

Surveying marine mammals in nearby Tidal Energy Development Sites: a Comparison

S. Benjamins^{#1}, A. Macleod*, L. Greenhill[#], B. Wilson[#]

[#]Scottish Association for Marine Science (SAMS)

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*SAMS Research Services Ltd. (SRSL)

University of the Highlands & Islands (UHI)

Dunstaffnage, Oban, Argyll

Scotland, UK

PA37 1QA

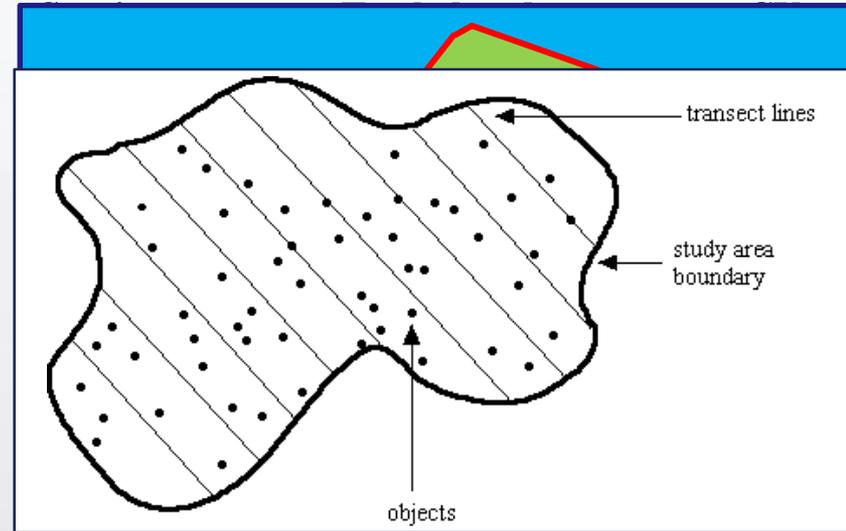
¹Corresponding author: Steven.Benjamins@sams.ac.uk

Context

- Potential impacts of tidal-stream sector on marine mammals remain poorly understood
 - Collisions?
 - Excessive noise?
 - Displacement?
- Need for pre-consent Environmental Impact Assessment
 - Existing datasets
 - Site Characterisation Surveys
- What are the challenges?

Typical survey aims and approaches

- Overview of species presence & diversity
- Estimate absolute abundance
- Establish connectivity with MPAs
- Line transect surveys
- Typically once monthly, for up to 2 years
- Typically ship-based
- Mostly visual observers, sometimes concurrent collection of passive acoustic data



dolphin

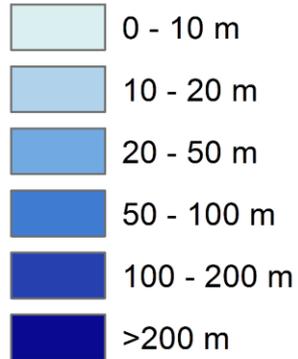
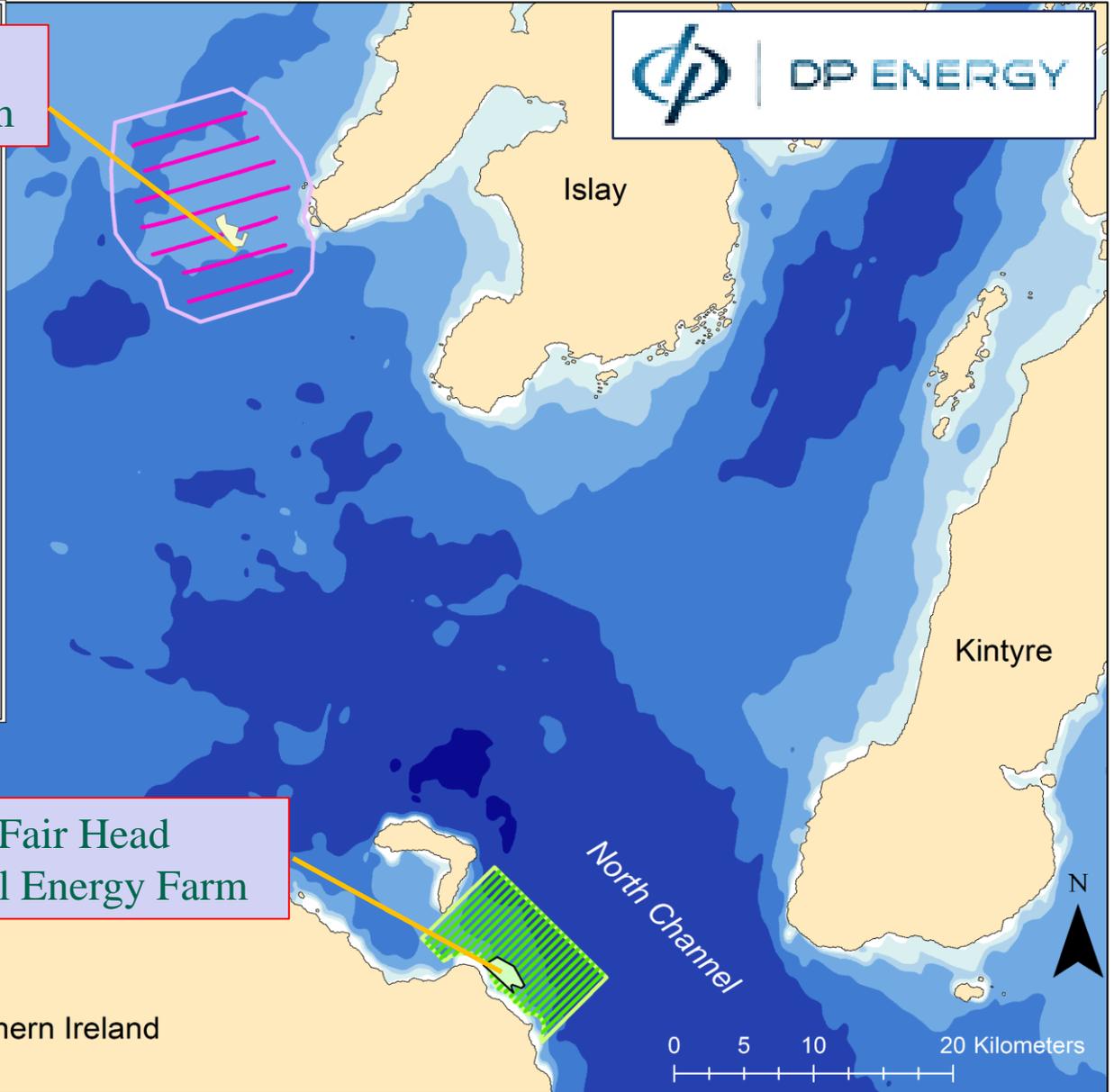
Minke whale

17.136 [9.015 – 32.568] 0.337

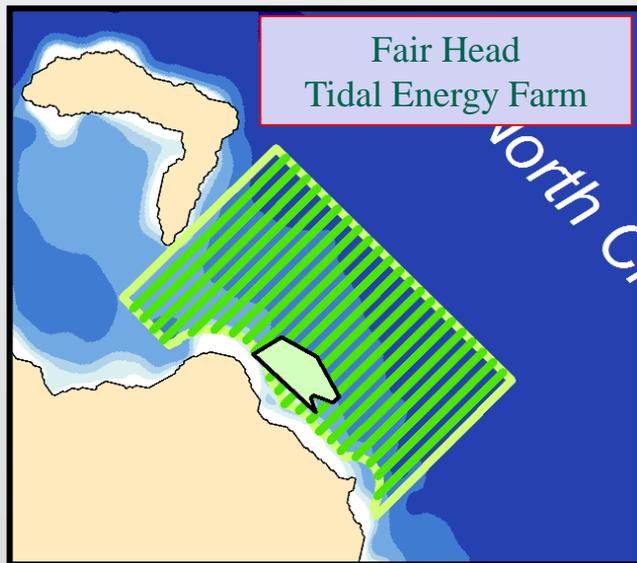
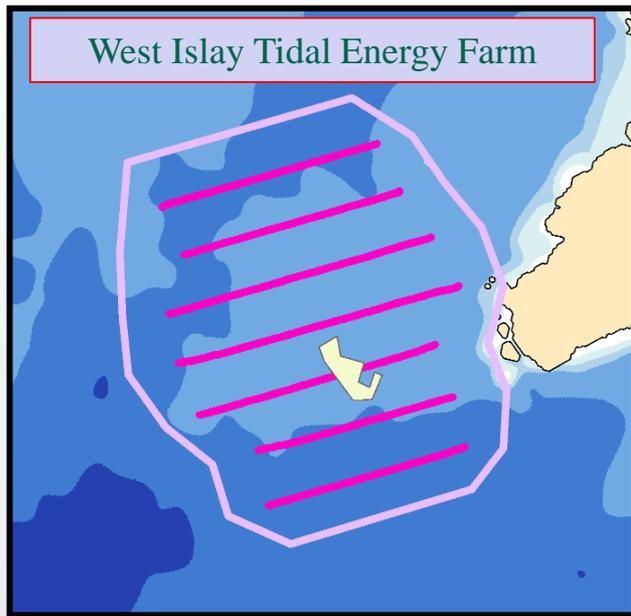


Overall aim is to provide robust data to underpin management

West Islay
Tidal Energy Farm



Fair Head
Tidal Energy Farm



Parameter	West Islay	Fair Head
Survey period	Nov. 2009 – Oct. 2011	July 2013 – June 2015
# surveys completed	21	24
Survey area	186 km ²	69 km ²
# of transects	7	22
Total transect length (per survey)	115 km	134 km
Total distance surveyed	2,248 km	2,695 km
Consenting authority	Marine Scotland	Dept. of Environment – Northern Ireland

Results - observed species diversity





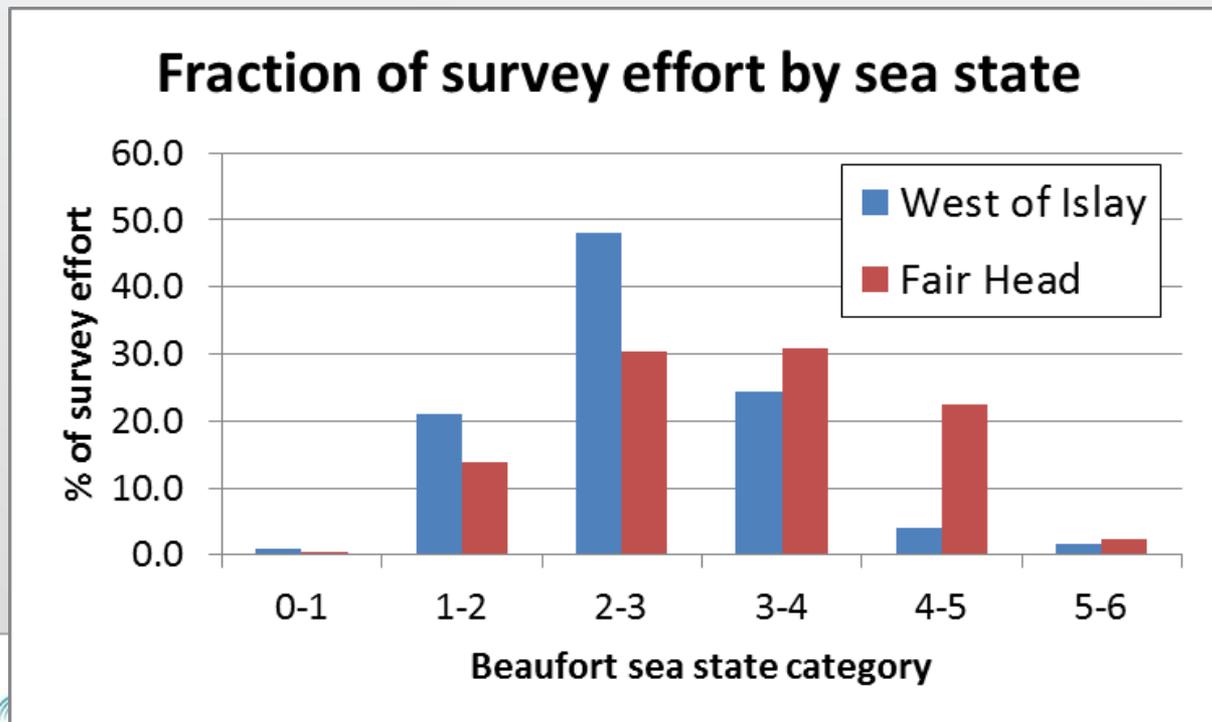
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Harbour porpoise - abundance estimation

Parameter	West Islay	Fair Head
# of sightings	12 (18 individuals)	114 (215 individuals)
Mean sightings-based density estimate (# animals / km ²) [95% C.I]	0.12 [0.03 – 0.48]	0.25 [0.18 – 0.35]
Coefficient of Variance	67%	17%
# of acoustic detections	41	Not needed
Mean acoustics-based density estimate (# detections / km ²) [95% C.I]	0.03 [0.02 – 0.05]	(but much higher than West Islay)
Coefficient of Variance	25%	

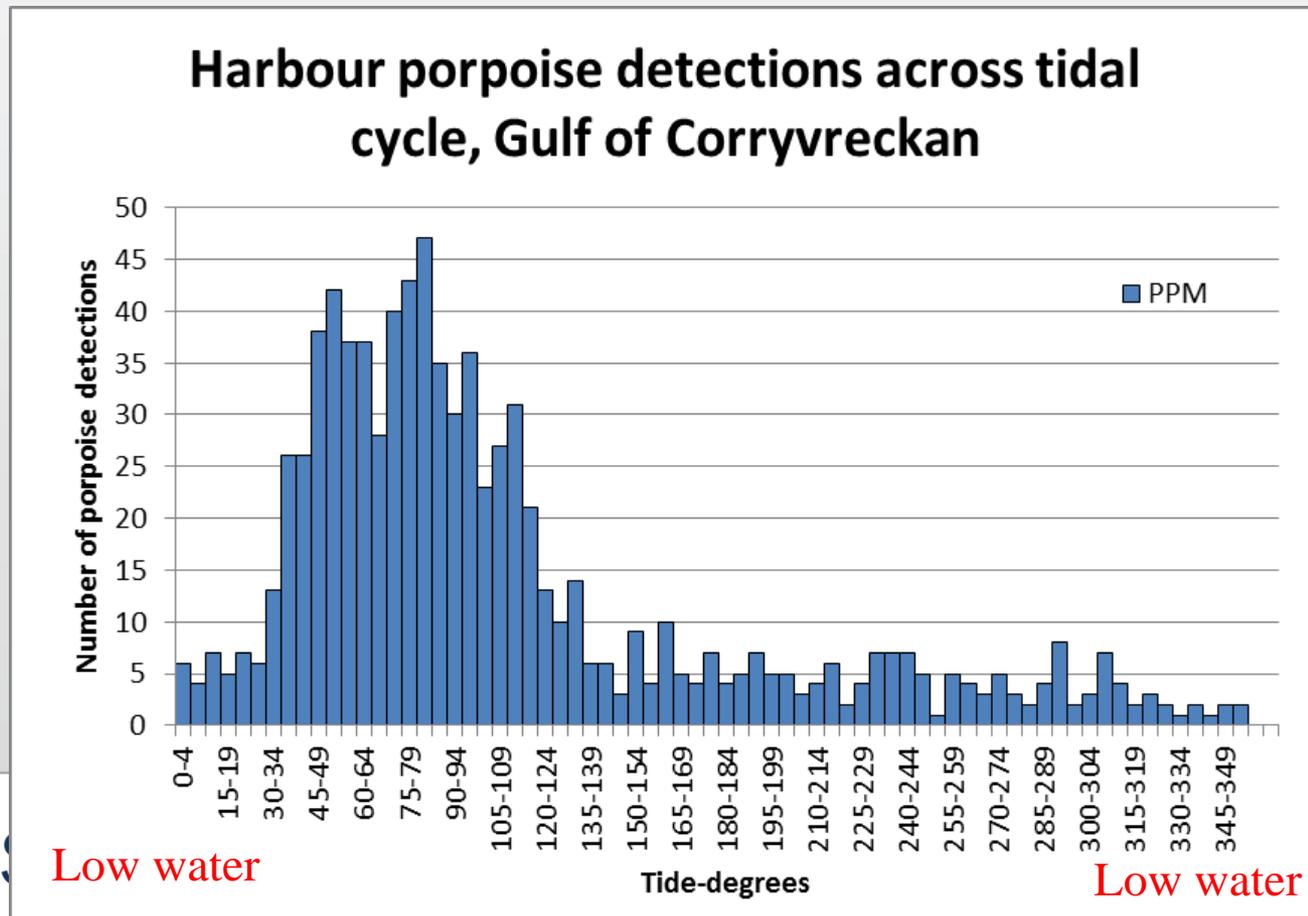
Comparison

- Very low detection rates at West Islay
 - Comparable sea states
 - Equally experienced observers
 - Likely to be same population
- Low detection rates + high uncertainty = extra survey effort???



Possible causes?

- Genuinely fewer animals; small-scale heterogeneity
- Long-term fluctuations in abundance
- Environmental factors (e.g. tidal cycle)



Conclusions

- One-size-fits-all monthly surveys may not be fit for purpose to understand risks to marine mammals
 - Small sample sizes may preclude meaningful density estimation
 - Small-scale spatiotemporal variability not covered
- Other parameters (e.g. patterns of site usage) may be more relevant than absolute abundance
- Are surveys worth their cost, in terms of data quality?

Recommen

- Need for monitoring strategies that are scientifically robust, and affordable
 - What data are to be collected, and how?
 - What spatiotemporal scales?
 - What levels of precision are needed?
- Need for adaptive monitoring strategies to ensure relevance
 - Pilot surveys!
- Understanding long-term habitat dynamics is more relevant than presence in the short-term
- Integration of adjacent survey data to create consistent datasets for cumulative impact assessment



Guidance to inform marine mammal site characterisation requirements at wave and tidal stream energy sites in Wales

Sparling C, Smith K, Benjamins S, Wilson B, Gordon J, Stringell T, Morris C, Hastie G, Thompson D & Pomeroy P

NRW Evidence Report Number 82

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