

**Bob Furness, Lila Buckingham,  
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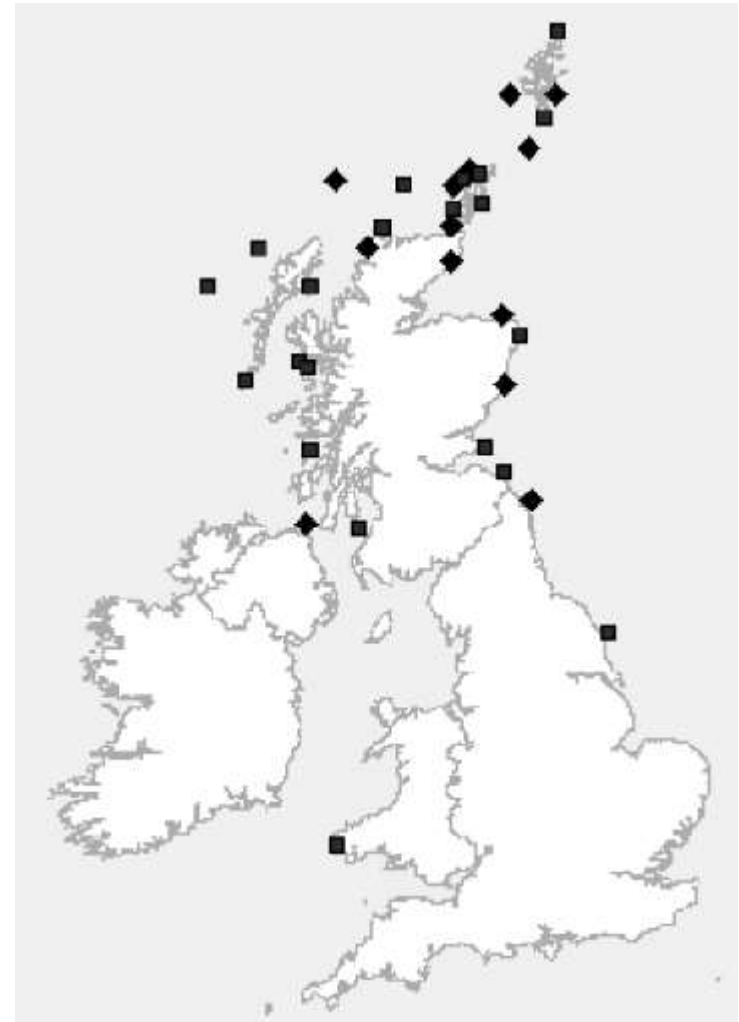
A teamwork approach  
to track auk movements  
in the nonbreeding period

# Auk tracking project (Guillemots and Razorbills)

- New project – started in June 2017, running for 4½ years;
- Funded mainly by Vattenfall's European Offshore Wind Deployment Centre (EOWDC) – by a contract to MacArthur Green, but also by Hywind and Seatrack support to CEH, allowing more colonies to be included;
- Part of the Vattenfall funding supports staff time and a PhD studentship (Lila Buckingham) supervised by Francis Daunt and Maria Bogdanova (CEH Edinburgh), Jon Green (University of Liverpool) and Bob Furness (MacArthur Green);
- Project involves combination of ENTHUSIASTIC local expert ringing groups, and professionals, doing the fieldwork - deploying geolocator tags on guillemots and razorbills at about 12 colonies from west Scotland to Northumberland, with data analysis by professionals/academics
- Geolocator tags record light on a time base, allowing geolocation, and record temperature and seawater contact

# SPA provision for breeding seabirds

- **34 SPAs for breeding common guillemots**  
**30 of these in Scotland;**
- **Nearly 700,000 pairs**  
**at designation;**
- **Over 90% of UK population**  
**breed at SPA sites.**





# Dierschke et al. 2016 Biological Conservation

## Review of avoidance and attraction

	<b>Strongly avoid</b>	<b>Weakly avoid</b>	<b>Indifferent</b>	<b>Attracted</b>
Guillemots	<b>5</b>	<b>3</b>	2	1
Razorbills	<b>2</b>	<b>4</b>	2	0
'Auks'	<b>1</b>	<b>2</b>	0	0
<b>Totals</b>	<b>8</b>	<b>9</b>	4	1

**17** cases where avoidance was shown; **5** where it was not evident



**Foula**

**Fair Isle**

**Orkney**

**East Caithness**

**Whinnyfold**

**Farnes**

**Isle of May**

**Colonsay**

**Treshnish**

**Canna**

**Shiants**





Wernham et al. 2002  
The Migration Atlas

Guillemots ringed as  
**breeding adults**  
and recovered  
outside the breeding  
season

Do birds from west  
Scotland winter in  
North Sea?















# CEH Isle of May deployments

- Tags deployed on guillemots, razorbills and puffins in 2007, and in 2014 and subsequently (latter funded by Seatrack)
- Glew et al. MS in press (Marine Ecology Progress Series) Moulting location and diet of auks in the North Sea, inferred from coupled light-based and isotope-based geolocation

# Marine Scotland deployments

- Tags deployed on guillemots, razorbills and puffins in 2014, 2015, 2016
- Highland Ringing Group (Canna); some tags recovered up to 2018, agreed to include in this project but no details yet.
- Orkney Ringing Group (Orkney); **14** tags recovered from razorbills, some after 2 years, but some download problems due to battery having expired

## Tag deployments in June 2017

Colony	Guillemots	Razorbills	Ringers	Tag funder
Canna	90	20	Andrew Call, Simon Foster, Bob Swann HRG	EOWDC
Foula	40	10	Bob Furness	EOWDC
Fair Isle	25	21	Bob Furness & FIBO	EOWDC
Orkney	0	30	Colin Corse, ORG	EOWDC
E Caithness	40	30	Bob Swann, HRG	Hywind
Whinnyfold	40	20	Ewan Weston	Hywind
Isle of May	30	30	Francis Daunt, CEH	Hywind, Seatrack
Inner Farne	4	6	Chris Redfern, Richard Bevan	EOWDC
<b>TOTALS</b>	<b>269</b>	<b>167</b>		



## New tag deployments in June 2018

Colony	Guillemots	Razorbills	Ringers	Tag funder
Colonsay	30	9	David Jardine	EOWDC
Treshnish	20	20	Robin Ward, TIARG	EOWDC
Canna	40	22	Andrew Call, Simon Foster, Bob Swann HRG	EOWDC
Shiants	0	20	Jim Lennon, SRG	EOWDC
Orkney	0	22	Colin Corse, ORG	EOWDC
E Caithness	40	30	Bob Swann, HRG	Hywind
Whinnyfold	40	19	Ewan Weston	Hywind
Isle of May	34	30	Francis Daunt, CEH	Hywind, Seatrack, EOWDC
<b>TOTALS</b>	<b>194</b>	<b>172</b>		

## Tags recovered in June 2018

Colony	Guillemots	Razorbills	Ringers
Canna	36 (40%)	4 (20%)	Andrew Call, Simon Foster, Bob Swann HRG
Shetland	23 (35%)	10 (32%)	Bob Furness
Orkney	-	4 (13%)	Colin Corse, ORG
E Caithness	20 (50%)	13 (43%)	Bob Swann, HRG
Whinnyfold	24 (60%)	2 (10%)	Ewan Weston
Isle of May	14 (47%)	11 (37%)	Francis Daunt, CEH
Inner Farne	1 (25%)	3 (50%)	Chris Redfern, Richard Bevan
<b>TOTALS</b>	<b>118 (44%)</b>	<b>47 (28%)</b>	

# Using light to locate birds

Day length and noon gives latitude/longitude  
two fixes per day

Error from

- equinox
- constant light
- breeding
- weather conditions

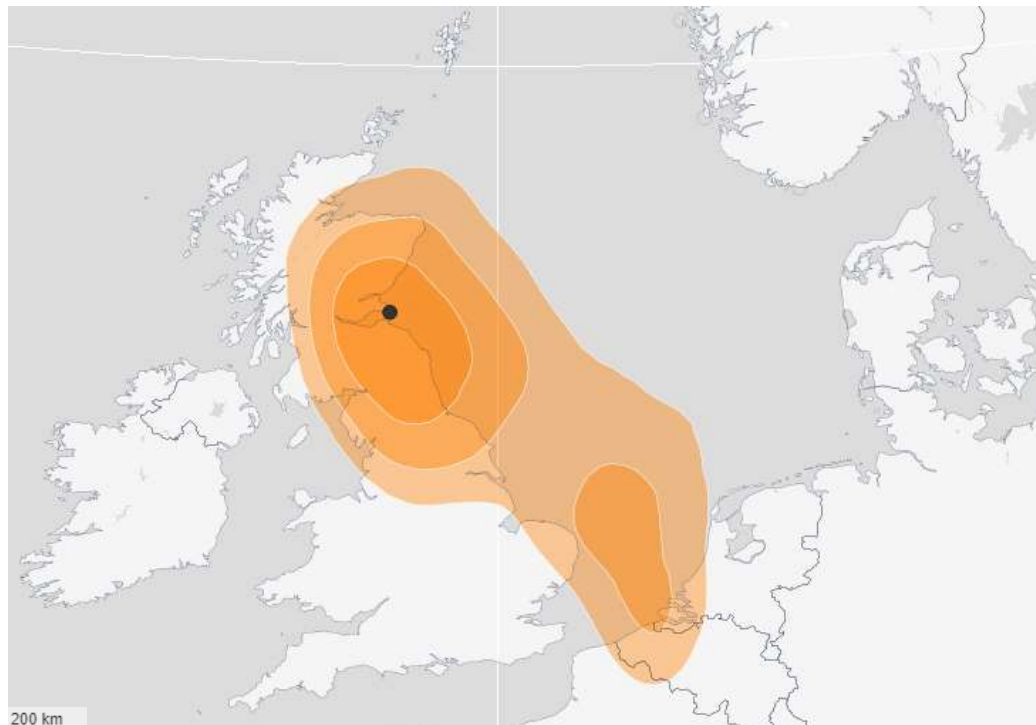
# Methods

Test methods for reduction of error

device's software accuracy =  $186 \pm 114$ km (Phillips et al. 2004)

aim for error reduction: 50-100 (Edwards et al. 2016)

Kernel zones created of areas of highest density



<http://seatrack.seapop.no>

# My research questions

1. Do razorbills and guillemots from different breeding colonies winter in the same or different areas?
2. Is there greater/less risk from development to certain individuals?
3. How do environmental conditions influence the birds' locations?
4. Will the areas we predict to be lower-risk for development be robust to environmental change?



Renewable Energy Hub