AudioMoth – an affordable survey tool and its future in bat monitoring

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Bat Conservation Trust

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Can be deployed in the field and be left unattended

Increases the survey effort. Minimises surveyor effort

Can be deployed during daylight. Easy to locate difficult to survey habitats

Need little or no previous experience of bat monitoring

PASSIVE ACOUSTIC MONITORING (PAM)

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AudioMoth

AudioMoth is a low-cost, full-spectrum acoustic logger, based on the Gecko processor range from Silicon Labs. Just like its namesake the moth, AudioMoth can listen at audible frequencies, well into ultrasonic frequencies. It is capable of recording uncompressed audio to microSD card at rates from 8,000 to 384,000 samples per second.

- EFM32 Gecko processor
- Capable of recording at sample rates up to 384kHz
- Records uncompressed WAV files to microSD card
- Powered by 3 x AA batteries
- Analog MEMS microphone
- Analog pre-amplifier with adjustable gain
- Measures just 58 x 48 x 15 mm
- Configurable USB interface
- Onboard real-time clock keeps track of time in UTC
- Exposed header for 3.5mm jack mic from version 1.2.0 onwards

https://www.openacousticdevices.info/
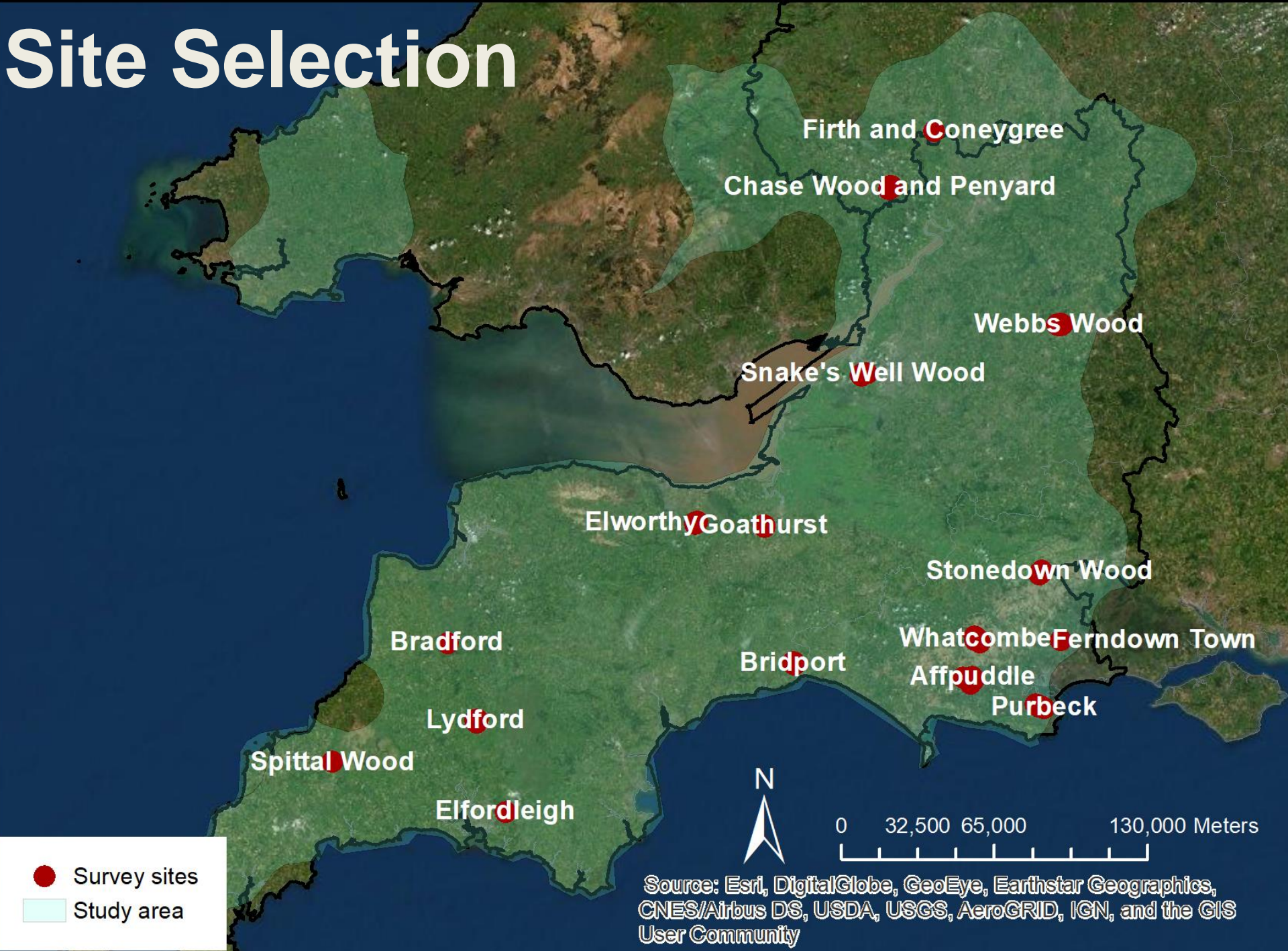
Full spectrum

- sounds are captured at a high sampling rate and are saved to an internal memory card.

- Can be used for continuous surveys in real time.

- Sonograms have more information – clear call shapes and structure – good for call analysis.

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PAM at BCT

- British Bat Survey

- Trialling a new low-cost full spectrum acoustic sensor

- Automated, end-to-end system for monitoring bats

- Interactive results portal

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Site Selection

Firth and Coneygree

Chase Wood and Penyard

Webbs Wood

Snake's Well Wood

Elworthy Goathurst

Stonedown Wood

Whatcombe Ferndown Town

Bradford

Bridport

Affpuddle

Lydford

Purbeck

Spittal Wood

Elfordleigh

N

0   32,500 65,000   130,000 Meters

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

● Survey sites
  Study area

BATS - AN IMPORTANT INDICATOR OF WOODLAND BIODIVERSITY AND CONDITION

LONG LIVED

RELIANT ON WOODLANDS FOR FORAGING, ROOSTING OR COMMUTING.

TOP PREDATOR

1/3

OF MAMMAL SPECIES IN THE UK

SENSITIVE TO PRESSURES THAT AFFECT A WIDE RANGE OF TAXA

INTERACT WITH THEIR ENVIRONMENT

Natural Capital Accounts

"From the soils to the trees, and all the species who live in them, the whole forest ecosystem is a resource known as 'natural capital'. We use a natural capital approach to help us understand the value to society of the various benefits that come from the nation's forests" Forestry England
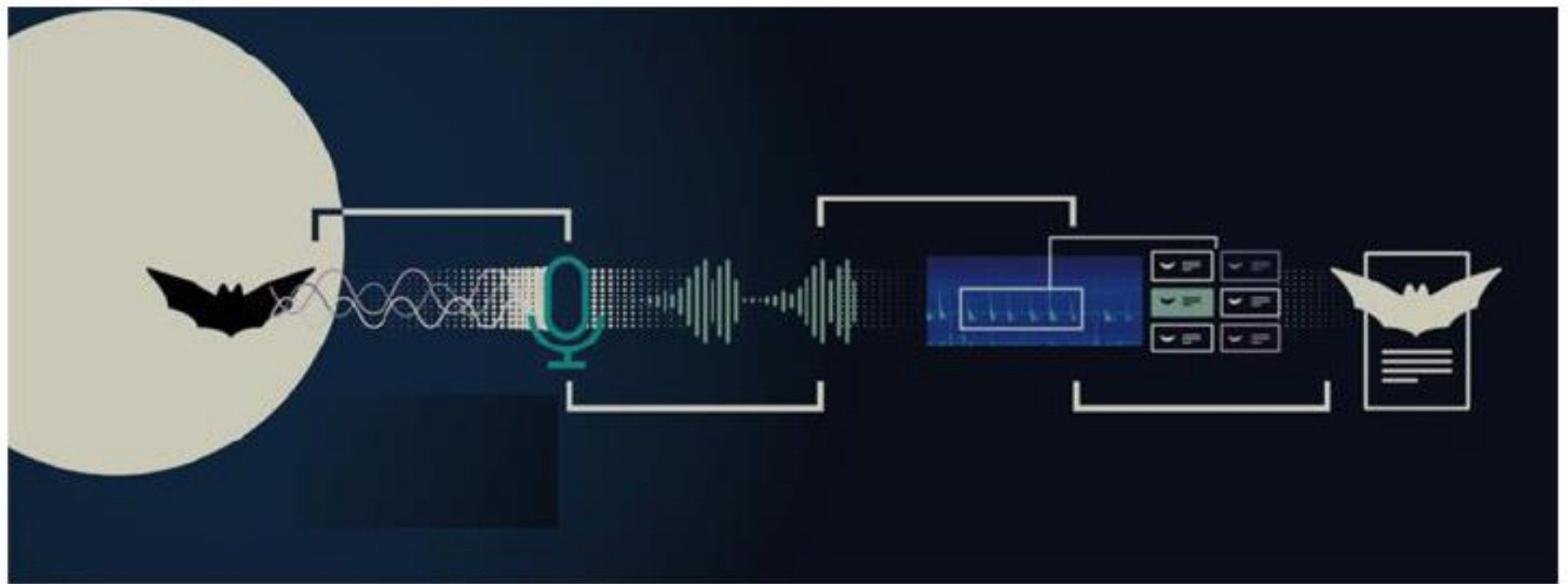
© Katherine Boughey

© Mark Warn

Equipment

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Acoustic Monitoring System

Bat echolocation calls are recorded in the field using a passive acoutsic sensor

Recordings are classified to species using automated algorithms

Results are used to automatically generate feedback

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Results

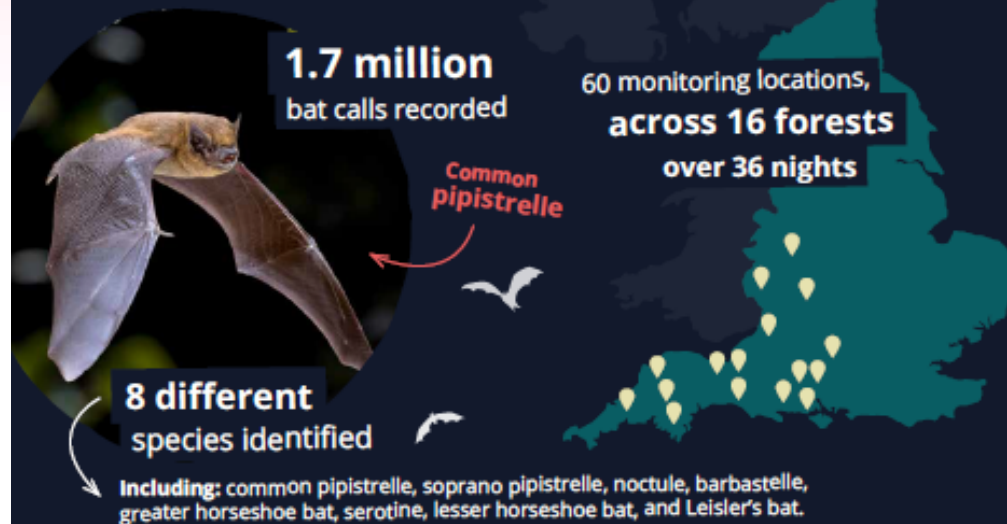# Developments and future directions

- **British Bat Survey**
- **Nightwatch**
- **Woodland Monitoring**

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Ancients of the future
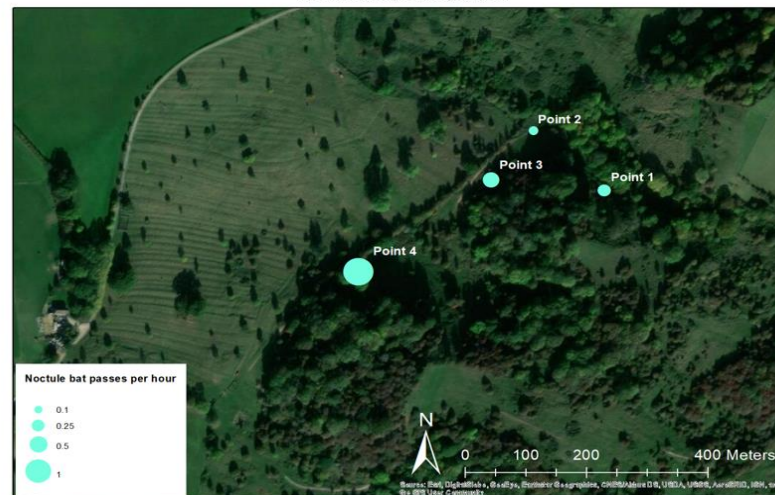

Barbastelle Distribution

Noctule Distribution

Bredon Hill NNR

Barbastelle Distribution

Noctule Distribution

Bredon Hill Acoustic Survey (Static)
3rd July 2019 (1 night)

Noctule bat passes per hour

Point 2
Point 3
Point 1
Point 4

Noctule bat passes per hour
- 0.1
- 0.25
- 0.5
- 1

Dixton Wood

Barbastelle Distribution

Noctule Distribution

Dixton Wood Acoustic Survey (Static)
3rd June 2019 (1 night)
Barbastelle bat passes per hour

Barbastelle bat passes per hour
- 2
- Monitoring Point Locations

Point 4
Point 3
Point 1 Point 2

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Lanhydrock

Barbastelle Distribution

Noctule Distribution
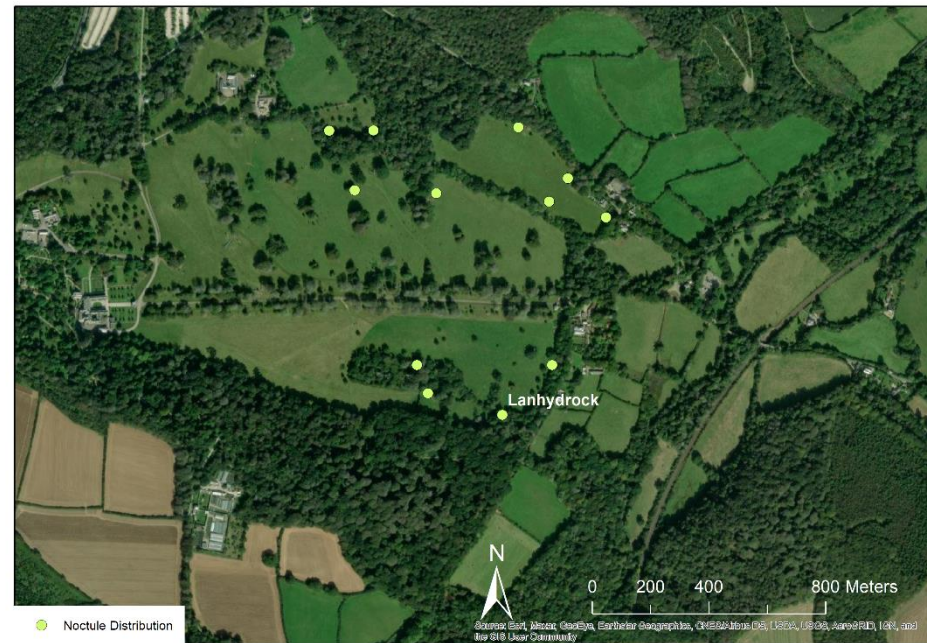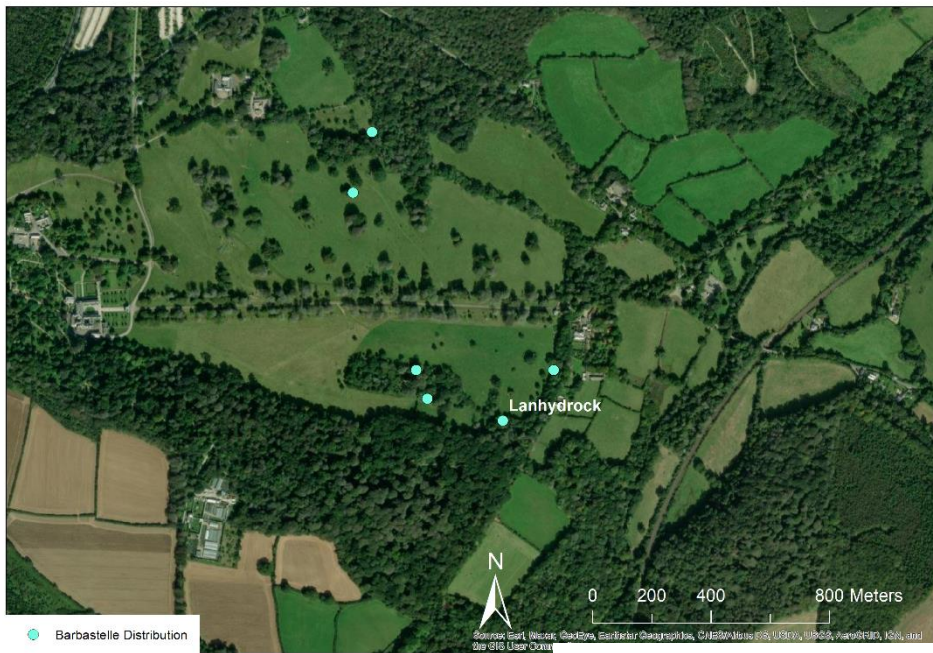
Lanhydrock Acoustic Survey (Static)
30th July 2019 (1 night)

Noctule bat passes per hour

Point 4
Point 2
Point 3
Point 1

Noctule bat passes per hour
- 0.1
- 0.25
- 0.5
- 1

Thank you for listening!