

Using land watch data to determine long-term trends in cetacean abundance



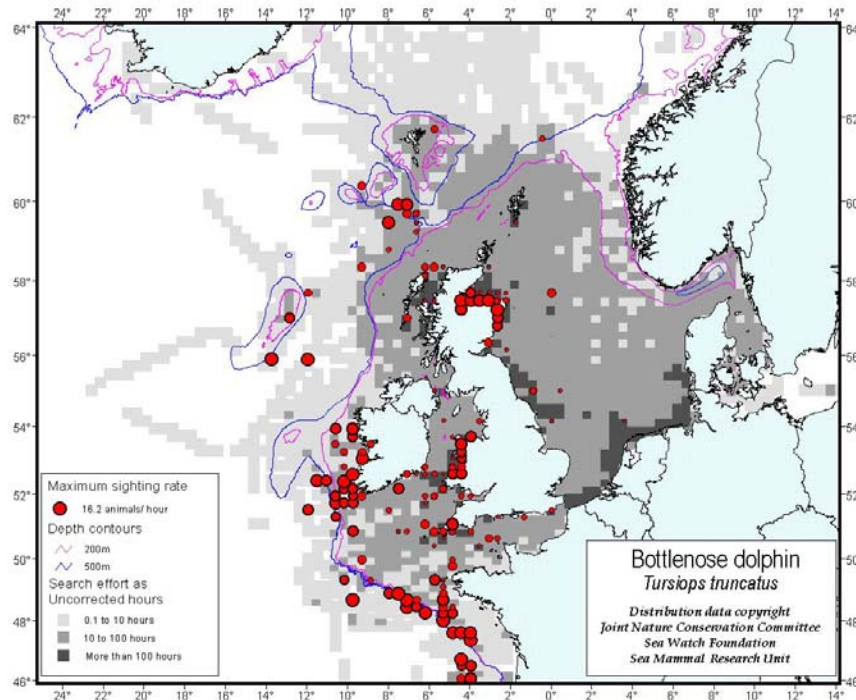
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Sea Watch Foundation - Land watch data

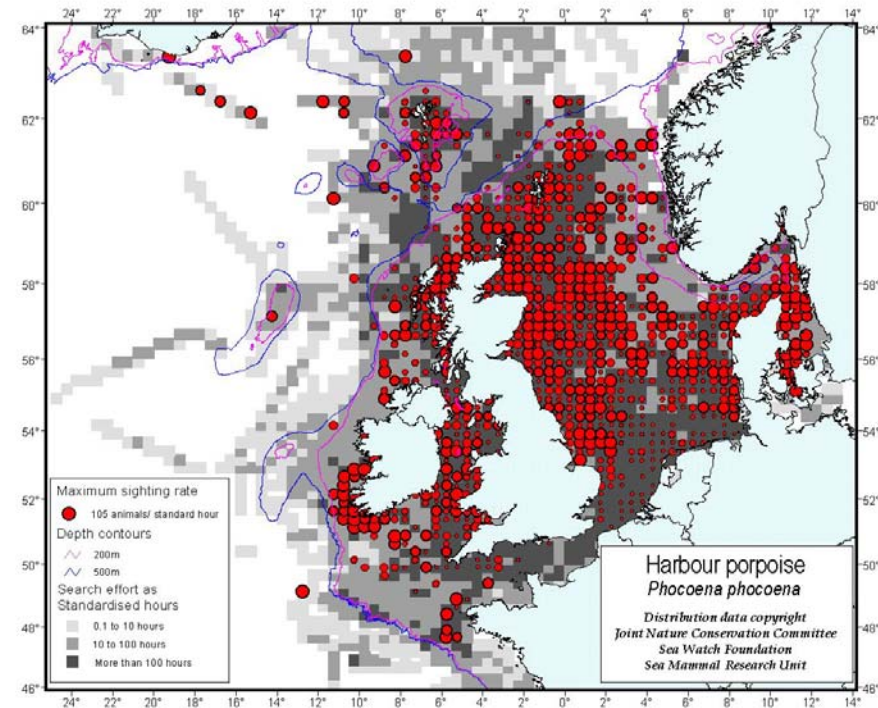


- **Citizen science** - pros and cons
- Since 1965...
- **Choice of site** on the basis of raised elevation, good field of view, and safety
- **Timing** depends on good weather, **NOT** on sighting cetaceans!
- *Usually* 1 or sometimes 2 primary observers (recorded)
- **Naked eye** scans plus binoculars to verify species & group size
- **Environmental information** recorded at start & end of watch, 15-min or 30-min intervals, or if conditions changed
- Plus instantaneous scan counts at regular intervals (separate)

Bottlenose Dolphin



Harbour Porpoise



- Predominantly coastal, 2 main local populations

- Widely distributed, more abundant

- Both protected under EU Habitats Directive

Maps from: Reid, Evans & Northridge (2003). *Atlas of Cetacean Distribution in Northwest European Waters*

Study Aims: Questions

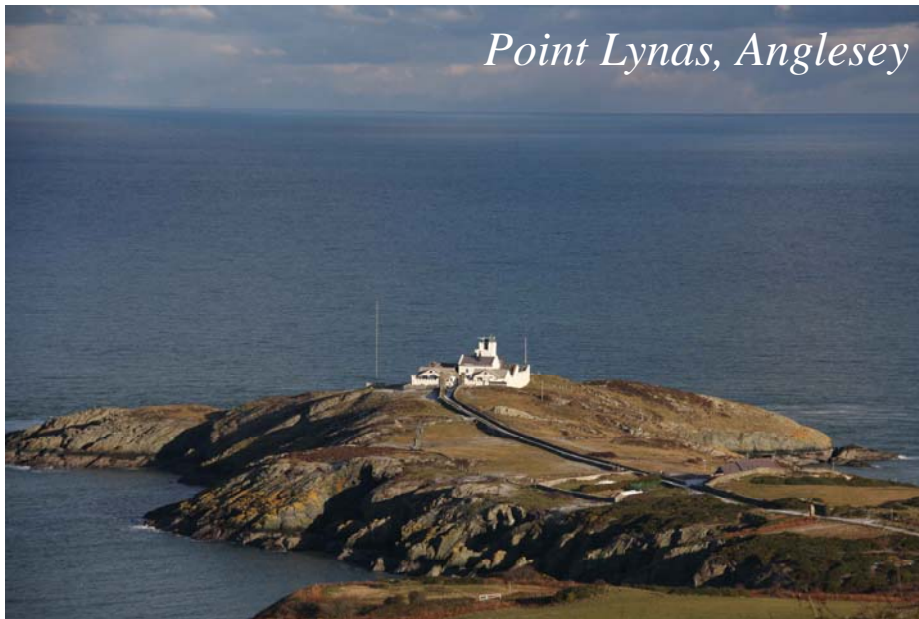


- 1) Can land watch data reveal spatial and temporal trends in bottlenose dolphin and harbour porpoise distribution and local abundance in UK waters?
- 2) Are there coastal hotspots which could be recommended as "Special Areas of Conservation"?
- 3) What improvements to land watch methodologies would maximise the value of the data collected?

Summary of UK land watch data & analysis



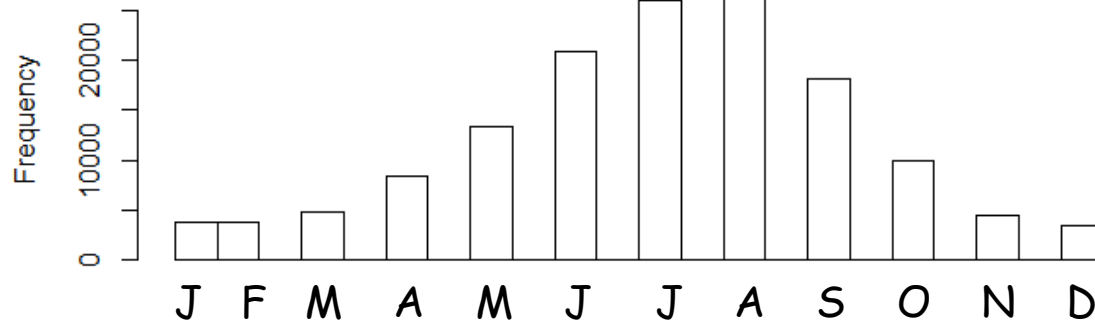
- >145,000 effort records
- c. 84,000 hours of effort
- 50-year time period: 1965-2014
- 732 sites
- c. 20,000 harbour porpoise records
- c. 27,000 bottlenose dolphin records



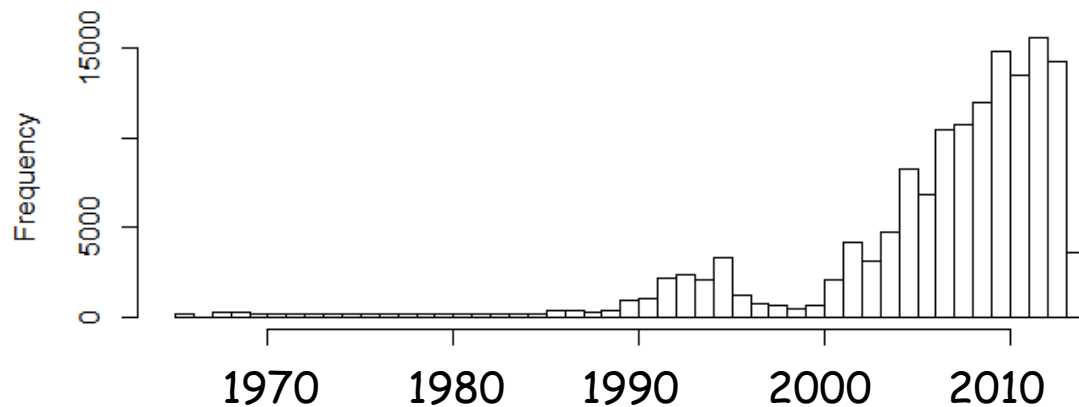
- Presence, sighting and count rates
- Results summarised by site-day (remove within-day AC)
- Remove repeat sightings, missing and high sea state values
- GAMs, by species, time period
 - Account for sea state, elevation, observation duration, etc
 - Quantify spatial, temporal, environmental patterns

Distribution of effort by month, year, area

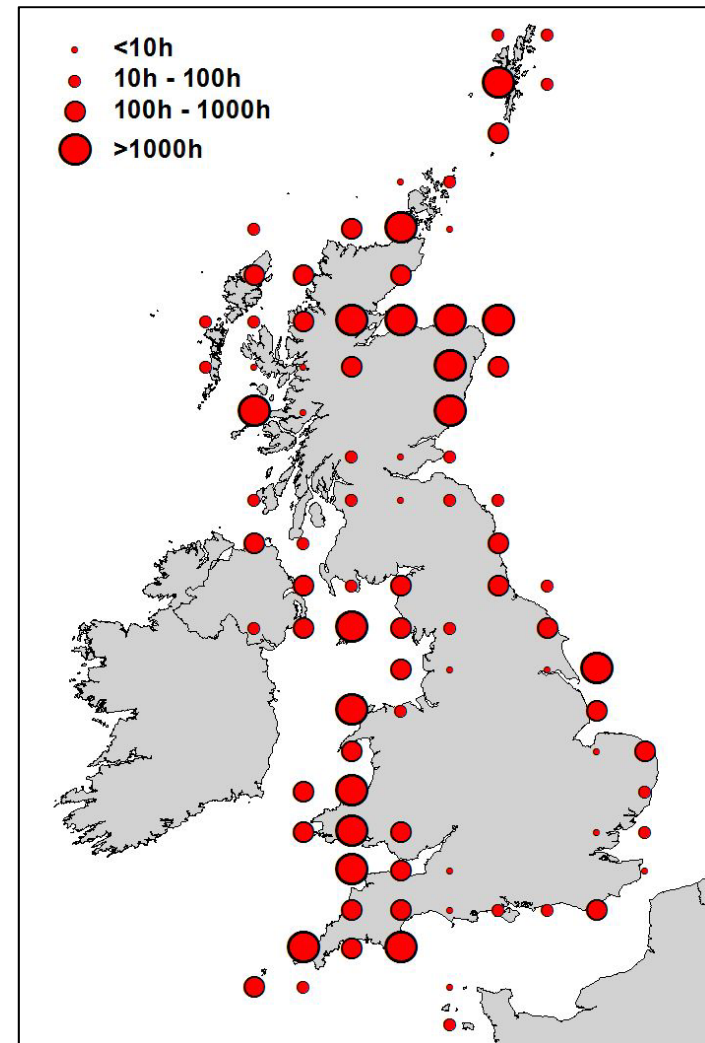
Land Watch Effort by Month



Land Watch Effort by Year

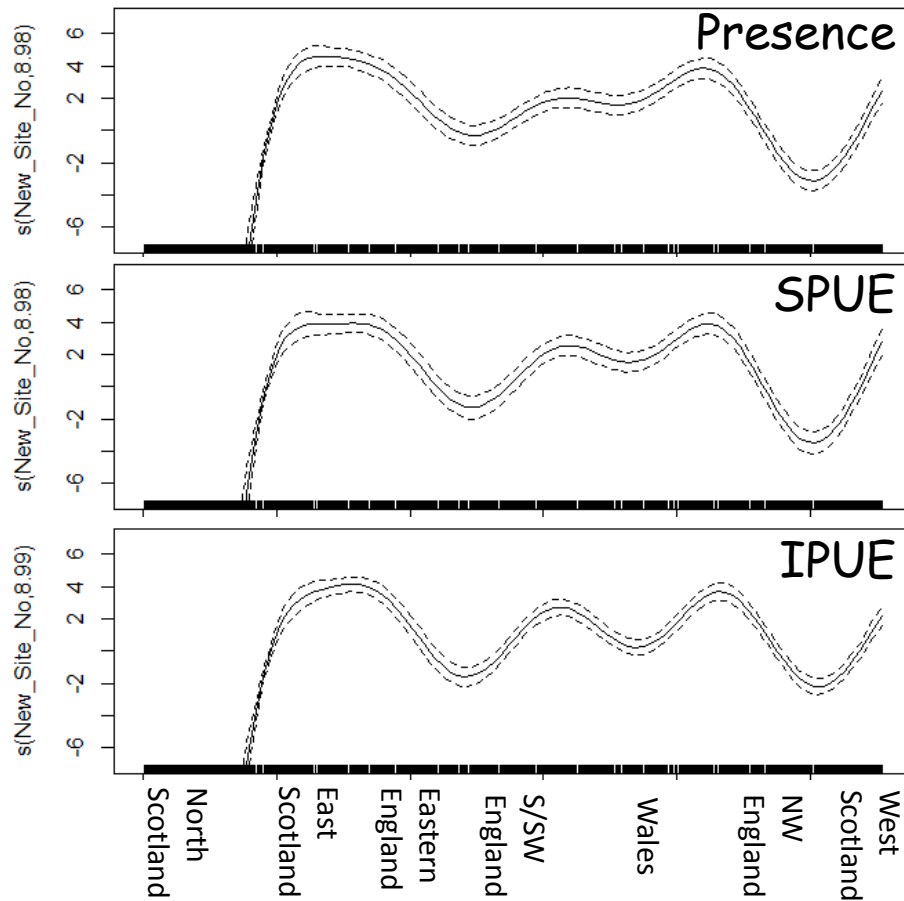


Land Watch Effort by Area

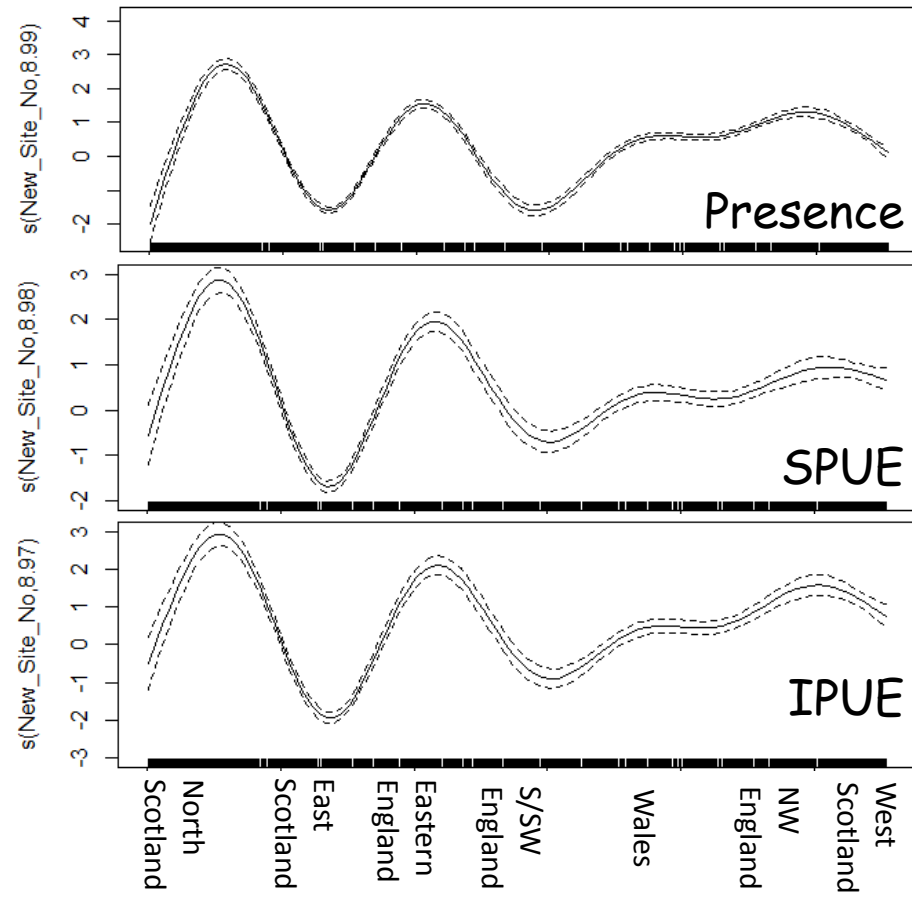


Results #1. Distribution of bottlenose dolphin & harbour porpoise (1990-2004): Presence, SPUE and IPUE by site

a) Bottlenose Dolphin

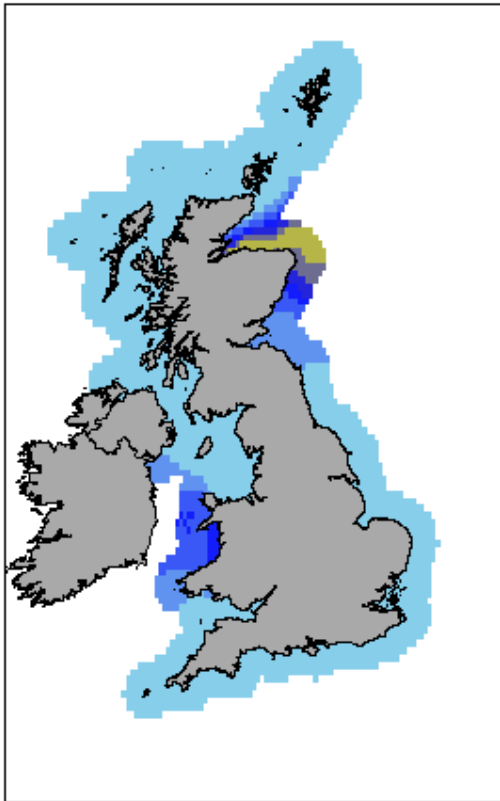


b) Harbour Porpoise

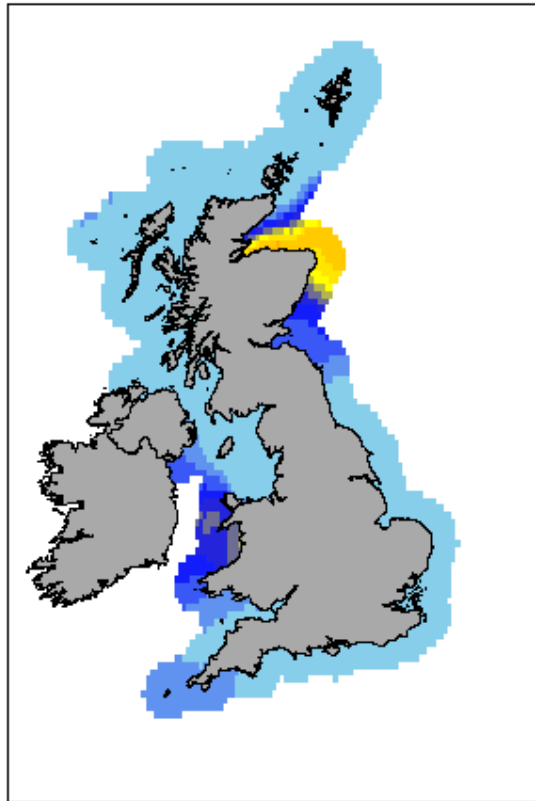


Distribution (1990-2004): Map of GAM predicted likelihood of occurrence for Bottlenose Dolphin

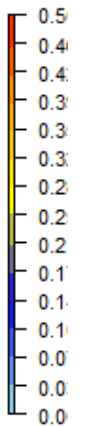
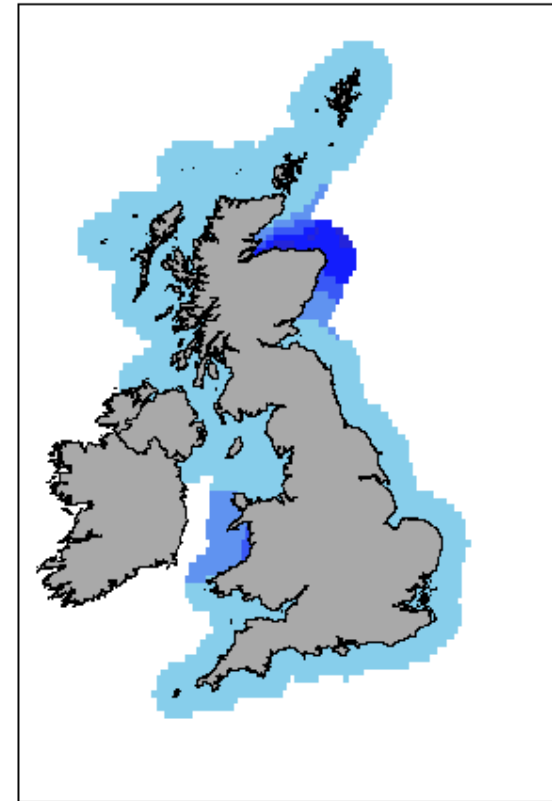
Predicted



Upper 95%

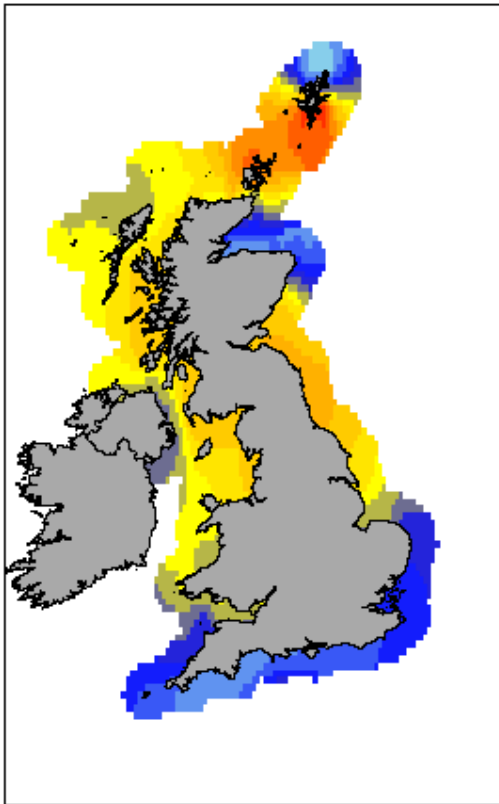


Lower 95%

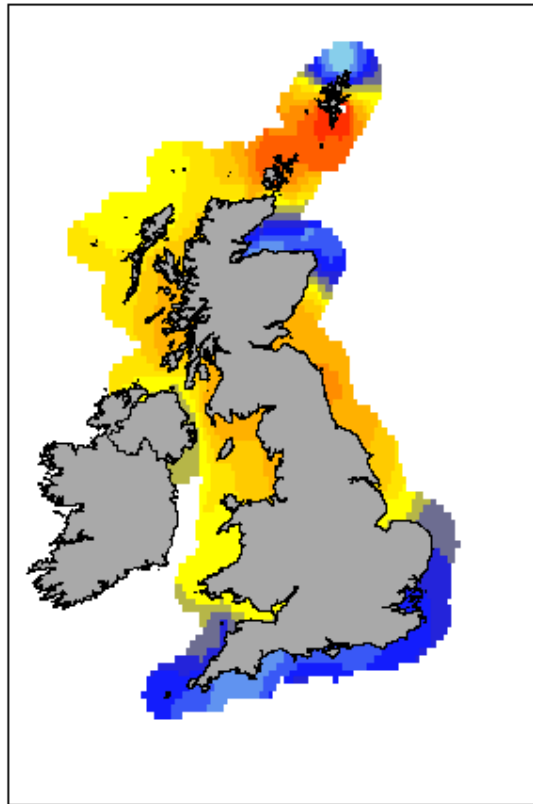


Distribution (1990-2004): Map of GAM predicted likelihood of occurrence for Harbour Porpoise

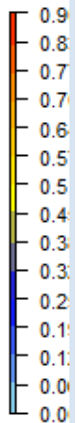
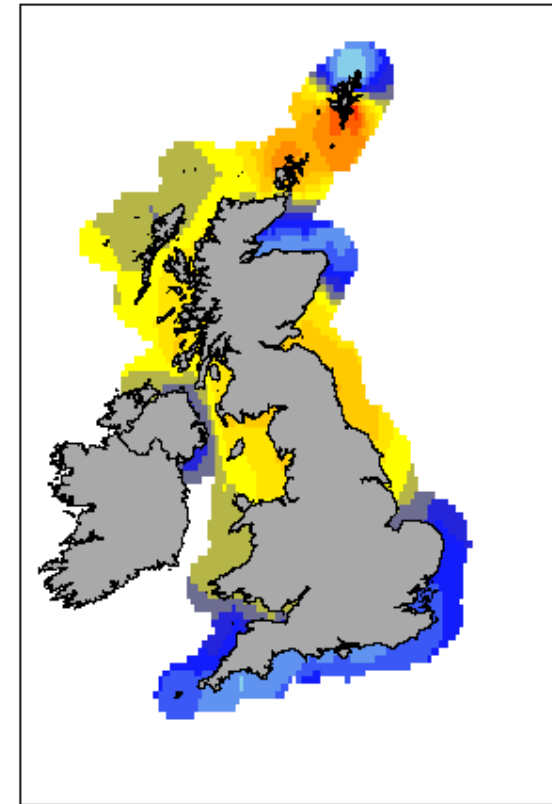
Predicted



Upper 95%

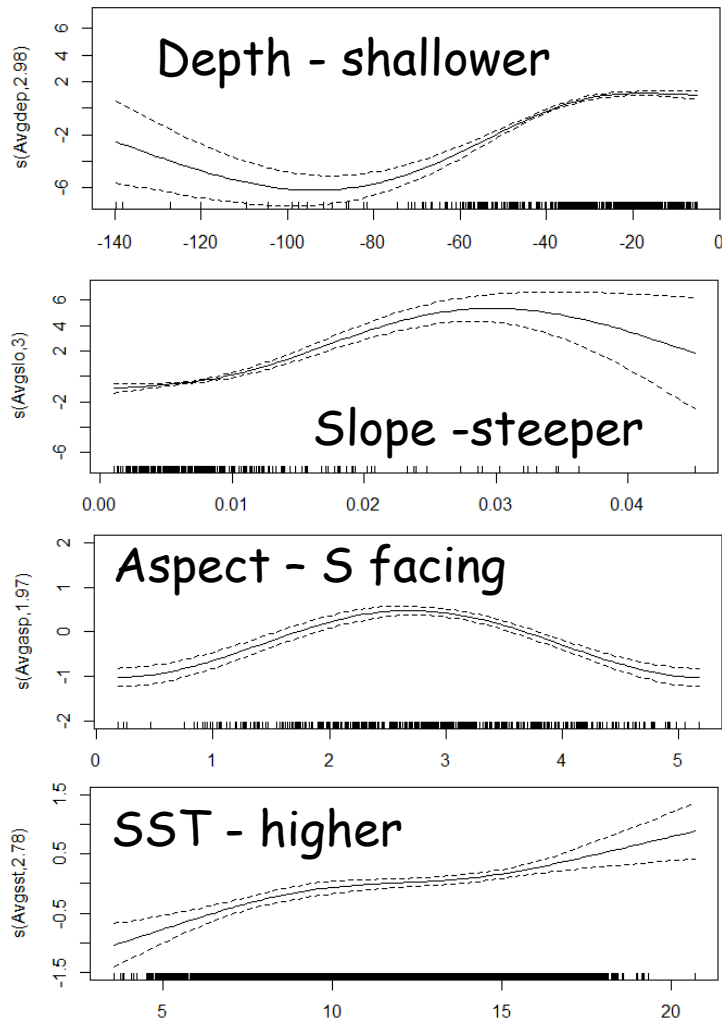


Lower 95%

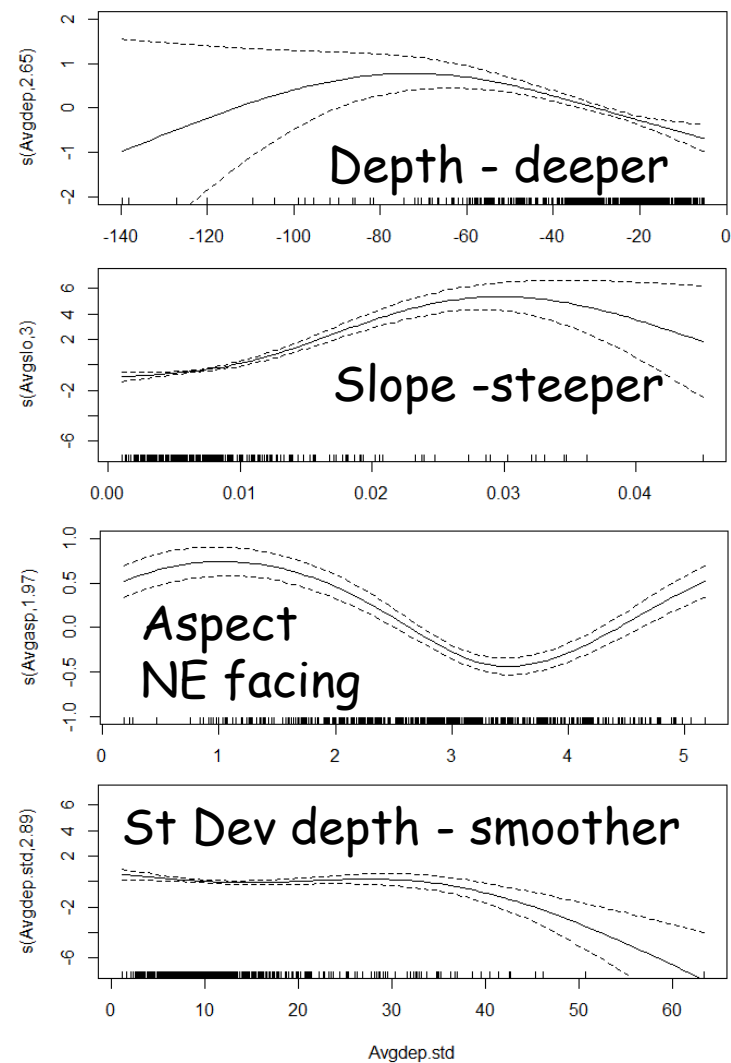


Environmental correlates of (coastal) sighting rate (1990-2004)

a) Bottlenose Dolphin

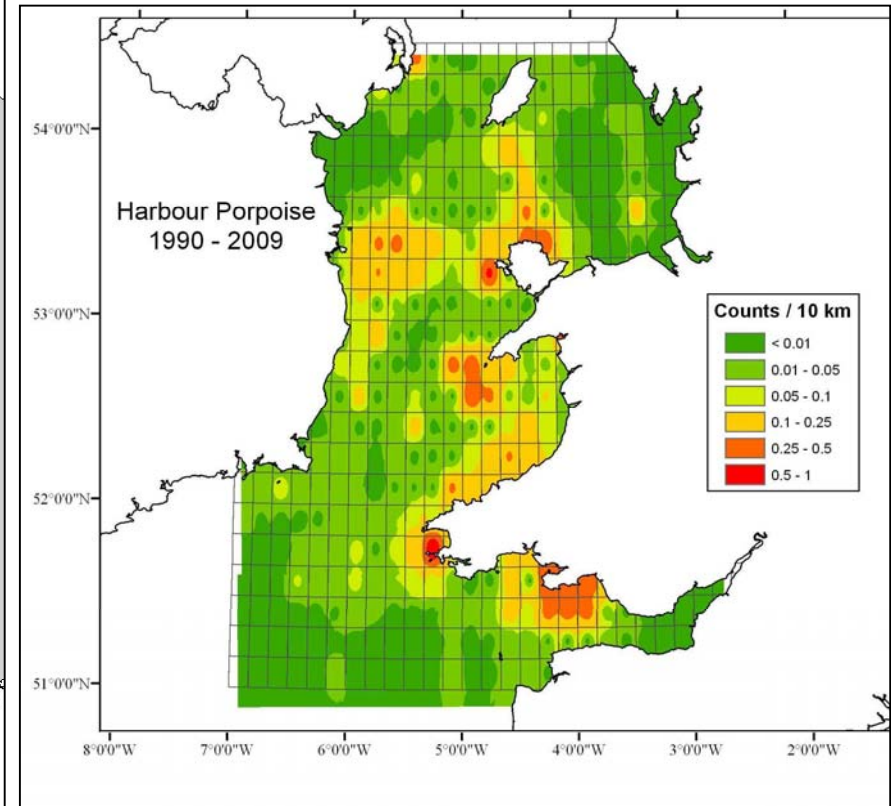
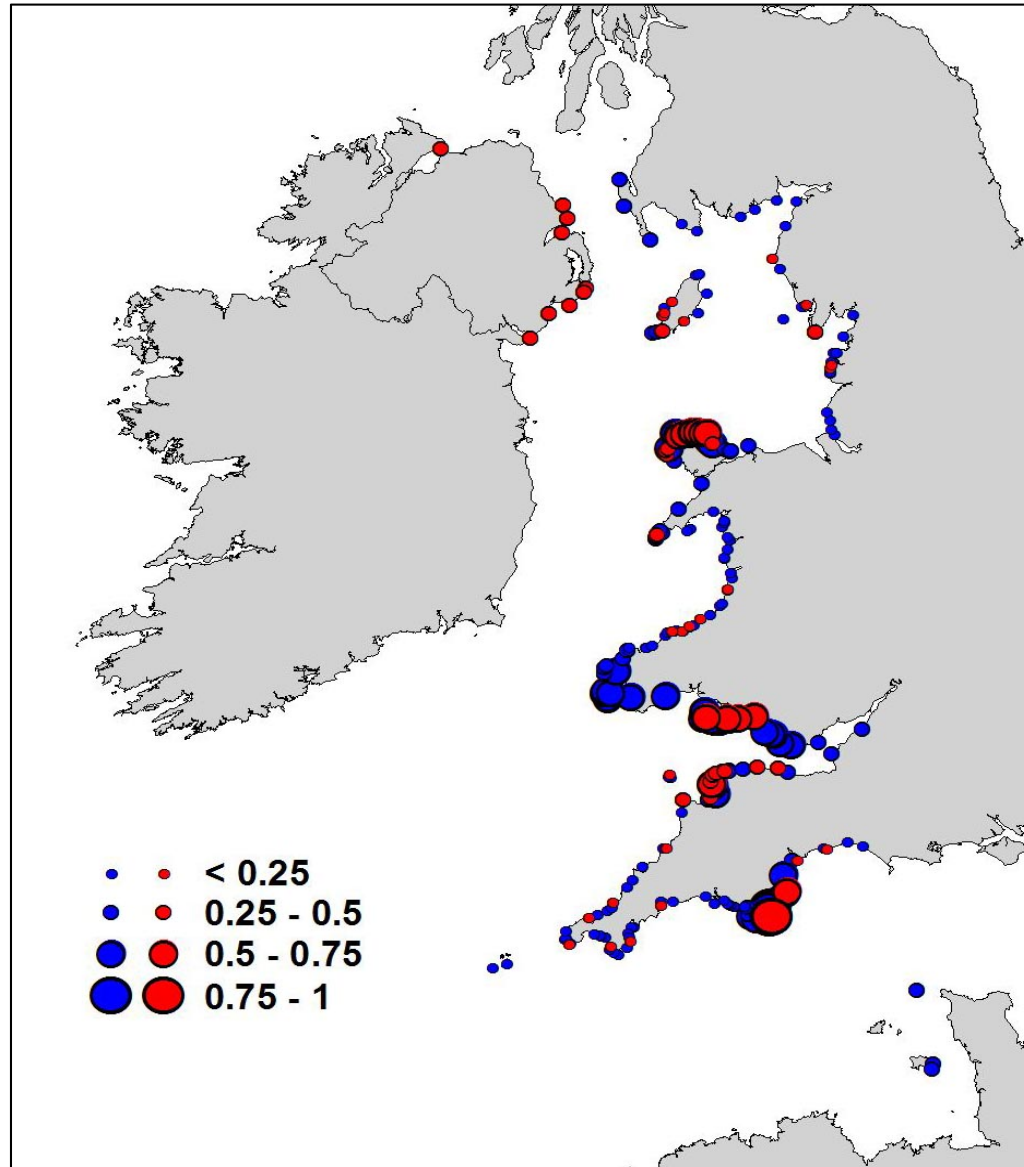


b) Harbour Porpoise



Data: monthly, 5 km x 5 km

Results #2. Agreement with at-sea survey results: Predicted likelihood of occurrence for Harbour Porpoise Celtic & Irish Sea Assessment Unit



Source: Baines & Evans (2012)
Atlas of Marine Mammals of Wales

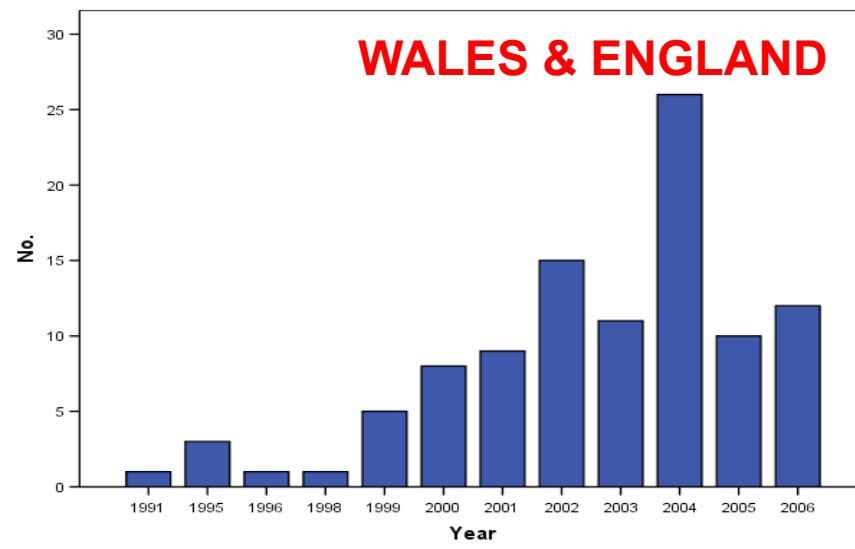
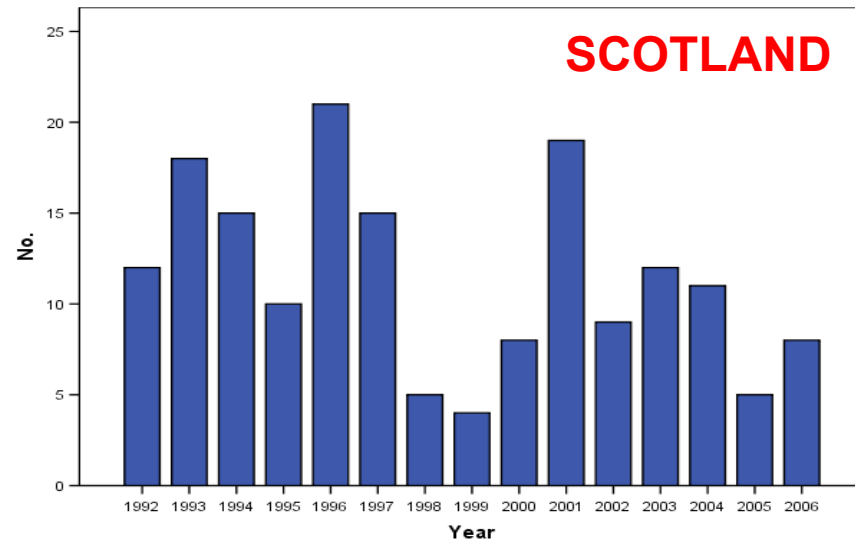
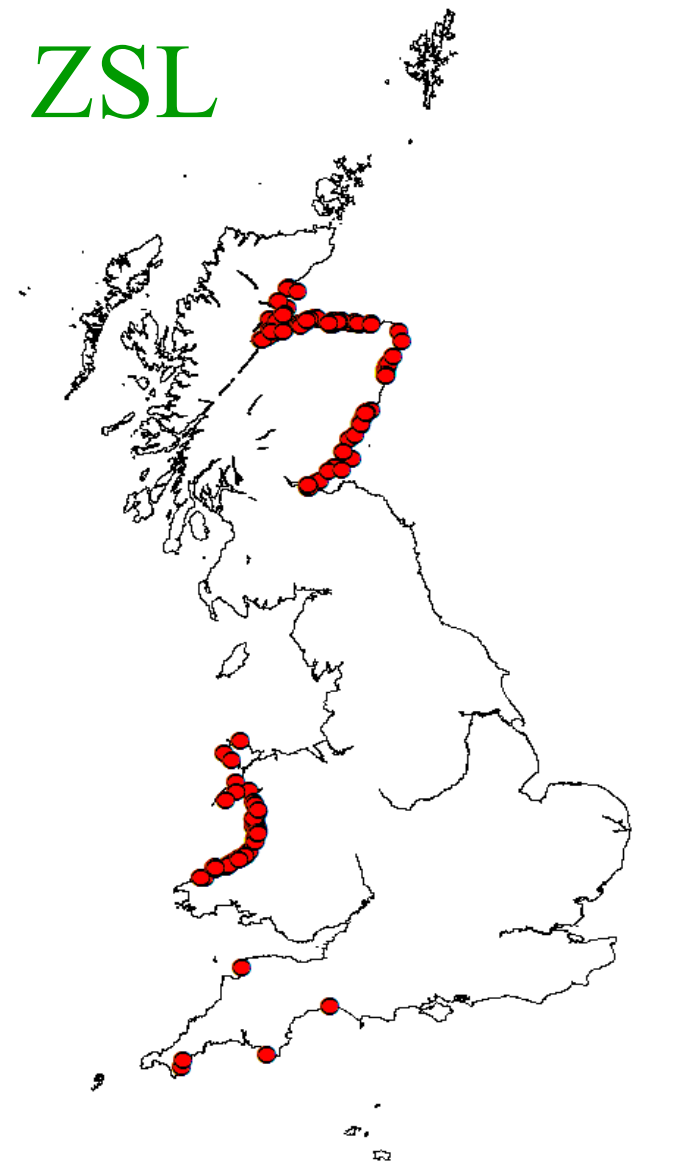
Results #3: bottlenose dolphins versus porpoises



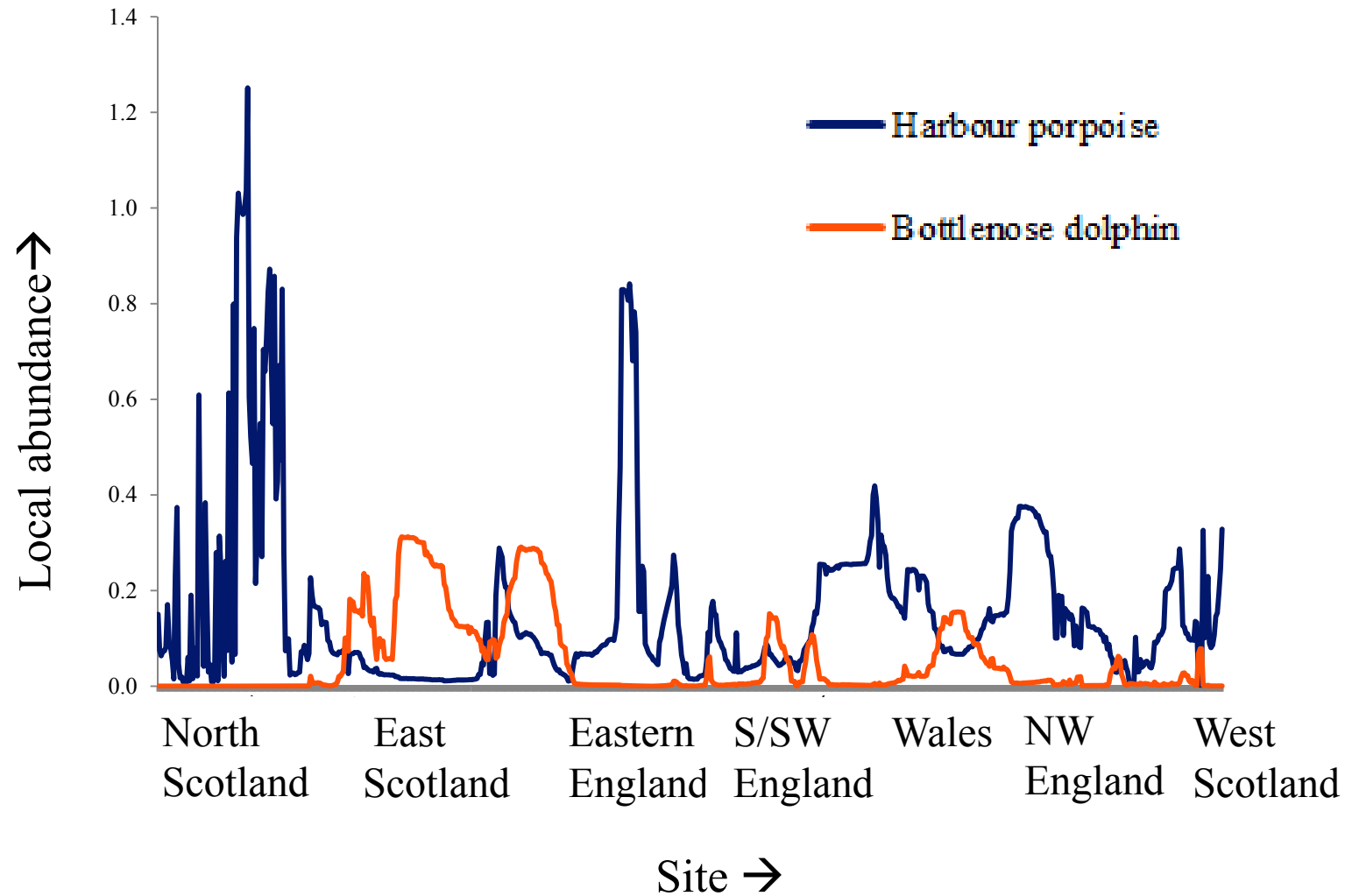
Southern Cardigan Bay, 13 June 2014

Distribution of uk-stranded porpoises killed by bottlenose dolphins

ZSL

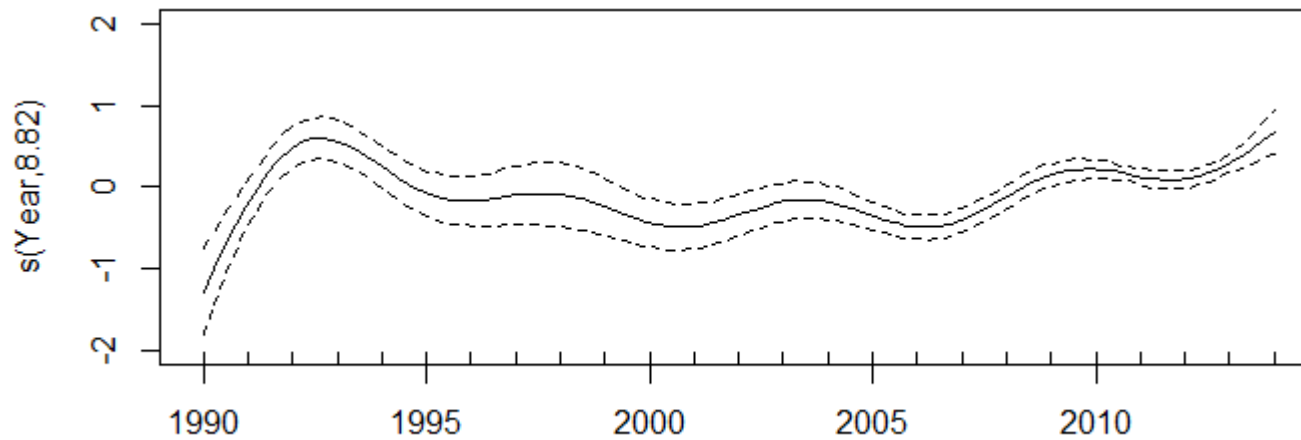


Bottlenose dolphin vs harbour porpoise distributions

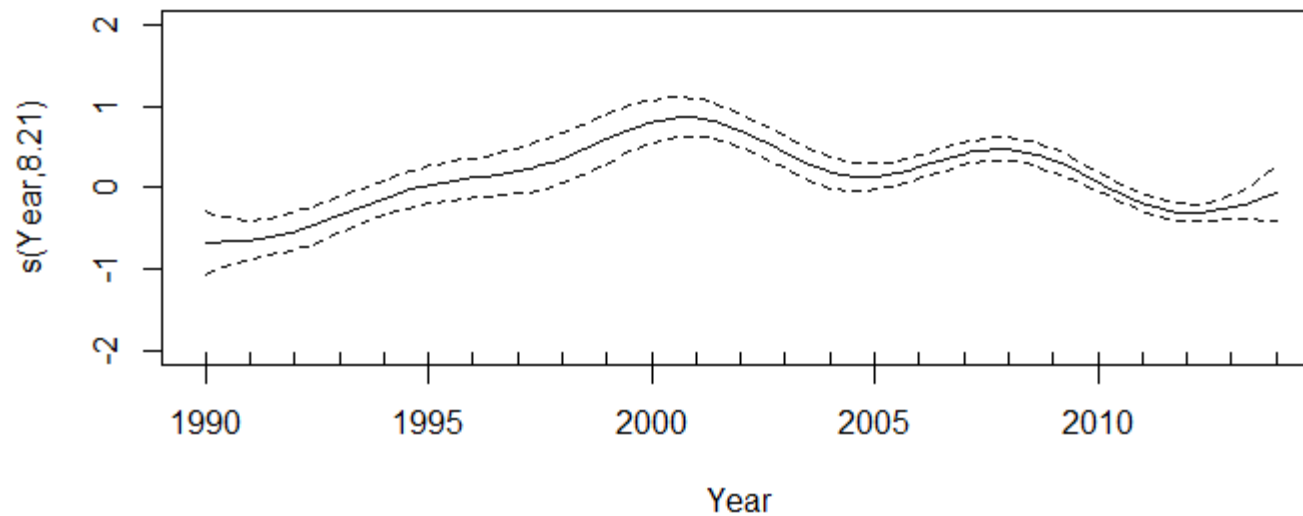


Results #4. Long-term trends in presence of bottlenose dolphin and harbour porpoise

a) Bottlenose Dolphin

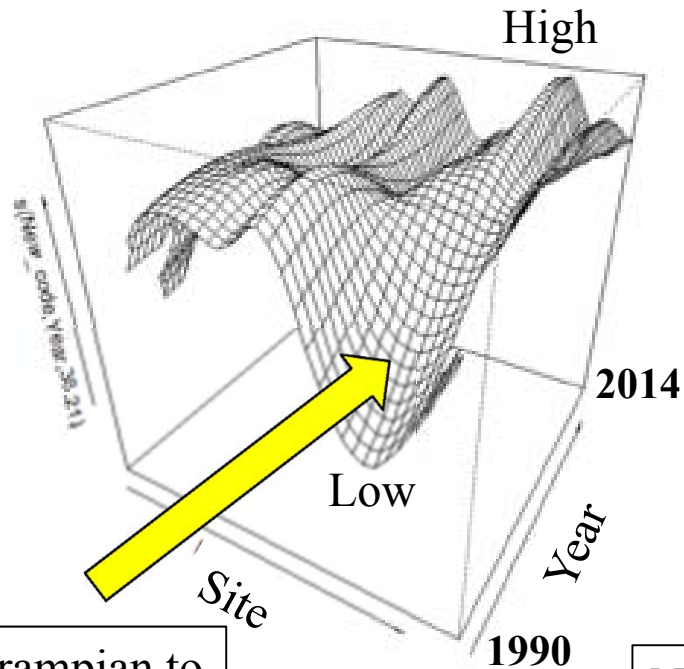


b) Harbour Porpoise



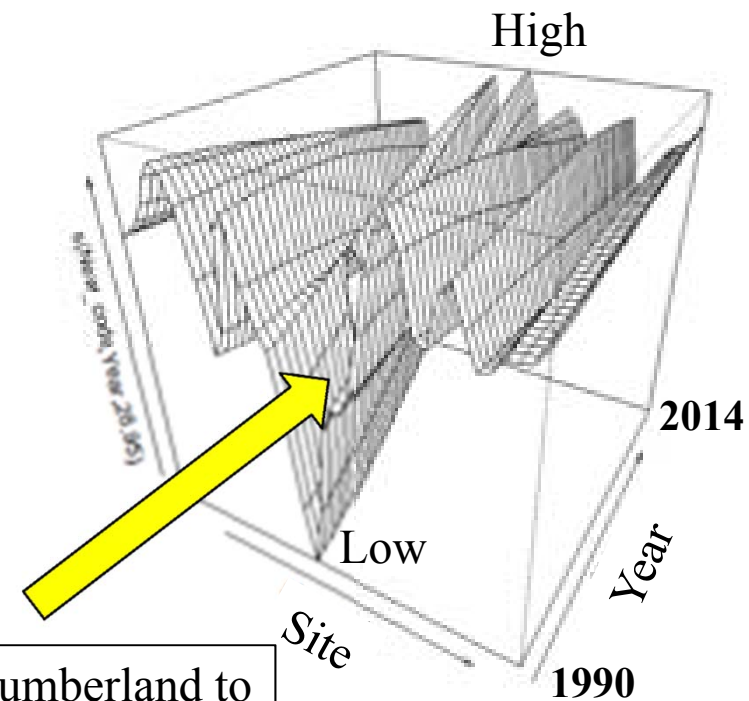
Regional long-term trends in presence of bottlenose dolphin and harbour porpoise

a) Bottlenose Dolphin



East Grampian to
Northumberland
N = 56 sites

b) Harbour Porpoise



Northumberland to
South Devon
N = 112 sites

SUMMARY

- c. 84,000 hours of land watch effort from c. 700 sites around the UK; most data in recent years
- Overall good but somewhat uneven spatial coverage
- Bottlenose dolphins concentrated in Eastern Scotland and West Wales, mirroring offshore survey information
- Harbour porpoises concentrations in N & E Scotland, Eastern England, SW & N Wales, and West Scotland. Coastal hotspots are consistent with offshore surveys
- Coastal distributions of the 2 species are inversely related
- Bottlenose dolphins increased since 2006; porpoises decreased since 2000, with regional variation
- Land watch data can supplement vessel/aerial surveys and provide early indications of population change

ACKNOWLEDGEMENTS

Funding for Analyses

- UK Joint Nature Conservation Committee



Data Contributors

- Sea Watch Observers
- Ceredigion County Council
- National Oceanography Centre
- Whale & Dolphin Conservation
- MANW and The Wildlife Trusts
- European Marine Energy Centre
- IWDG, HWDT, ORCA and MarineLife
- HCMR