



## Satellite tracking swan and goose migration in relation to wind farm sites: Phase 2 trial of GPS-GSM loggers on whooper swans and geese – Project Completion

A pilot project was undertaken by the Wildfowl and Wetlands Trust (WWT), funded by the Department of Energy and Climate Change (DECC) Offshore Energy Strategic Environmental Assessment (OESEA) programme. For further information, contact the Project Coordinator at [sml@hartleyanderson.com](mailto:sml@hartleyanderson.com)

### Context

This phase of the project built on previous satellite-tracking of migratory swans and geese in relation to existing and proposed offshore and major onshore wind farm locations, undertaken by WWT under contract to COWRIE (Griffin *et al.* 2010) and DECC ([Griffin \*et al.\* 2011](#)).

### Project Objectives & Scope

Figure 1: Whooper swans carrying tags just before release



This study was devised to assess the practicality of using GPS-GSM devices mounted on plastic neck collars to track swans and geese, allowing data to be downloaded opportunistically over mobile phone networks. Whooper swans were tracked initially because they are relatively large, have been tracked successfully in the past (using solar-powered Platform Transmitter Terminals (PTTs)), and can be readily observed throughout their range (Britain, Ireland and Iceland). If the trial proved successful, it was hoped that the study would extend to the smaller Bewick's Swan, which breeds in arctic Russia and winters in NW Europe, whose population is currently in rapid decline.

The main objectives of the tagging trial were to:

- Fit 5 GPS/GSM loggers to whooper swans at WWT Caerlaverock (Dumfries and Galloway) in spring 2012, to trial the new GPS/GSM technology. Preliminary data on whooper swan movements would be downloaded to monitor the effectiveness of the new technology whilst the swans were in the UK in spring 2012, and during their migration to Iceland.
- Fit GPS loggers to migratory geese, focussing on Greenland white-fronted geese wintering on Kintyre/Islay/Loch Ken in spring 2012, to trial the GPS-only tags on geese.
- Download and analyse the GPS data recorded for whooper swans and Greenland white-fronted geese returning to the UK in autumn 2012 in relation to current and proposed offshore wind farm sites.

## Phase 2 trial of GPS-GSM loggers on whooper swans and geese

### Project Outcomes & Outputs

Four whooper swans were fitted with GPS/GSM loggers at the WWT Caerlaverock reserve in April 2012 (the fifth tag was not fitted). Additionally, a Greenland white-fronted goose was fitted with a radio GPS-only logger in southeast Iceland in April 2012. The goose, known to winter in Wexford, Ireland was tagged as a “proof of concept” – i.e., to determine whether it could carry a collar without ill effect through a full migratory cycle, and assess whether the collar would continue to work until it returned to Ireland in the winter (Griffin *et al.* 2013).



Figure 2: Overview of the extrapolated spring migratory tracks of the four whooper swans collared with GPS-GSM devices in relation to UK onshore and offshore wind farm sites.

The tags proved reasonably good at depicting the routes taken by swans on exiting the UK; (about 50–75% successful), and it was possible to draw conclusions about the routes they took in relation to onshore and offshore wind farm areas (see Figure 2). The tracks produced were not perfect, in the sense that there were fewer GPS fixes than expected. The ability to assess the frequency and quality of the data (via GSM download, when in the vicinity of the mobile phone network) during the life-time of the tags, and to re-schedule the programme on the tags if needed, was a major advantage of these particular loggers (Griffin *et al.* 2013).

The goose fitted with a GPS logger was re-sighted in Ireland in November 2012 looking fit and well, with its tag still in place. It was not possible to approach the goose sufficiently closely to retrieve any data, but six bean geese at Slamannan, Falkirk fitted with similar collar-mounted loggers in autumn 2012 (as part of a separate study), were still providing useful location data four months later (Griffin *et al.* 2013). The study proposed a number of potential strategies to collect and download data from tags to ensure tag longevity, and to have sufficient tagged birds to ensure that if only a percentage provide frequent fixes, there would be enough useful data to describe the route taken.

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### DECC Offshore Energy SEA

The SEA process aims to help inform licensing and leasing decisions by considering the environmental implications of a plan/programme and the activities which could result from its implementation. Since 1999, DECC has conducted a series of offshore energy SEAs, the latest covering wind, tidal stream and range, CO<sub>2</sub> and hydrocarbon gas storage, and oil & gas – see right.

Since the first SEA, the associated research programme has targeted key information gaps on the marine environment and potential industrial impacts, to inform the SEA process, developers, consenting bodies and others. Research priorities are discussed with the SEA Steering Group and a range of other stakeholders.

For more information on the OESEA programme, visit the offshore SEA web pages on <https://www.gov.uk/> or email [oepe@decc.gsi.gov.uk](mailto:oepe@decc.gsi.gov.uk)

A data portal for previous SEA reports and data is at <http://www.bgs.ac.uk/data/sea>

	Area	Sector
SEA 1	The deep water area along the UK and Faroese boundary	Oil & Gas (19 <sup>th</sup> Licensing Round, 2001)
SEA 2	The central spine of the North Sea which contains the majority of existing UK oil and gas fields	Oil & Gas (20 <sup>th</sup> Licensing Round, 2002)
SEA 2 Extension	Outer Moray Firth	Oil & Gas (20 <sup>th</sup> Licensing Round, 2002)
SEA 3	The remaining parts of the southern North Sea	Oil & Gas (21 <sup>st</sup> Licensing Round, 2003)
R2	Three strategic regions off the coasts of England and Wales in relation to a second round of offshore wind leasing	Offshore wind (R2 of Leasing, 2003)
SEA 4	The offshore areas to the north and west of Shetland and Orkney	Oil & Gas (22 <sup>nd</sup> Licensing Round, 2004)
SEA 5	Parts of the northern and central North Sea to the east of the Scottish mainland, Orkney and Shetland	Oil & Gas (23 <sup>rd</sup> Licensing Round, 2005)
SEA 6	Parts of the Irish Sea	Oil & Gas (24 <sup>th</sup> Licensing Round, 2006)
SEA 7	The offshore areas to the west of Scotland	Oil & Gas (25 <sup>th</sup> Licensing Round, 2008)
OESEA	UK offshore waters*	Oil & Gas (26 <sup>th</sup> Licensing Round, 2009) Gas storage Offshore wind (R3 of Leasing, 2009)
OESEA2	UK offshore waters*	Oil & Gas (27 <sup>th</sup> Licensing Round, 2012) Gas storage Carbon dioxide transport and storage Offshore wind, wave and tidal energy

\*For renewable energy included potential leasing in the UK Renewable Energy Zone (REZ) and the territorial waters of England and Wales but not the Scottish Renewable Energy Zone and Northern Irish waters within the 12 nautical mile territorial sea limit