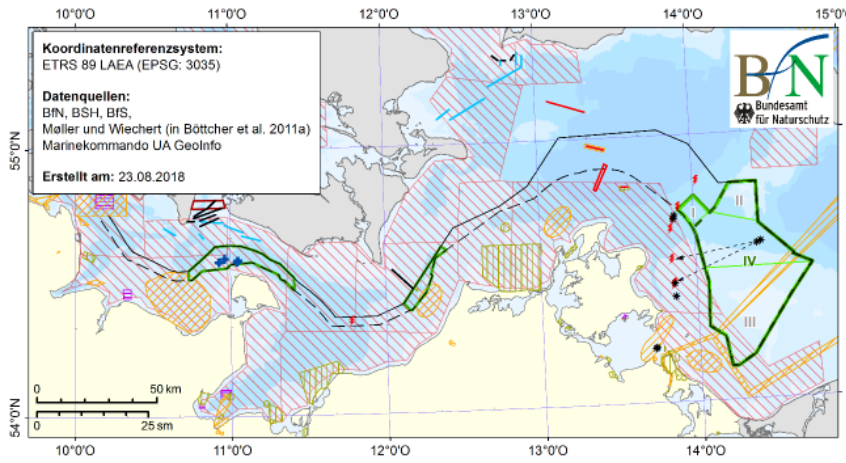
- Munitionsversenkungsgebiet
- Munitionsbelastete Fläche

Bekanntmachung Seefahrer (2013-16)

- Munitionsfund
- Sprengung

NSG in der deutschen AWZ (Nordsee)

- Außengrenze
- NSG "Sylter Außenriff - Östliche Deutsche Bucht"
- Bereich I (nach FFH-RL)
- Bereich II (nach VRL)



Naturschutzgebiete in der deutschen AWZ

- Außengrenze
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- Bereich IV (nach VRL) im NSG "Pommersche Bucht – Rönnebank"

Bekanntmachungen für Seefahrer

- Unrein Munition Ankerverbot
- Sprengung von Granaten 2015/2016
- Munitionsfund, nicht ermittelbare Art der Beseitigung

Militärische Altlasten

- deutsche Minensperren 1. Weltkrieg
- deutsche Minensperren 2. Weltkrieg
- dänische Minensperren 2. Weltkrieg
- russische Minensperren 1./2. Weltkrieg
- englische Luftminen - "Gardens"

Munitionsbelastete Flächen

- Munitionsversenkungsgebiet
- Munitionsbelastete Fläche
- Munitionsverdachtsfläche

What we need

Effective protection / Coherent network of protected areas

- All relevant sites identified
- Implemented as protection areas
- Adequately managed

Avoid/mitigate impacts of threats outside protected areas

How to get there

Review coherence of site network

- All relevant sites identified? (throughout yearly cycle)
- Implemented?
- Adequately managed? (MP cannot address shipping/fishery)
- Assess at flyway scale
- Identify season-specific bottleneck sites

Spatial planning to avoid impacts of pressures

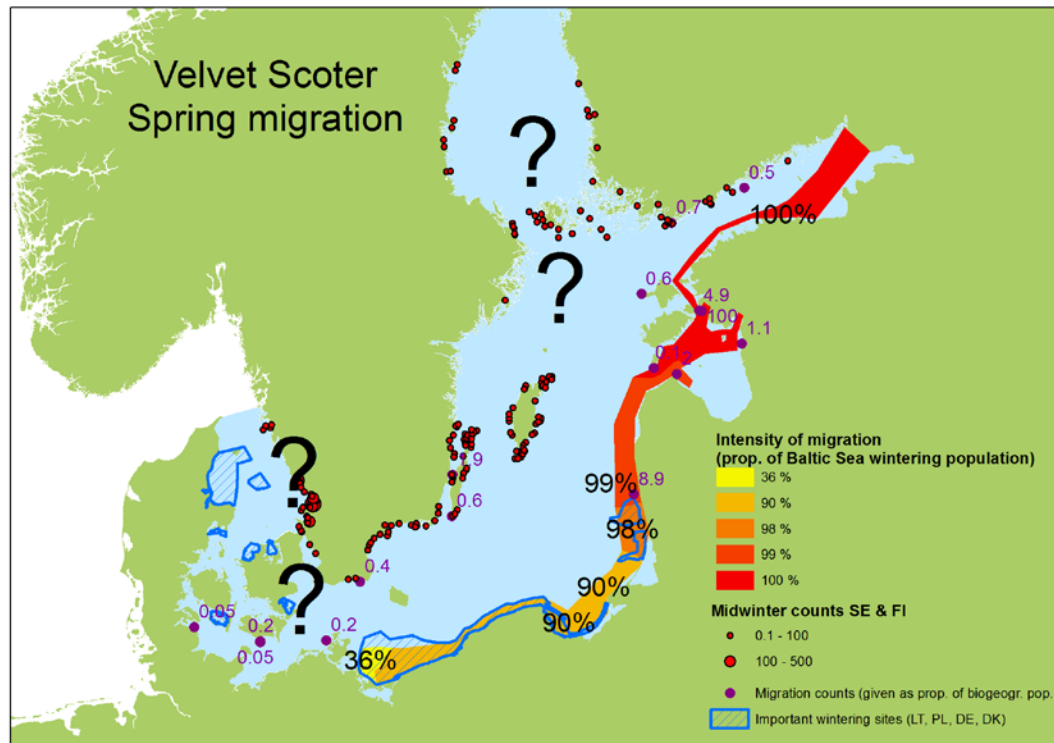
- Produce sensitivity maps
- Draft guidance document
- Appropriate SEA/EIA
- Cumulative impact assessment at flyway scale

Initiatives



HELCOM Recommendation 34E-1 'Safeguarding important bird habitats and migration routes in the Baltic Sea from negative effects of wind and wave energy production at sea'

Workshop in Nov 2018, Helsinki



Suggestions for BSAP update

Maintain updated map of the sensitivity of seabirds to threats such as wind energy facilities, wave energy installations, shipping and fisheries
(to inform EIAs and spatial planning)

Assess the effectiveness of conservation efforts to protect seabirds against threats and pressures

Initiatives

Development MSFD indicator D1C5 “Marine bird habitat quality”

(Lead: Volker Dierschke)

model distribution
for situation without disturbance
from human activities

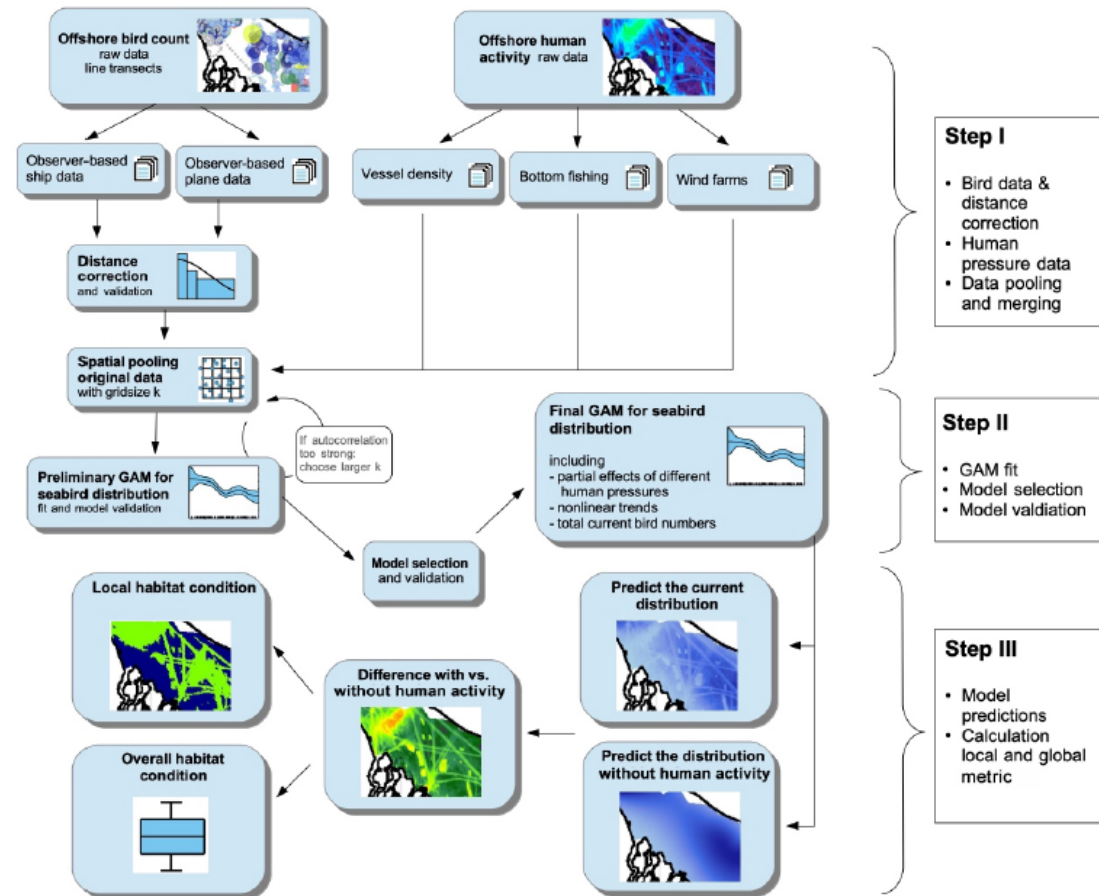
and compare with

actual distribution in assessment period

→ Strength of effects

→ Map effects (local difference
between unaffected and affected
bird densities)

→ Global effect (indicator metric)



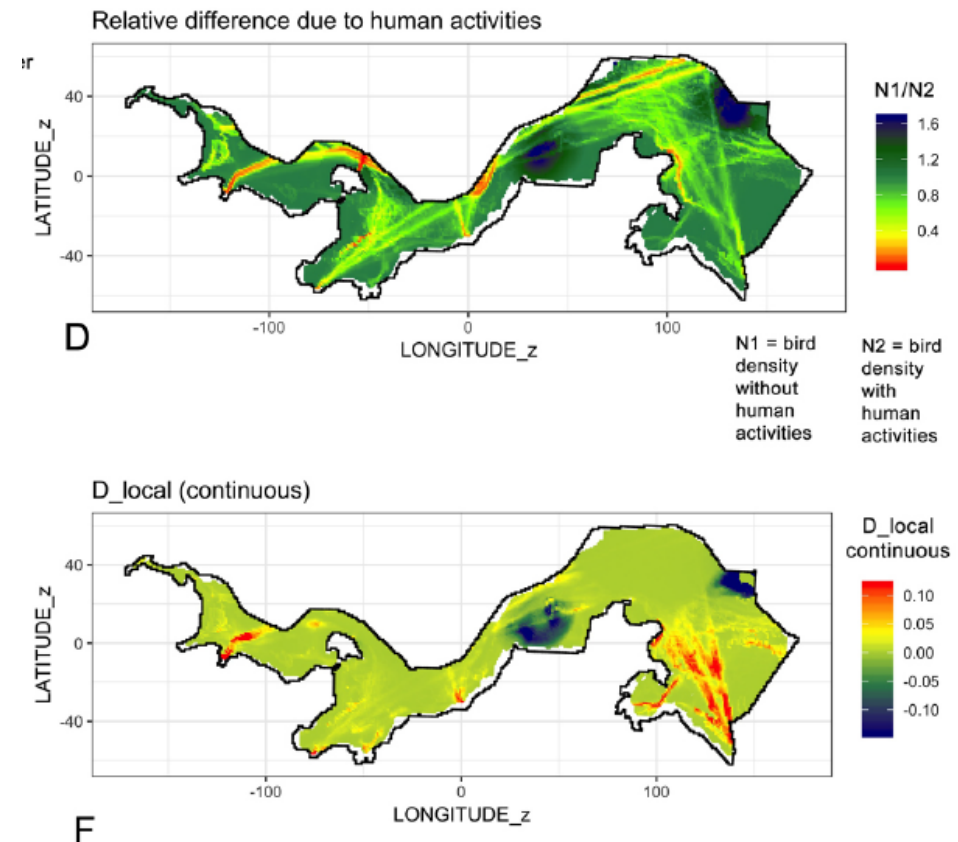
Initiatives

Development MSFD indicator D1C5 “Marine bird habitat quality”

(Lead: Volker Dierschke)

Example LTD German Baltic Sea

Significant negative effect of ship traffic & bottom trawling on Long-tailed Duck abundance



Thank you for your attention!

