Fishing in Wind Farms

Brown & May Marine Ltd.
Introduction

- Examples of fisheries monitoring conducted in wind farms
- Current projects
- UK-policy: fishing in wind farms
Fisheries Monitoring in Operational Wind Farms

- Barrow Offshore Wind Farm, Irish Sea
  - Otter trawl surveys
  - Potting surveys

- Lynn and Inner Dowsing Wind Farm, North Sea
  - Shrimp trawl surveys
  - Beam trawl surveys

- Walney Offshore Wind Farm, Irish Sea
  - Dover sole spawning surveys during piling operations

- Kentish Flats Wind Farm, Thames Estuary
  - Beam trawl surveys

- Others
Vessel details

- Vessel Model: 23.38m Stern Trawler
- Length: 23.38m
- U.L. Weight: 148 tonnes
- Engine: 478 hp
- Beam: 6.4m
- Draught: 3.35 m

Gear details

- Towing warp: 18 mm, 6x19+1 fibre core.
- Depth to payout ratio: 3:1
- Bridles: 36.5m, 20 mm combination
- Trawl doors: 2.35 Dumbar
- Net: Boris 80mm cod end mesh, 100mm mesh bag, Belly chafers
- Ground line length: 53.5m
- Footrope: 26.26 m rock-hopper 12” rubber discs, 6” spacers
- Headline height (est.): 2.5m
- Dist. between wing ends (est.): 15.0m
Otter Trawl Tow Tracks - Barrow Wind Farm

- December 2006
- Blue lines → Vessel tracks
- Red lines → Trawl tows

→ N.B. 180° turns between the rows of turbines.
- 30 min trawls
Otter Trawl Tow Tracks - Barrow Wind Farm

- March 2007 survey
- Blue lines → Vessel tracks
- Red lines → Trawl tows
- 30 min trawls
Otter Trawl Tow Tracks - Barrow Wind Farm

- March 2007 survey
- Blue lines → Vessel tracks
- Red lines → Trawl tows
- 30 min trawls

Note vessel tracks in between and in closest proximity to turbines

Barrow Post-Construction Survey October 2007
Trawling within Barrow Wind Farm
Fish Abundance within the Wind Farm Site
Pre- and Post-Construction

- Pre-construction survey Dec 2004 vs. post-construction survey Dec 2006:
  - Higher catch rates of dab, lesser spotted dogfish and thornback ray within the wind farm in 2006.
  - Lower catch rates of plaice, whiting and cod within the wind farm in 2006.

- Pre-construction survey March 2005 vs. post-construction survey March 2007:
  - Higher catch rates of plaice, dab, lesser spotted dogfish, thornback ray and cod within the wind farm in 2007.
  - Similar catch rates of whiting in 2007.
Barrow Offshore Wind Farm: Potting Survey

<table>
<thead>
<tr>
<th>Vessel Model: Cheetah Marine 9.95m series Catamaran</th>
<th>Engine: Twin 90hp Honda Petrol Outboard</th>
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</thead>
<tbody>
<tr>
<td>Vessel Registration: BW261</td>
<td>Beam: 3.6m</td>
</tr>
<tr>
<td>Length: 9.98m</td>
<td>Draught: 0.4m</td>
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<tr>
<td>U.L. Weight (not incl. engine): 3500kg</td>
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Survey Methodology

- 50 pots with top or side opening
- 10 pots are rigged to a shank
- 27 m between each pot
- Length of shank: approx. 260m (850ft)
- Bait → Flounder, herring, gurnards
- No anchors, no clump weights
- Shanks are shot to align with the direction of the tidal flow, which coincides with the alignment with the rows of the turbines.
- Undersized (below MLS) crabs and lobsters are noted and thrown back
Tracks and Locations of Hauled and Re-Shot Shanks of Pots
Shellfish Abundance within the Wind Farm

- Similar catch rates of legally sized crabs (above MLS) inside and outside the site.

- Overall catch rates **higher within the site** than outside the site.
  \[\Rightarrow\] due to higher ratio of crabs below MLS in the site:
  
  - Approx. **60%** of crabs caught in control sites \[\Rightarrow\] below MLS and thrown back.
  - Approx. **80 – 90%** of crabs caught **within** the wind farm site \[\Rightarrow\] below MLS and thrown back.

Nursery Area for juvenile crabs??

Scour protection around turbine bases possibly provides shelter from predators especially during moulting.
Impact on Fishing Activity

Fisherman testimonies:

- Apart from avoiding turbine exclusion zones, there was no difference in the general operating patterns inside and outside of the wind farm.
- Skippers fish inside the wind farm in weather of up to a Force 5.
- To date there have been no conflicts or interference with maintenance vessels.
Lynn and Inner Dowsing: Shrimp Trawl Survey (Nov 2010)

Length: 13.1m
Beam: 6.0m
Draft: 1.5m
Main Engine: 203kW
Propeller: Fixed Pitch
Sounder: Furuno

Towing warp diameter: 14mm
Depth: Payout ratio: 3:1
Beams: 2 X shrimp nets with 22mm cod ends
Ground line length: 9 m
Footroper: 22 x 8” rollers
Headline height: 0.61m
Lynn and Inner Dowsing: Shrimp Trawl Locations (Nov 2010)
Lynn and Inner Dowsing: Shrimp Trawling within the Wind Farm
Lynn & Inner Dowsing: Beam Trawl Survey: Vessel and Gear Details

Length: 21.2m
Beam: 6.9m
Draft: 2.3m
Main engine: Caterpillar Type 340TA 475 BHP
Gearbox: Hydraulic 6: reduction
Propeller: Sodena Plotter with Electronic Charts

Beam width: 2m
Headline height: 55cm
Shoe length: 77cm
Shoe width: 15cm
Cod-end liner: 5mm
Lynn and Inner Dowsing: Beam Trawl Locations
Walney Offshore Wind Farm: Dover Sole Spawning Survey during Piling Operations

Length: 20.34m
Beam: 6.79m
Draft: 3.5m
Main engine: 675 hp Baudouin V12
Gearbox: Baudouin 6:1
Propeller: 1.8m Variable Pitch

Beam length: 4m
Headline height: 60cm
Mesh size: 80mm
Cod end liner: 80mm
Beam Trawl Survey Tow Tracks for All Trawl Tows (Day & Night Combined)

- 9th April - 13th May 2010
- 10 piling events
- 193 trawl tows
- Trawls at 3 stages of piling at 3 distances from piling source:
  - Pre-piling (1 x 750m/2x 1500/4x 2500)
  - Piling (1 x 750m/2x 1500/4x 2500)
  - Post-piling (1 x 750m/2x 1500/4x 2500) (12h after)
Survey Results

• Piling stage:
  - Highest catch rates: piling
  - 2nd highest catch rates: pre-piling
  - Lowest catch rates: post-piling

• Trawl distance to piling source:
  - highest catch rates at a distance of 750m
  - Catch rates decreased with increasing distance from the pile.
  ⇒ Exception: Post-piling surveys at a distance of 2500m: catch rates higher than at 1500m

• Dover Sole Maturity & Sex
  - Total caught: 498
  - Majority spent (54.6%)/maturing (23.1%)
  - Hyaline females (14.4%)
Kentish Flats Wind Farm Otter Trawling
Vessel Details

- Vessel Model: 9.54m Stern Trawler
- Length: 9.54m
- Engine: 300hp
- Beam: 4.26m
- Draft: 1.52m

Towing warps: 12m Scagen
Depth: payout ratio: 3:1
Bridles: 8m stainless split
Doors Steel V type Dunbar
Headline height: 1.75m
Dist between wing ends: 12m

N.B. The skipper of this vessel regularly fishes the site for bass, dogfish and skate.
Otter Trawl Tow Tracks

- Blue Lines → Vessel tracks
- Red lines → Tow tracks
- Dark broken lines → Inter-array cables
- Tows undertaken in the direction of the tide.
Fish Abundance within the Wind Farm/Control Site

- Bass (total 102 ind.)
  - 98% caught within the wind farm → 84% below MLS (36cm)

- Thornback Ray (total 45 ind.)
  - Two-thirds of thornback rays caught (control and wind farm) below MLS (40cm)
  - 66.7% of the total catch caught in the wind farm
  - 33.3% of the total catch caught outside the wind farm

- Lesser spotted dogfish (28 ind.) → 100% within wind farm
Current Projects: Round 3 Wind Farms

- Commercial fisheries assessment

- Fisheries liaison:
  - Belgium: ILVO, Rederscentrale
  - Holland: IMARES, VisNed
  - France: IFREMER, CNPMEM (Comité National des Pêches Maritimes et des Elevages Marins)
UK-Policy: Fishing in Wind Farms

UK policy-fishing in wind farms

- Standard Marine Coast Guard Agency (MCA) Policy is that there should not be either navigation or fishing exclusion within operational wind farms.

- Fishing exclusion zones of 50m around turbines