Fish and benthos at alpha ventus

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Sampling design - Fish & benthos

Baseline study before
2008
2009
Construction period
2010 & 2011
Operation period

Sampling stations
+ van Veen grab
● video
--- trawl
--- echo sounder

WGS84, UTM32N
Hydroacoustic survey on pelagic fish
- Construction period -

- Scare off effects
- Patchy distribution patterns

<table>
<thead>
<tr>
<th>Area</th>
<th>single target detection ping⁻¹</th>
<th>mean ± SD (median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphaventus</td>
<td>0.040 ± 0.024</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Reference</td>
<td>0.112 ± 0.035</td>
<td>(0.113)</td>
</tr>
</tbody>
</table>
Video & fishing survey on pelagic fish
- Operation period -

- Local aggregations of horse mackerel at FINO 1
- Snapshots
- Stationary hydroacoustic measuring system
Video and diving on demersal fish & crab

- Diving transects at “Jacket” & “Tripod” foundations
- Video surveys at open areas
High abundances of fish and crab at wind turbine foundations relative to open areas

No difference between “Tripod” & “Jacket”
Survey on benthic invertebrates

- Increased difference in endobenthos between controls and wind farm from before to after construction.

- After construction:
  - (i) nemertean decreased
  - (ii) *B. guilliamsoniana* increased in impact locations.
Survey on benthic invertebrates

- From before to after the construction mean species richness:
  - (i) do not vary in control locations
  - (ii) increase in impact locations.

ANOVA: $p < 0.05$
Fish & benthos database

- Environmental impact assessment (EIA) data are harmonised, quality checked and analysed in combination with monitoring and research data.
- More than 9000 EIA and > 2100 AWI station entries for environmental data, fish and benthos.
- Identify benthic spatial patterns and main drivers for species distribution.

Average abundance (N m⁻²) of benthic invertebrates in the German EEZ (grid size: 25 km²), N = 4586 stations.
Fish & benthos database

**Habitat information**
Raster data (full coverage)

- Bathymetry
- Sediment

Depth & sediment for each (grid) cell of the raster map

**Species information**
Stations (point data)

- Binomial logistic regression model
- Probability of species occurrence at each depth and sediment

- Probability of occurrence for *Callianassa* spp.

Perspectives

- In the near future the areal extent of planned offshore wind farms will be ca. 25% of the German exclusive economic zone.

- Large scale effects on biodiversity of fish & benthos, and thus economic value of ecosystem services are unknown so far.

- Future studies should reveal if spatio-temporal dynamics of fish & benthos at small scales will also occur at large scales.
Thank you for your attention!