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Bio-logging science into management policy

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Outline of talk

- monitoring for marine renewables

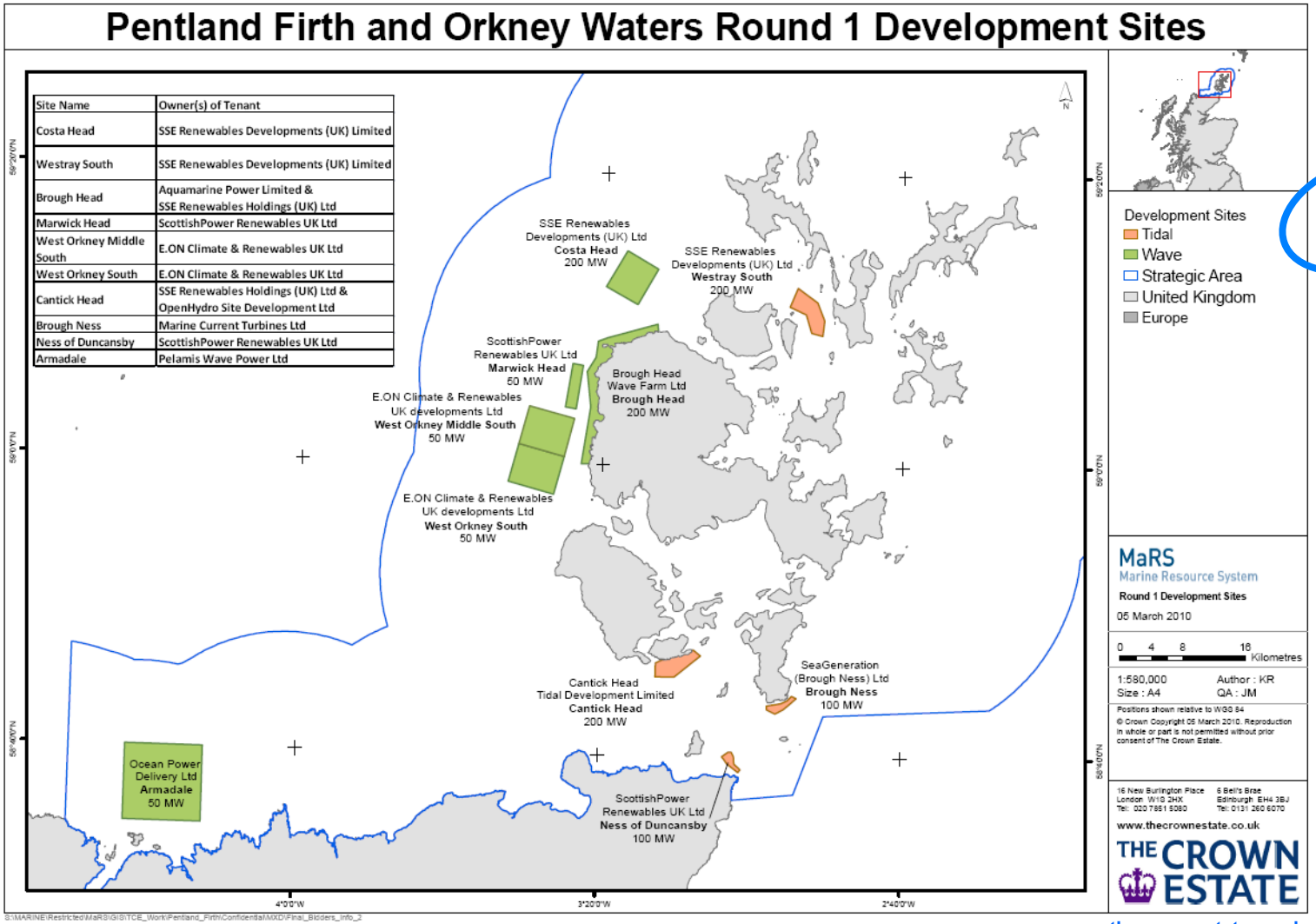
2 case studies

- informing statutory agents (Orkney, N Scotland)
- environmental monitoring (Strangford Lough, N Ireland)
  - management
  - telemetry results => Bernie McConnell talk

Monitoring for Marine renewables

- strong commitment from Governments
  - 2020 energy targets in EU
  - first wave and tidal leasing round in Scotland

Monitoring for Marine renewables



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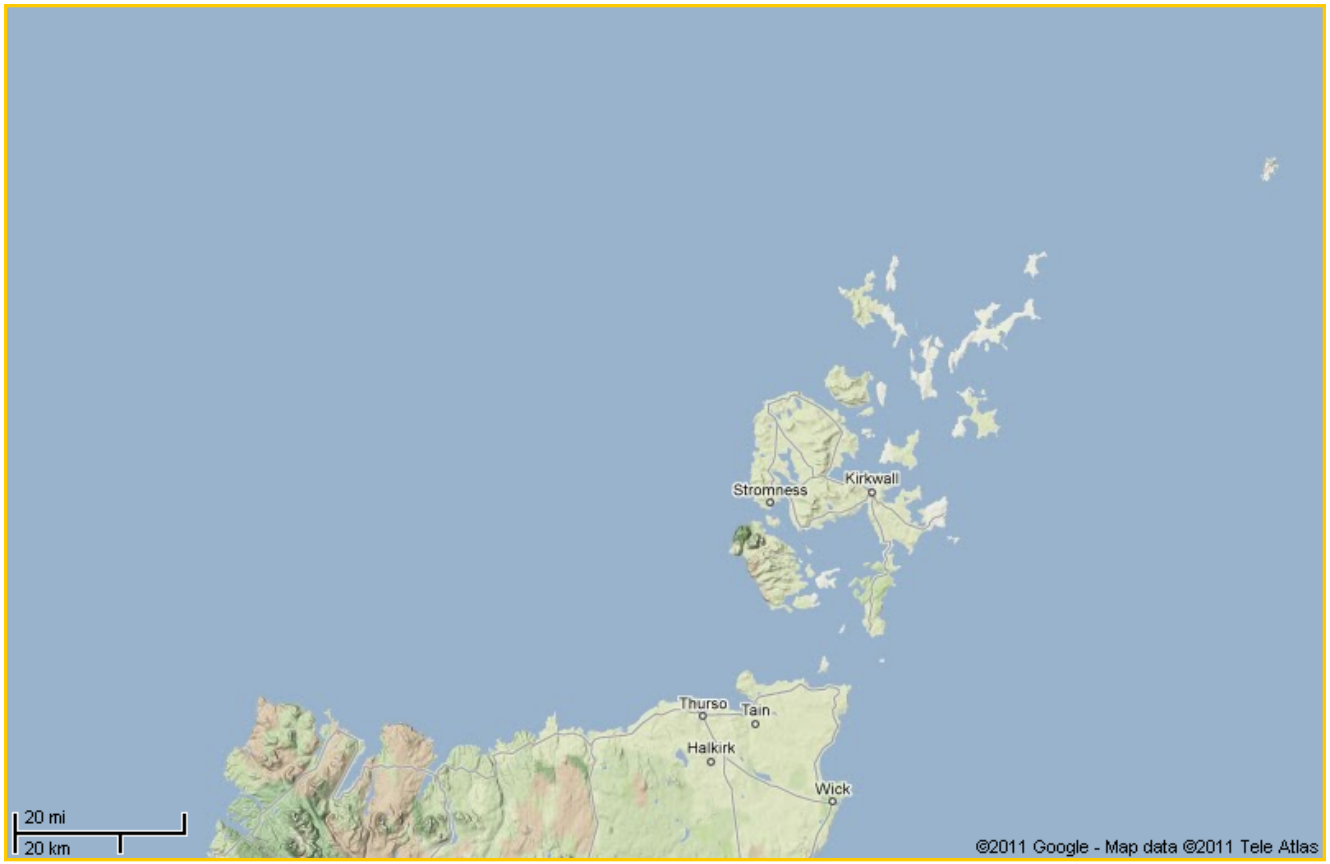
Monitoring for Marine renewables

- areas also home to marine mammals
  - 20+ cetaceans;
  - harbour seals (~ 30% of European in the UK);
  - grey seals (45% of the world's grey seals breed in the UK; 90% in Scotland)

- special consideration to SACs (protected areas)
  - 16 designated specifically for seals

Orkney



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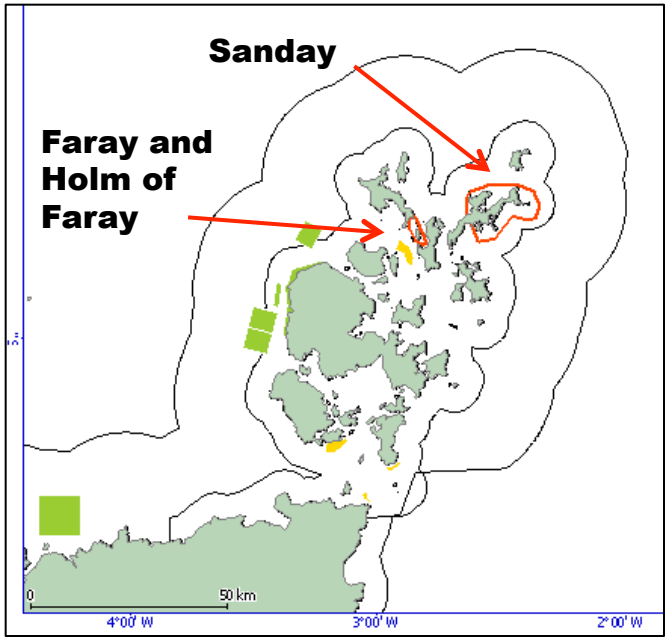
Orkney

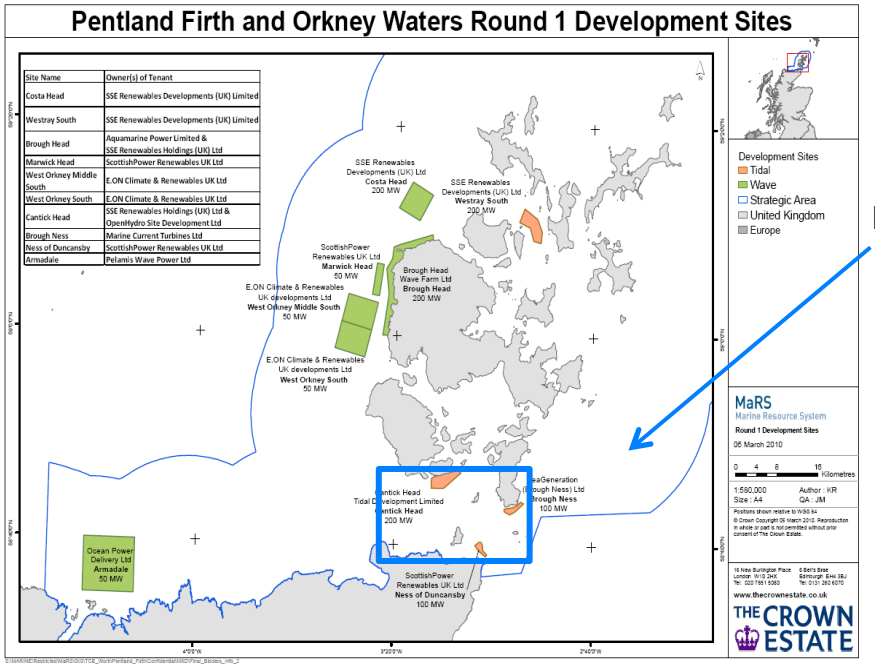
Orkney

- home to large numbers of seals
  - rate of increase has declined since 2000
  - up to 50% declines since 2000
- 2 SACs



Orkney

- key location for wave and tidal renewable energy technology



Pentland Firth

Open Hydro

informing statutory agents

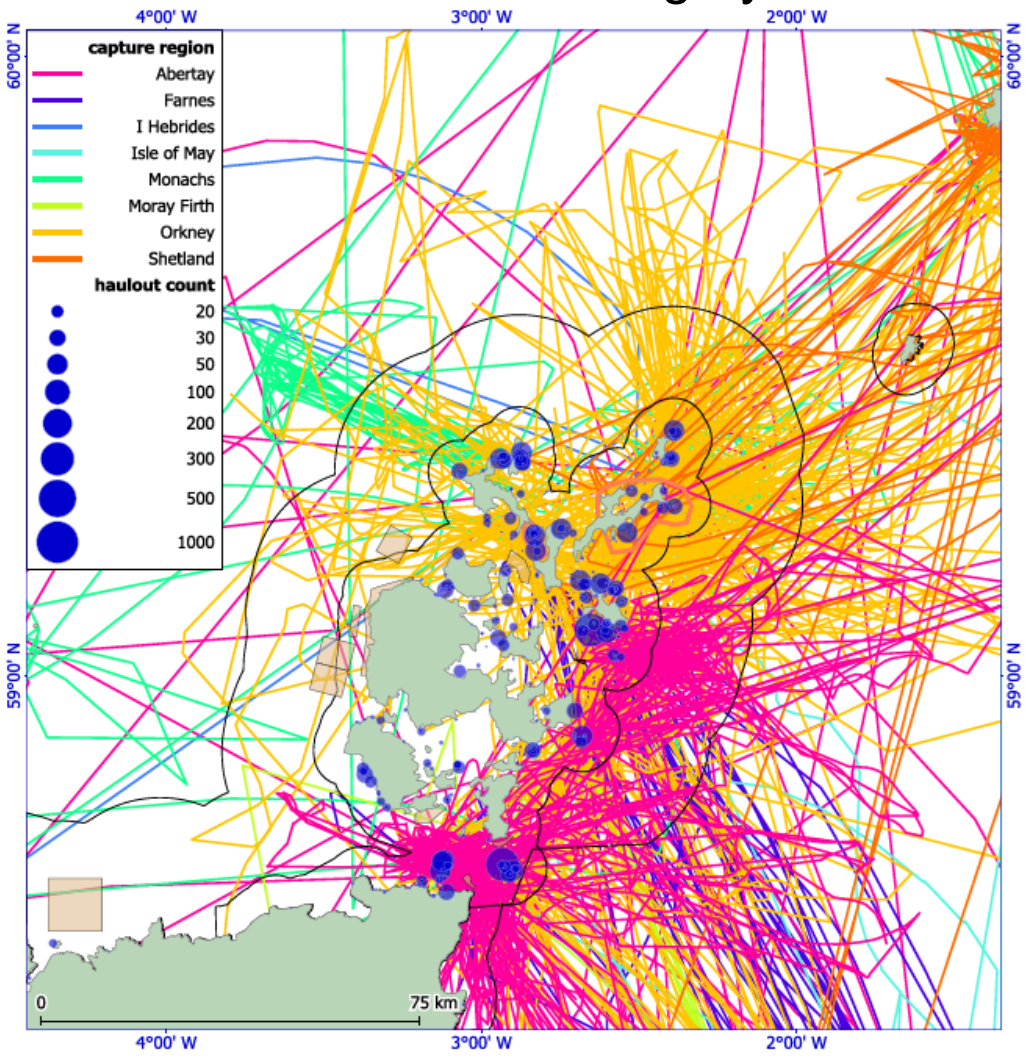
- assess the potential for overlap between areas used by seals and those proposed for wave/ tidal energy development
  - determine use of land and sea;
  - consider implications of installing marine renewable developments
  - ❖ review existing data
    - ground and aerial survey of seals hauled out (since 1960s);
    - at-sea movements (last 20 years)
  - ❖ guidance for development locations

Orkney

Combining data haulout counts overlaid with tracks

- visits from distant capture region
- proximity to lease areas

grey seals

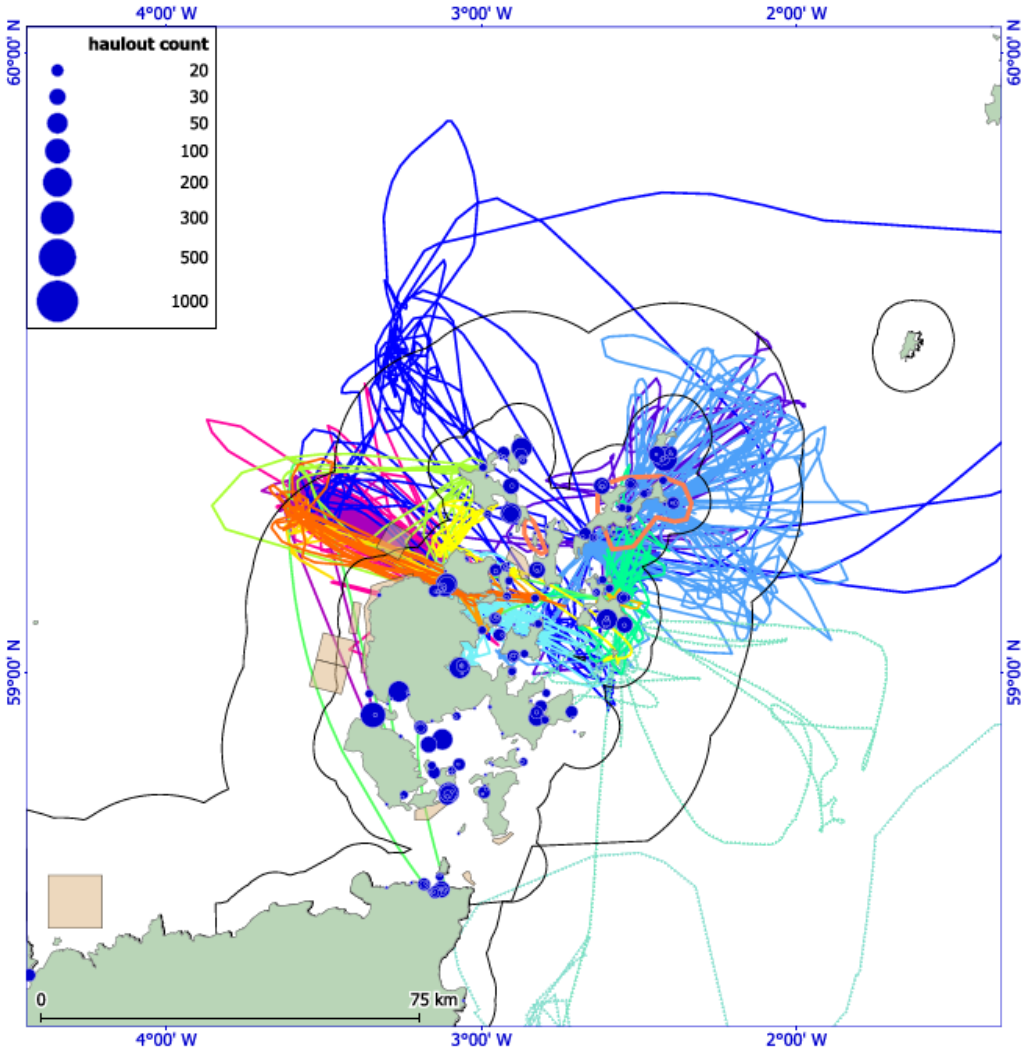


Orkney

Combining data haulout counts overlaid with tracks

harbour seals

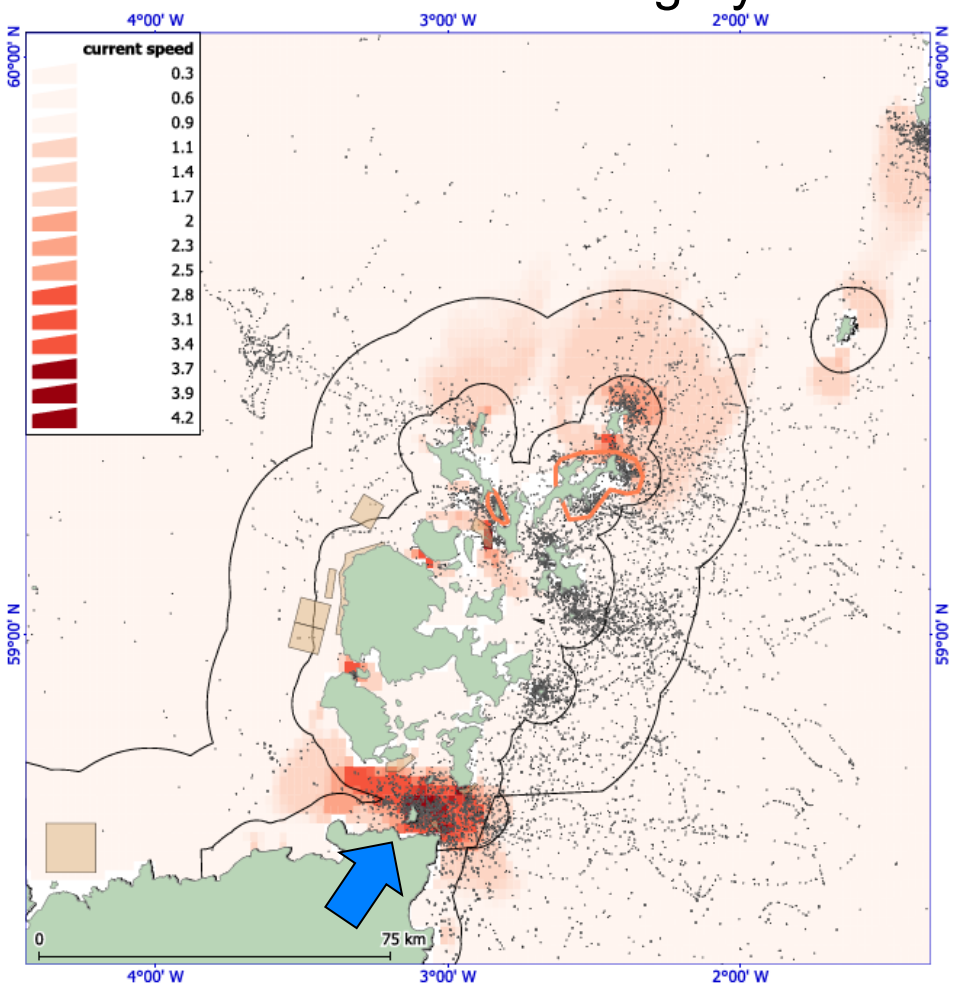
- tracks colour coded by individual seal
- overlap with lease areas
- smaller distances



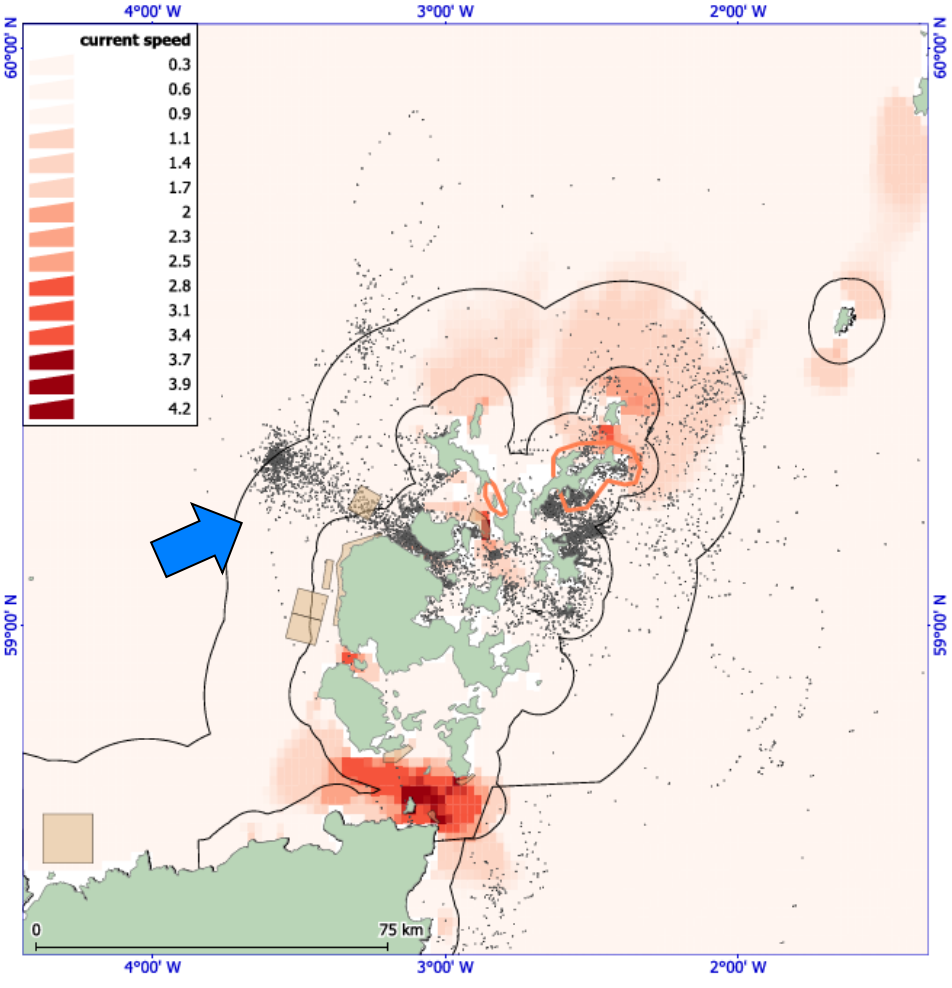
Orkney

Combining data magnitude of tidal currents

grey seals



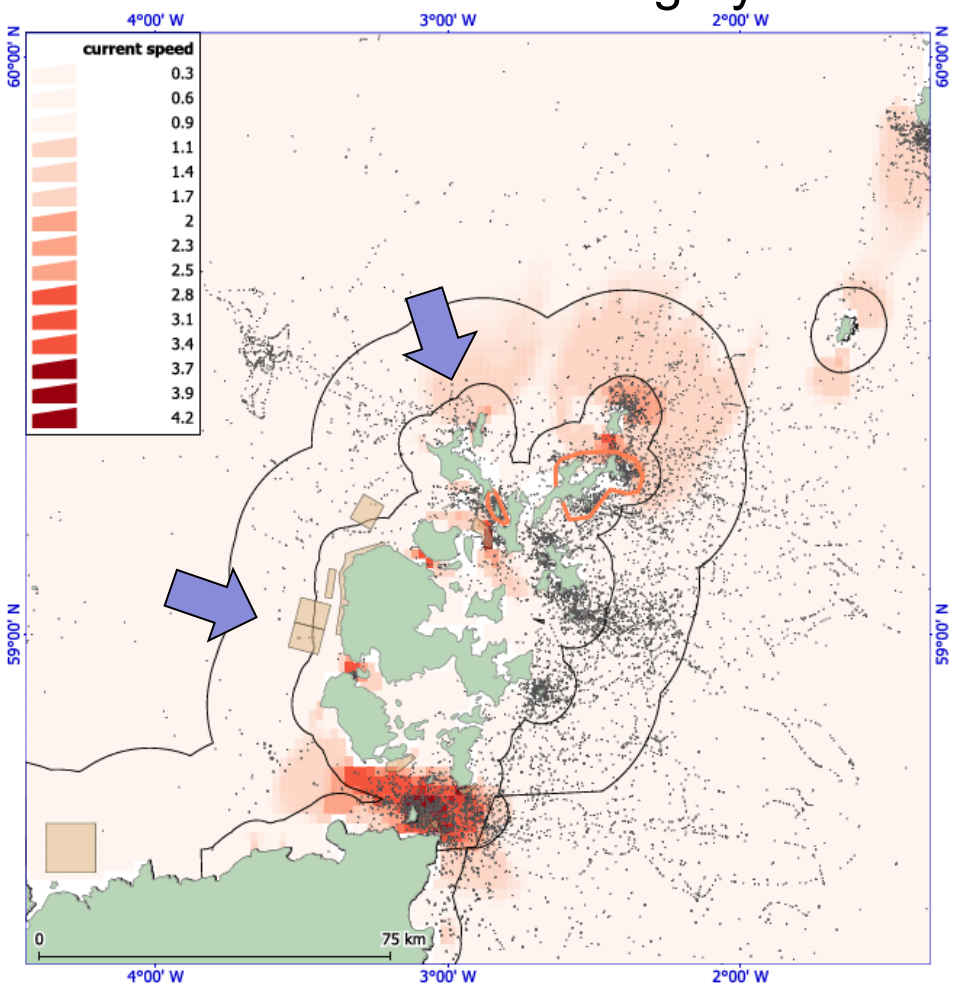
harbour seals



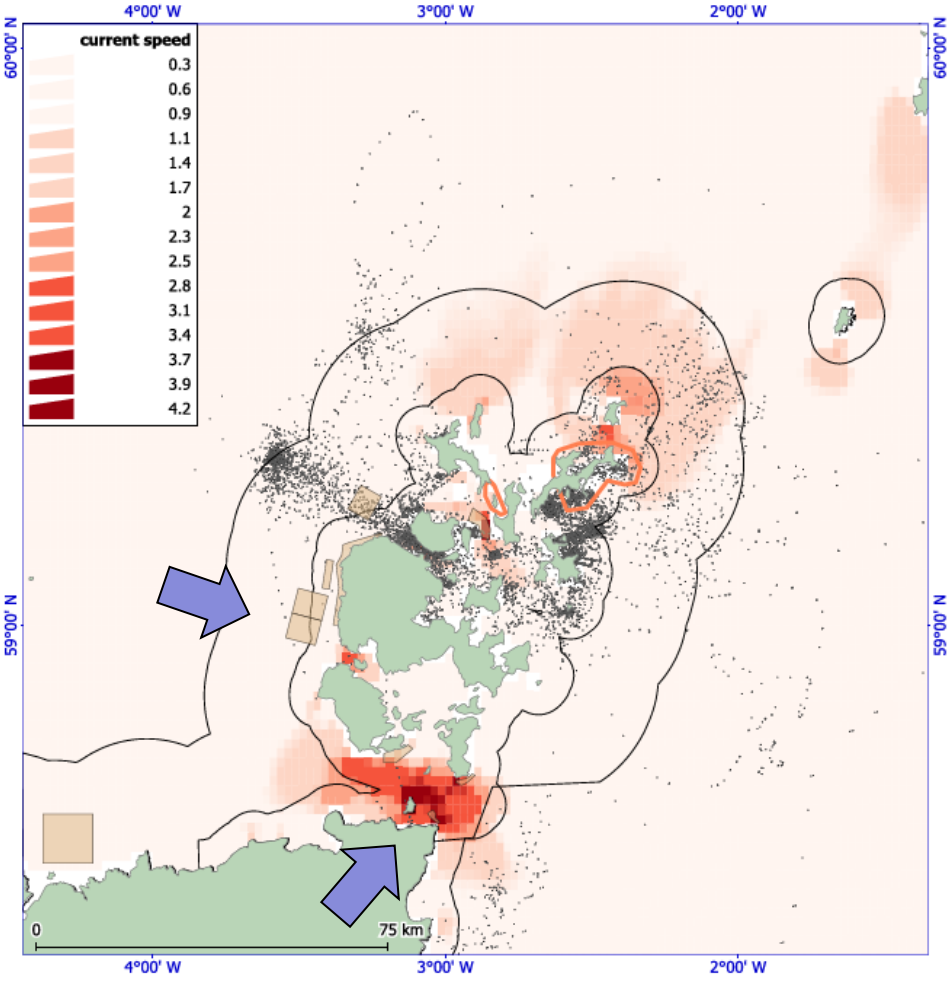
Orkney

Combining data => **data gaps**

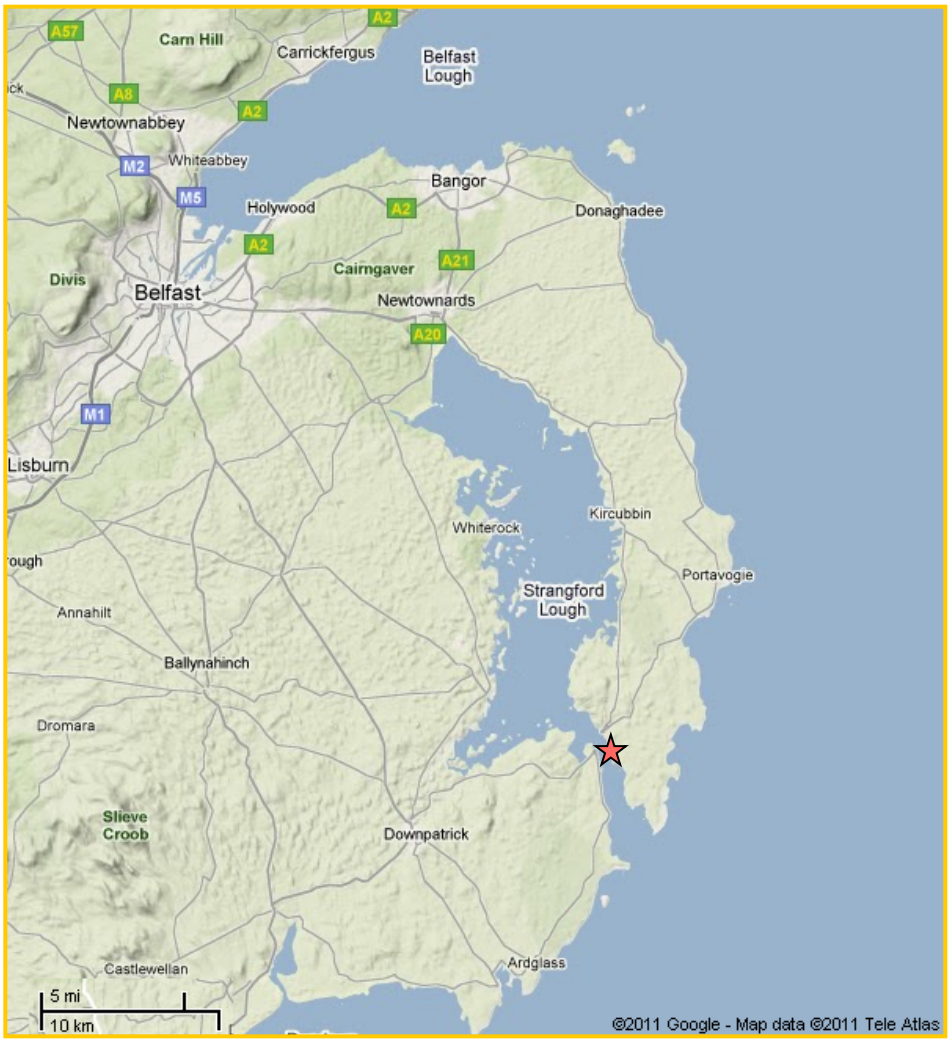
grey seals



harbour seals



Strangford Lough



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Strangford Lough

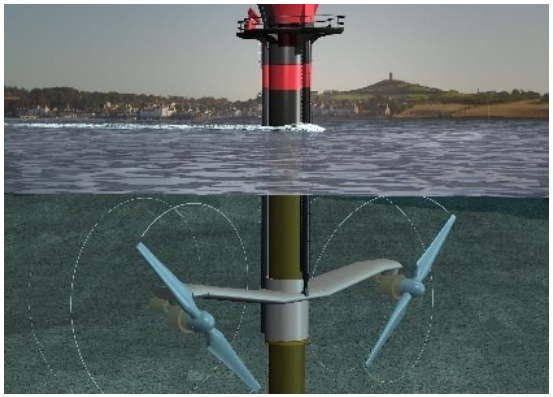
Strangford

- strong tides, good accessibility
- also one of the most environmentally sensitive conservation areas in Europe

Strangford Lough

environmental monitoring

- assess the impact of the worlds first commercial scale tidal turbine
  - comprehensive monitoring programme
  - number of key questions about the impact of the turbine on marine mammals



Seagen

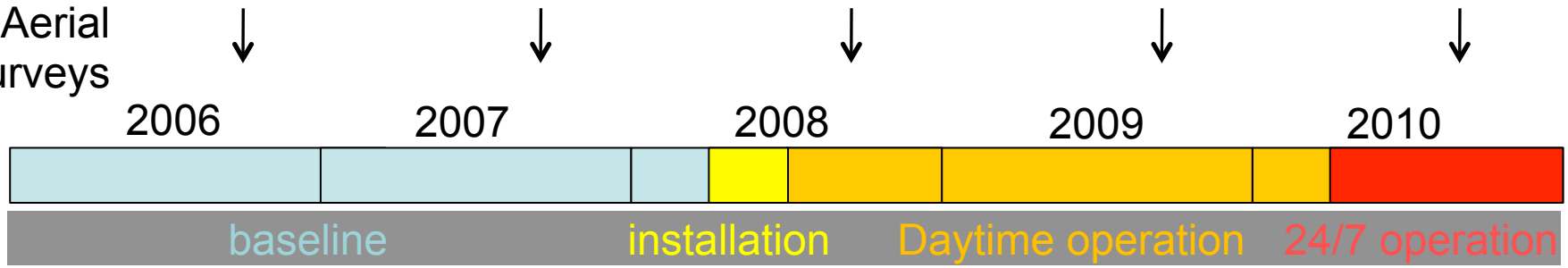
Strangford Lough

Shore based visual obs.

TPOD monitoring

Telemetry

Aerial surveys



Installation March-May 08
Daytime Operation started July 08 (not continuous)
24 Hr Operation started late March 2010 (but sporadic)

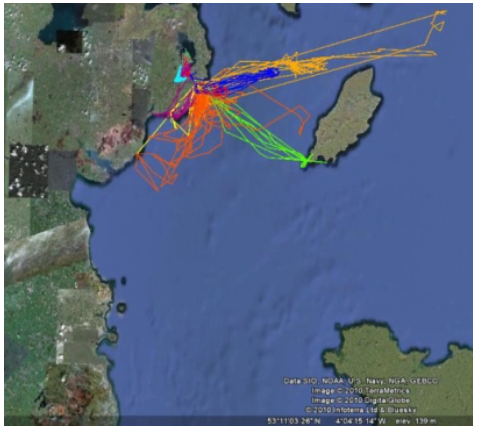
telemetry

- key question
  - ❖ does SeaGen change the habitat use of seals in its the vicinity?
  - ❖ does SeaGen present a barrier to the passage of seals through the Strangford Narrows?

Strangford Lough

telemetry

- 3 deployments, 36 tags
  - Baseline (2006), installation (2008); operation (2010)
- SMRU GSM/GPS phone tags
- GPS location every 20 minutes (10 minutes in 2010) & when hauled out



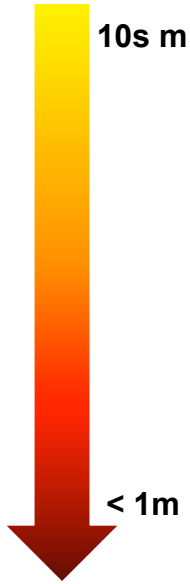
Strangford Lough

telemetry as monitoring tool

+ fine scale information on movement
+ detailed individual behaviour
+ habitat preference

- small sample size
- inter-individual variability
  ↳ limited ability to detect change

Strangford Lough



what next?

- improve accuracy of locations
- location on every surface (battery life...)
- incorporate device to detect proximity to turbine
- improve methodology to interpolate movement between surface locations (eg combine dive profile with bathymetry)

- cheaper
- improve analysis to detect changes through time (variability, autocorrelations...)

Monitoring for Marine renewables

summary

- informative to statutory agents
- data review –> areas of overlap & data gaps
- environmental monitoring - barrier effect
- good tool & can we improve it

❖ applicable to management of marine mammals around marine renewables sites outside the UK

Acknowledgments

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- MCT and DECC (funders)

Thank you!

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Carol Sparling