The potential of acoustic monitoring to inform and expand common bird monitoring

BTO Birds Science People

Adham Ashton-Butt Simon Gillings Mark Wilson

James Heywood - BRC Conference, York, 15 March 2025

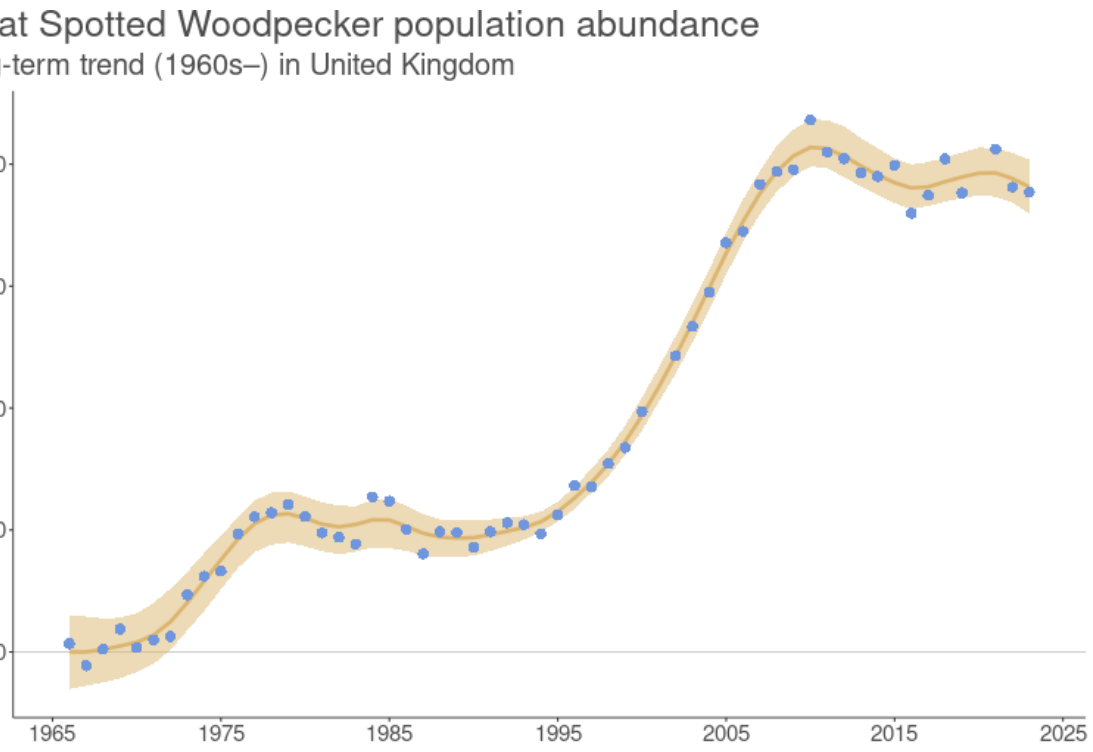
Detecting population change over time

Birds Science People

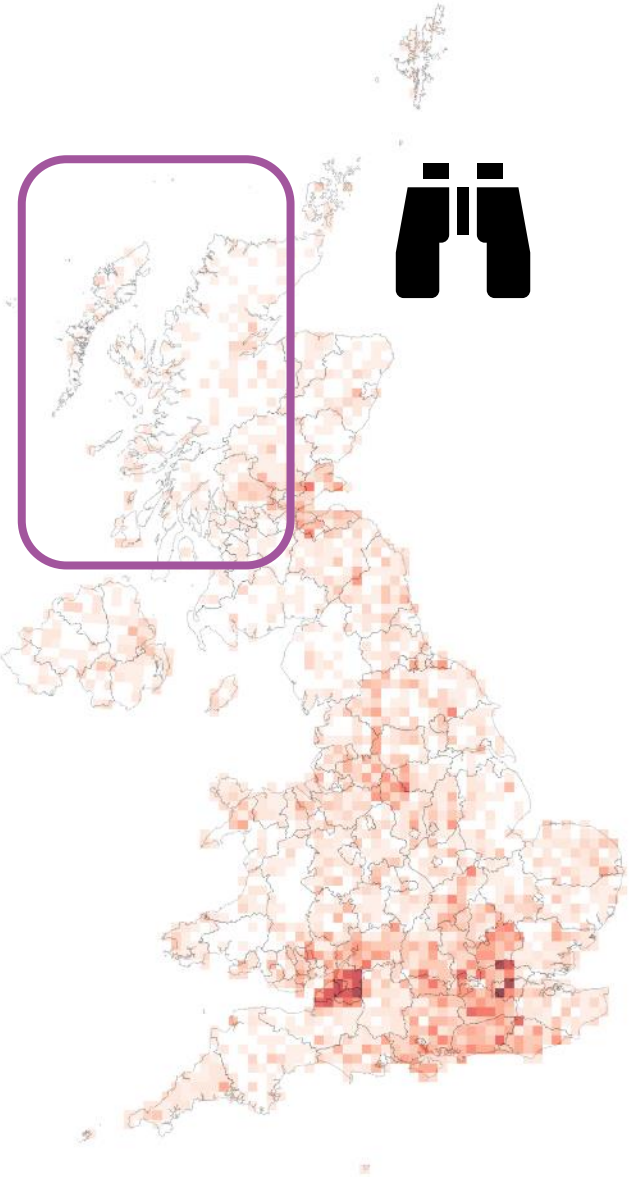
CBC BBS

Great Spotted Woodpecker
(*Dendrocopus major*)

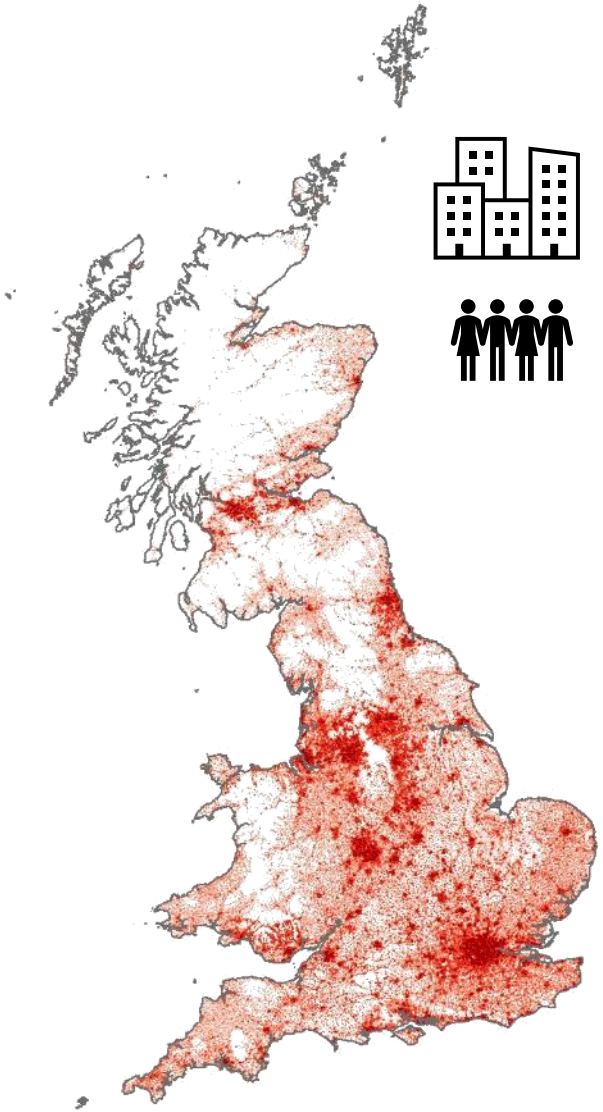
Willow Tit
(*Poecile montanus*)



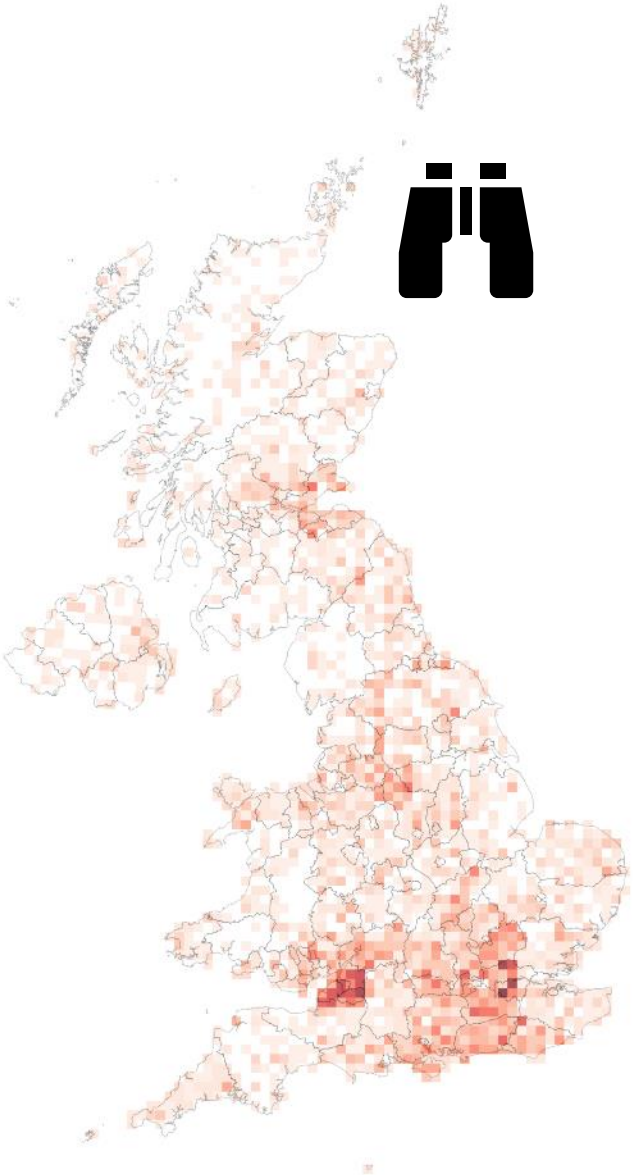
2023 BBS Coverage



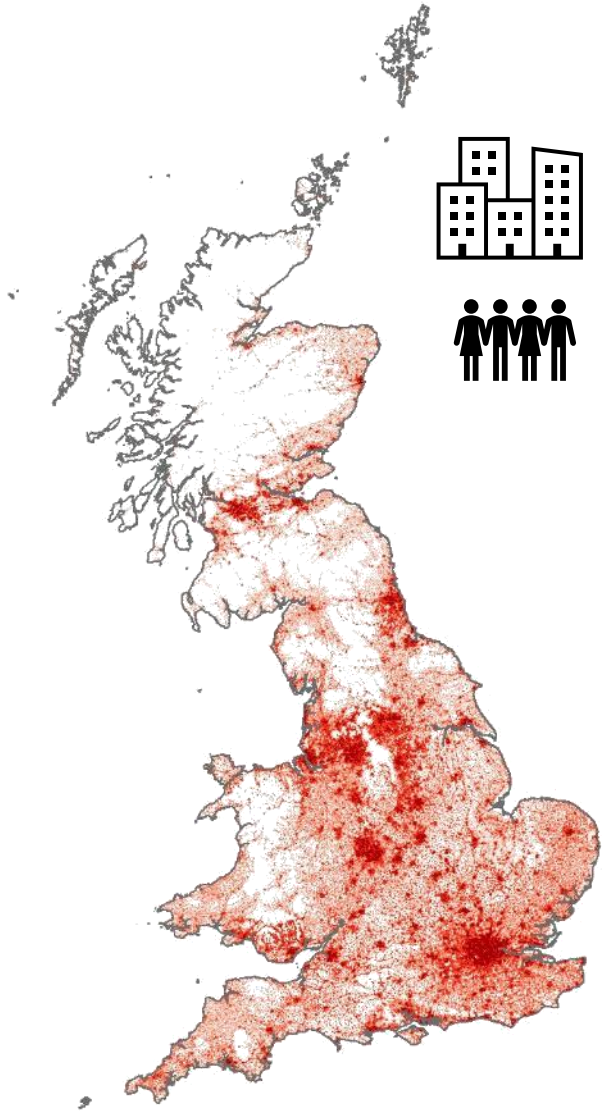
Human population



2023 BBS Coverage



Human population



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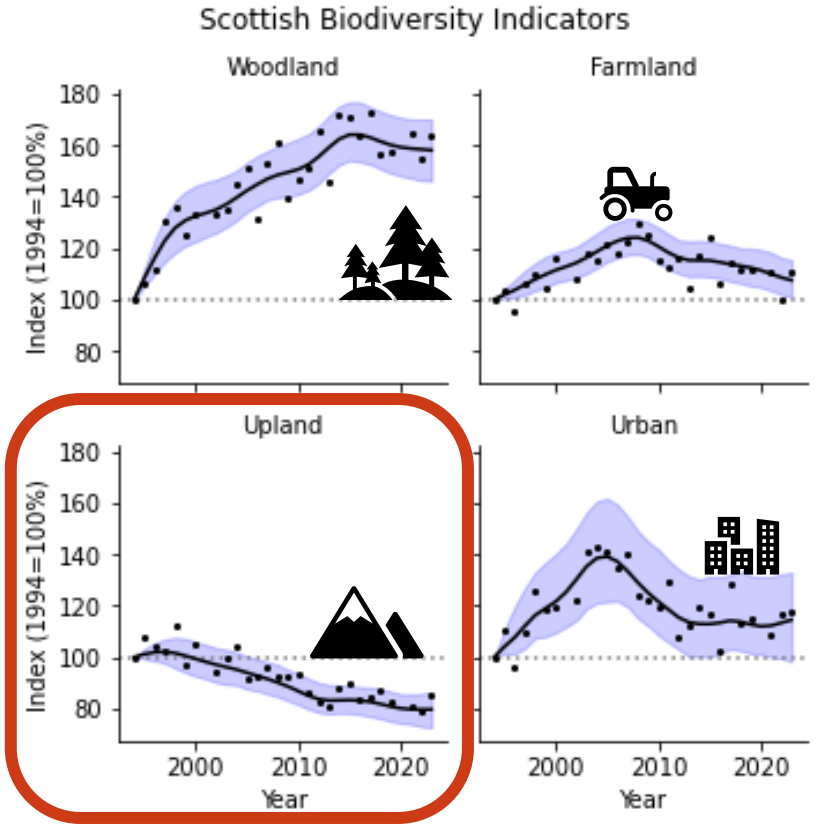
NatureScot NàdarAlba Scotland's Nature Agency Buidheann Nàdair na h-Alba

Official Statistics - Scottish Terrestrial Breeding Birds 1994 – 2023

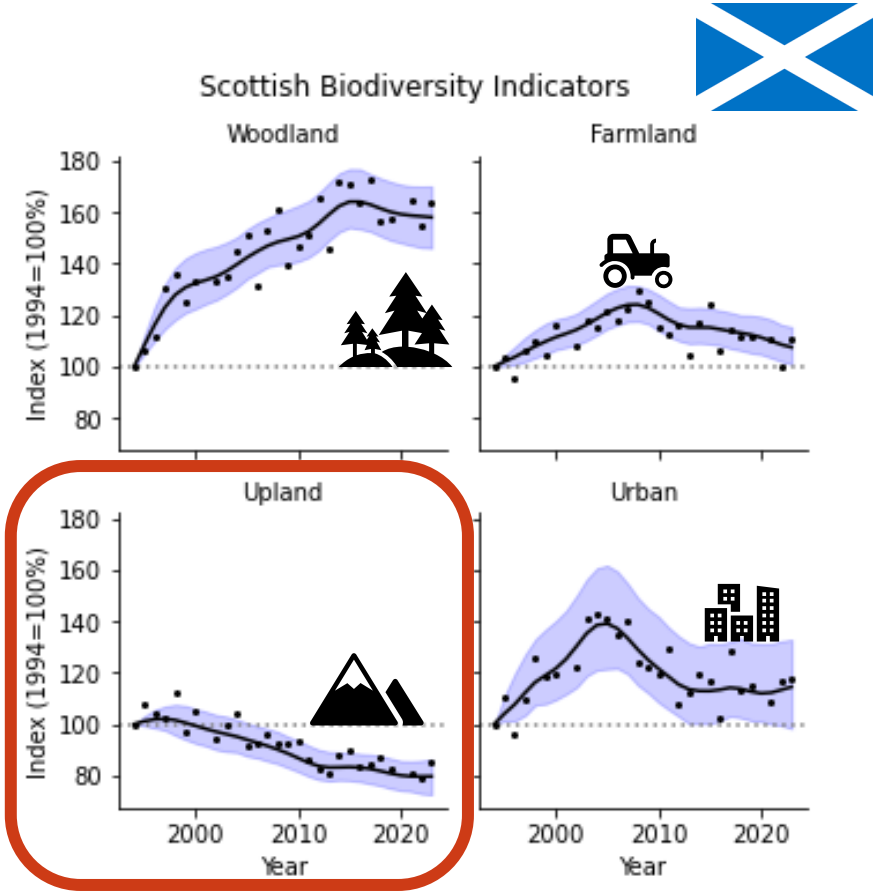


2023 BBS Coverage

Hillwalker population

© Annie MacDonald

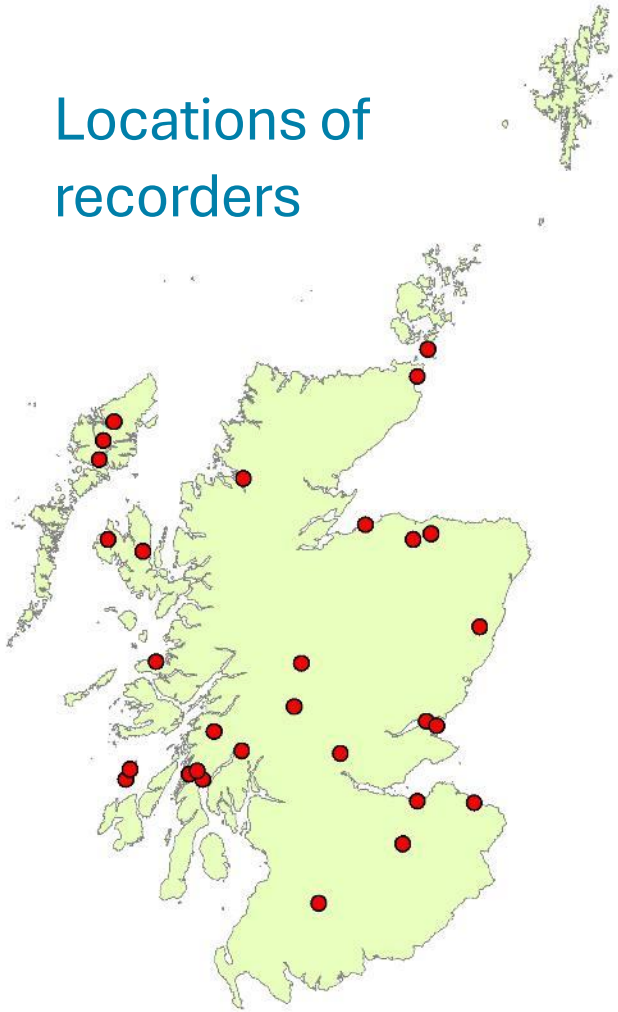
© Tom Ryan



Passive Acoustic Recorders on BBS squares

Birds Science People

Locations of recorders



Acoustic monitoring on BBS squares

28 BBS squares with recorders

300GB

2077 hours

Acoustic monitoring on BBS squares

28 BBS squares with recorders

300GB

2077 hours

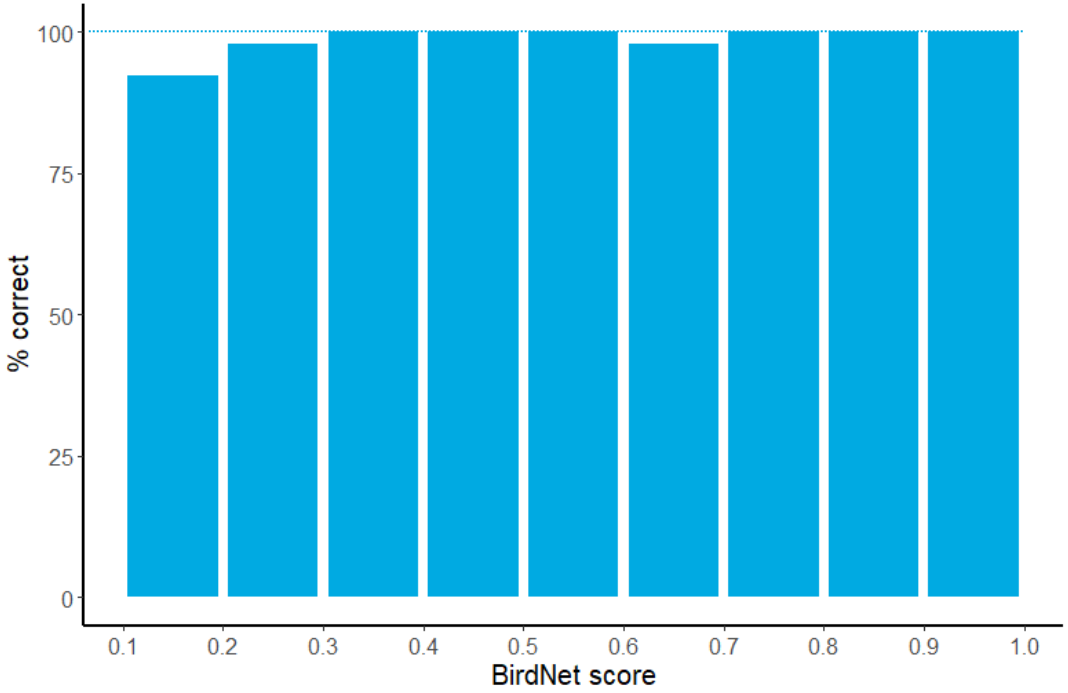
>750,000 detections of 196 species by BirdNET

Classifier performance varies between species

Goldcrest (*Regulus regulus*)

Recall: 26%

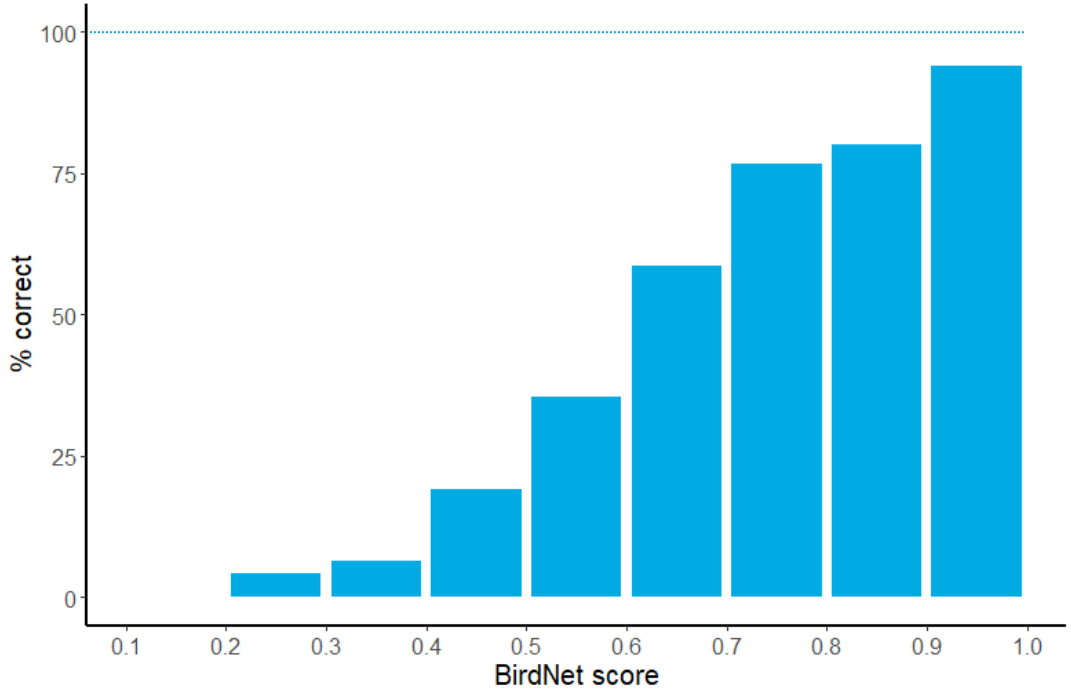
Precision: 94%



Tree Pipit (*Anthus trivialis*)

Recall: 73%

Precision: 19%



Tom Cadwallender, Philip Croft

BBS survey findings (2019 – 2023)

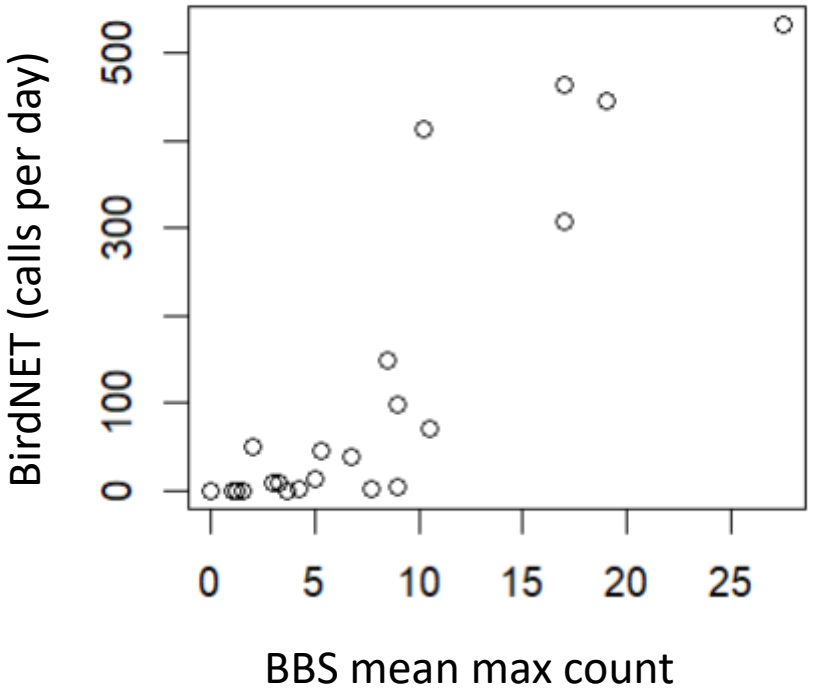
- >750K detections of 194 species by BirdNET
- 134 species reported by BBS surveyors (over 5 years)

Filtering BirdNET using confidence scores

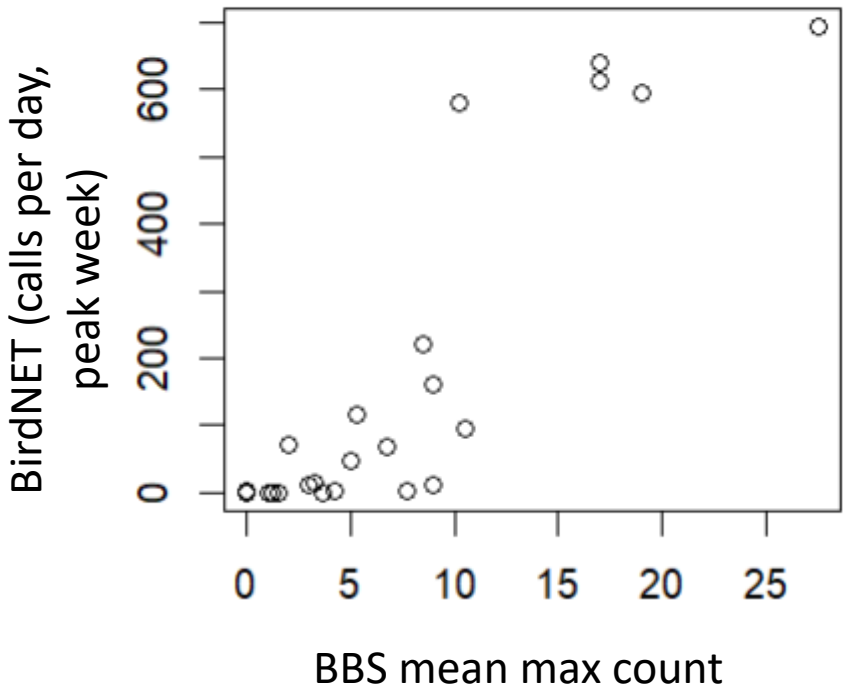
Skylark

Alauda arvensis

All BirdNET



BirdNET precision >= 0.9

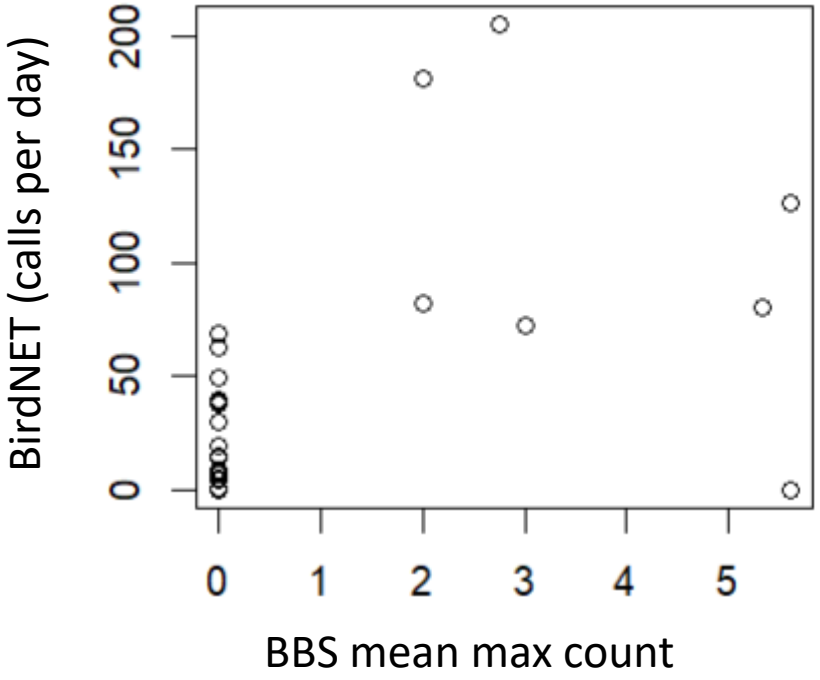


Filtering BirdNET using confidence scores

Tree Pipit

Anthus trivialis

All BirdNET



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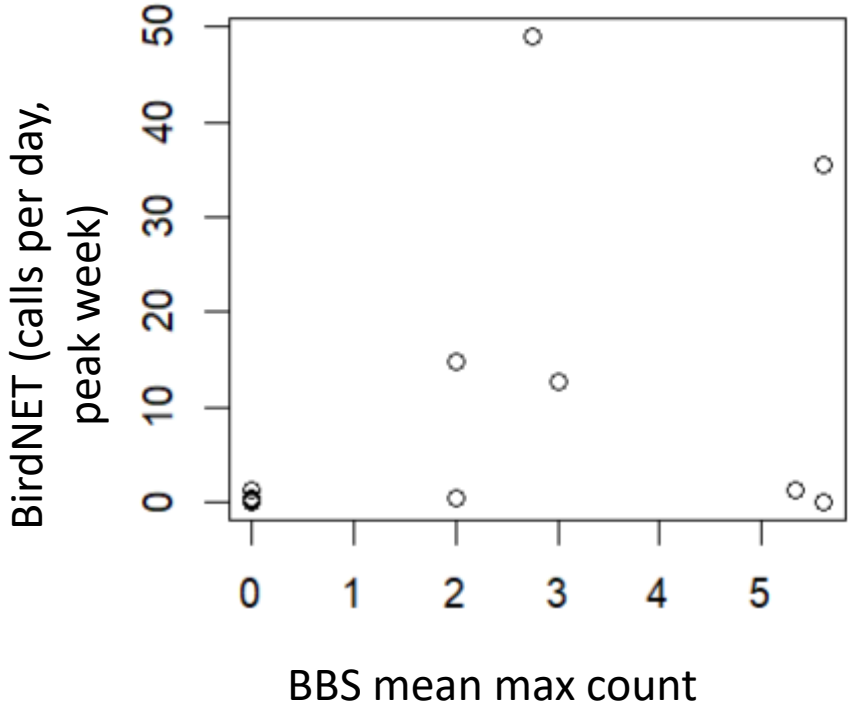
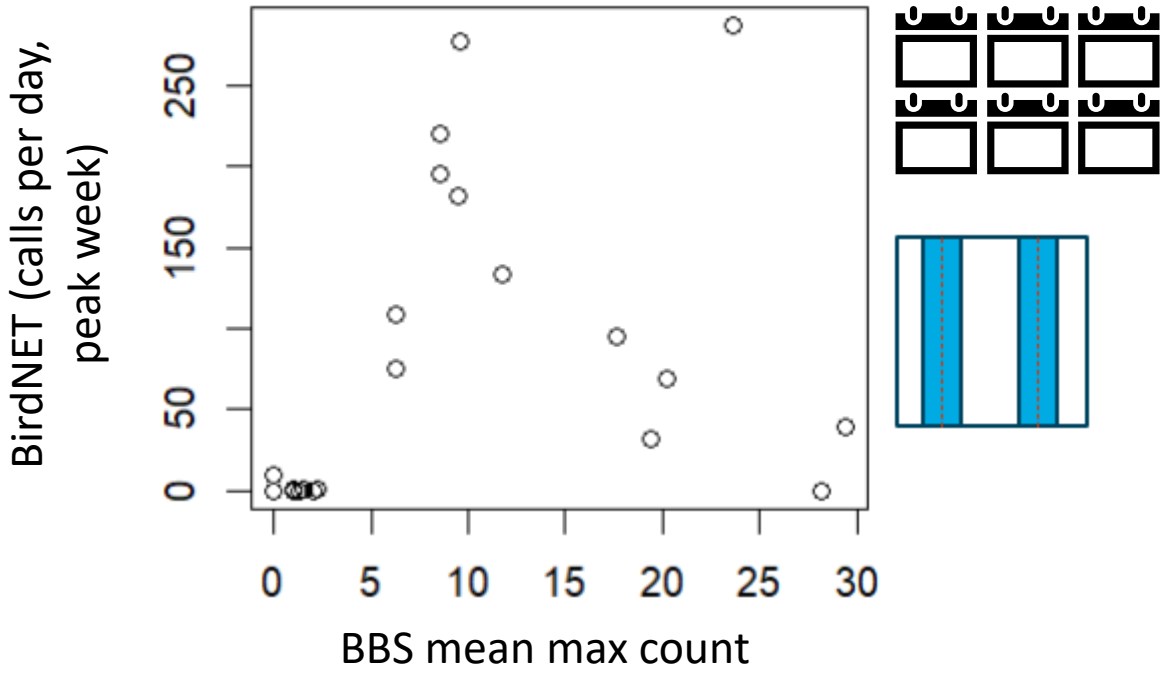


Filtering BBS on space and time

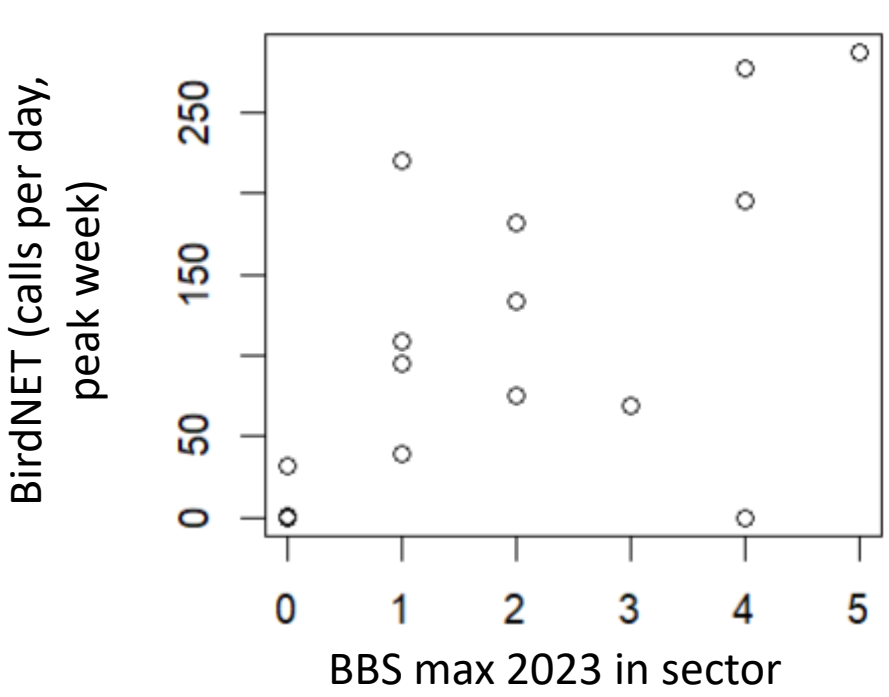
Willow Warbler

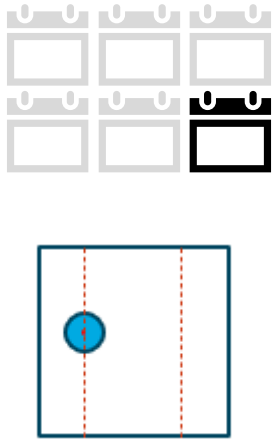
Phylloscopus trochilus

All BBS



200m sector, 2023



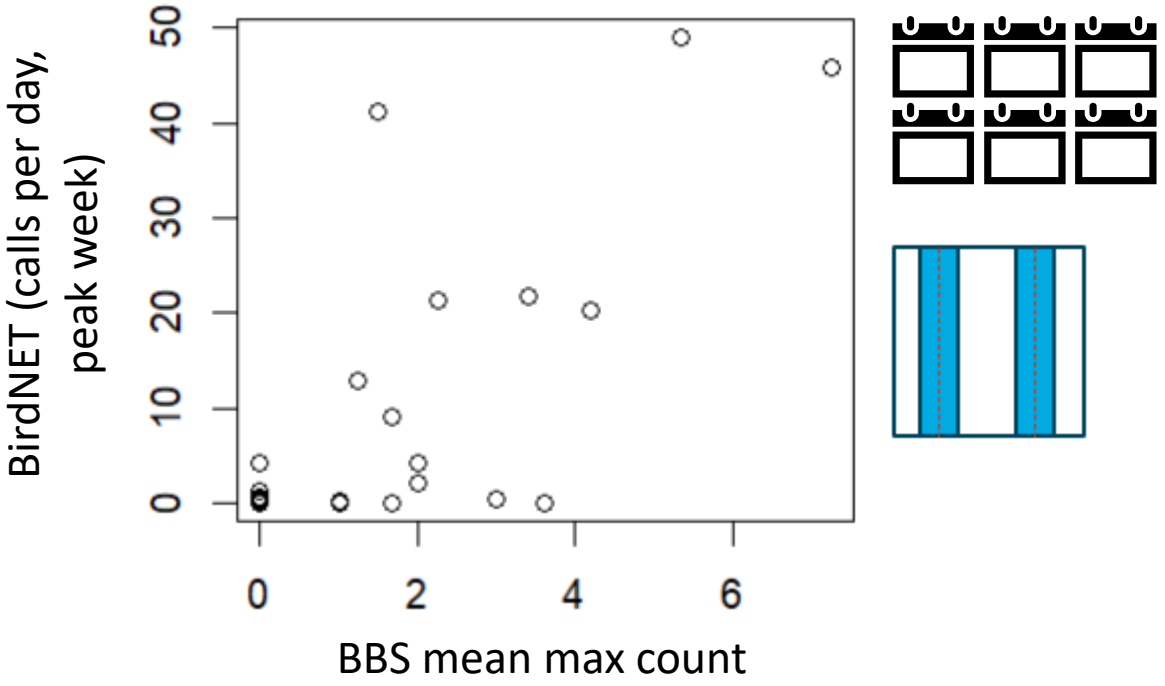


Filtering BBS on space and time

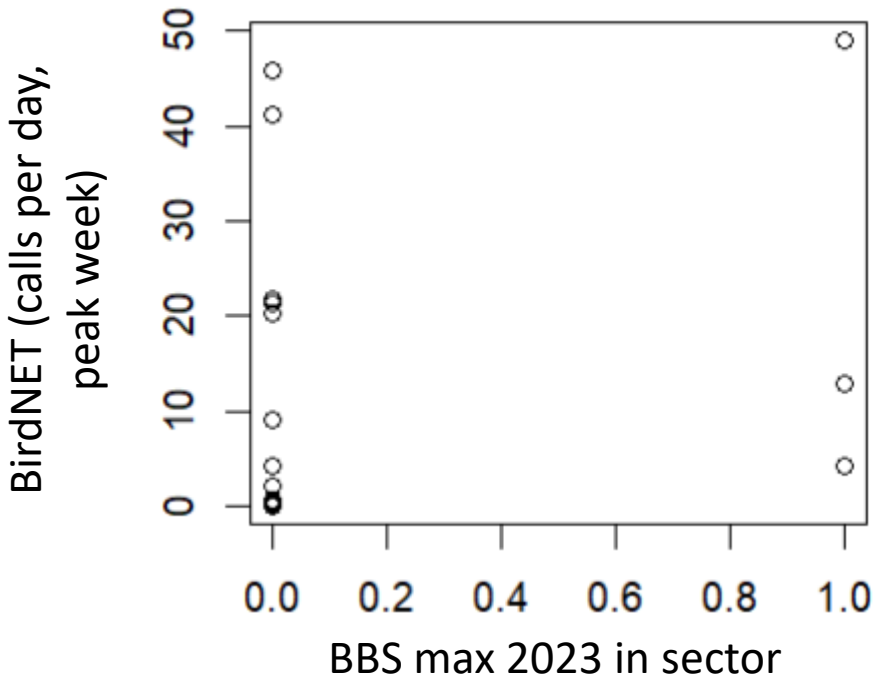
Cuckoo

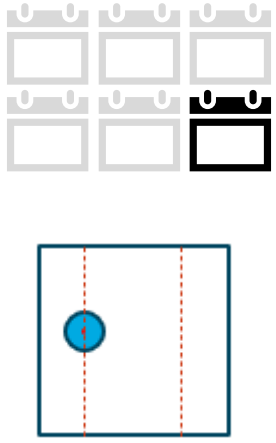
Cuculus canorus

All BBS



200m sector, 2023





Advantages of acoustic monitoring

More effective for many species

Not limited to bird surveyors

vs

Breeding status and productivity

Next steps

Improve extraction of robust data from recordings

Recorder

Classifier

Data

Thanks to…

Thanks to the funders of this work: **Mark Constantine** and **Ken and Linda Smith**.

The BTO/JNCC/RSPB Breeding Bird Survey and the trial of passive acoustic monitoring I've just described owe everything, like the vast majority of BTO surveys, to our amazing community of volunteers.

A big thank you also to the many BTO staff and students who have contributed to this project and to related work: Adham Ashton-Butt, Anthony Wetherhill, Ben Darvill, Dario Massimino, David Noble, Dawn Balmer, James Heywood, John Calladine, Justin Walker, Ruari Marshall-Hawkes and Simon Gillings.

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Adham Ashton-Butt **Simon Gillings** **Mark Wilson**