Green Tech South West

wilder sensing

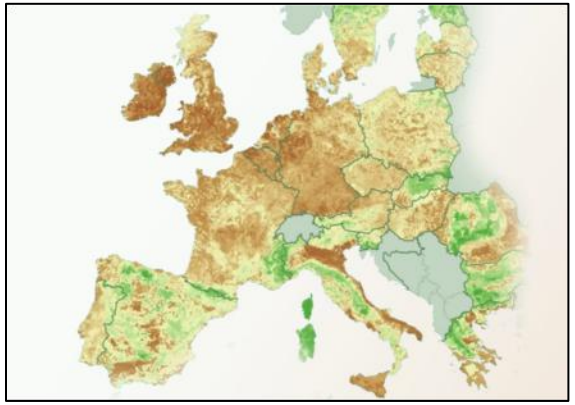
Using bioacoustic data to assess nature recovery

Geoff Carss, CEO, Wilder Sensing

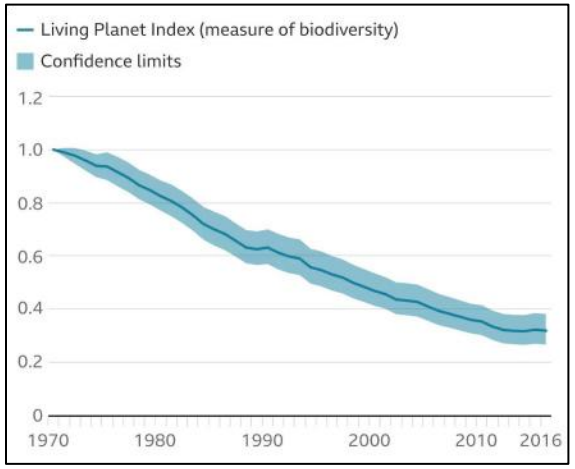
- How does it work?
- Case study
- Strengths and weaknesses
- Conclusions

“You can’t manage what you don’t measure” - Peter Drucker

Why measure biodiversity?



UN Ecological Integrity Index



The global Living Planet Index. WWF/ZSL

Global environmental and reporting requirements are significantly increasing demand e.g.:

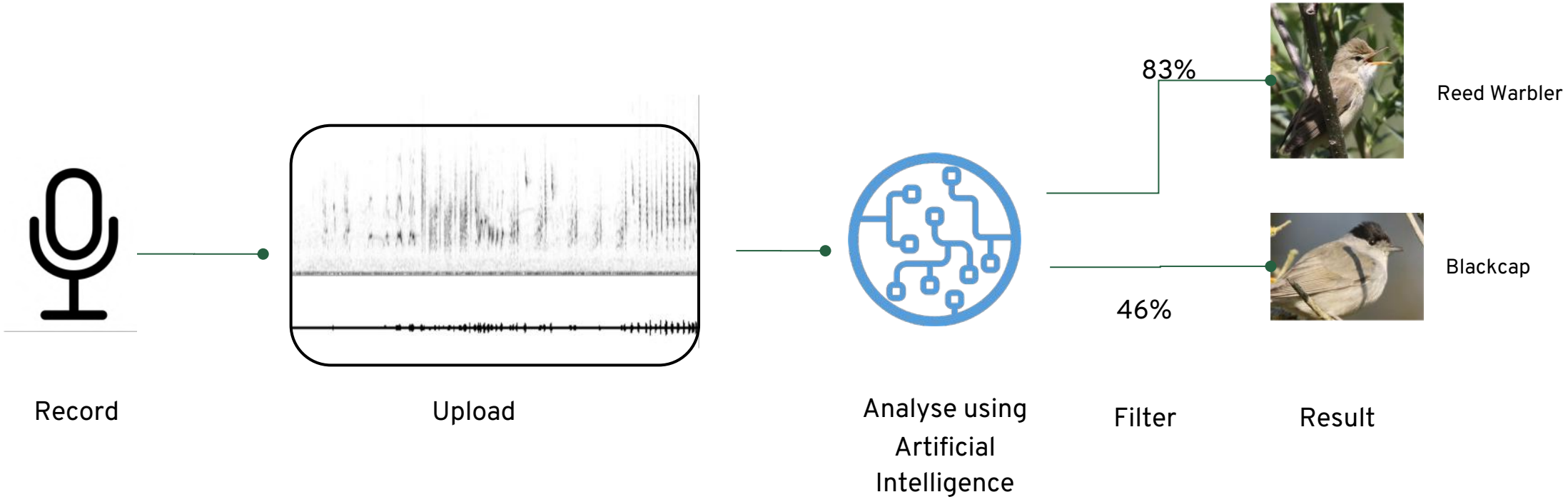
- **Biodiversity Net Gain**
- **Taskforce for Nature Based Financial Disclosure (TNFD)**

- **Current methods are slow, expensive, biased and don't scale**

Significant opportunity for emerging technologies to meet the demand

How can sound be used to measure biodiversity?

Many organisms make sounds: Birds, Bats, Insects, Soil, Fish, Whales etc



One recorder working 24/7 will produce c. 1.3Tb/year and a site may have a number of recorders.
A site with 4 recorders will produce >1,000,000 species level records/year

Using bioacoustic data to assess nature recovery

- Deploy standard passive audio recorders
- Multiple recorders per site
- For short term/baseline and long term biodiversity monitoring

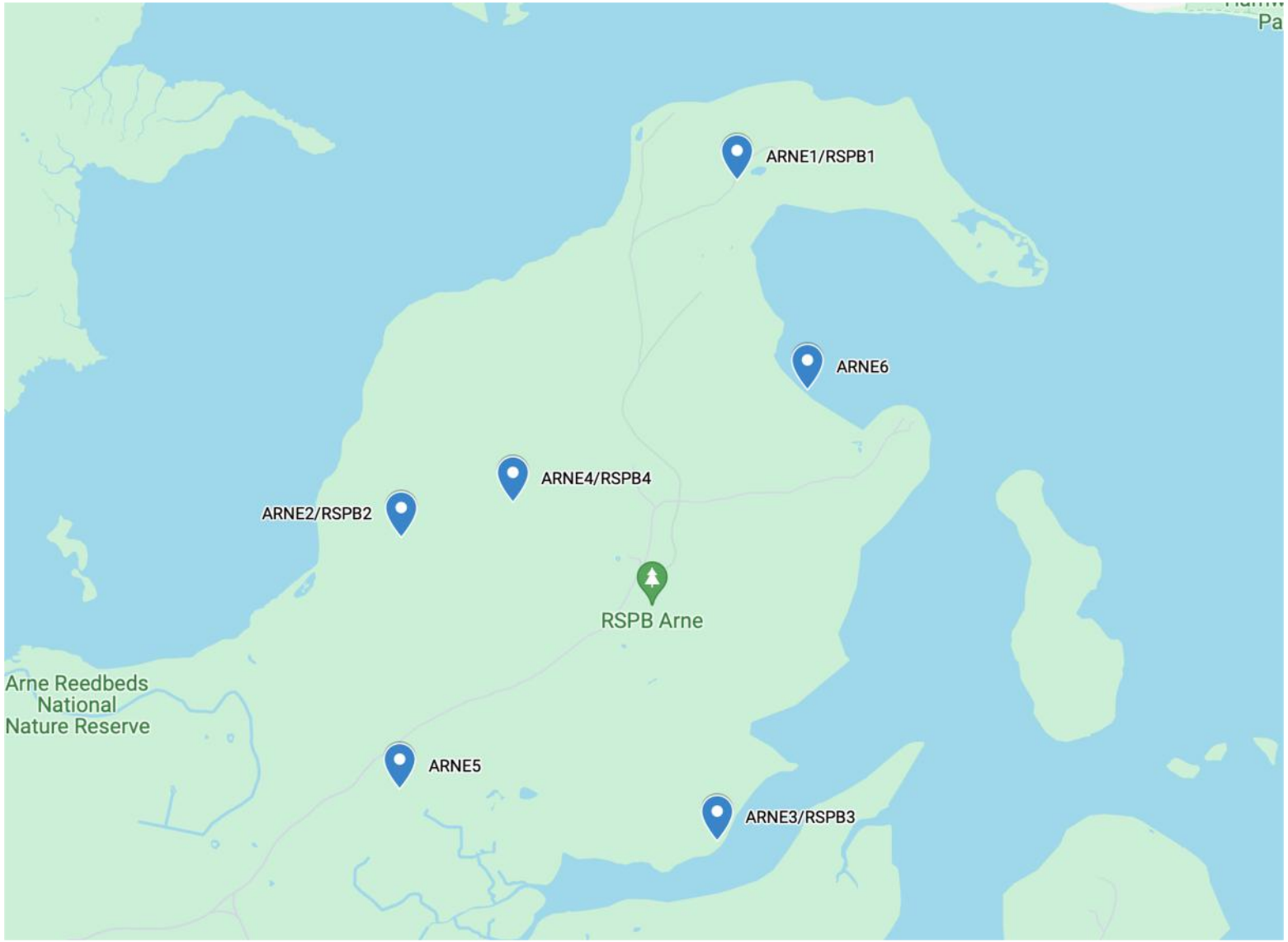
Review site plan

Take action using biodiversity data

Millions records per site over 3 - 4 years

Large species level data sets provide insights on species assemblages, time series changes, behaviours, monitoring of key indices etc

Case Study: BBC Springwatch/RSPB Arne

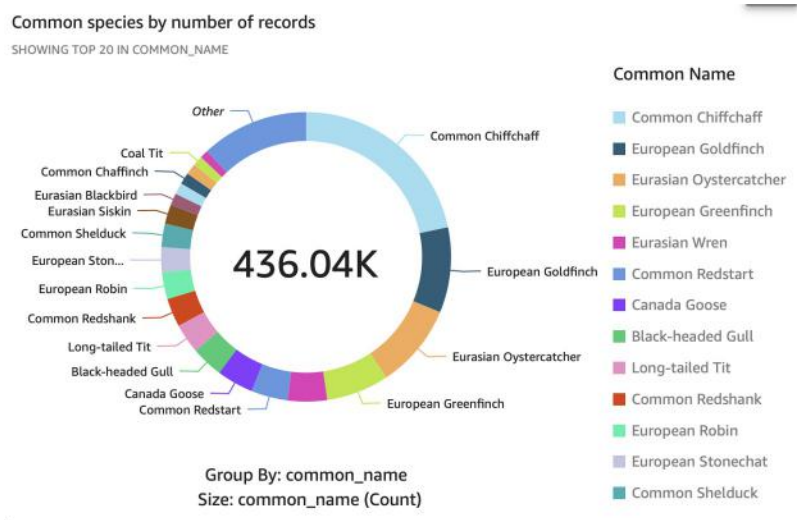


RSPB Arne - 1

Controlling data quality: Records/species count

		Location probability			
		1%		10%	
Detection confidence	80%	349,000	157	263,000	89
	85%	310,000	89	236,000	85

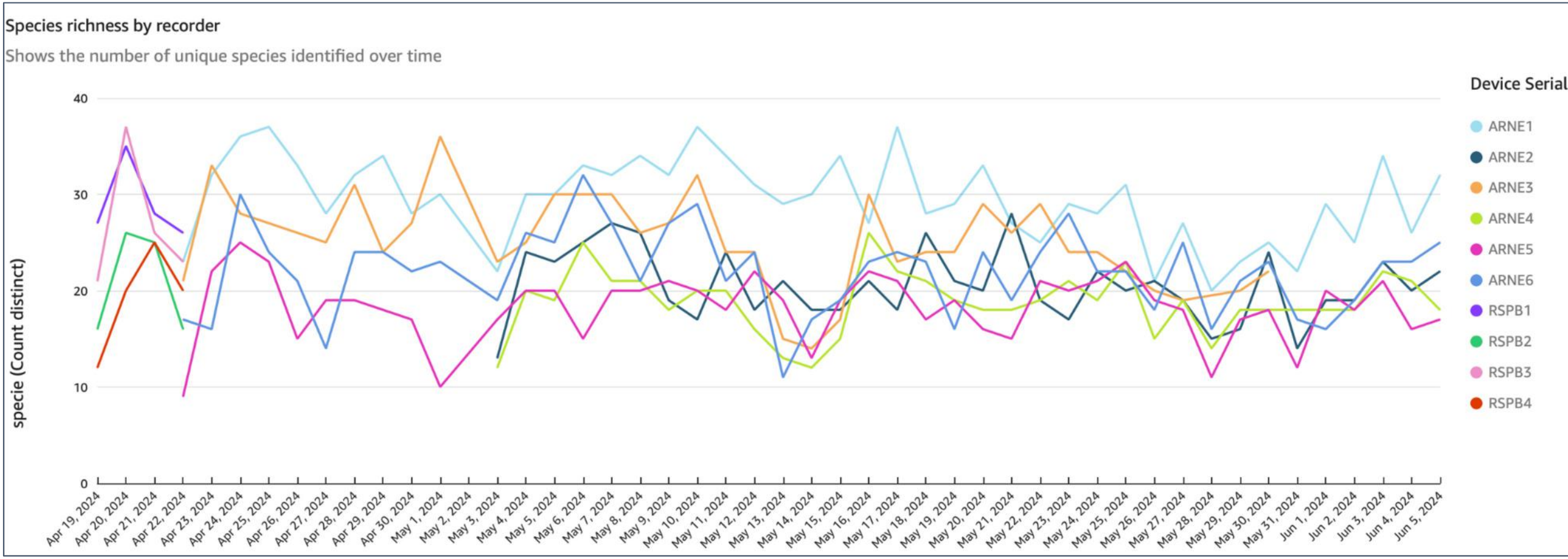
Common Bird Count



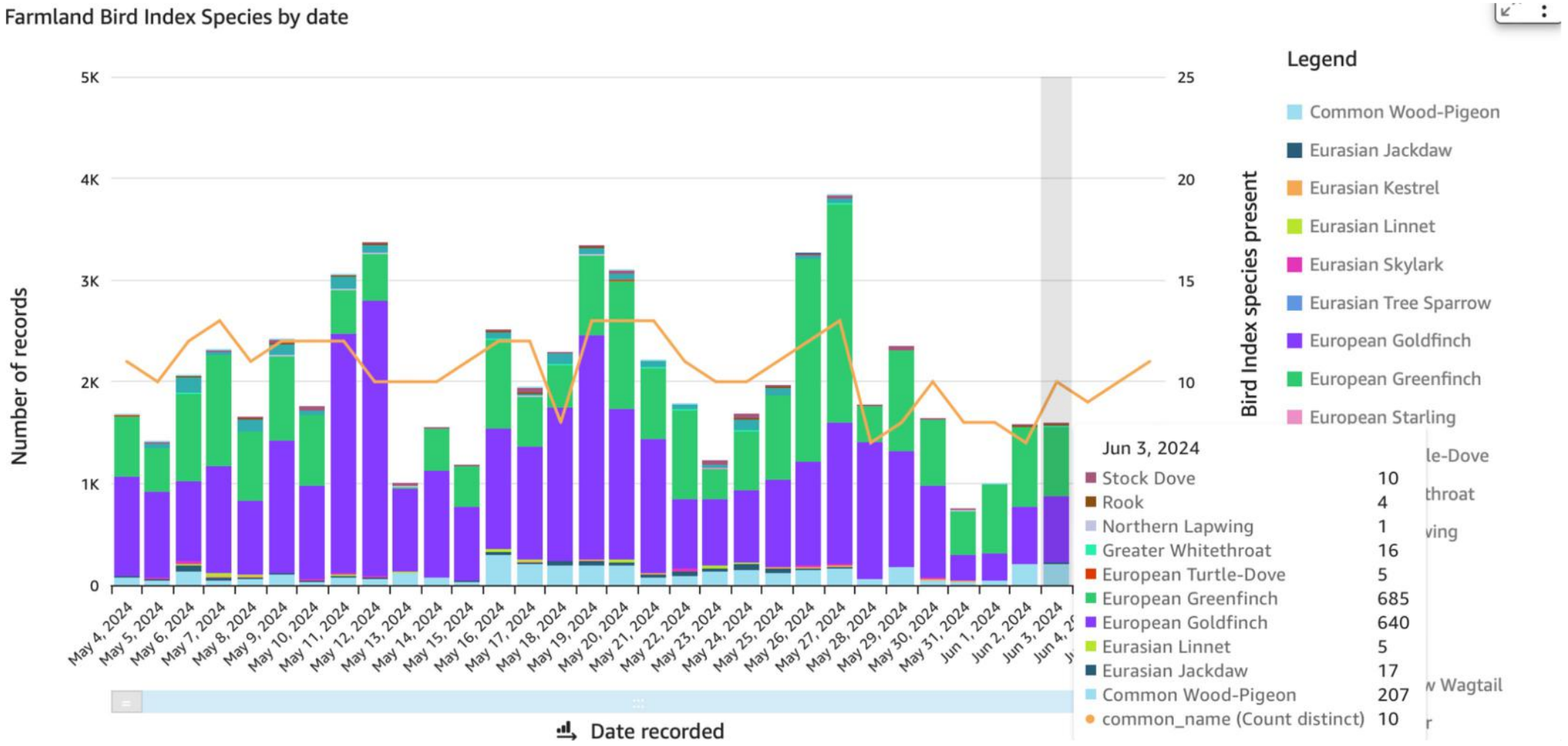
Species location preference

common_name	ARNE6 Count	ARNE5 Count	ARNE4 Count	ARNE3 Count	ARNE2 Count	ARNE1 Count	Total Count
Dunnock	46	8	1,082	1,075	144	735	3,090
Eurasian Blackbird	260	509	333	1,340	86	1,211	3,739
Eurasian Blackcap	31	114	48	8		2,696	2,897
Eurasian Blue Tit	129	292	280	28	42	872	1,643
Eurasian Bullfinch	20	1	1	152	1	106	281

Species richness

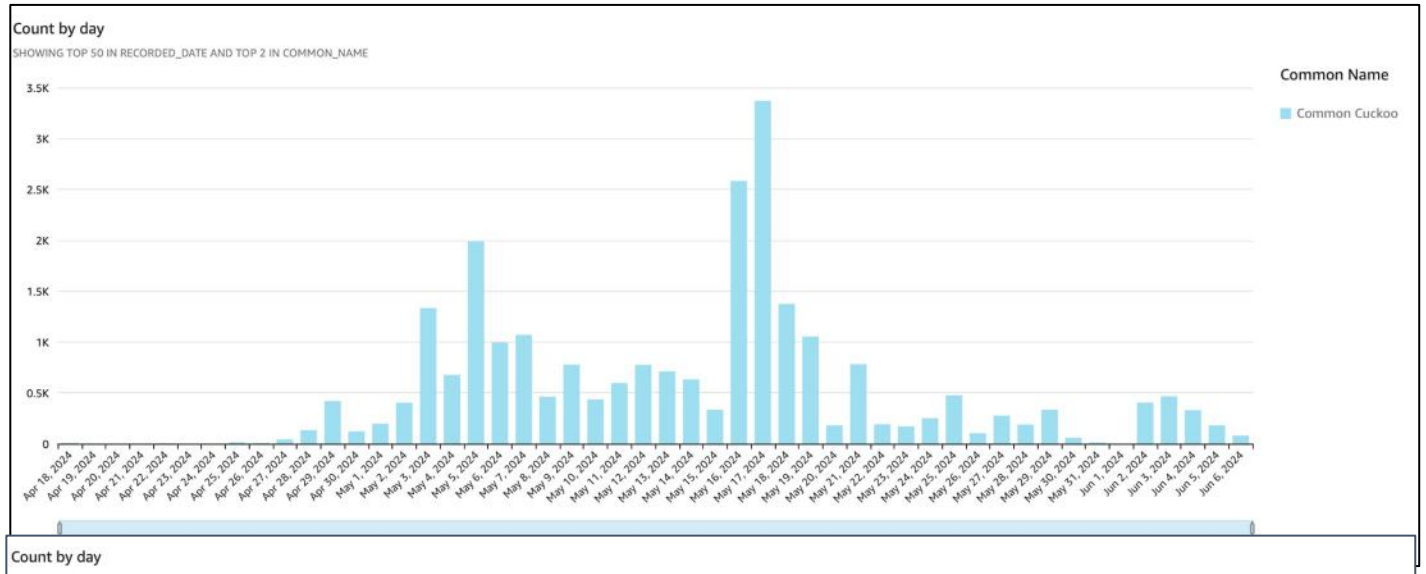


Farmland Bird Index

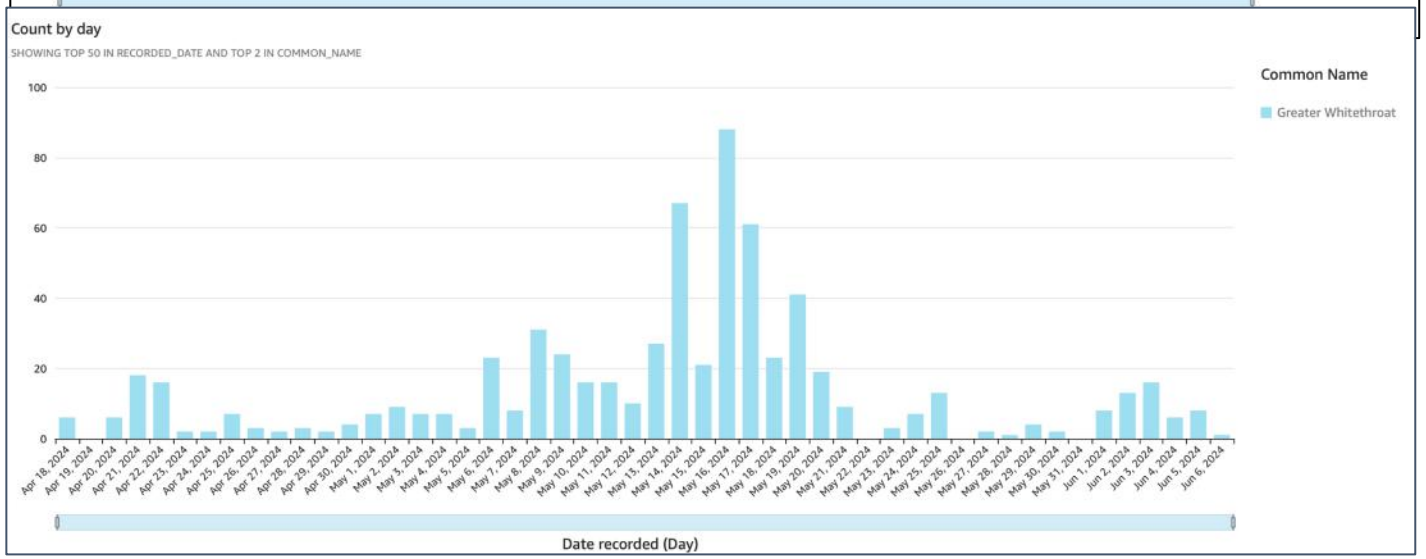


Farmland Bird Index

Species behaviour

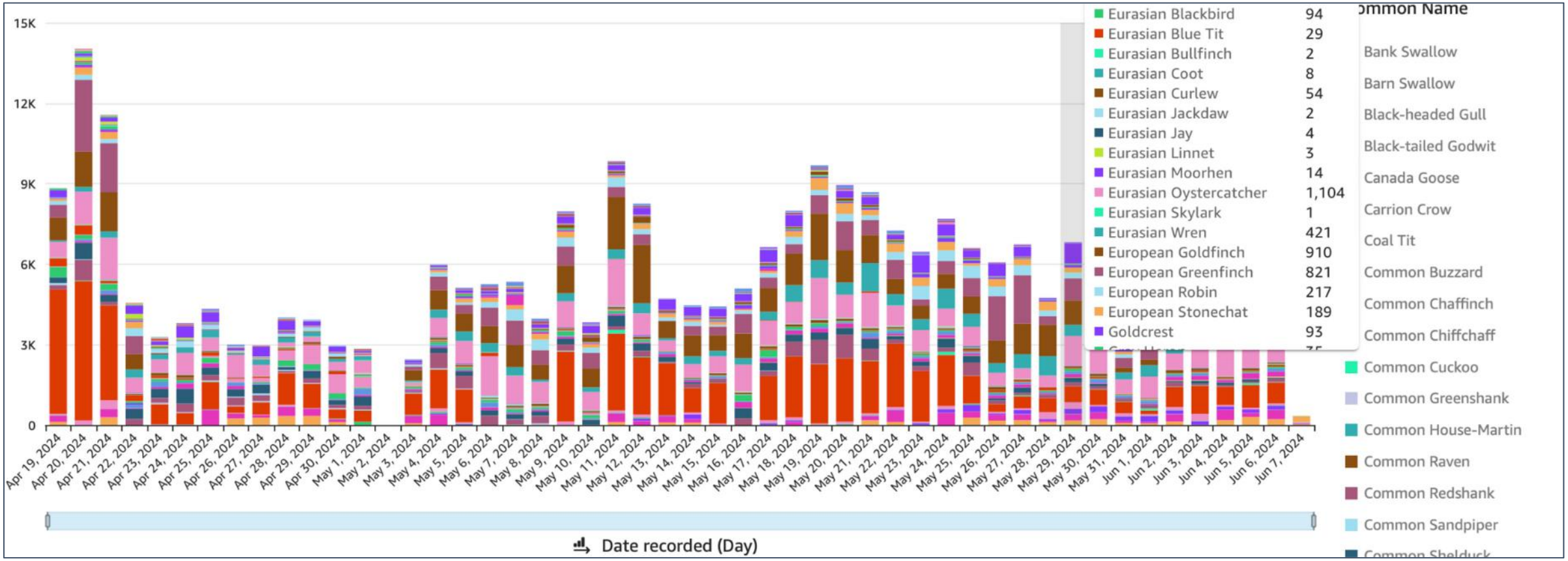


Cuckoo



Greater Whitethroat

Daily analysis



Long term use of bioacoustics

Corporate reporting
(TNFD etc)

Habitat Health Indices

Triangulation

Bioacoustic Indices

Value of data increasing for customers and third parties

Birds

Bats

Soil

Insects

Water

Comparison of site surveys and bioacoustic/AI surveys

Limitations of traditional survey approach	**Can bioacoustics and AI assist?**	**Comments**
Surveyor experience/ability/bias	Y	Can be used by inexperienced surveyors/volunteers without affecting data quality.
Surveyor energy/motivation	Y	Does not get tired. Consistent effort. No difference day or night.
Surveyor/analysis cost	Y	The amount of data is more cost effective compared to that gathered by human surveyors. The use of AI for data analysis is fast, has a high level of accuracy and is cost-effective.
Length of survey	Y	Acoustic sensors can cover a minimum of a week at a time - 24/7 (depending on temperature) - unlike human observers where surveys tend to be infrequent snap-shots. Acoustic surveys can be much longer with higher spec kit and/or use of sampling if needed.
Access restrictions	Y	Surveys can take place on sites where regular visits by surveyors could be a problem. Can be installed adjacent to sites with no access to obtain data from them.
Bird disturbance	Y	Only a disturbance risk when deployment/collection - unlike walked transects where disturbance can lead to reduced detectability.
Limited evidence base	Y	All vocalisations recorded whereas traditionally surveys normally only constitute record shots at best.
Limitations of acoustic survey	**Can traditional survey assist?**	**Comments**
Species not vocalising are not detected	Y	Traditional survey can make visual identifications.
Does not provide number of individuals	Y	Observers can count individuals.
Animals at a distance beyond the sensors capability	Y	Long range visual identifications possible with optics.
High levels of background noise	Y	Visual observations can be made without interference.

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Conclusions

- Bioacoustics can generate accurate large scale species level datasets at a moderate cost
- False positive, negatives and validation needs to be considered
- Significant supplement to site surveys
  - Consistency
  - Accuracy
  - Long term
- Significant time savings vs on-site surveys
- Need good survey design
- Interpreting and applying insights from the data is key
- Volunteers can make a significant contribution in managing the sensors and validating the results

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Questions?

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Thank you