# Remote-tracking upland breeding Curlew; *implications for survey methods & agri-environment schemes*

2016, North Wales.
Collaboration between BTO Cymru & RSPB Cymru

# Pilot study – main questions

Curlew are shy and vigilant (sensitive to disturbance!) –

*Survey methodologies rely on direct observation = disturbed behaviour*

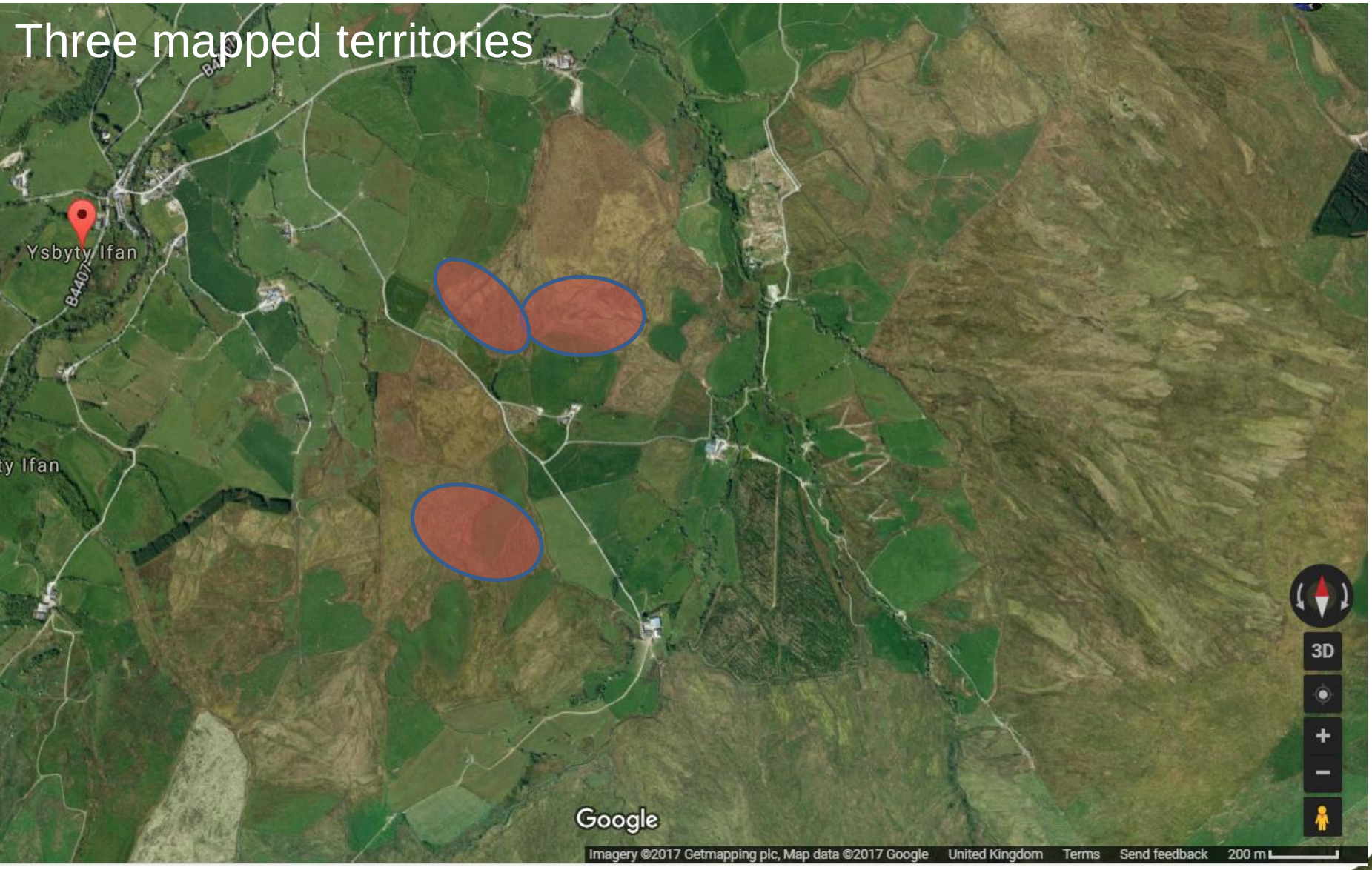
**Remote-download tags** allow 'observation' without disturbance

*2016 pilot: catching Curlew on breeding territory, duration of glue-mount tags, performance of remote-download system in complex landscape, negative impacts?*

They might help us answer important questions for Curlew:

- How big is a breeding territory?
- How do they cope with 'patchy' landscapes? What do they select?
- Are we making the right plans (in agri-environment schemes) to support breeding birds?

# Pilot study – Welsh upland agricultural mosaic

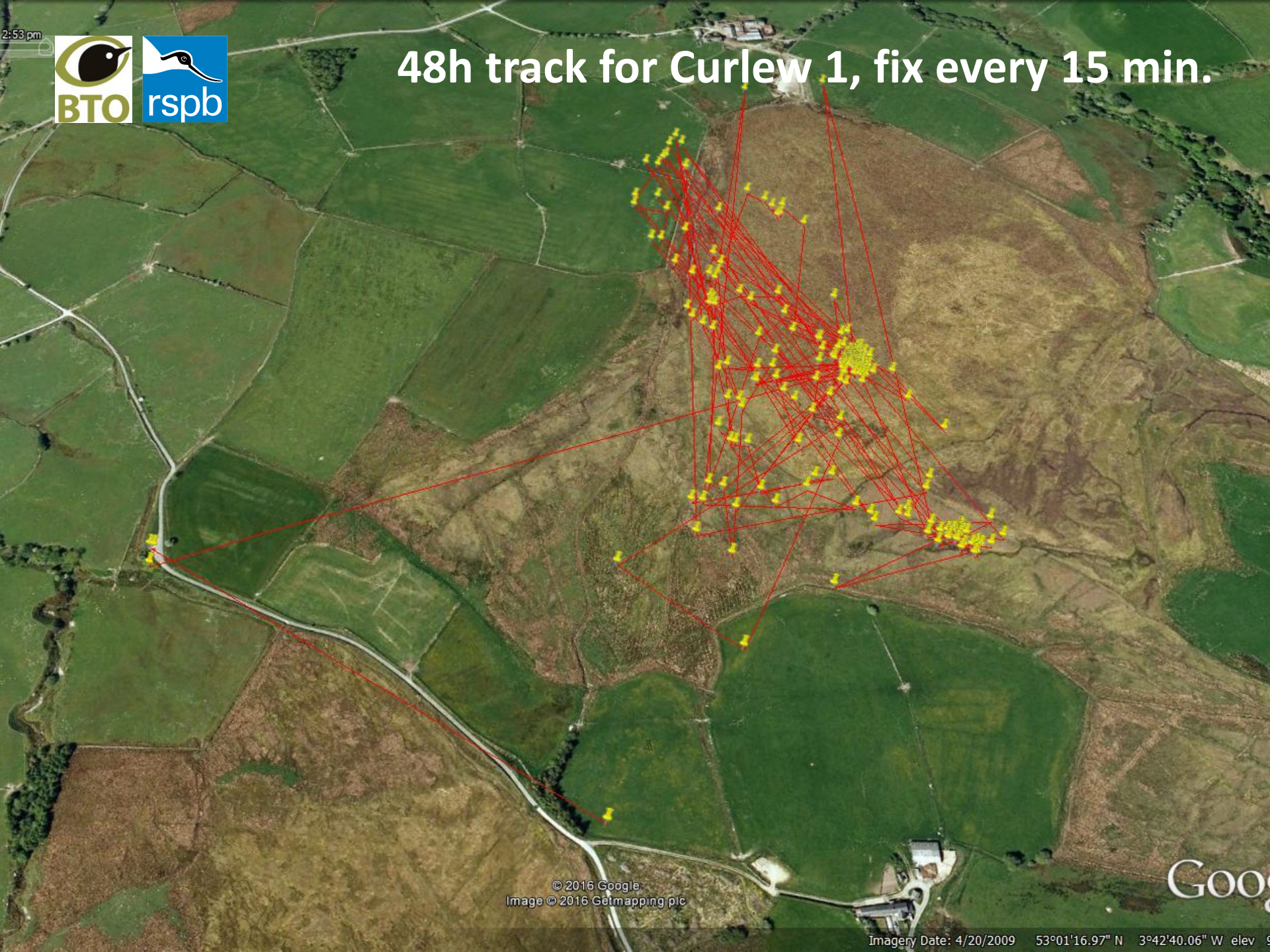


# Pilot study – A quick look at the data

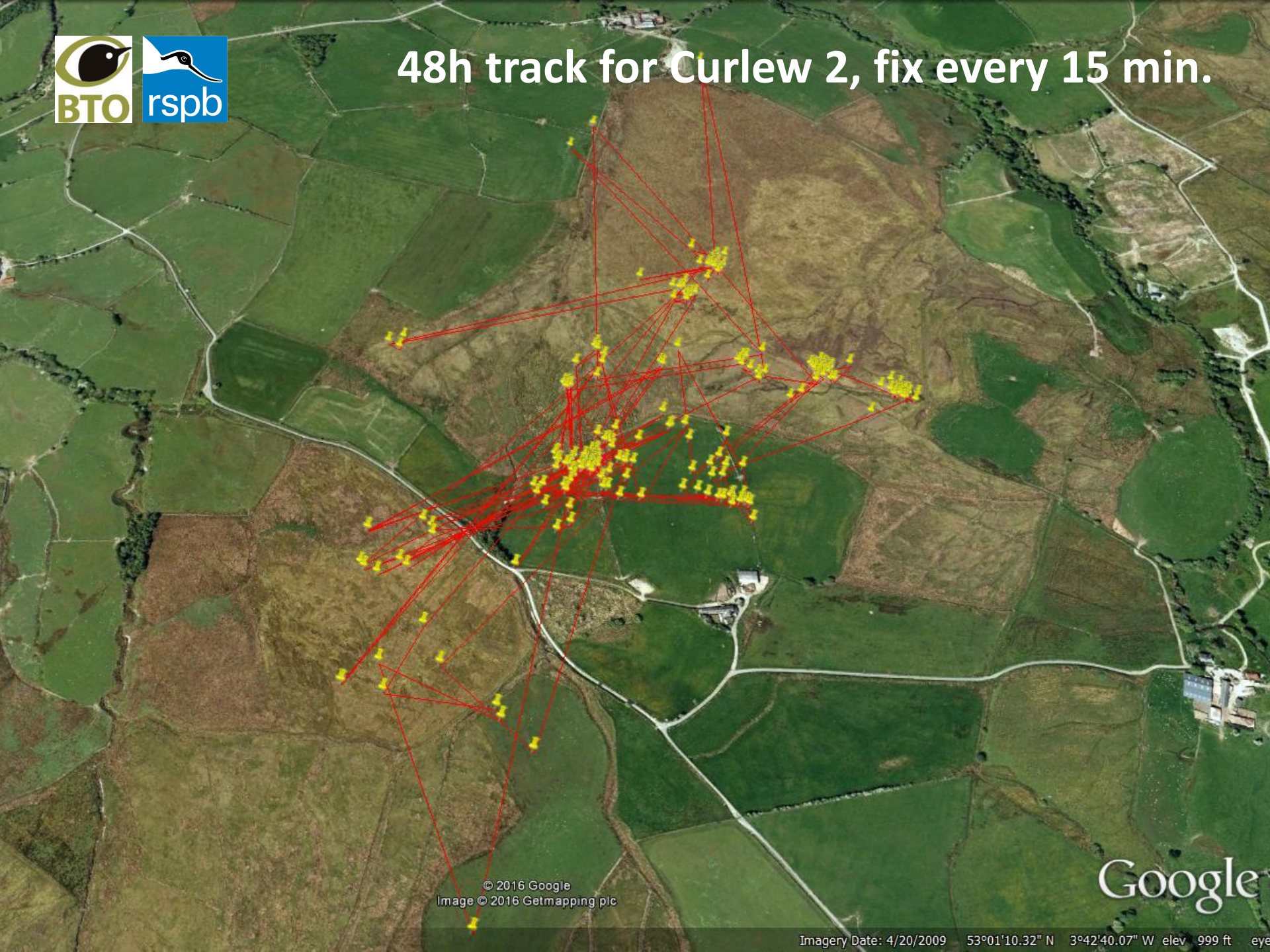
**Three birds caught, colour-marked and tagged**

**6g PathTrack NanoFix GPS/GSM tags**

**…the first 48h…**


2:53 pm
BTO
rspb
48h track for Curlew 1, fix every 15 min.
© 2016 Google
Image © 2016 Getmapping plc
Imagery Date: 4/20/2009 53°01'16.97" N 3°42'40.06" W elev

# 48h track for Curlew 2, fix every 15 min.



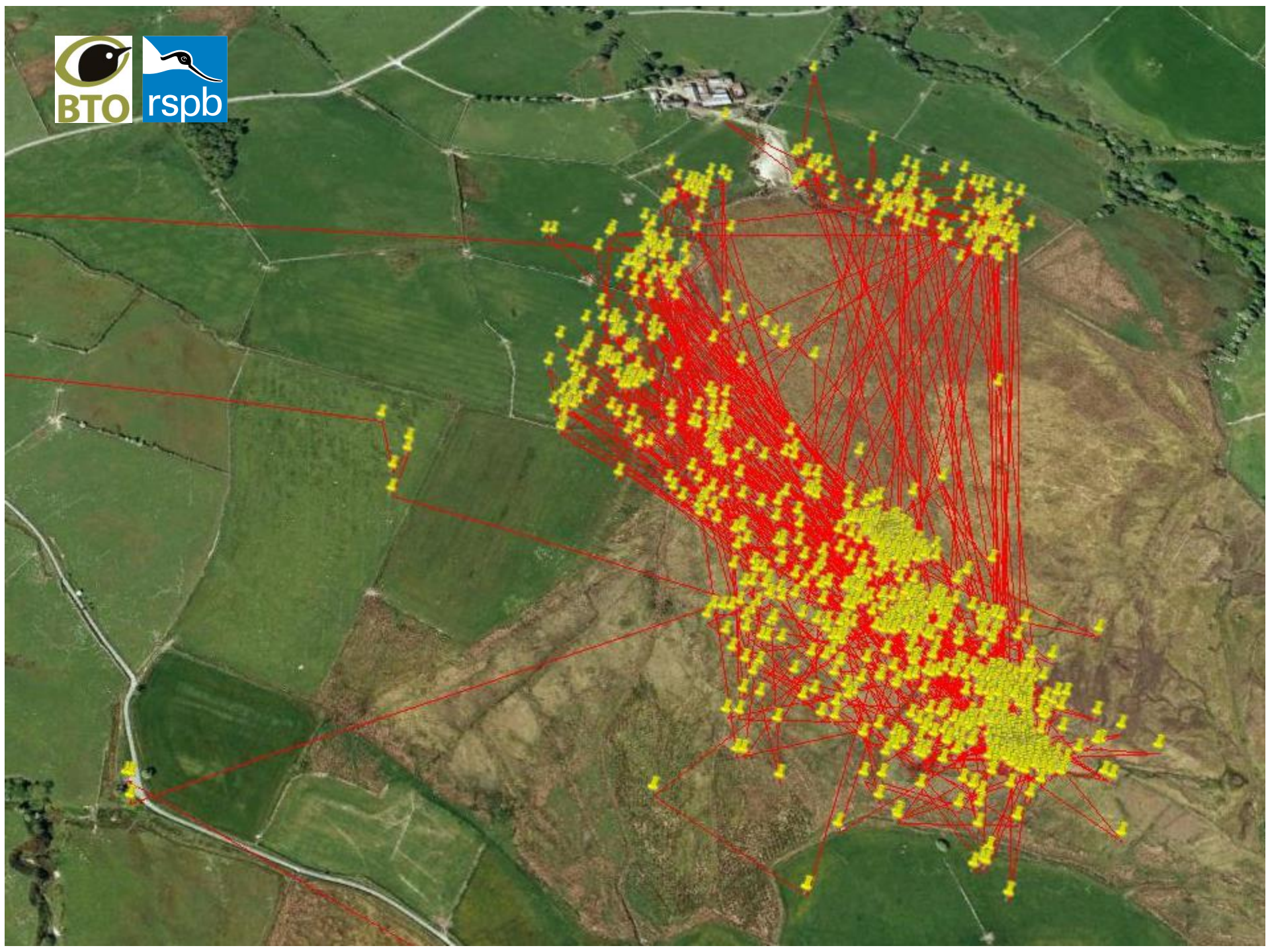

48h track for Curlew 3, fix every 15 min.
Overnighting 3km from daytime locations
BTO
rspb
© 2016 Google
Image © 2016 Getmapping plc
Google earth
Imagery Date: 4/20/2009 53°00'00.01" N 3°42'18.24" W elev 1411 ft eye alt 12408 ft

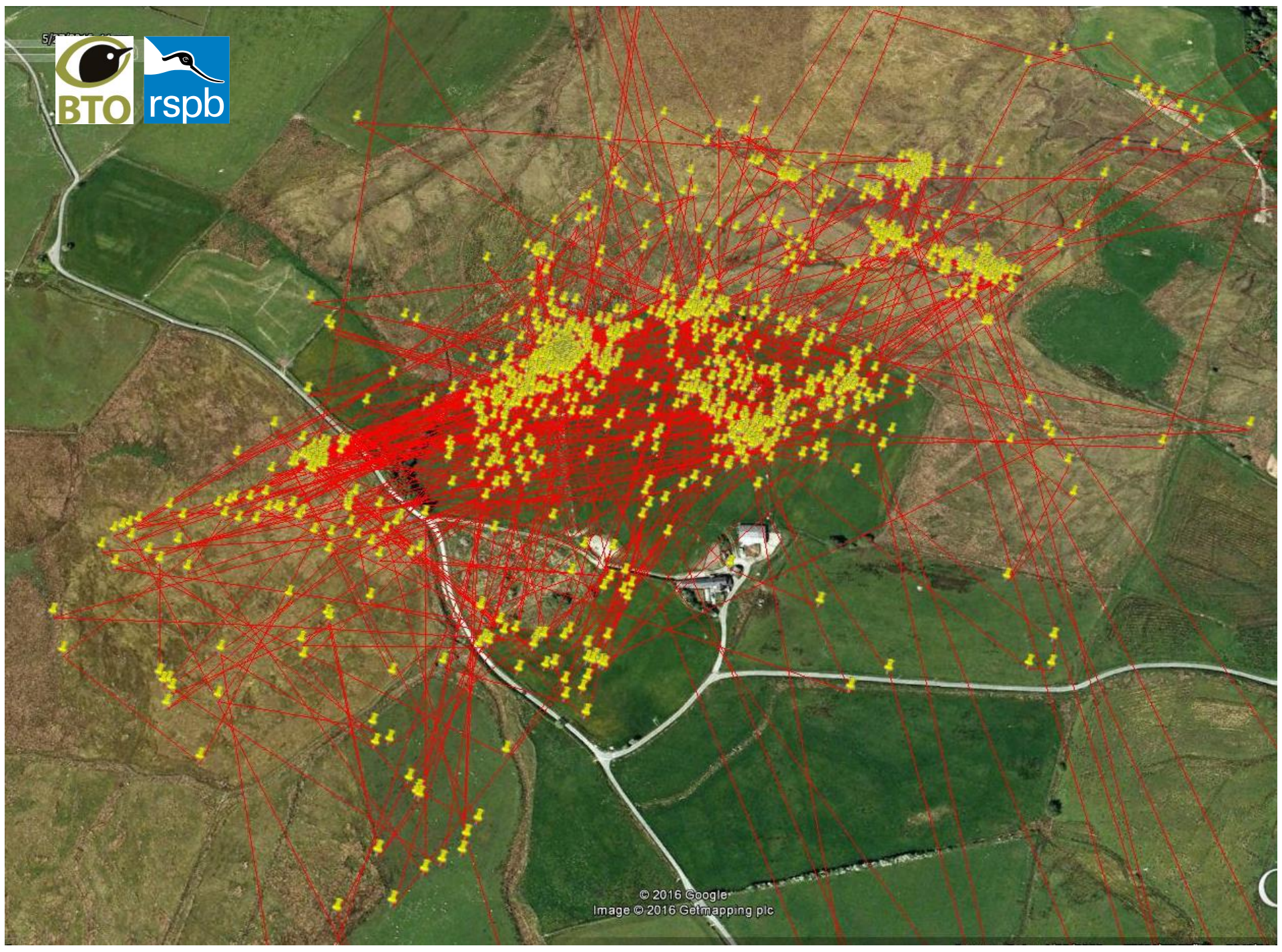
# Pilot study – A quick look at the data

**Three birds caught, colour-marked and tagged**

**6g PathTrack NanoFix GPS/GSM tags**

**…five weeks later…**


BTO
rspb


BTO
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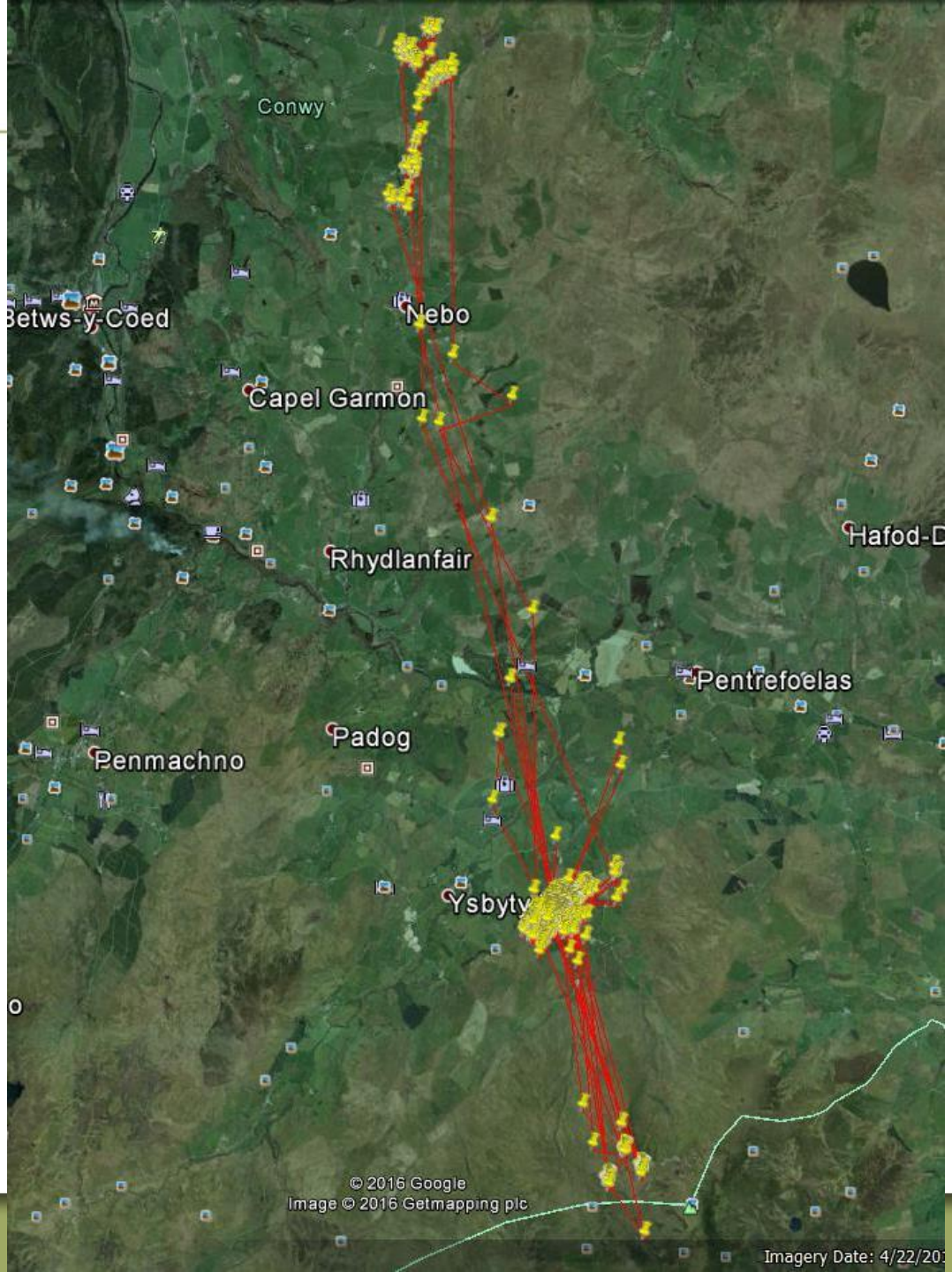
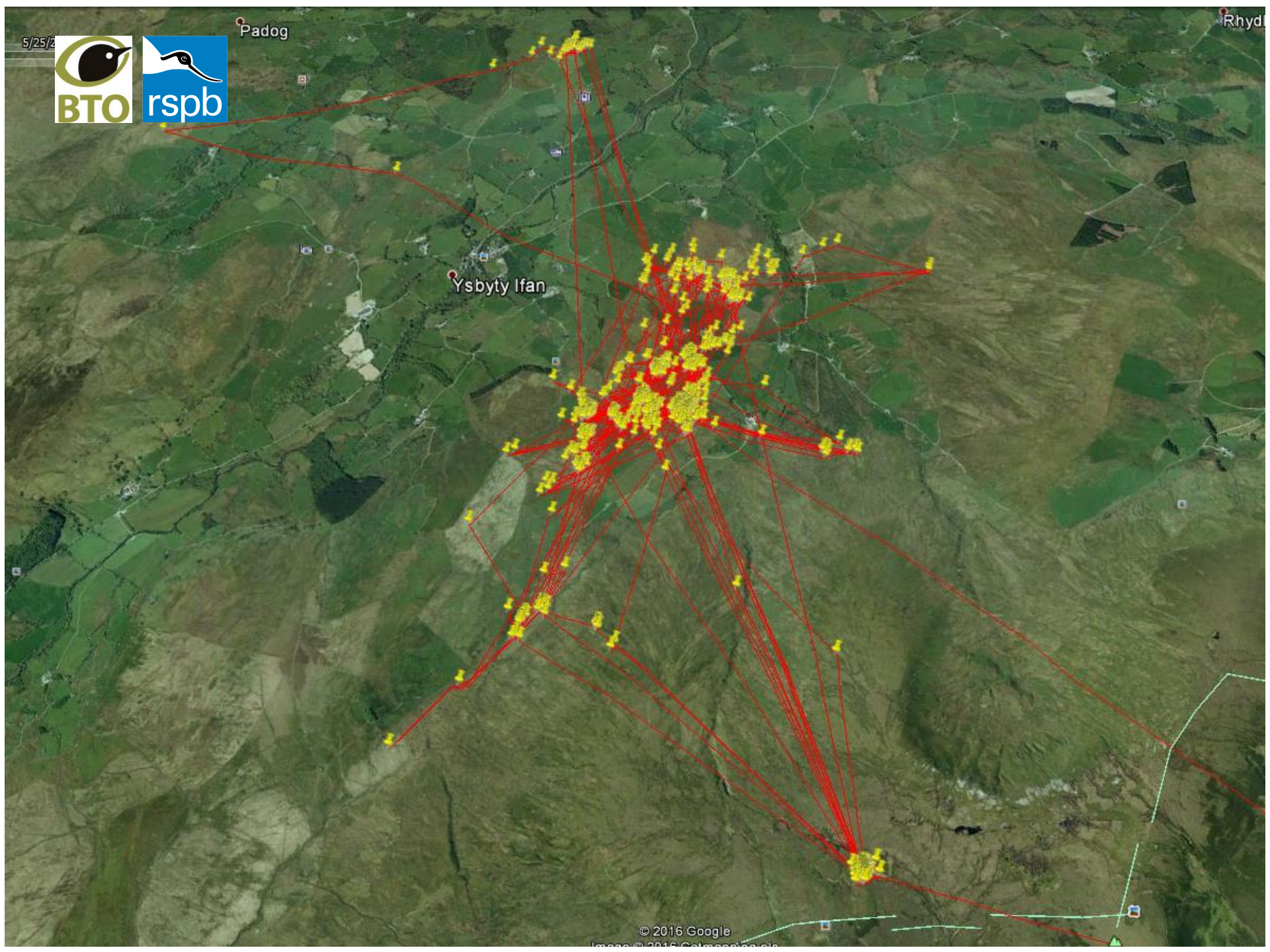

Conwy
Nebo
Capel Garmon
Rhydlanfair
Pentrefoelas
Padog
Penmachno
Ysbyty
© 2016 Google
Image © 2016 Getmapping plc
Imagery Date: 4/22/201

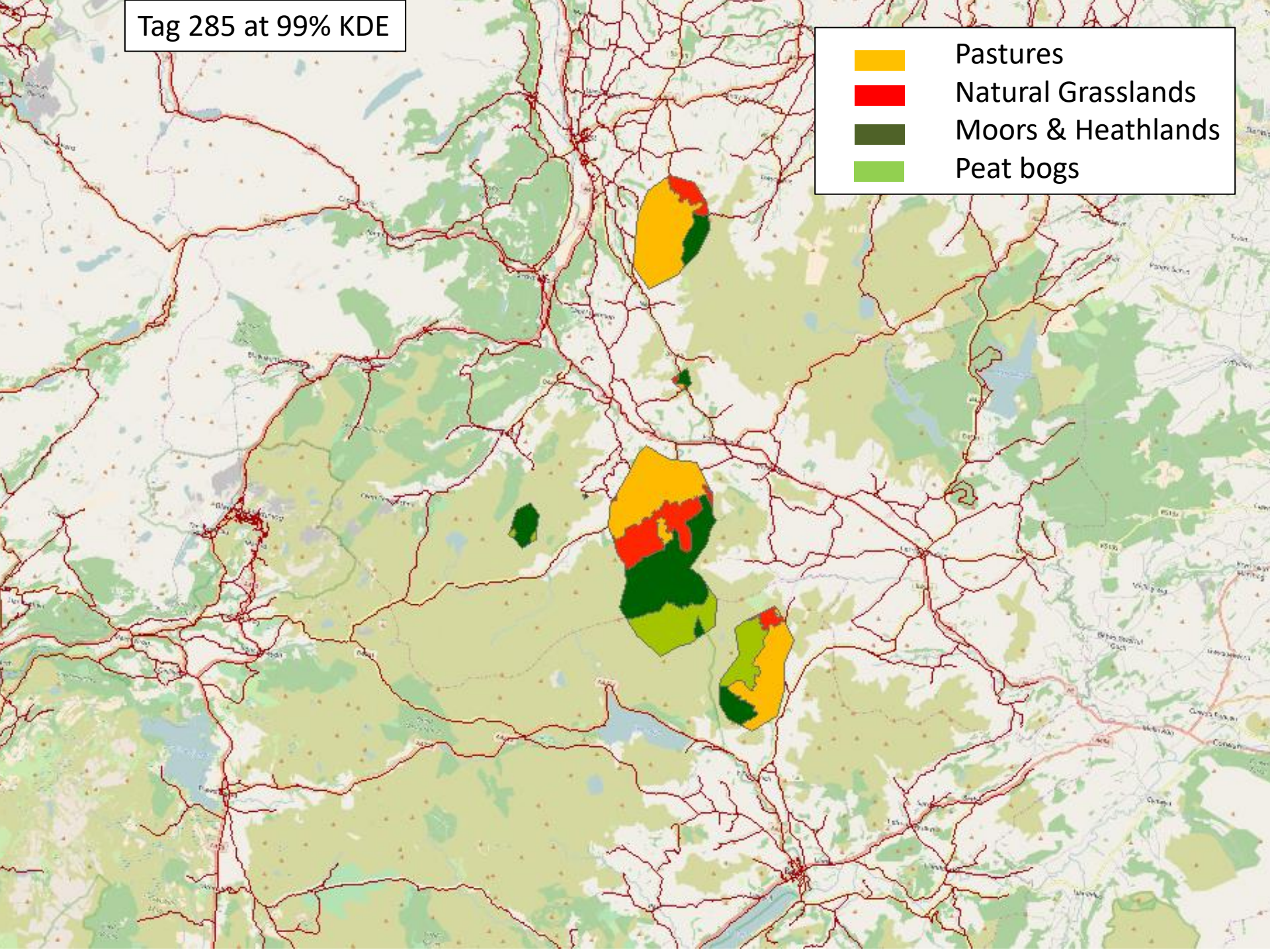

Padog
Ysbyty Ifan
© 2016 Google

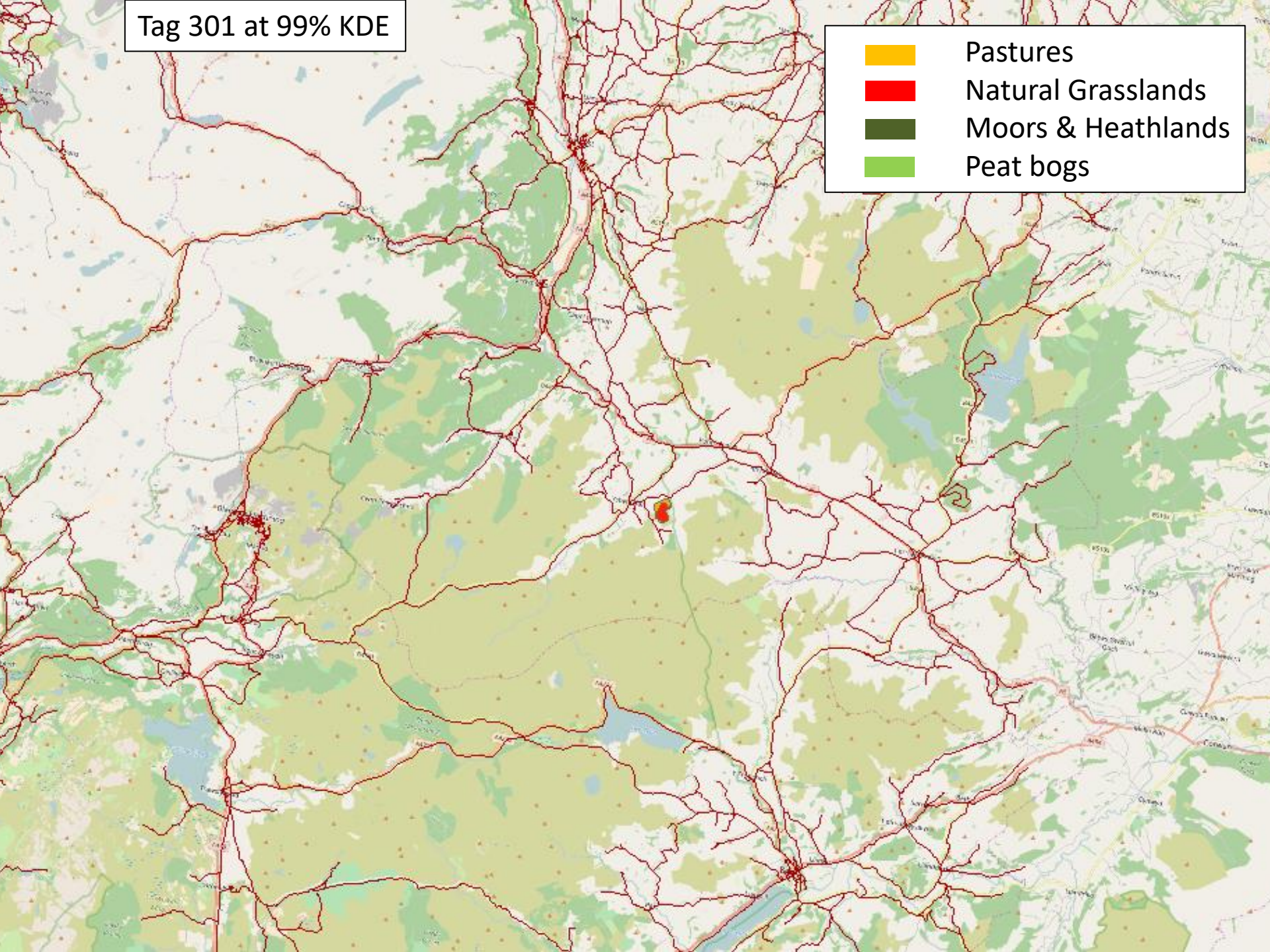
# Pilot study – Analysis

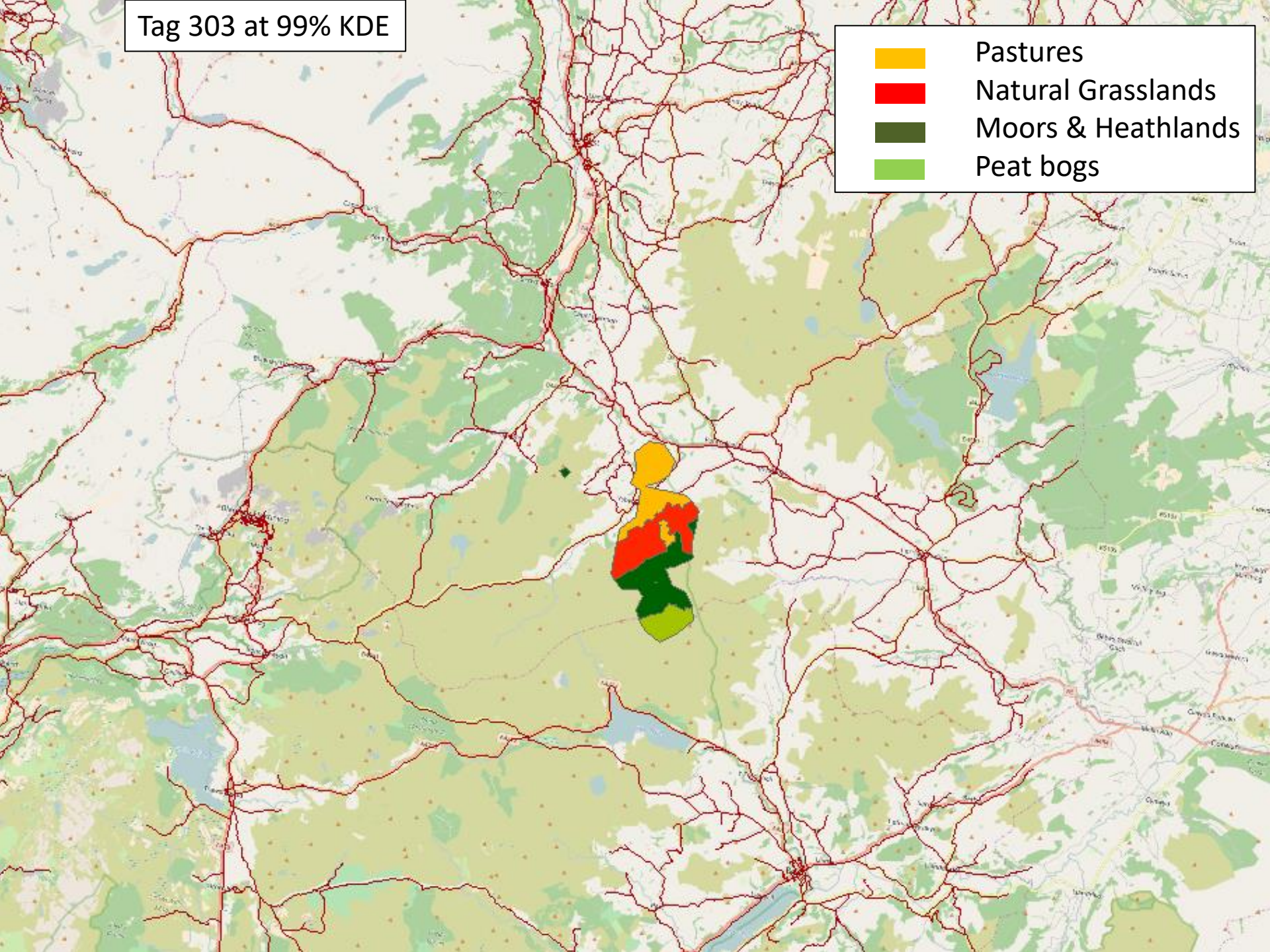
Tags functioned continuously for 17-31 days (to battery depletion), locating birds every 15 minutes and uploading data daily to base stations

Spatial analysis performed:

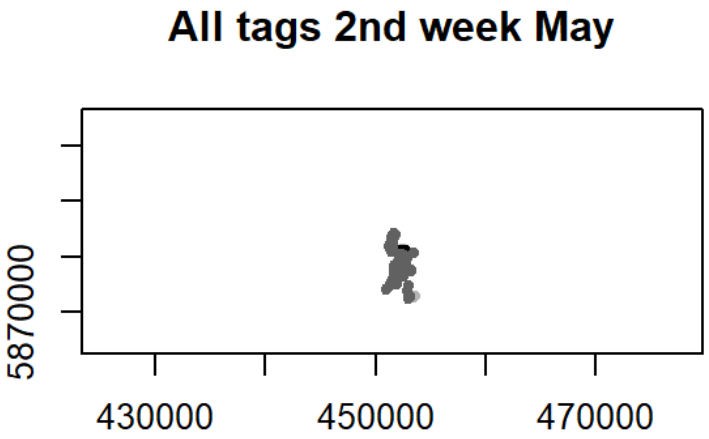
- KDE (50-99%) – all data, day/night, weekly time-series
- Movement direction (compass-rose) and distance
- Habitat assessments (area-based, point-based) using Corine and Wales Phase 1 habitat maps

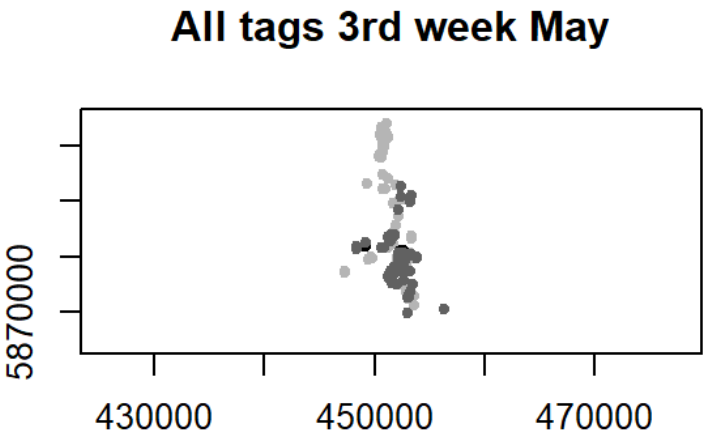

Tag 285 at 99% KDE
Pastures
Natural Grasslands
Moors & Heathlands
Peat bogs

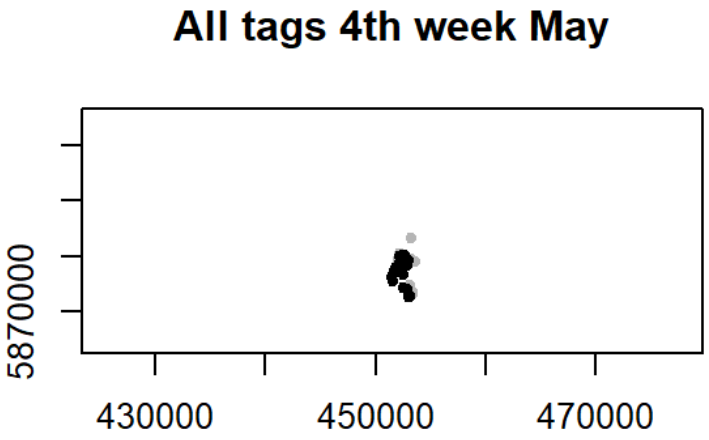

Tag 301 at 99% KDE
Pastures
Natural Grasslands
Moors & Heathlands
Peat bogs

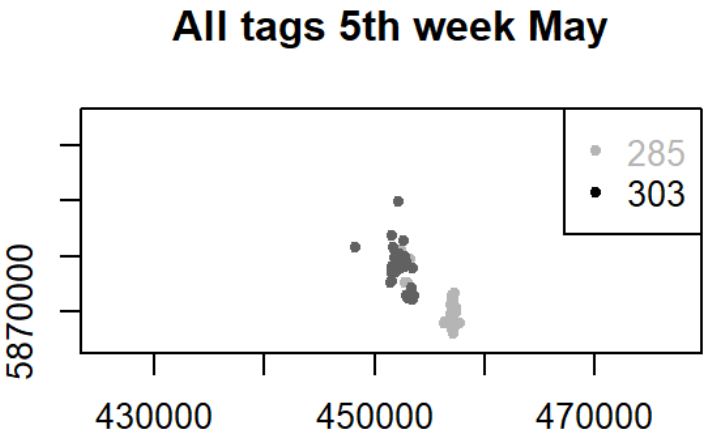

Tag 303 at 99% KDE
Pastures
Natural Grasslands
Moors & Heathlands
Peat bogs

# Spatial scale increased over time (7-28 days)

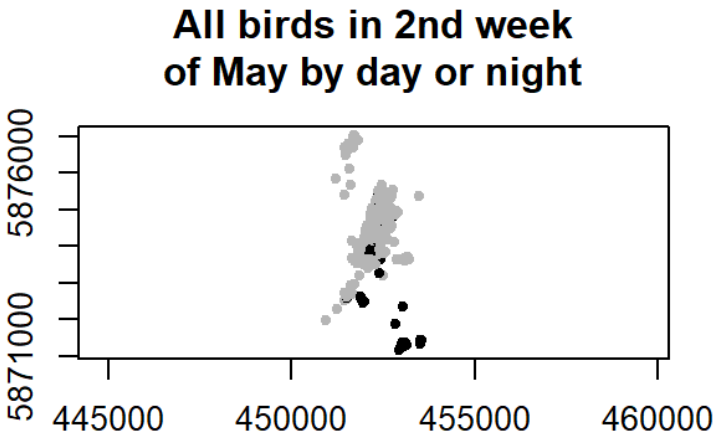


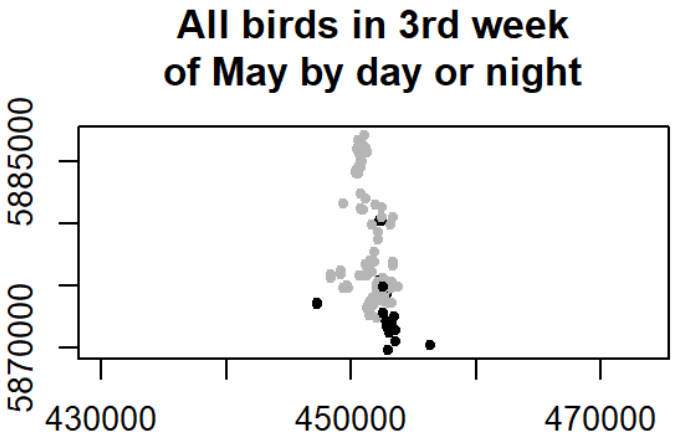



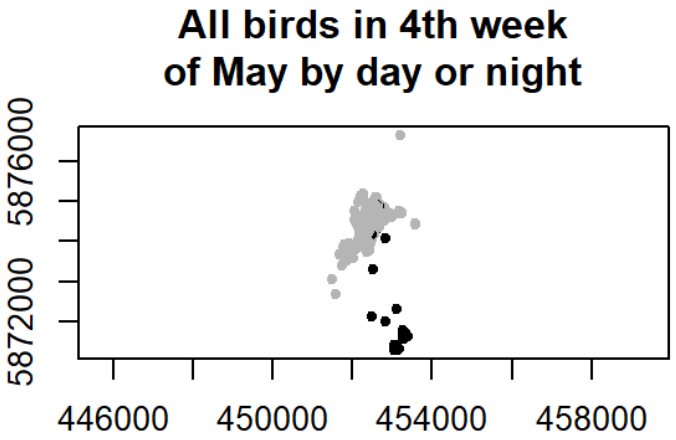



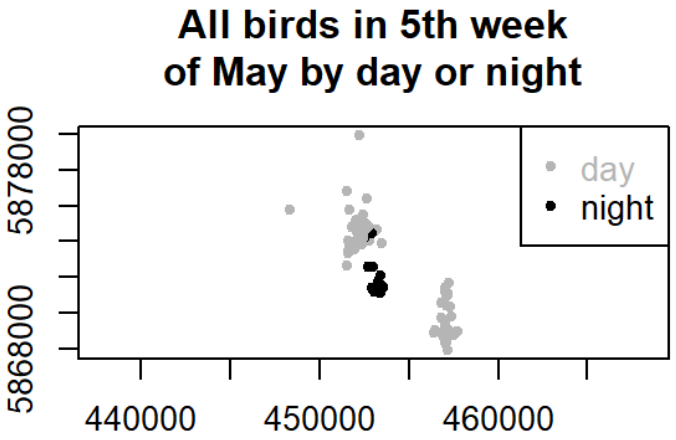



# Birds used different places in day / night (all locations)



# Spatial scale of 99%KDE (ha)

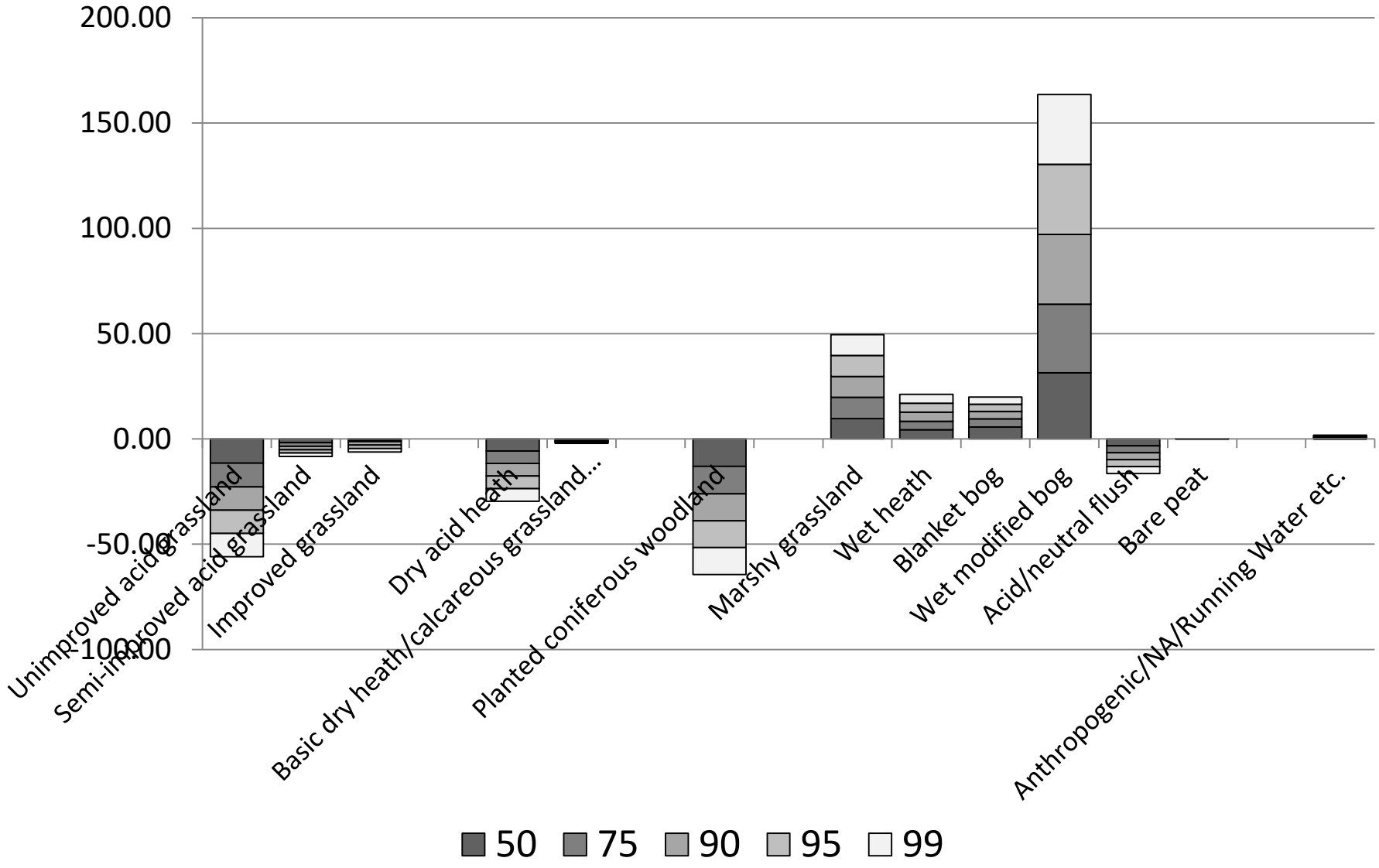
| Curlew Tag number | Pastures | Natural grasslands | Moors and heathland | Peat bogs | Home range at 99% KDE |
|---|---|---|---|---|---|
| Bird 1 | 1790 | 556 | 1150 | 660 | ~4000 |
| Bird 2 | 17 | 25 | | | ~40 |
| Bird 3 | 430 | 410 | 430 | 170 | ~1400 |

AES Wales: whole-farm compliance, optional scheme entry + field-scale management options.

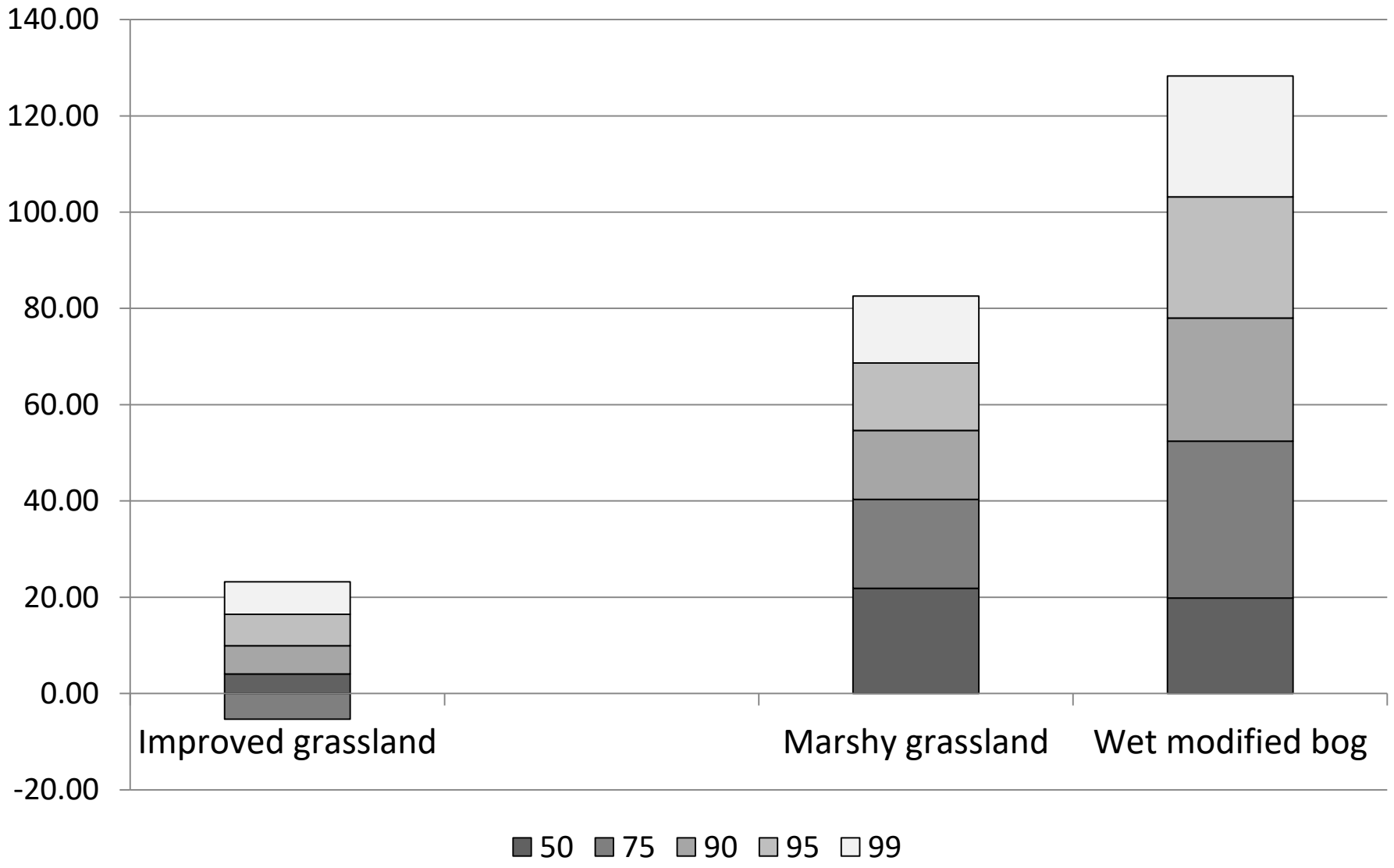
Average farm size: 48ha (average field size: 5ha)

Low area and farm participation: at 30-50% target in 2015 (<100,000ha for all biodiversity options in all places and farm types)

# Habitat selections of bird 301: 50-99%KDE by spatial area



# Habitat selections of bird 301: 50-99%KDE by locations



# Implications for survey methodologies:

- Most methods based on disturbance behaviour (impacts?)
- Very high territory overlap – *underestimation?*
  - Territory mapping found points of activity NOT single territories
  - Three birds all used the same areas
  - At least two more territorial males present in same locations
- Very large breeding areas – *overestimation?*

- Allee effects, implications for study design (separation of study/control areas), implications for population estimation
- CAVEAT – impact of landscape structure?

# (Hoped) follow-up study 2018

TAGS Sample of 10 birds
SOLAR + battery (extended life)
15min locations for 22h plus 1 min locations for 2h

- 'Live' tag data highlights nest location and centres of activity (POI)
- Add data logger to nest to monitor outcome & timings
- In-season at POI
  - Sward measures
  - Vegetation cover, height & density
  - Soil moisture and penetrability
  - Invertebrate sampling
  - Behaviour observation if possible
- In-season across landscape
  - Estimates of predator abundance
  - Livestock movements and stocking rates: field management operations
- End of season full vegetation & water table assessments