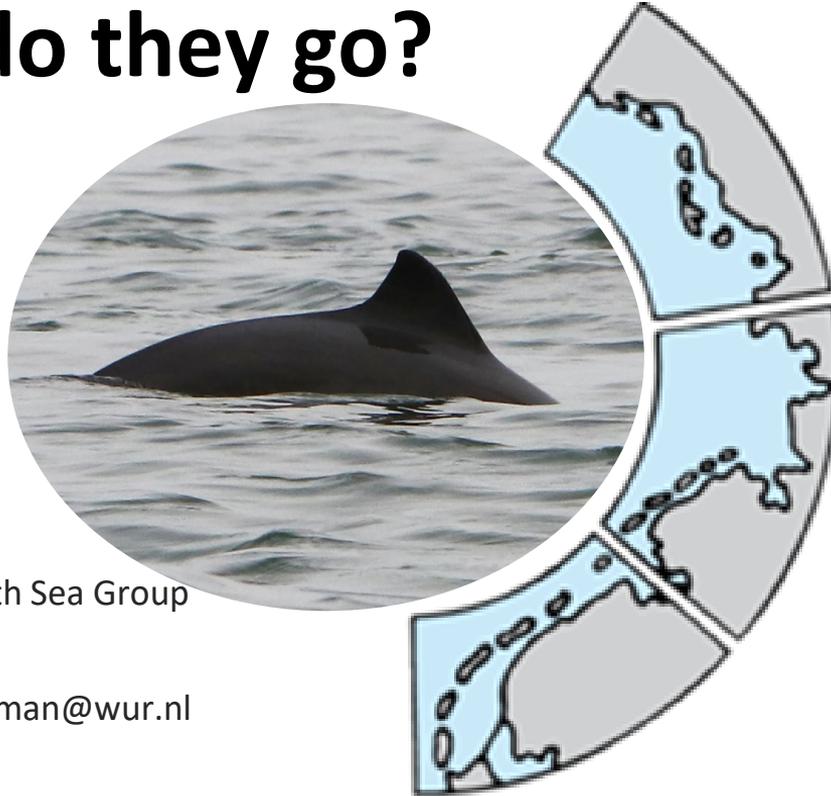


Harbour porpoise in the Wadden Sea - where do they come from and where do they go?

Using current knowledge for successful trilateral monitoring in the World Heritage Site



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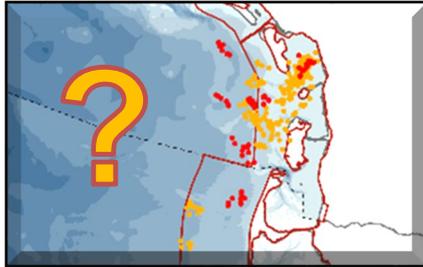
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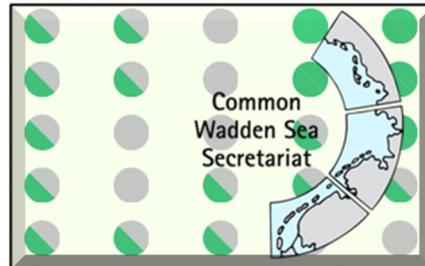
This talk addresses these three questions:



Why talk about porpoises in the WHS Wadden Sea?

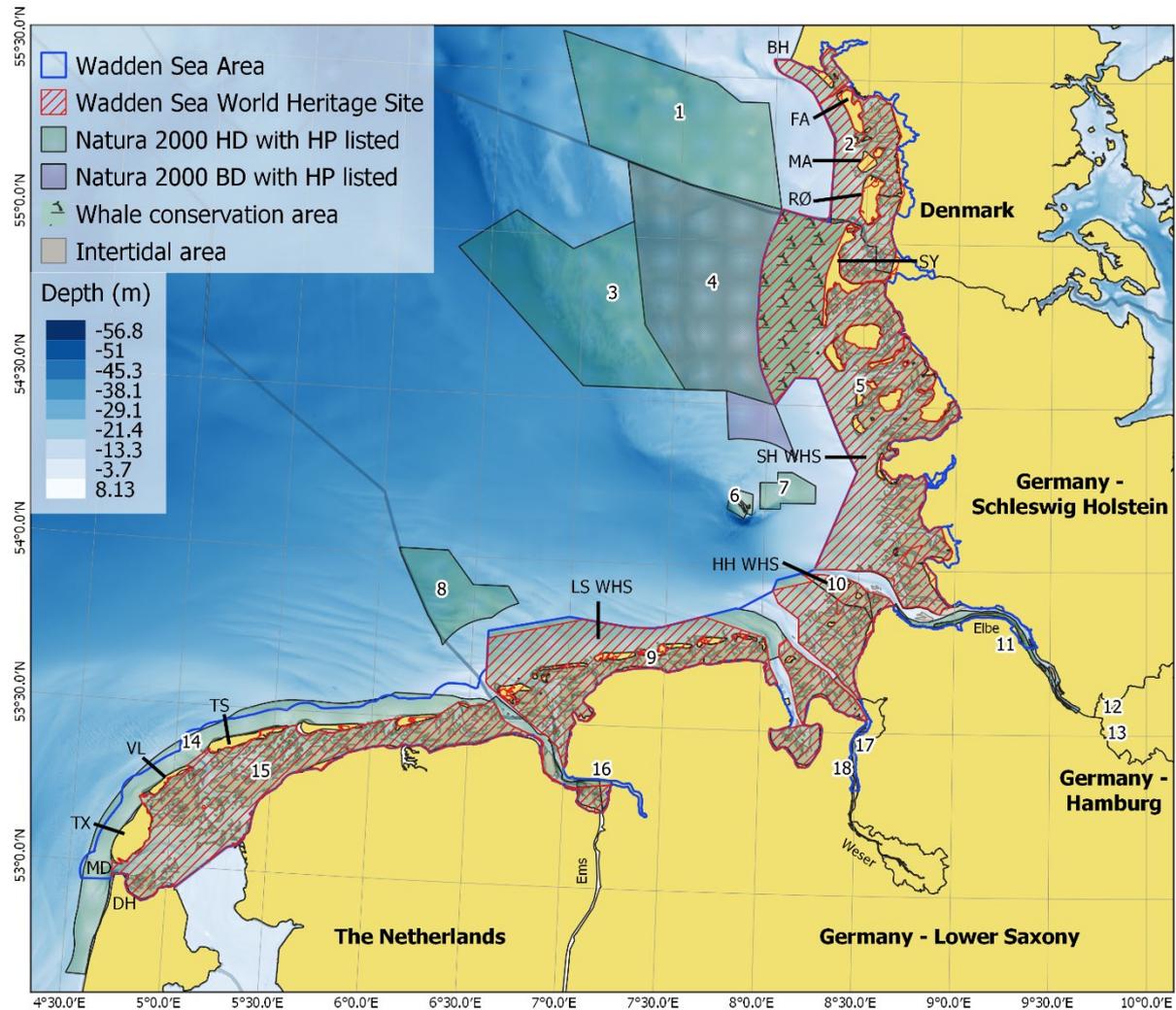


What do we know?



How can we assess the local porpoises?

Where are we



The Wadden Sea Plan identifies two conservation and management targets for the harbour porpoise:

1. **Viable stock** and a **natural reproduction capacity**
2. **Habitat quality** should be adequate for the conservation of the species



The Wadden Sea Plan identifies two conservation and management targets for the harbour porpoise:

Quality Status Assessment (Reijnders et al. 2009):

A **viable population** is one that “maintains its vigour and its potential for evolutionary adaptations”.

To do this a population has to be large enough to withstand catastrophic events, and to have enough genetic variability so that its evolutionary potential is not hindered.

The use of the term “**stock**”, if used in fishery management, is to describe a living resource from which catches are taken. The term “usually implies that the particular population is more or less isolated reproductively from other stocks of the same species and hence self-sustaining” (FAO 1997).



How to assess the management targets for the harbour porpoise in the WHS is not defined

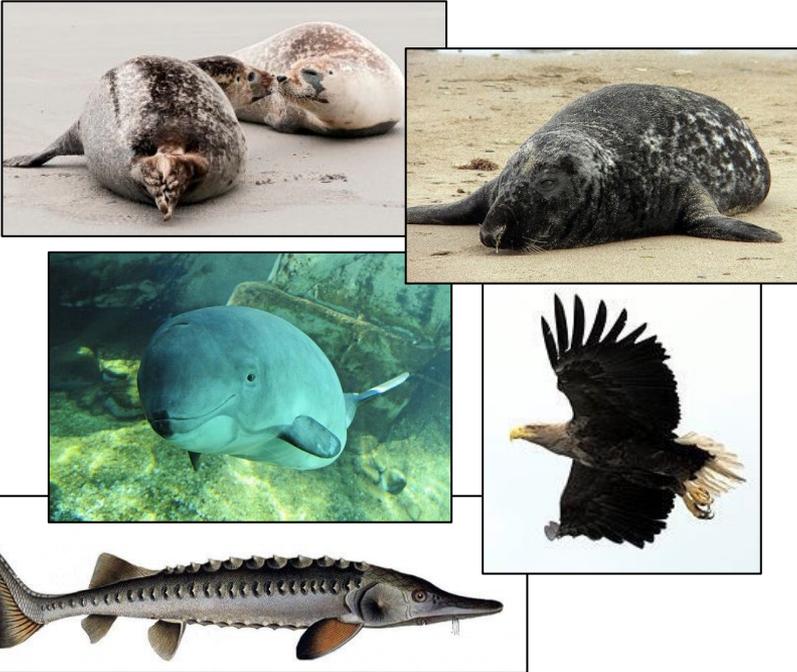
Viable stock with a natural reproduction capacity

Conservation of habitat quality

What monitoring criteria are needed to assess these management targets?

The harbour porpoise is used in outreach and public relation

One of the “big five”



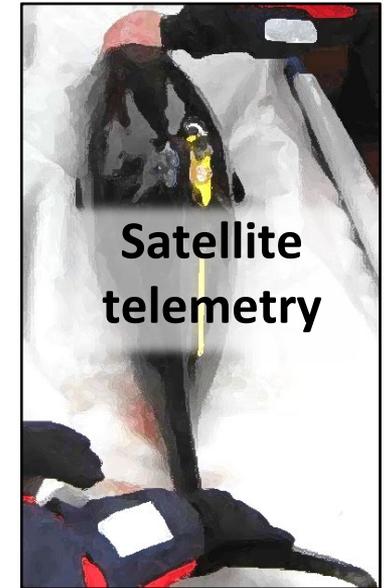
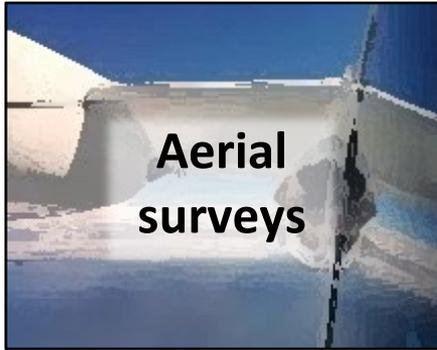
On the logo of the WHS
Wadden Sea



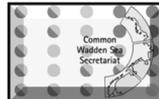
Images: <https://dier-en-natuur.infonu.nl/dieren/162052-big-five-van-de-waddenzee-vijf-grote-dieren-dichtbij.html>



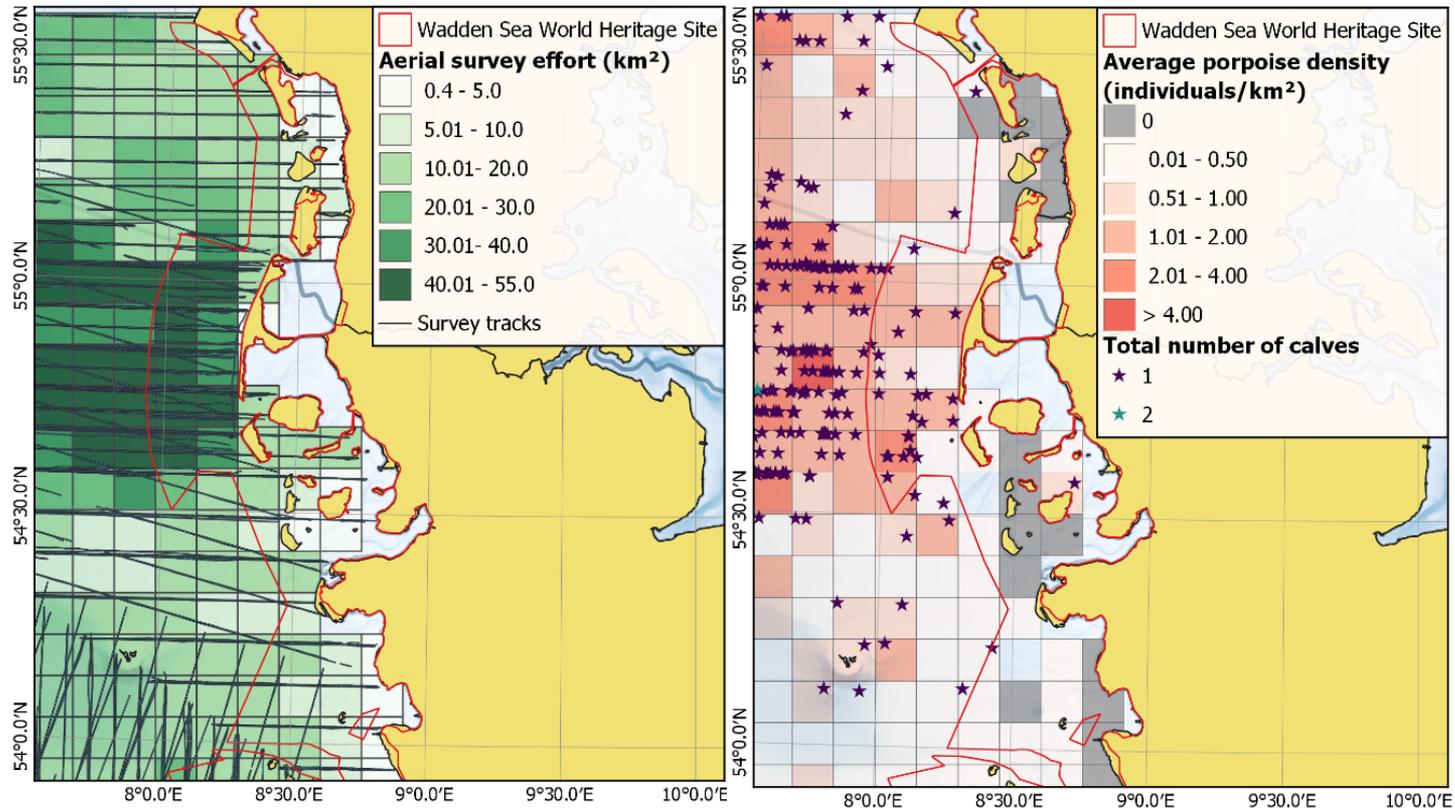
Harbour porpoise research in the Wadden Sea



Scheidat et al. *in prep.* Status of harbour porpoise in the Wadden Sea World Heritage Site and requirements for trilateral monitoring. [Submitted to Marine Biodiversity Special issue Wadden Sea]

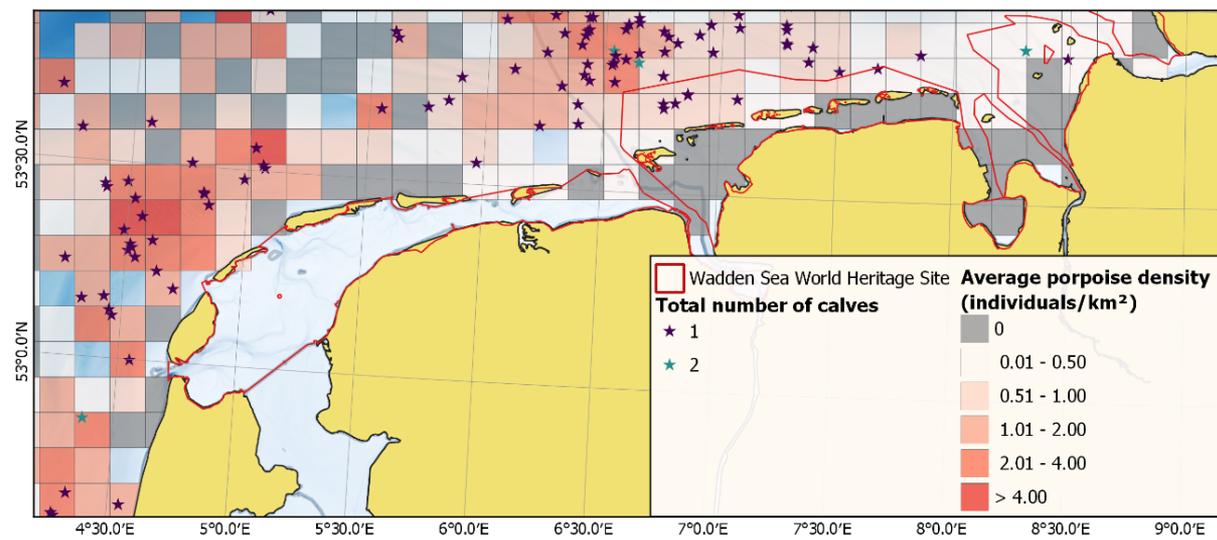
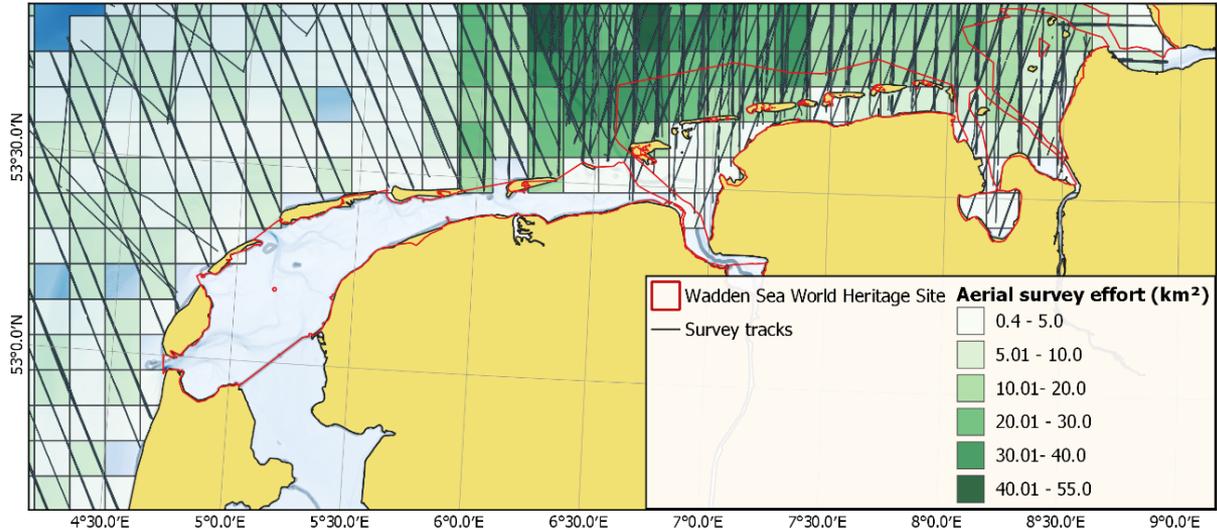


In the WHS Wadden Sea, harbour porpoise summer density is highest in Whale Conservation area off Sylt



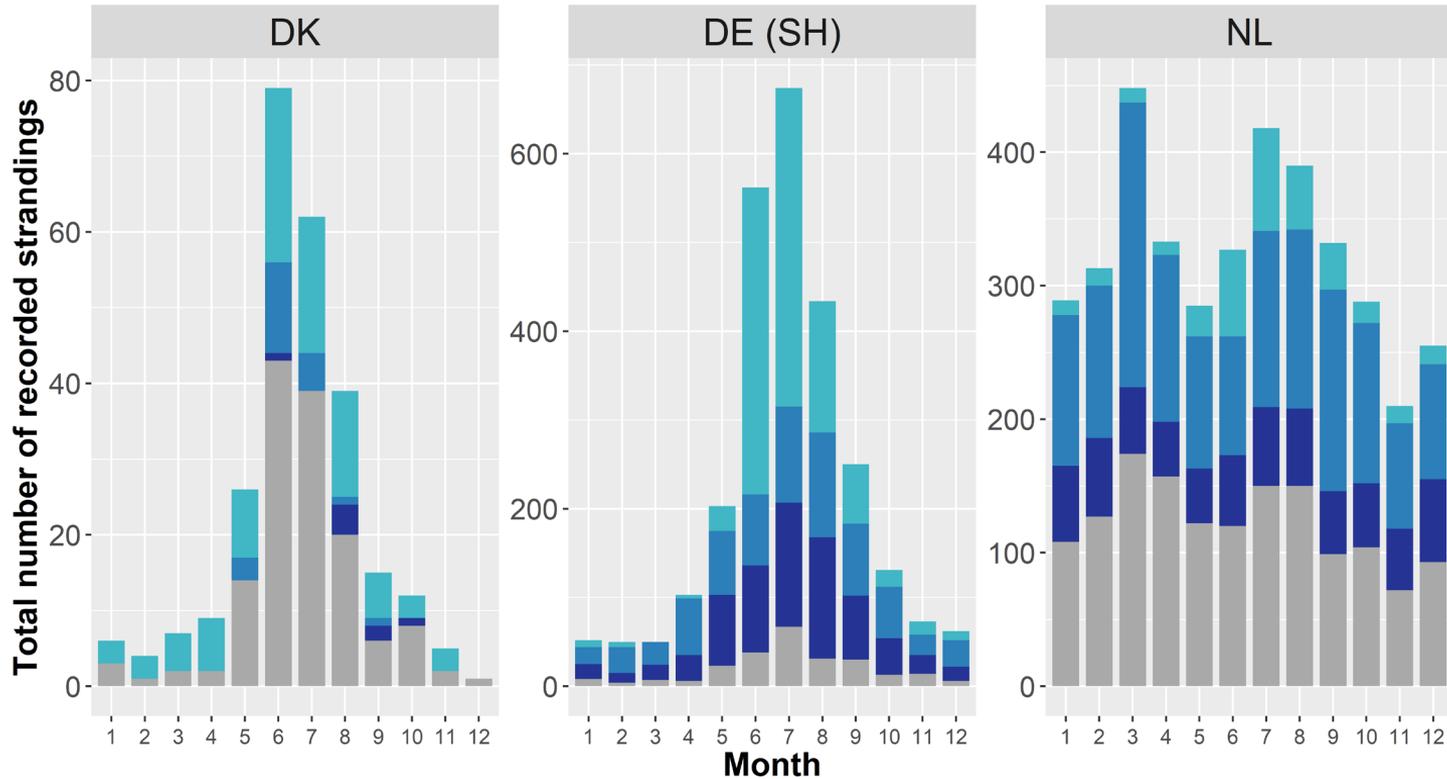
Data sources: dedicated aerial surveys Denmark (2011 to 2019) and Germany (2002 to 2020)

Harbour porpoise summer density in Lower Saxony and NL is highest off Borkum and Texel



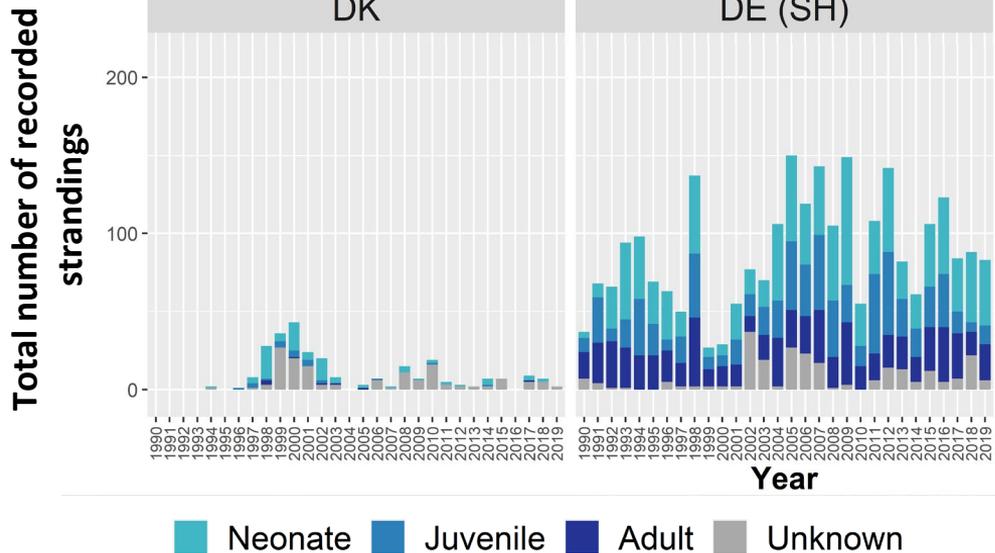
Data sources: dedicated aerial surveys Germany (2002 to 2020), and the Netherlands (2008 to 2019).

Harbour porpoise stranding peak in DK and DE (SH) in the summer with high proportion of calves



Neonate Juvenile Adult Unknown

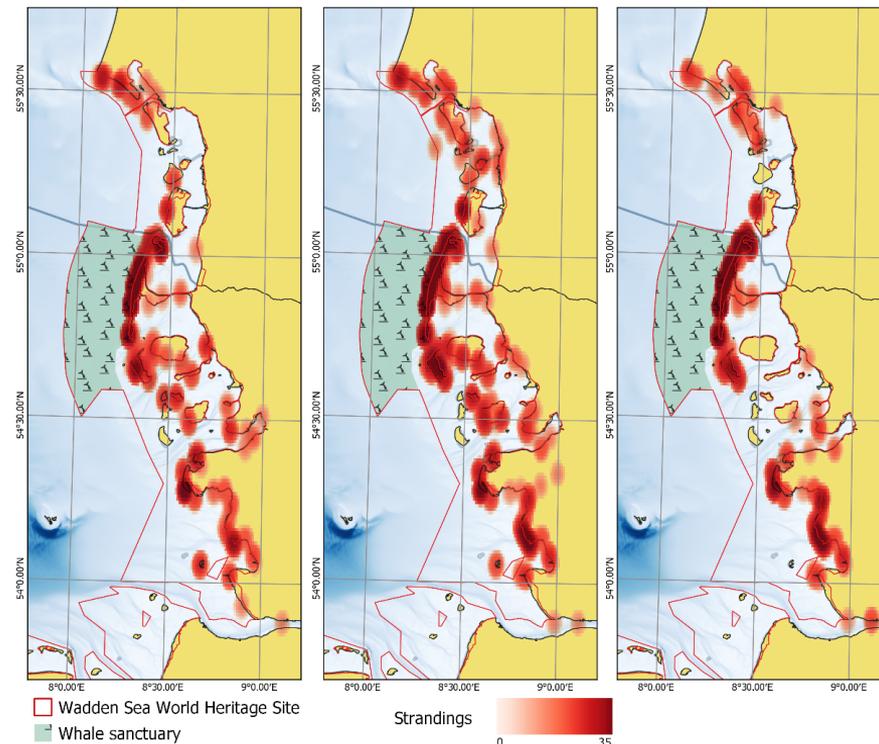
Decrease of stranding numbers along the German (SH) mainland coast in the last decade



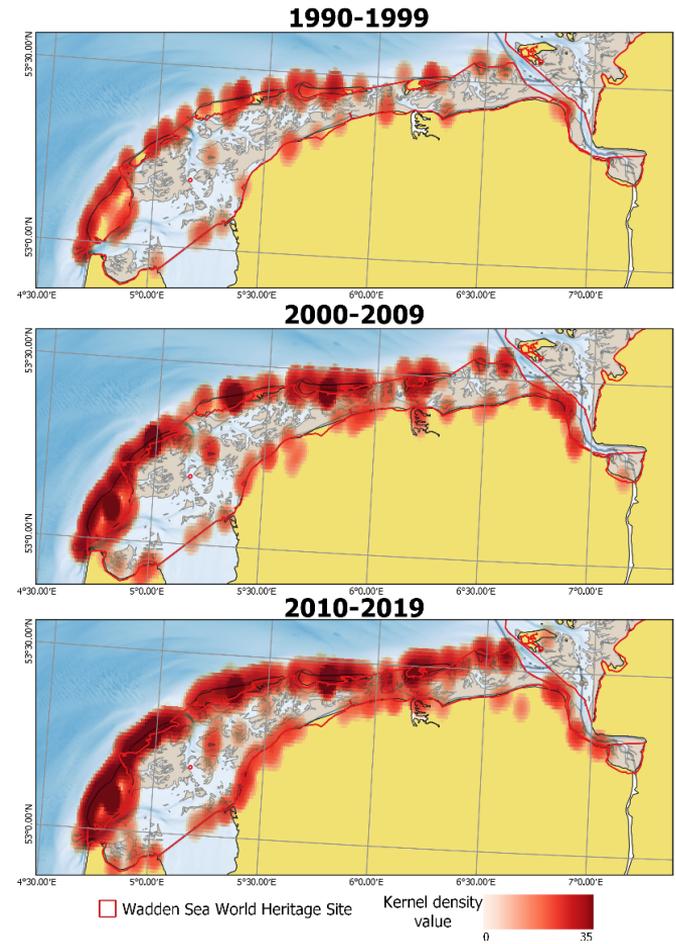
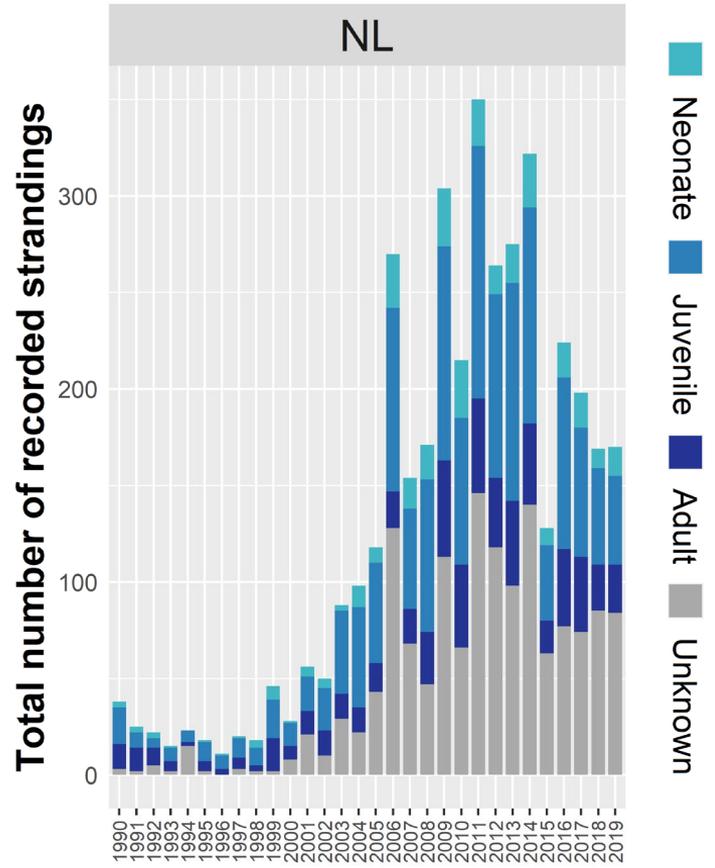
1990-1999

2000-2009

2010-2019

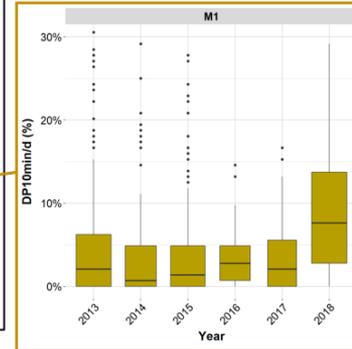
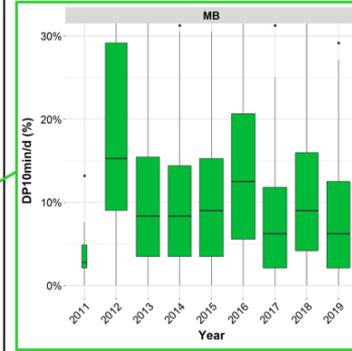
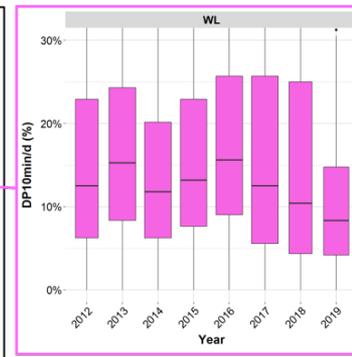
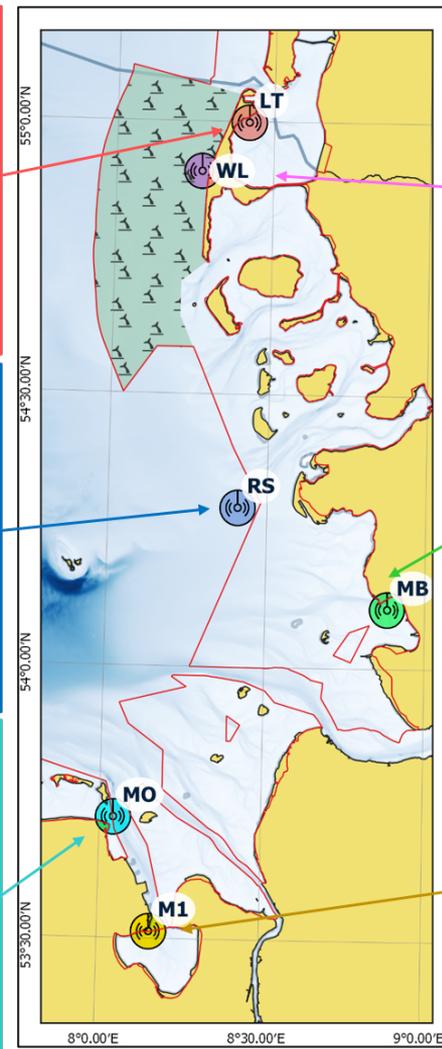
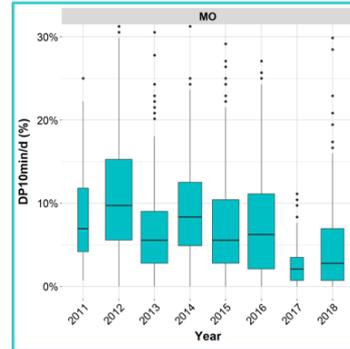
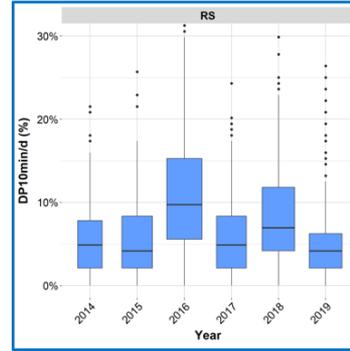
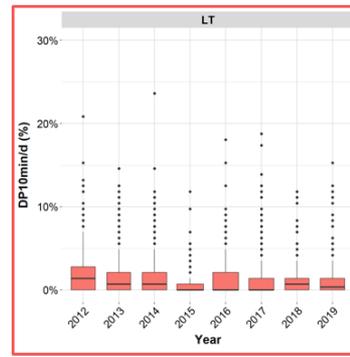


Increase in stranding records in the NL

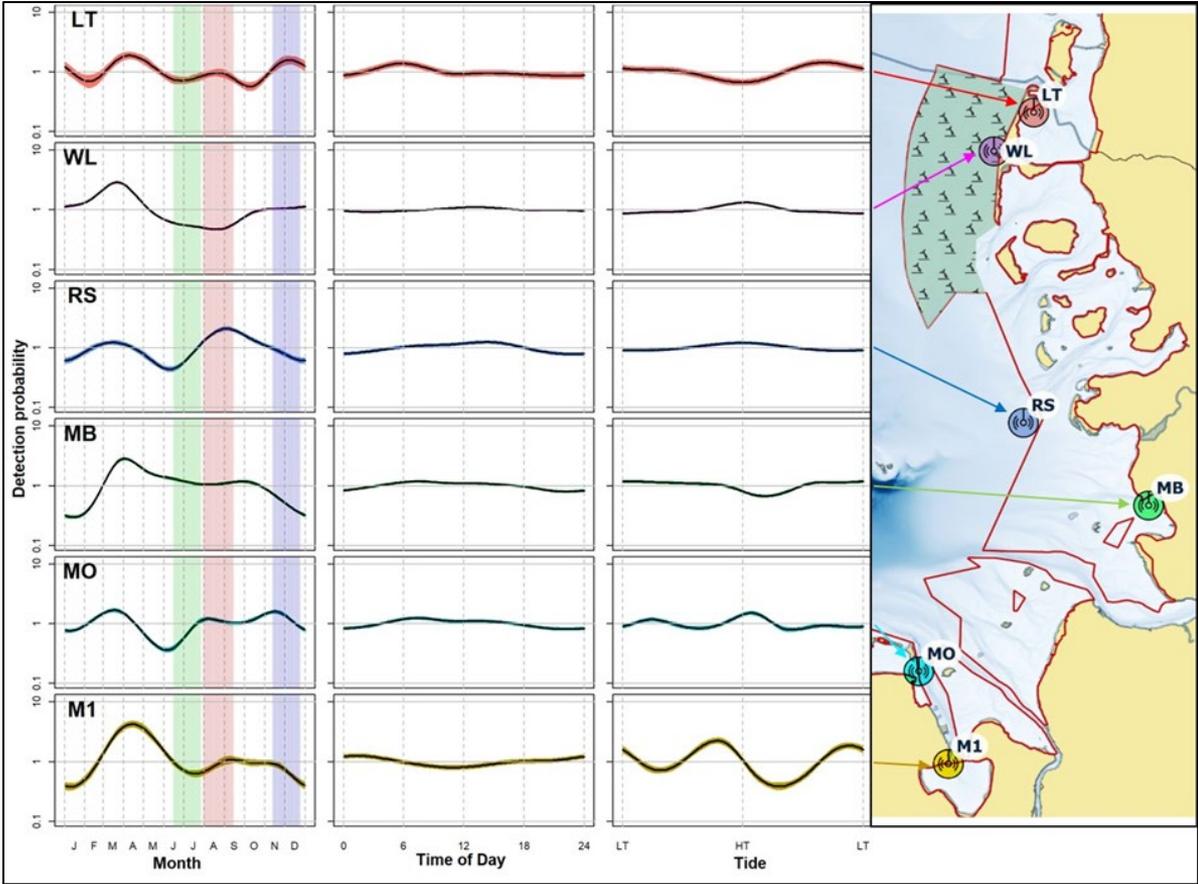


Data: 1990 to 2019

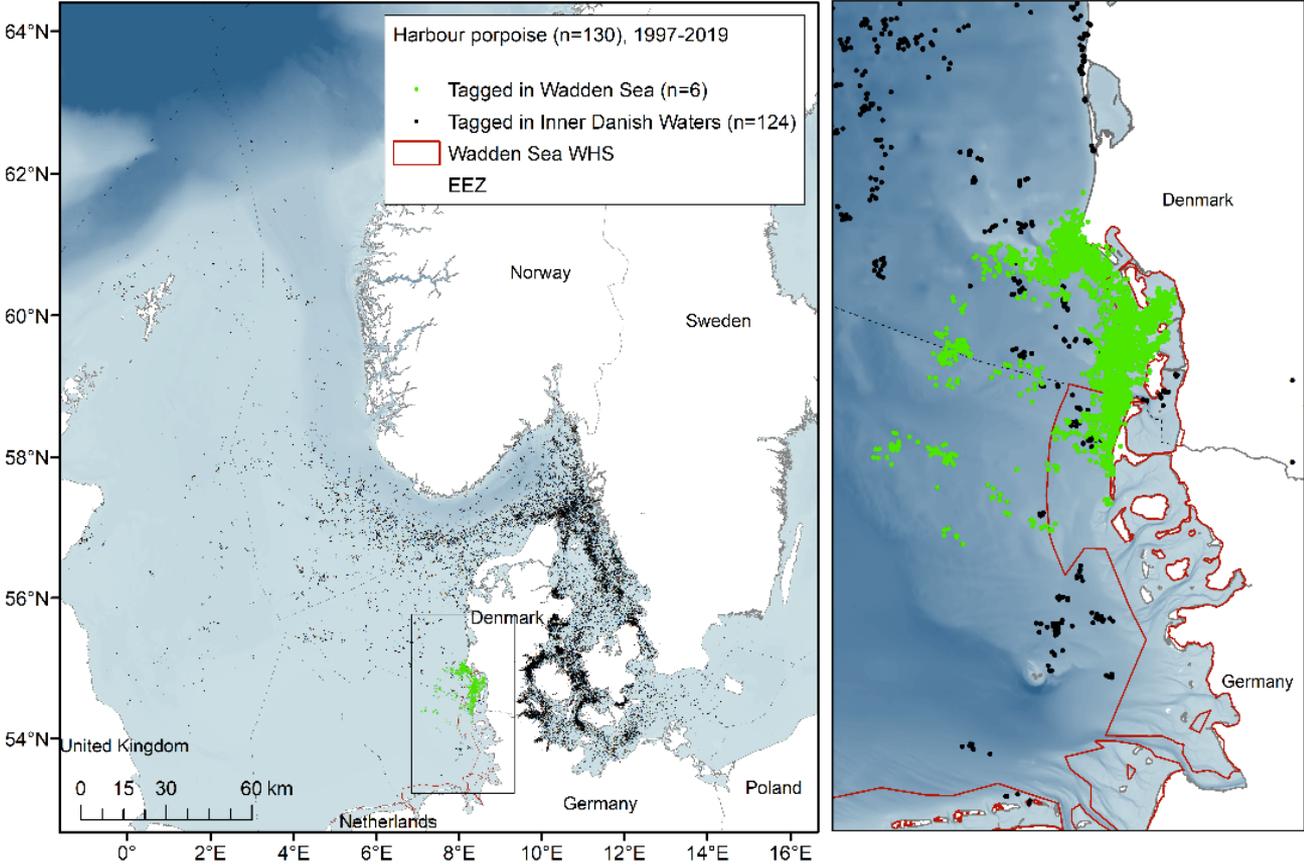
Harbour porpoise acoustic detections vary between locations but are fairly stable over time



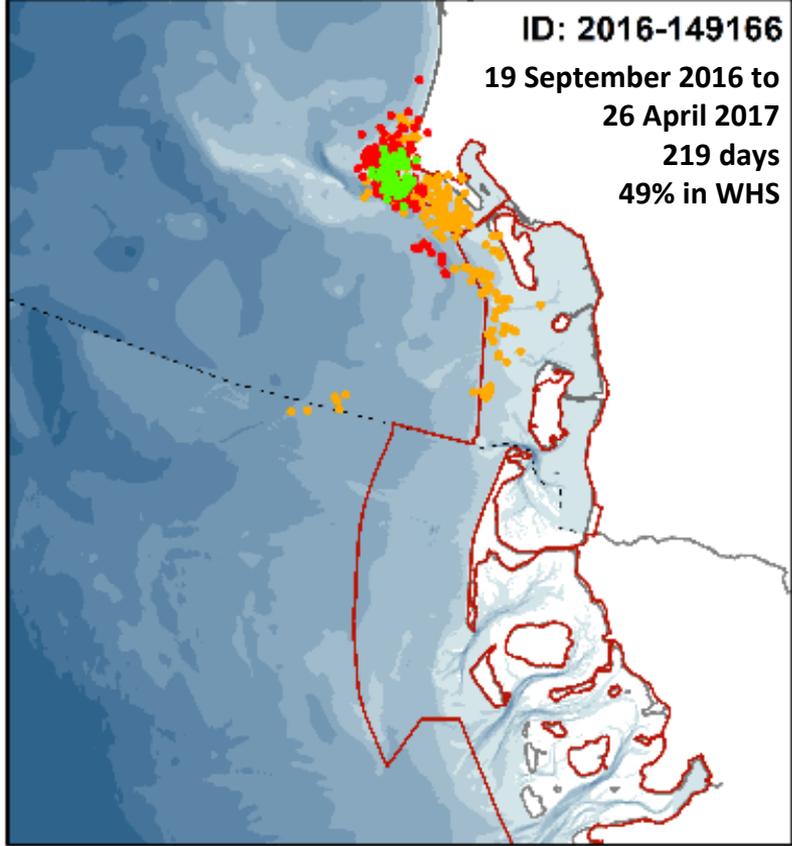
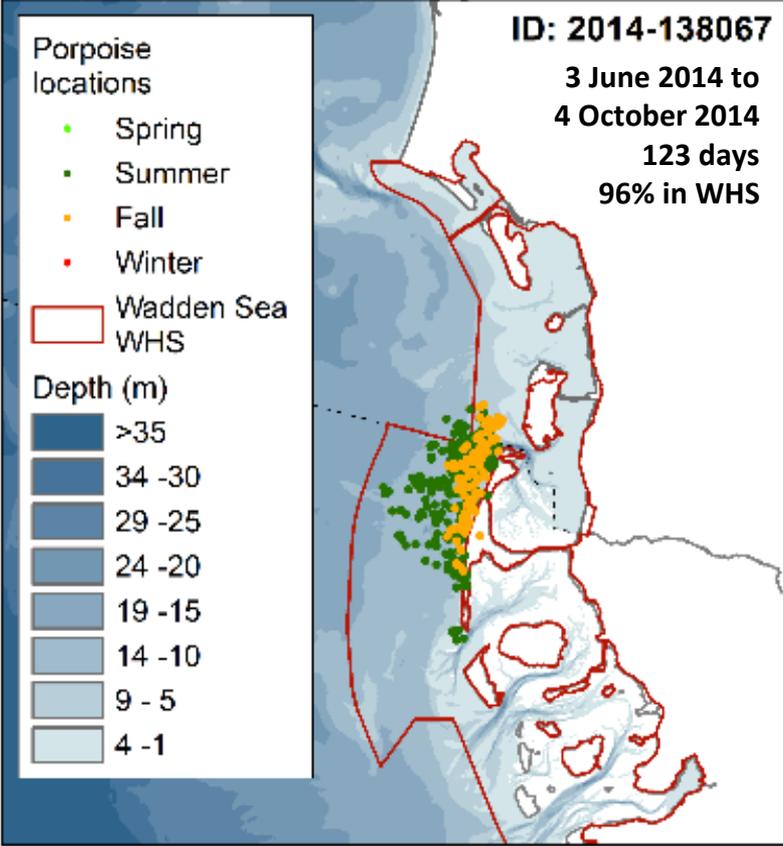
Harbour porpoise acoustic detections show relationship with season and tide but are variable between stations



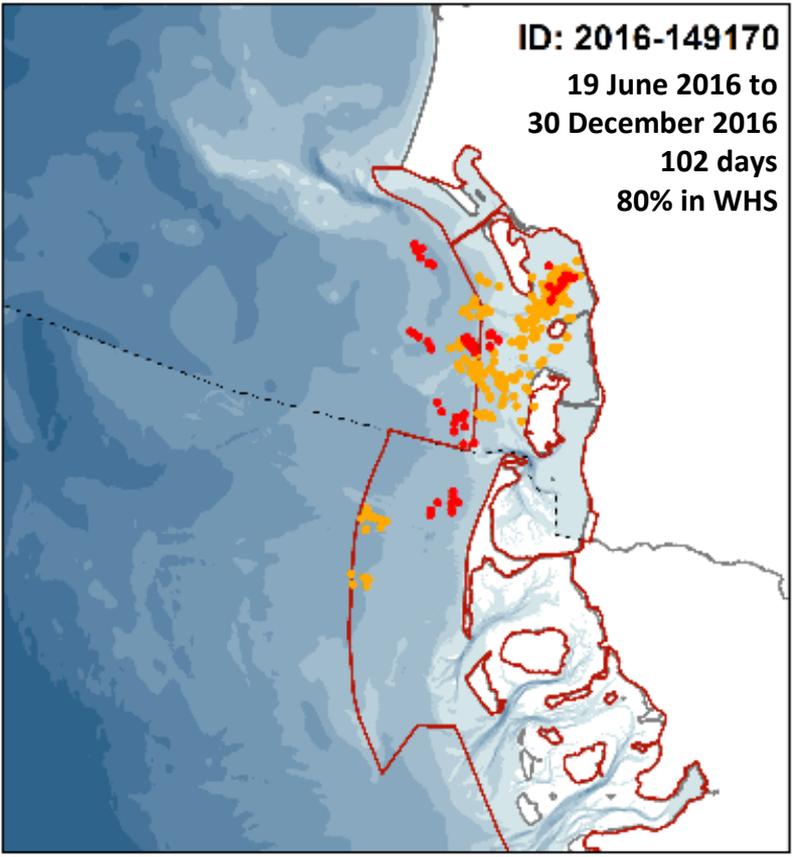
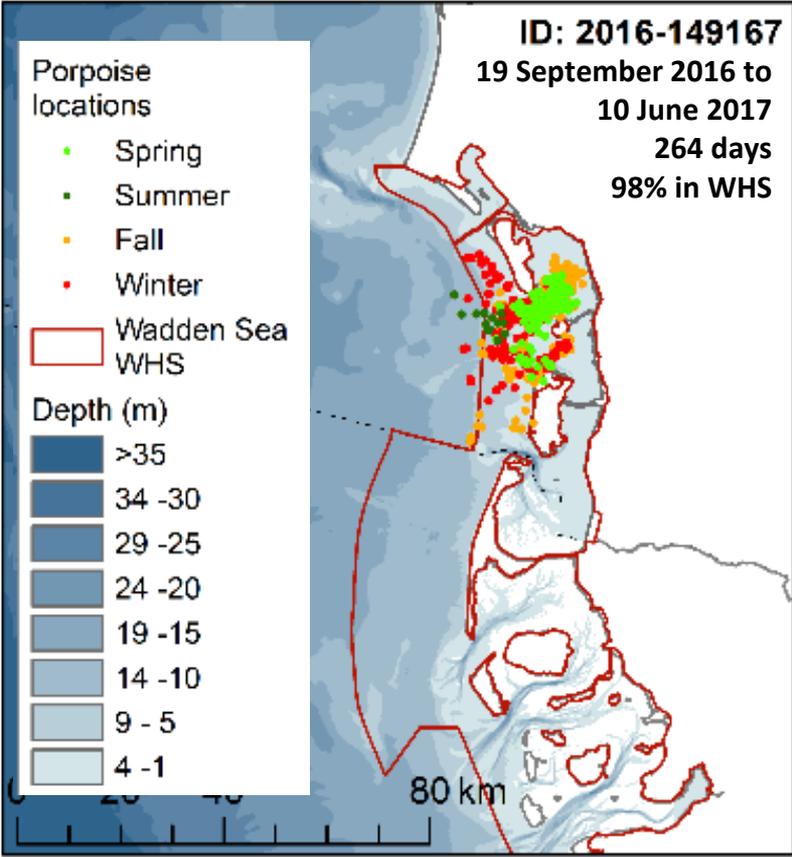
Six male porpoises tagged in the Wadden Sea – they didn't venture far



Six porpoises tagged in the Danish Wadden Sea stay in the WHS Wadden Sea most of the time



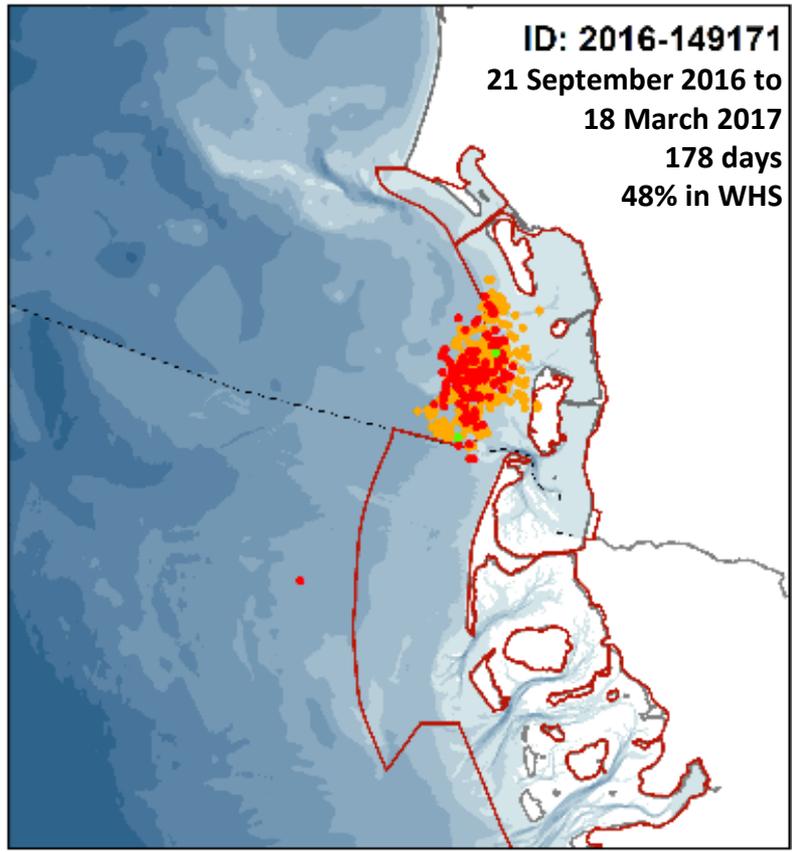
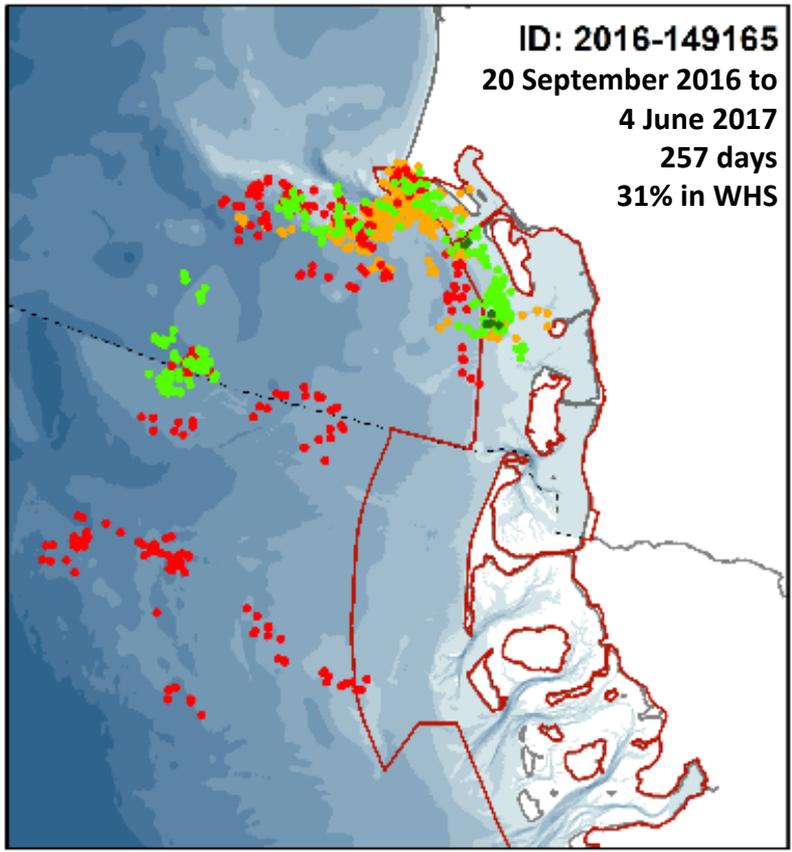
Six porpoises tagged in the Danish Wadden Sea stay in the WHS Wadden Sea most of the time



Six porpoises tagged in the Danish Wadden Sea stay in the WHS Wadden Sea most of the time



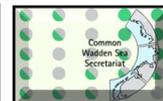
- Porpoise locations
- Spring
 - Summer
 - Fall
 - Winter
- Wadden Sea WHS
- Depth (m)
- >35
 - 34 -30
 - 29 -25
 - 24 -20
 - 19 -15
 - 14 -10
 - 9 -5
 - 4 -1



How can we assess the local porpoises?

Recommendations:
Management framework

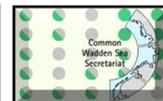
- Evaluate the current conservation objectives (“viability”, “stock” and “habitat quality”)
- Identify what assessment criteria should be used
- Clarify the Management Unit (WHS, Wadden Sea Area)
- Identify suitable monitoring methods
- Identify the required spatial and temporal coverage
- Use a trilateral framework for data collection, analyses and storage



How can we assess the local porpoises?

Recommendations:
Science & Management

- Fill “gaps” in current research efforts between countries, such as in stranding network
- Ensure that methods on data collections are streamlined between countries
- Compile and (re)analyse existing datasets across trilateral partners, such as include new algorithms to find foraging clicks in PAM data
- Extend existing scientific projects to neighbouring countries, such as PAM or tagging



In summary:

Why talk about porpoises in the WHS Wadden Sea?



- Integral part of the WS WHS outreach and contribute to OUV
- Framework aims to assess viability, reproductive capacity and habitat quality

What do we know?



- Regular occurrence, linked to season and tides
- Shifts in occurrence over time
- Satellite telemetry indicates a degree of residency

How can we assess them?



- Identification of criteria to monitor
- Use of methods most suited
- Coordinated trilateral approach

Questions?

Research methods and criteria to measure

Monitoring Criteria \ Methods	Aerial surveys	Stranding database	Post-mortems	PAM	Telemetry
Abundance					
Index of occurrence					
Distribution					
Habitat use					
Behaviour					
Feeding ecology					
Reproduction					
Age structure					
Health					