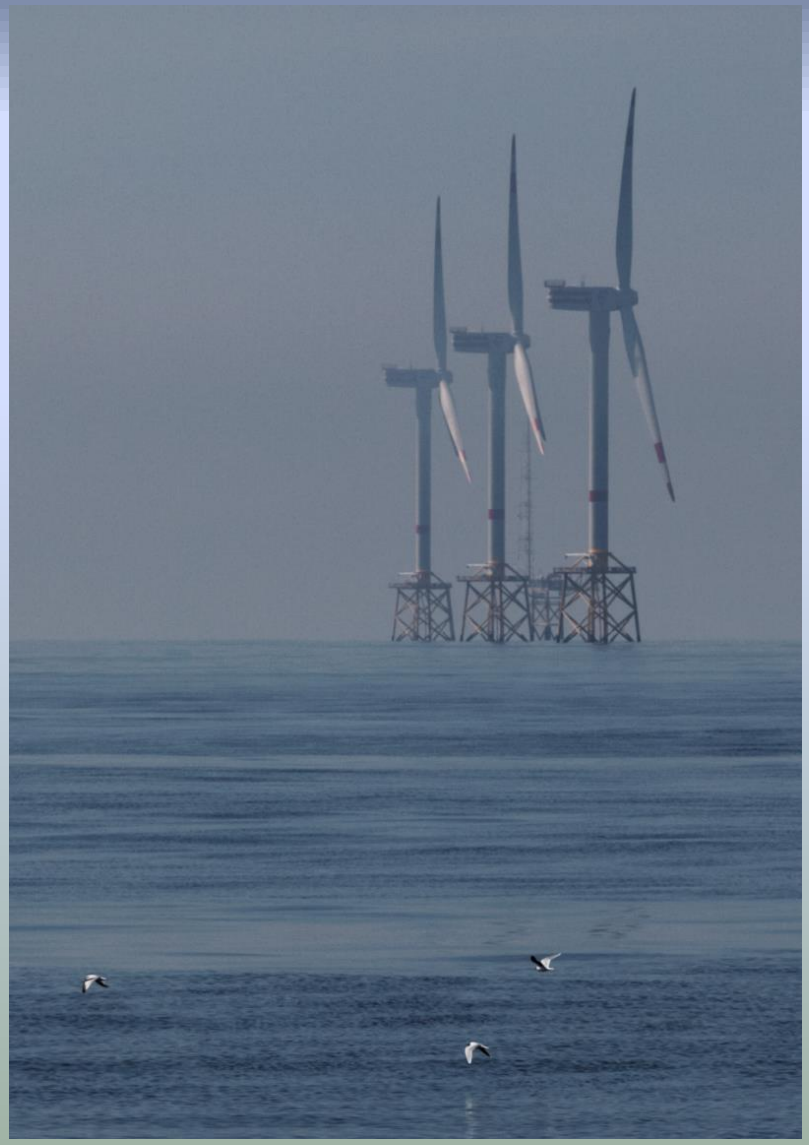


RAVE - Offshore Wind R&D Conference 2015

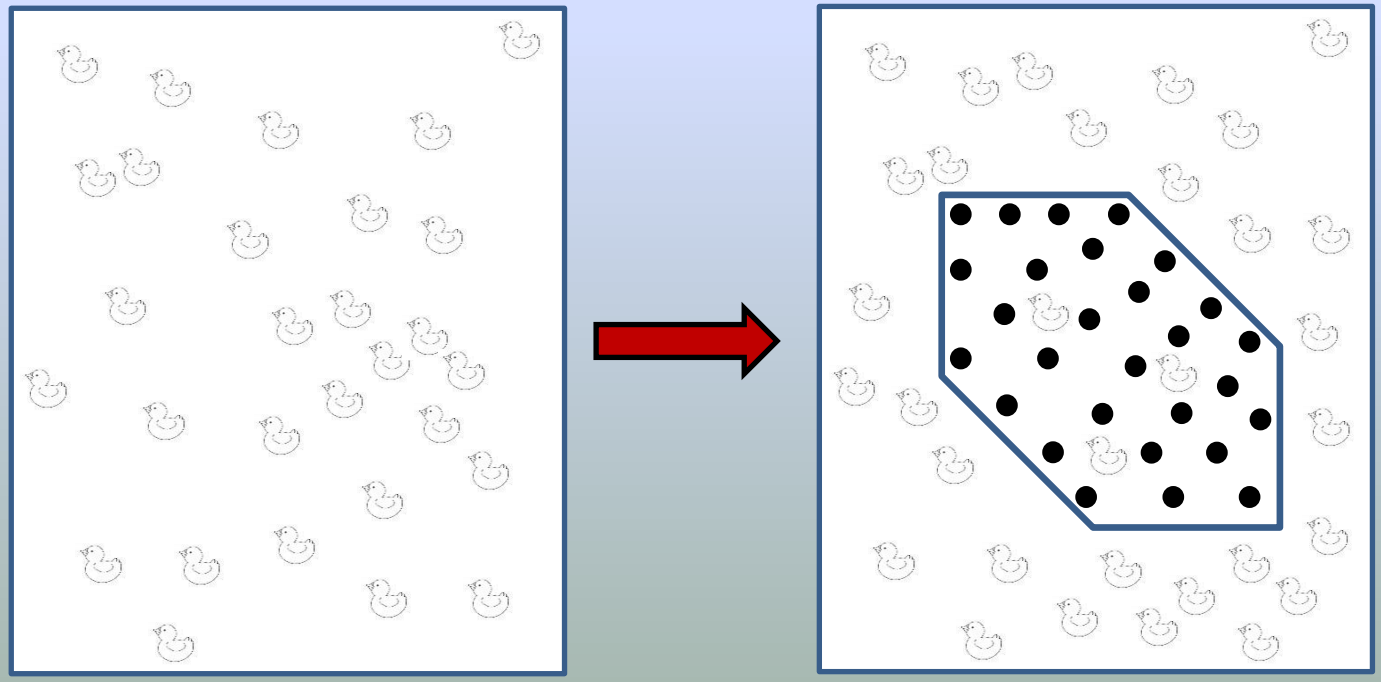
Displacement of seabirds by the offshore wind farm ‚alpha ventus‘

Jorg Welcker

Bio Consult SH

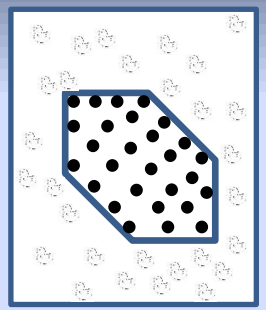
Background

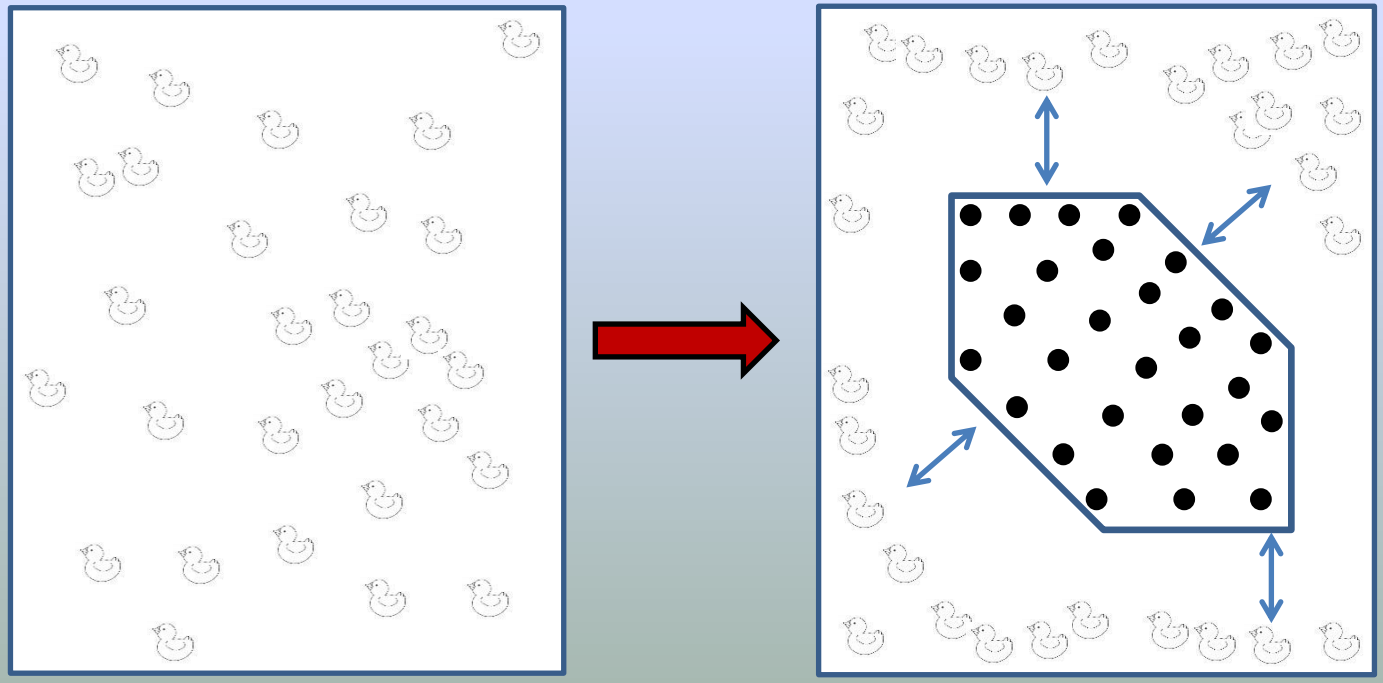
Displacement from wind farm area: habitat loss



Background

Displacement beyond wind farm area

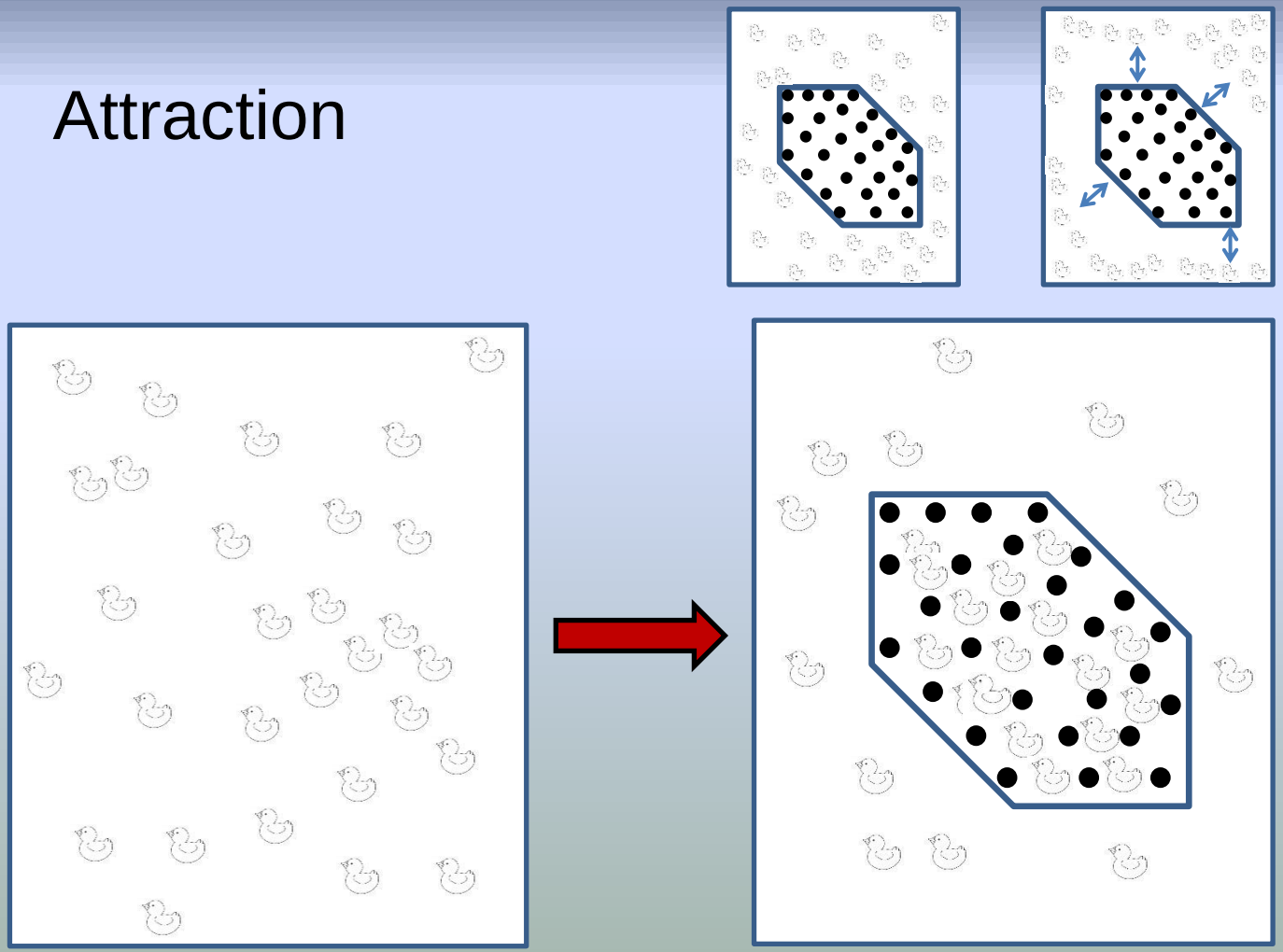




Bio Consult SH

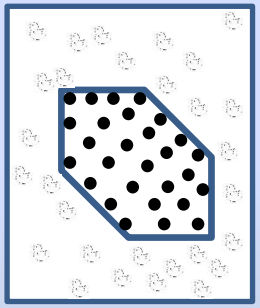
Background

Attraction

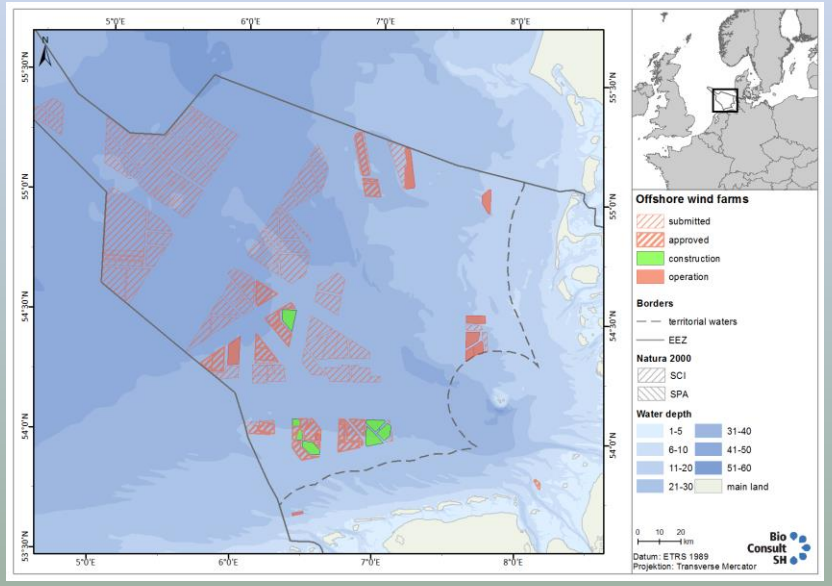


Bio Consult SH

Relevance of displacement

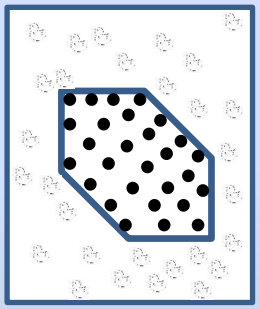


All planned wind farms:
c.21% of German EEZ

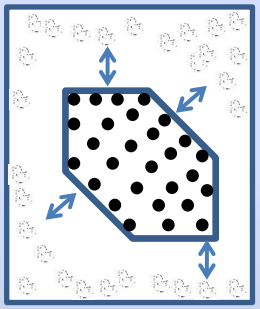


Bio Consult SH

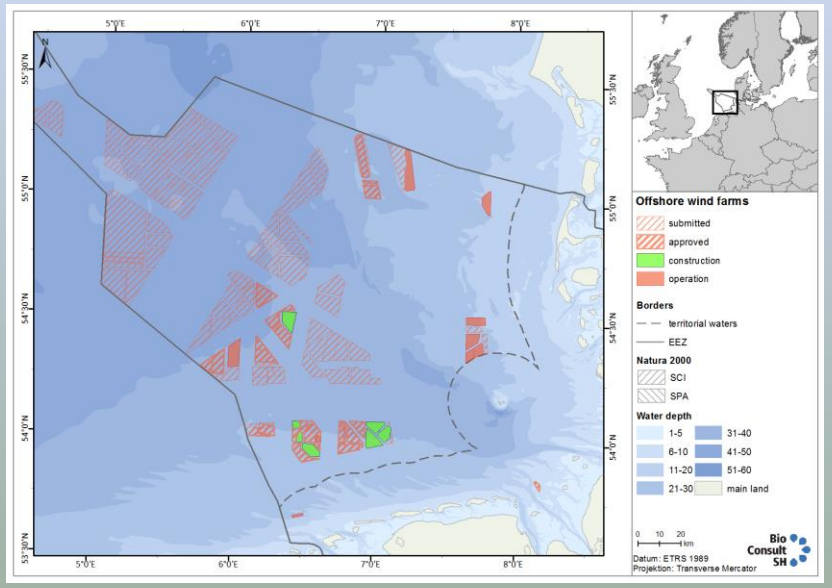
Relevance of displacement

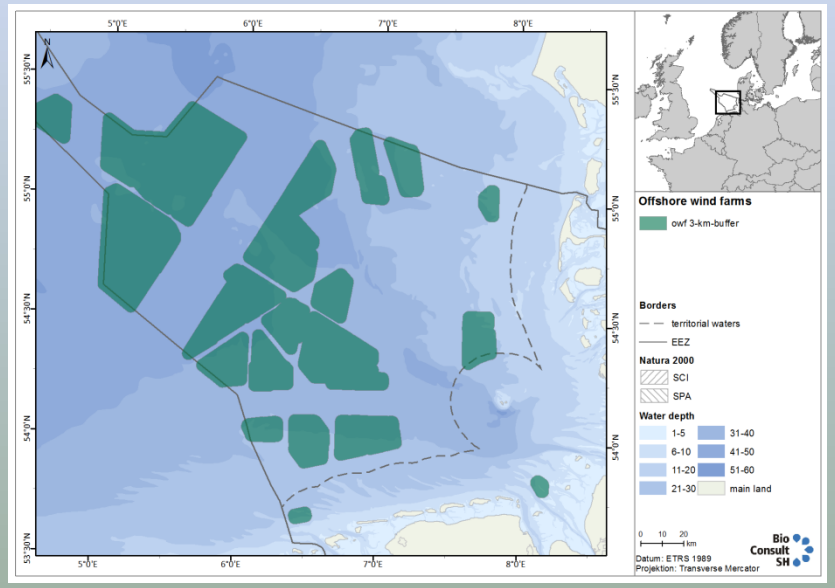


All planned wind farms:
c.21% of German EEZ



Including 3 km buffer:
c. 40% of German EEZ





Bio Consult SH

Background

Aim of study:

- Determine the degree of displacement / attraction of seabirds by ‚alpha ventus‘
- Determine response distance to outer wind turbines
- Construction and operational phase

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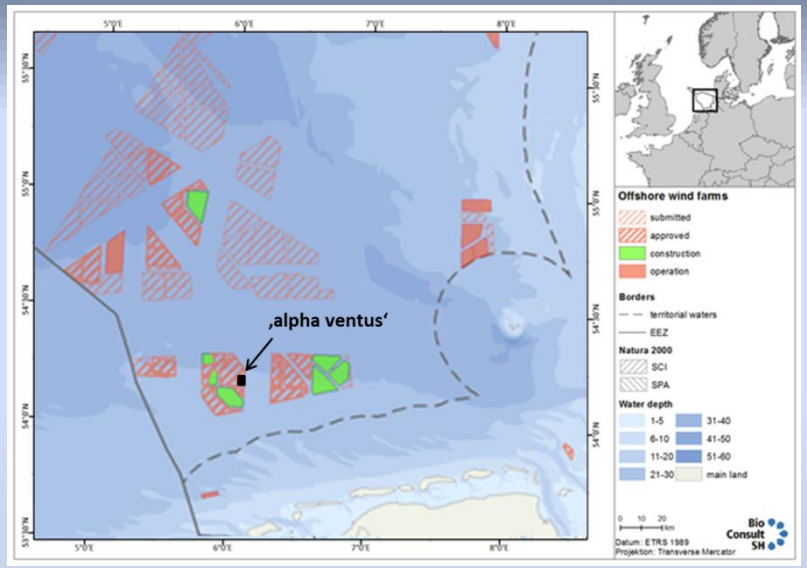
Material & Methods

‘alpha ventus’:



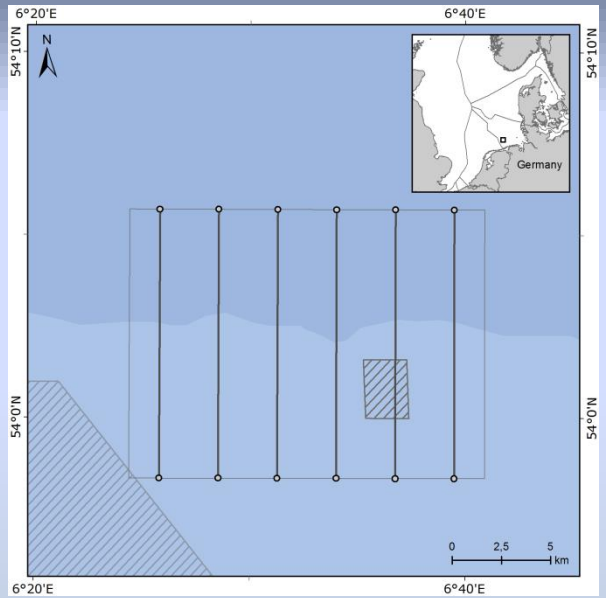
- located in southern German Bight
- small wind farm, 12 turbines, 6.5 km^2
- construction: April to November 2009
- fully commissioned since April 2010

Material & Methods

Data:

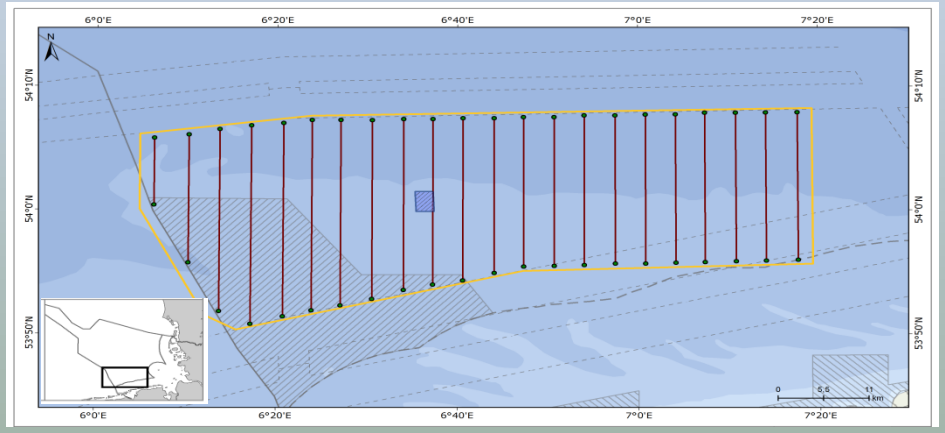
Ship-based surveys

- 19 during construction
- 77 during operational phase
- standard SAS method



Aerial surveys

- 9 during construction
- 30 during operational phase



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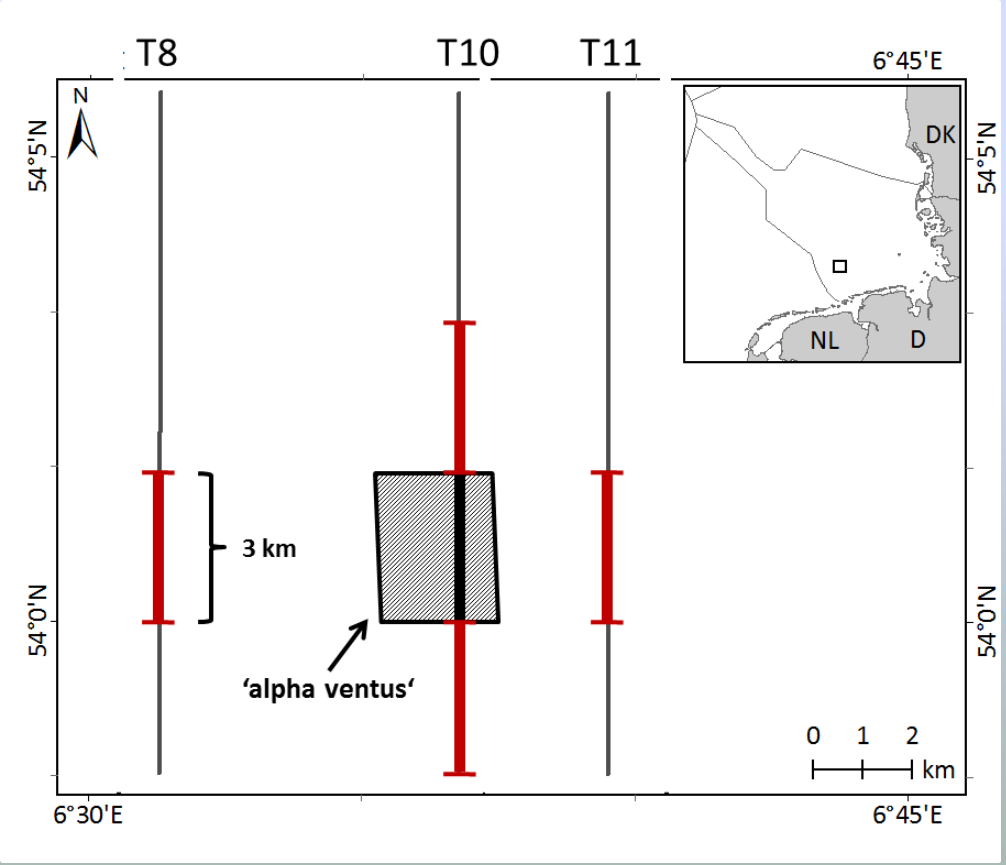
Data analysis:

- Comparison of total number of birds inside and outside the wind farm
- ‘natural experiment‘ –
  no systematic difference in:
  - Water depth
  - Sediment structure
  - Distance to shore
  - East-west gradient
  - Effort
  - Observation conditions
- Ship-based and aerial surveys separately
- Species:
  - Divers (red-throated and arctic)
  - Gannet
  - Little gull
  - Lesser black-backed gull
  - Great black-backed gull
  - Terns (common, arctic and sandwich)
  - Alcids (common guillemot and razorbill)



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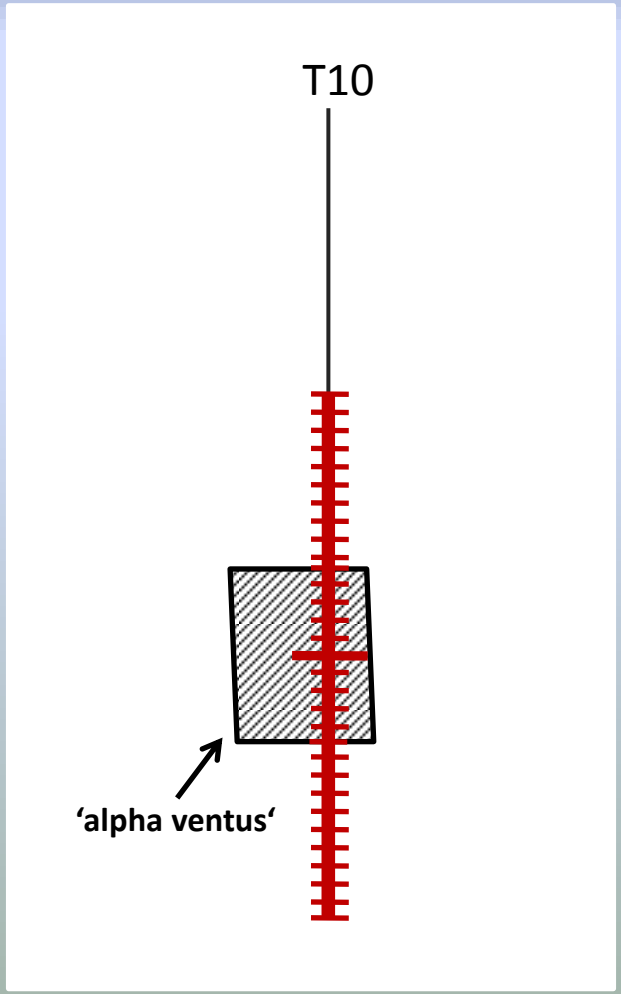
Material & Methods

Data analysis:

- Response distance to outer turbines
- ‘fine scale’ analysis:
  300 m bins
- Ship-based data only
- GAM (Generalized Additive Models)
- Species:
  - Divers (red-throated and arctic)
  - Little gull
  - Terns (common, arctic and sandwich)
  - Alcids (common guillemot and razorbill)



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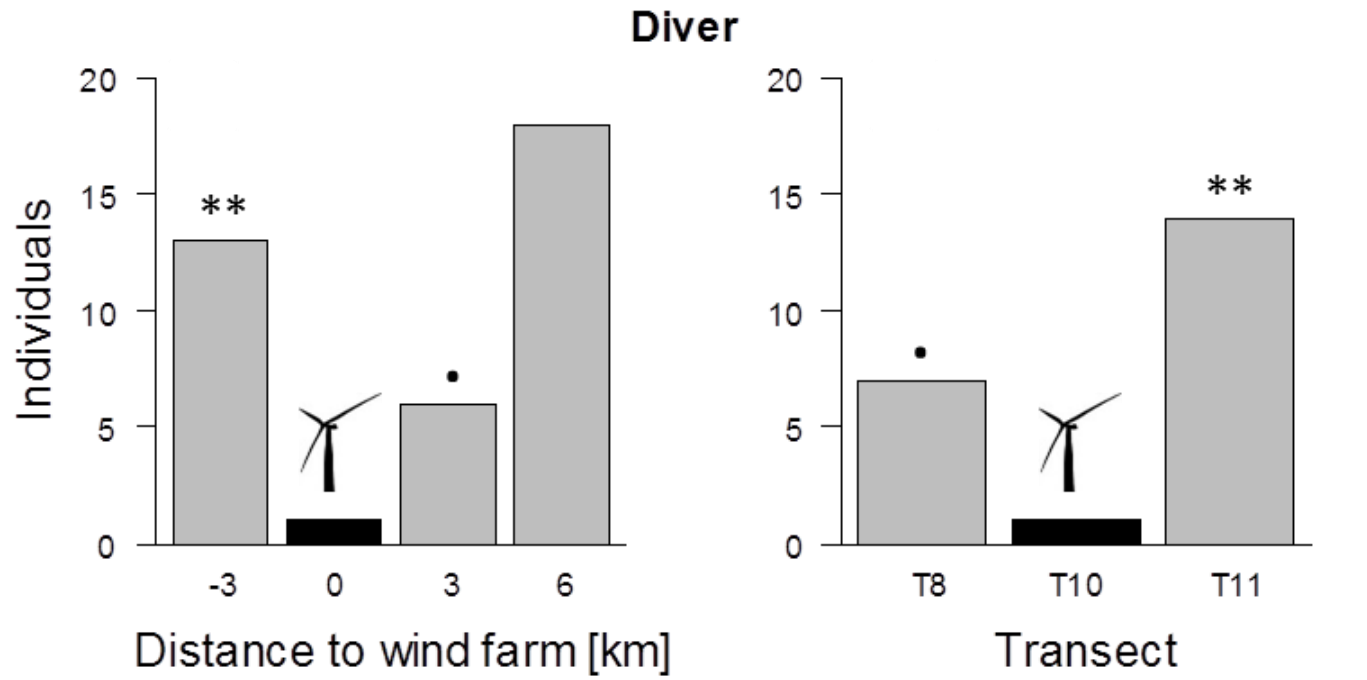
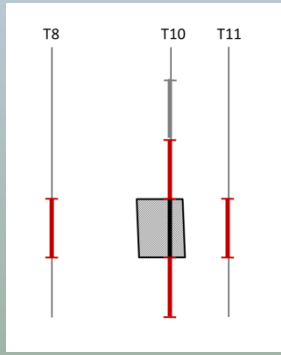
Operational phase – Divers

- 90% difference

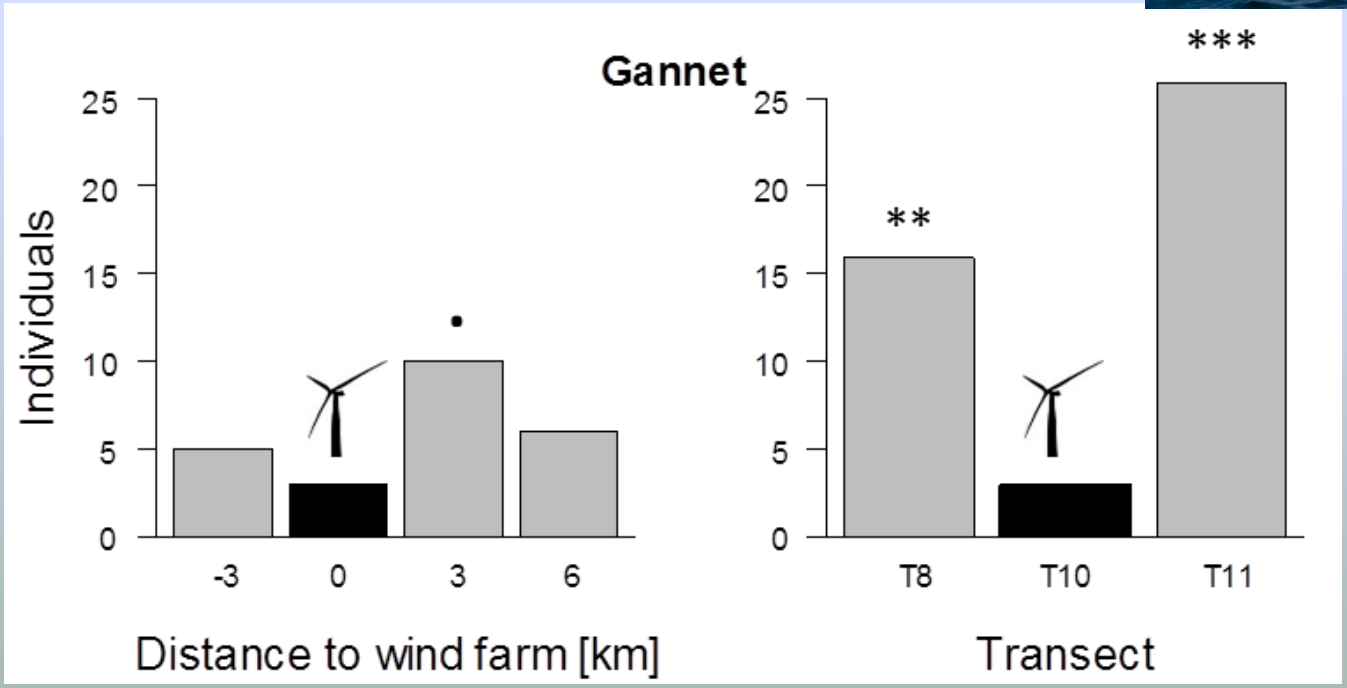


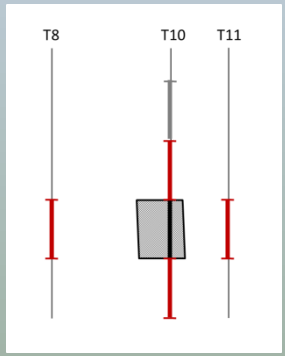


Bio Consult SH

Operational phase – Gannet

- 79% difference





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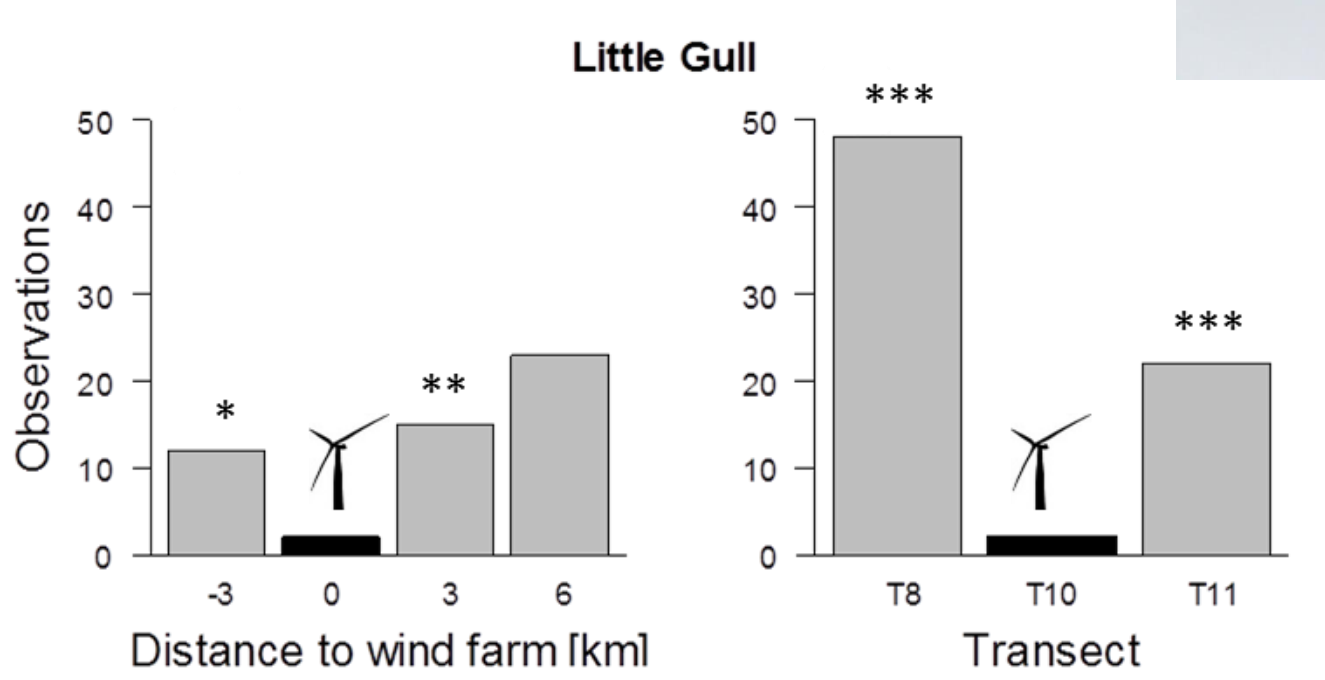
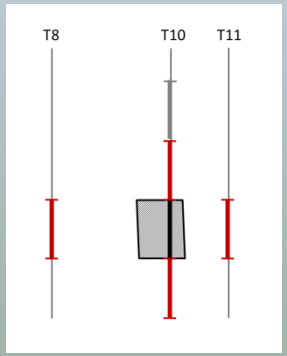
Operational phase – Little gull

- 92% difference

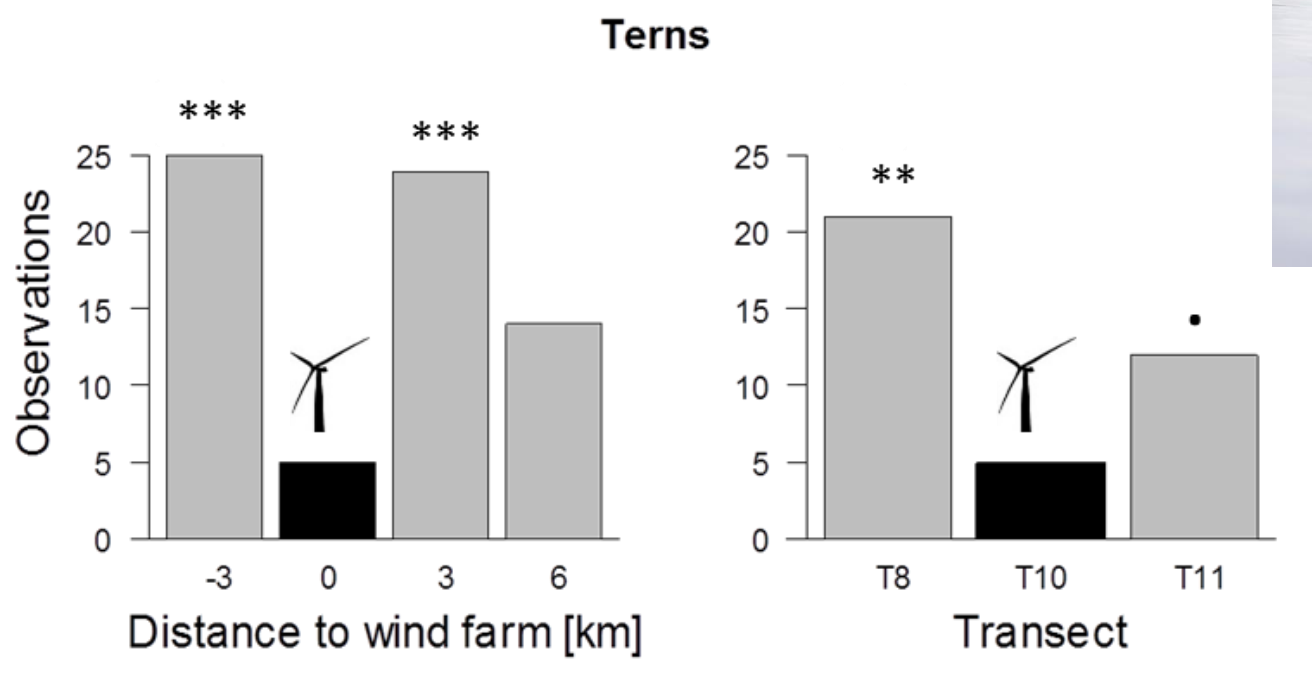


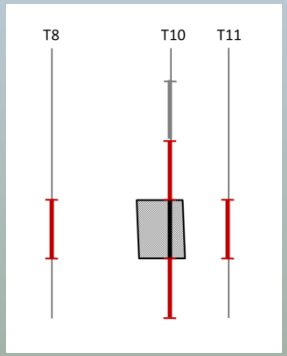


Bio Consult SH

Operational phase – Terns

- 76% difference

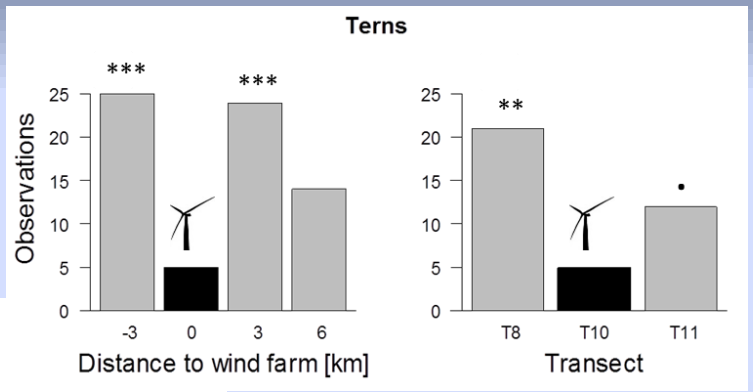


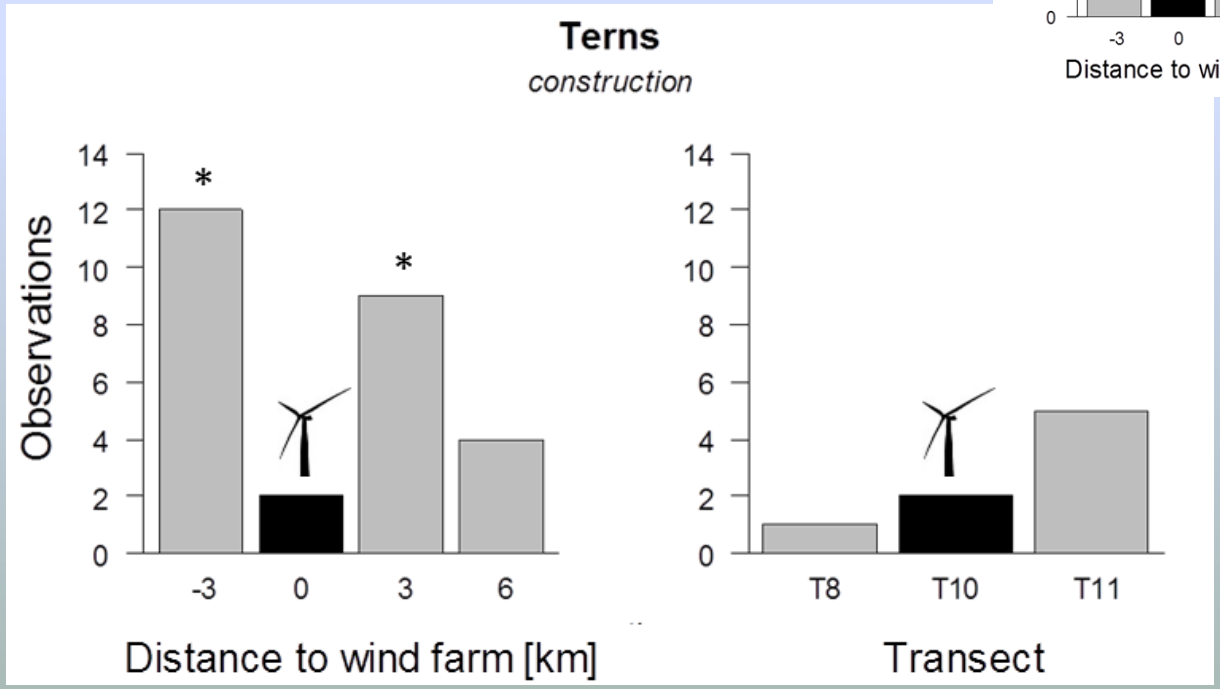


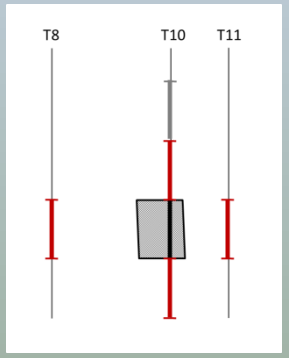
Bio Consult SH

Construction – Terns

- 70% difference







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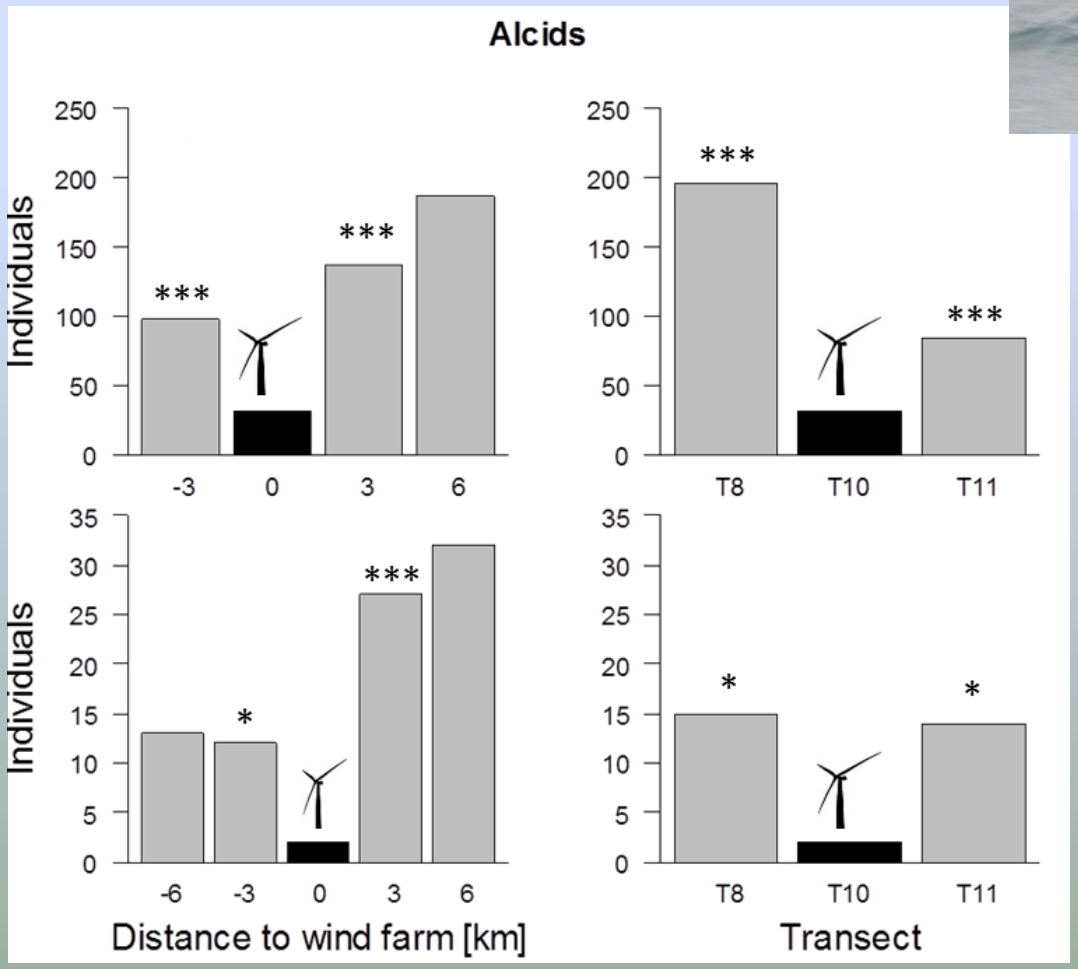
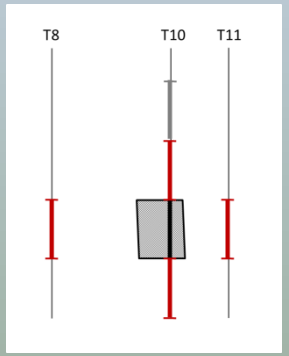
Operational phase – Alcids

- 75% difference (ship-based), 88% (aerial surveys)





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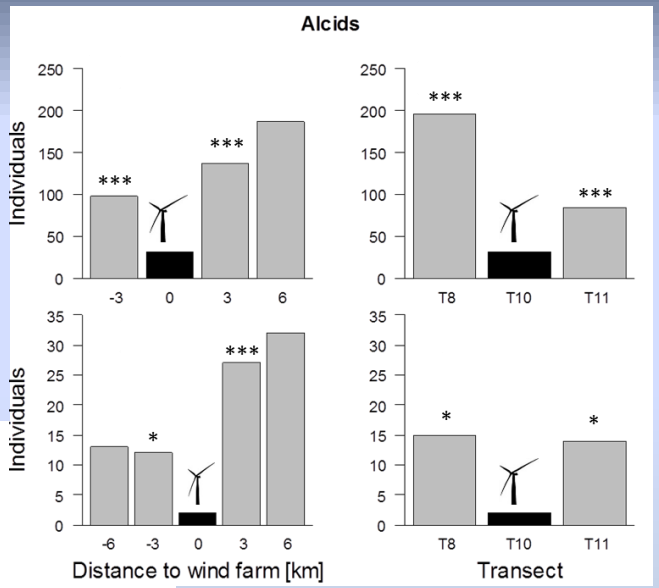
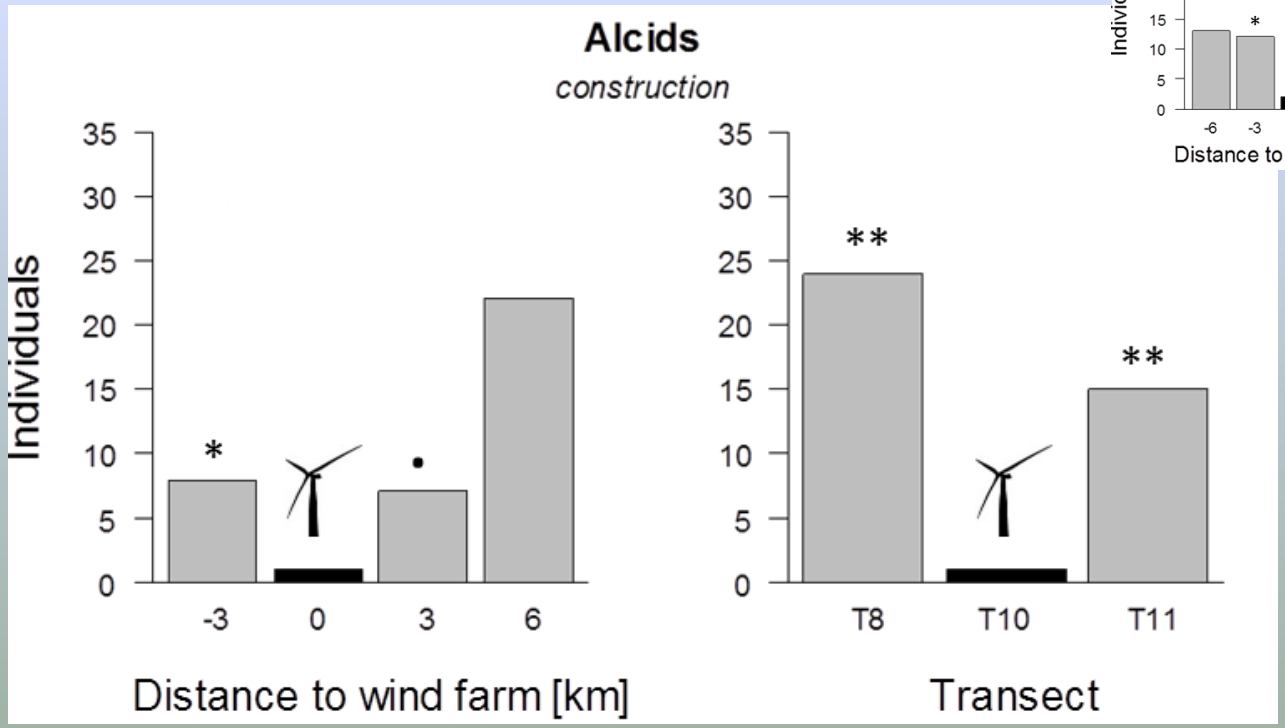
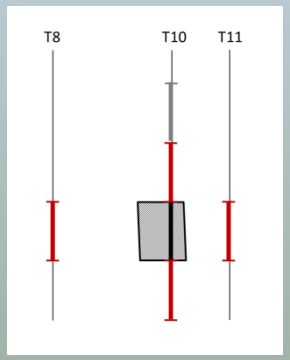
Construction phase – Alcids

- 93% difference







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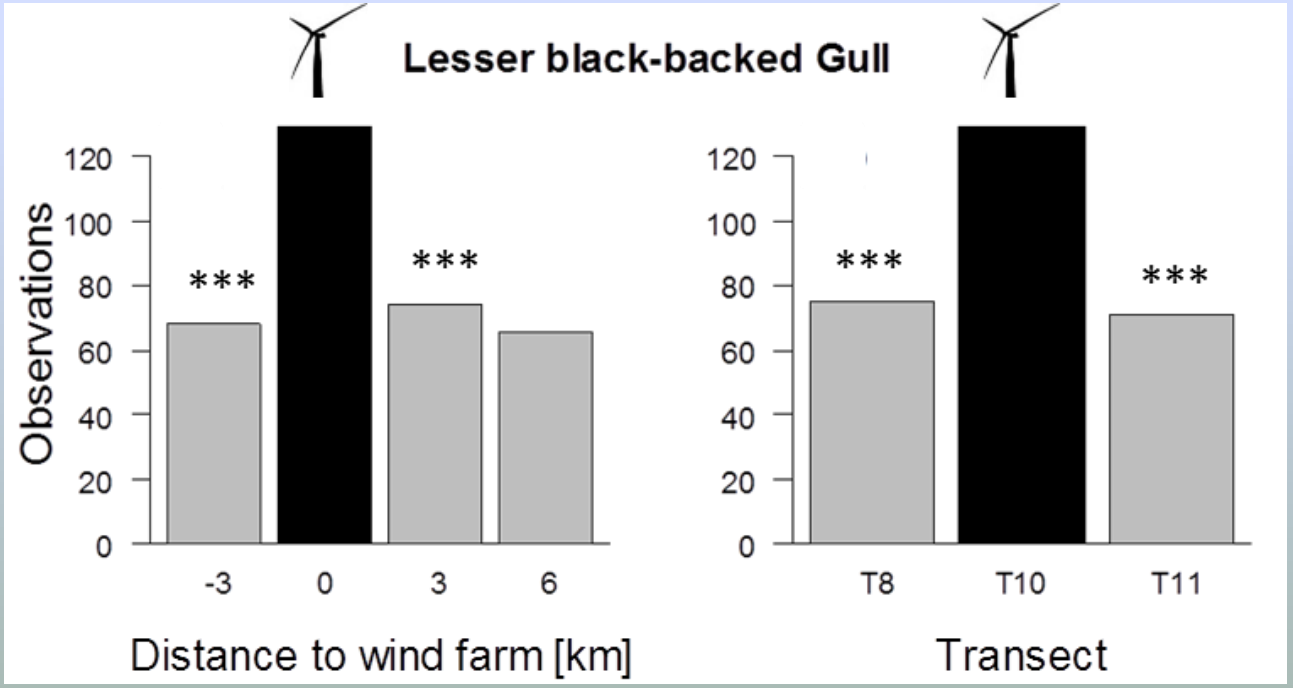
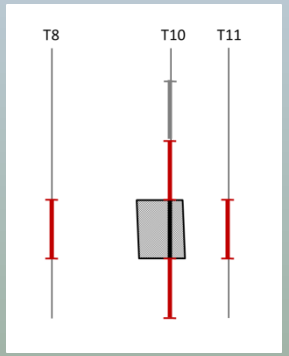
Operational phase – Lesser black-backed gull

- 79% difference





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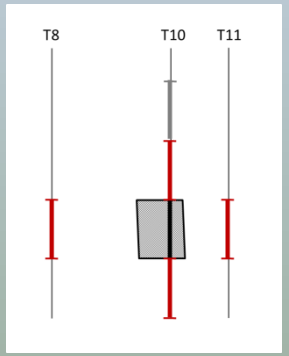
Operational phase – Great black-backed gull

- 100% difference



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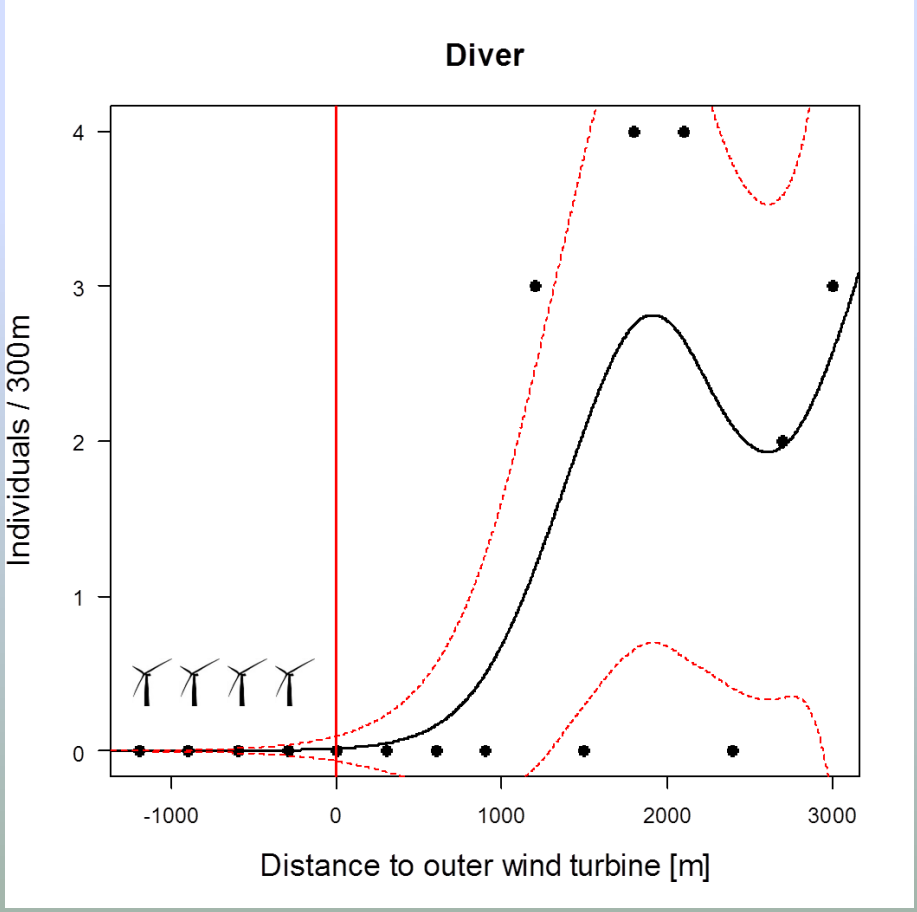
Operational phase – distance to outer turbines



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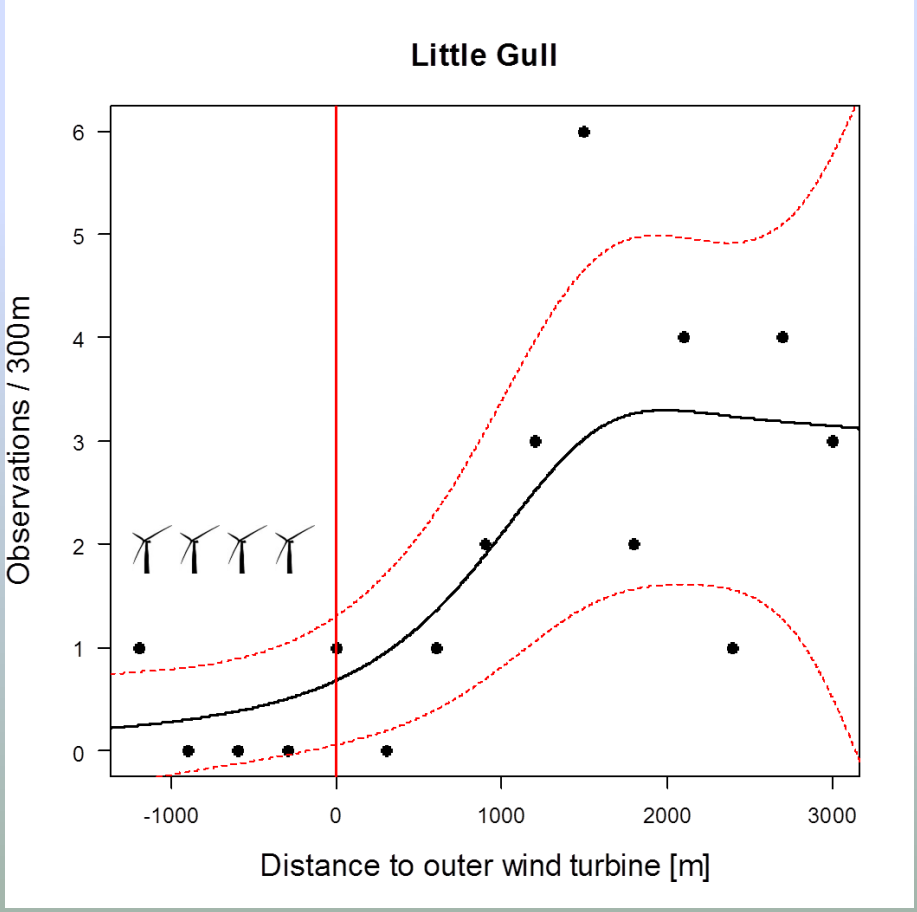
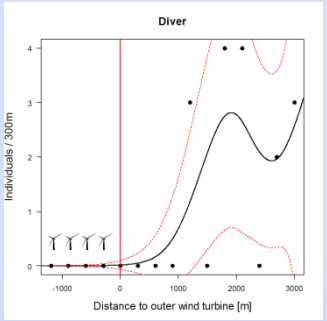
Operational phase – distance to outer turbines





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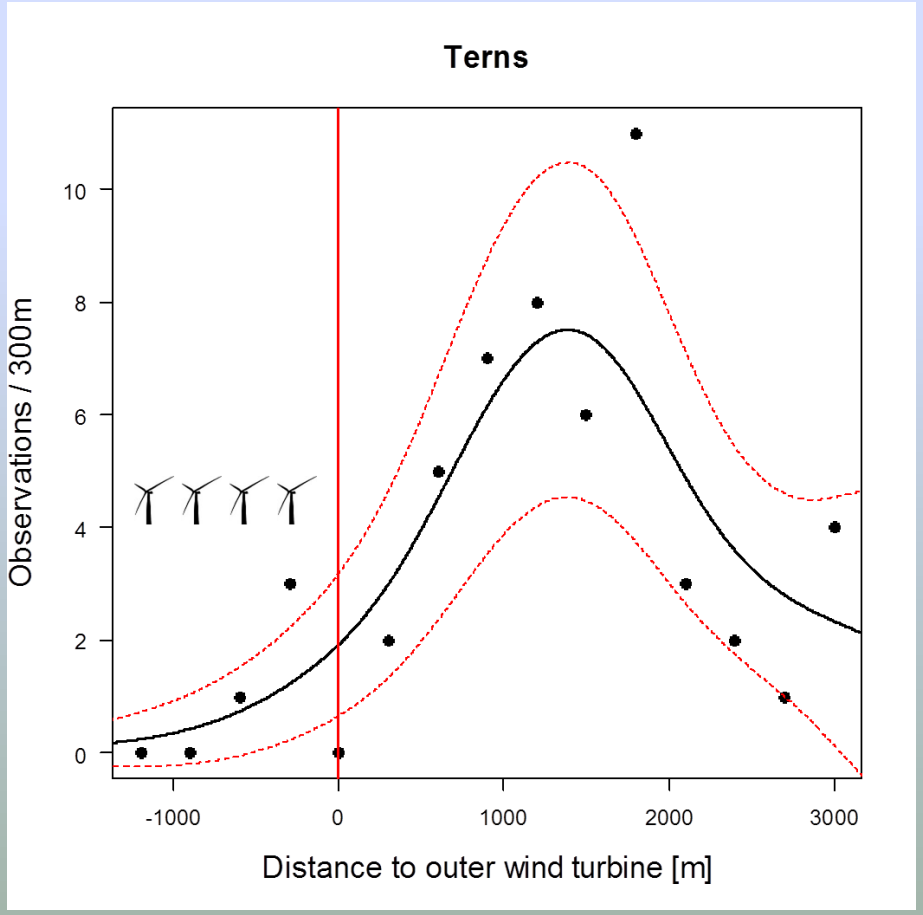
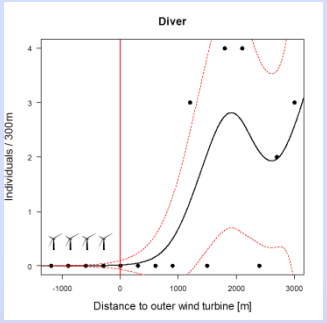
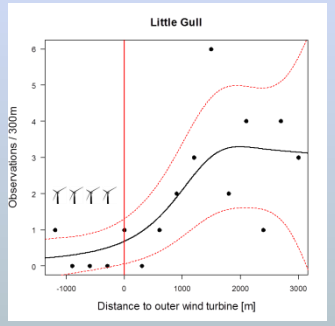
Operational phase – distance to outer turbines







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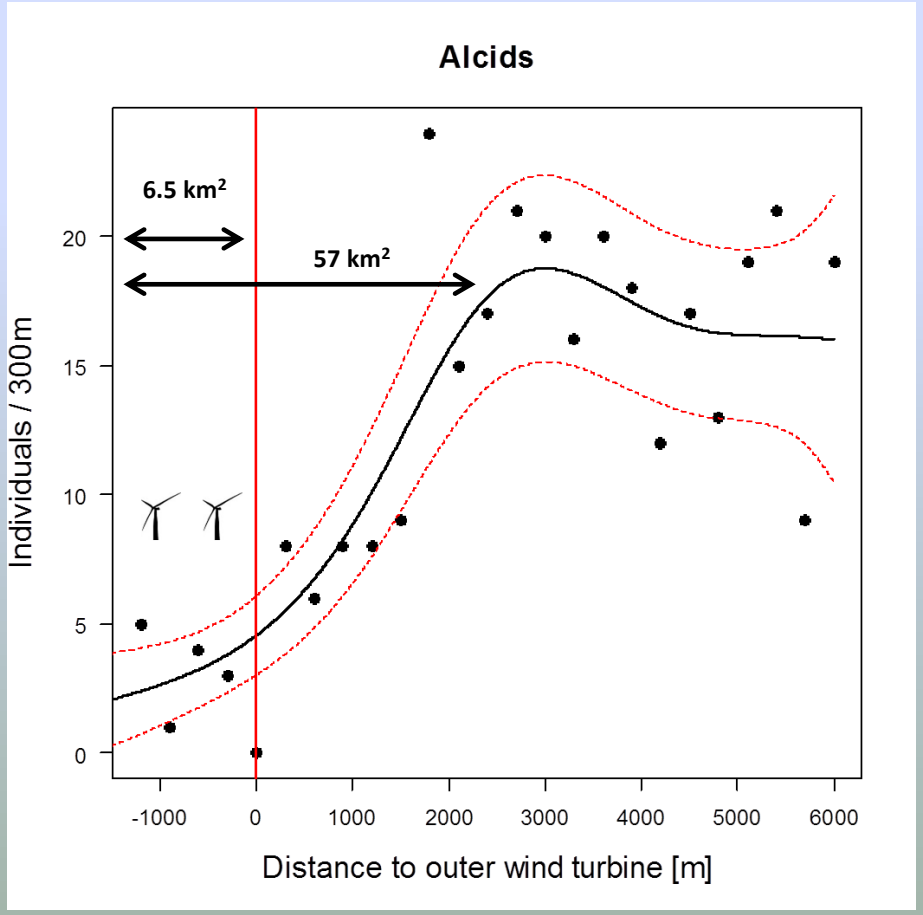
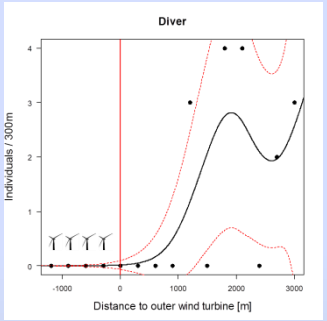
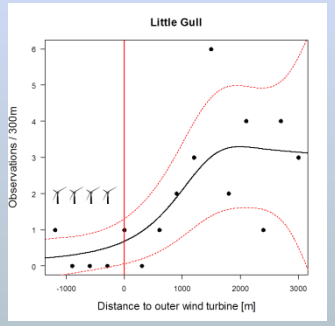
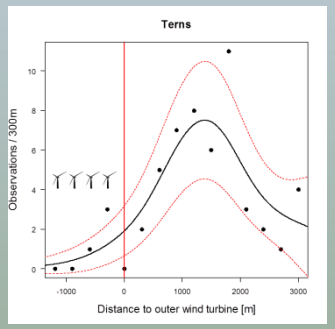
Operational phase – distance to outer turbines









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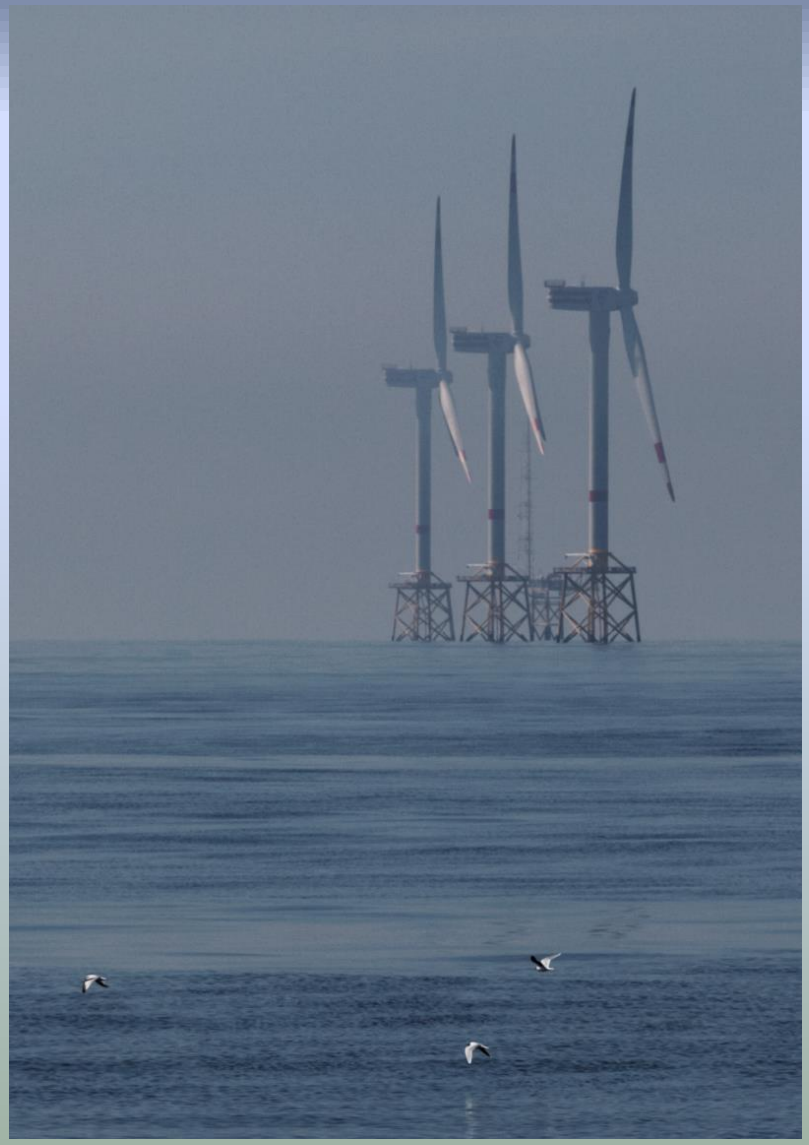
Summary

- Response to wind farm highly species specific
- Displacement of:
  - Divers (90%)
  - Gannet (79%)
  - Little gull (92%)
  - Terns (76%)
  - Alcids (75%)
- No species with total displacement
- Attraction:
  - Lesser black-backed gull (79%)
  - Great black-backed gull (100%)
- Disturbance extents outside wind farm
  - Species-specific: 1.5 – 2.5 km
- Response during construction similar to operational phase, but low sample size
- ‘alpha ventus’: small wind farm – comparability of results?



Thank you for your attention!

Questions?

Bio Consult SH