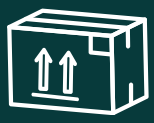


BIOACOUSTIQ

SCOPE OF SERVICE & EQUIPMENT PROTOCOLS

BIOACOUSTIC MONITORING: PROCESS OVERVIEW

Our easy-to-use recording technology can be scaled for all sizes of land and is standardised for repeat measurement. Recording devices are shipped in advance of the survey, and can be easily set up onsite.



Devices are posted to site with clear set up instructions



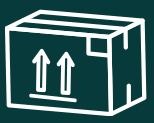
Recording units deployed.

LED Status check made for all recording units during deployment (instructions provided in this document)



Client updates Carbon Rewild with recording locations.

A link to an online form will be provided to submit this information



At end of survey period, recording units are collected and returned via post for results analysis



Data is processed for automated species classification.

Data is analysed and validated each month separately



Further analysis and human verification performed to increase results accuracy.



Report completed and results stored on your online Nature Dashboard

REPORTING & DATA

We aim to deliver reporting to meet your requirements, and custom reporting documentation can be provided on request. The format & reporting output needs to be agreed in advance of the survey, and custom reporting may also require additional time to deliver. Please find the standard reporting metrics available on the following page. As standard, one PDF report is delivered per order, and a single dashboard account will be set up (with up to three users to access).

We aim to deliver the survey reports within 4 weeks of the return of the recording units. However, during busy times of year, the report delivery timeframe may be up to 6 weeks, and we will updated you on any extended delivery timeframes if this is applicable.

The Client shall recognise that every effort will be made by the Service Provider to provide information that is accurate and accessible, which includes human verification of some of the identified species. Nevertheless, the Client shall also recognise that errors in species identification and information provided may occur. The Client shall recognise that software is used to measure the acoustic activity from the audio recorded during the survey. The absence of a detection does not necessarily imply the absence of a species from a location.

Carbon Rewild acts as Data owner for the monitoring service and maintenance of audio & survey data. Unless agreed otherwise, Carbon Rewild agrees to retain data records as follows:

- Deliverables and raw numerical data relating to the service delivery to be retained indefinitely.
- Full survey audio to be retained for 6 months following the completion of the survey period.
- Sample of audio for all identified species to be retained for 5 years following the completion of the survey period.

Carbon Rewild may use data that does not contain personal information (e.g. audio recordings) to design, conduct, or improve data analysis processes. This may include the Company or third-parties using non-personal data for scientific or commercial AI/ML applications or other applications.

If you require long-term storage of survey audio data as part of our service, please get in touch to discuss this further.

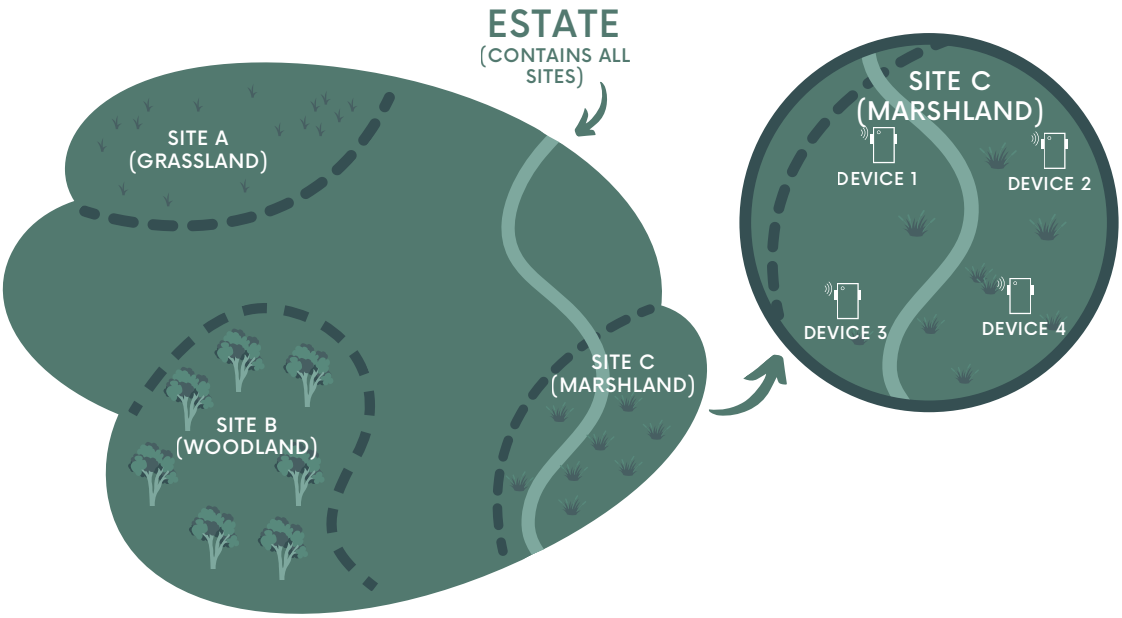
RECORDING LOCATIONS

Carbon Rewild can support the design of your survey by recommending suitable recording locations. These are suggested locations and Carbon Rewild can only advise on the approximate placement of recording units. Carbon Rewild is unable to assess the access and risks at these locations so your discretion is required in order to ensure safe installation and retrieval of the recording units.

Once the recording units have been setup onsite, the Client must provide the locations of each recording unit deployed either via longitude and latitude (to at least four decimal places) or via a What3Words address. Carbon Rewild will provide a form requesting this location information, along with relevant site information that inform our analysis and validation processes.

For reporting purposes, your recording units can be grouped into "Estates" and "Sites", as illustrated below. "Estates" are distinct areas of land that can contain multiple "Sites" (e.g. multiple managed woodlands or distinct habitats). On your dashboard, you can view the overall Estate biodiversity levels, and compare the sites side-by-side. All of the survey data for your Sites will be combined to show the biodiversity values for your whole Estate.

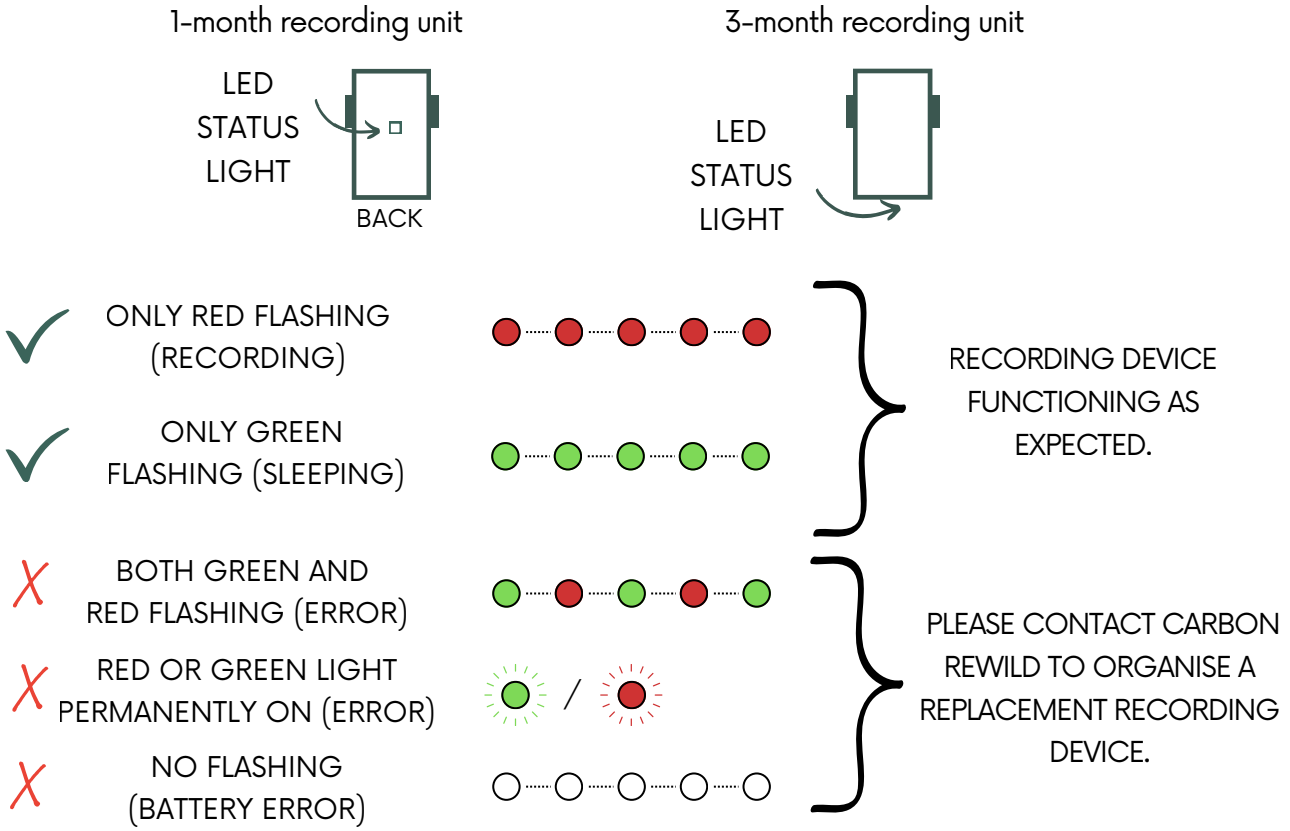
You may wish to have all your recording units grouped into a single site. How you structure your Estates and Sites account is your choice. You can request separate sites and estates for your reporting dashboard when you submit the recording location data.



RECORDING UNIT CHECKS

The survey duration shall be defined in advance, commencing from the agreed-upon start date. In preparation, recording units will be dispatched prior to the commencement date, accompanied by instructions and guidance for their setup and deployment. **Please keep the original packaging for the return of the recording units.**

The recording device has a LED status light which can be used to check if it is correctly operating. The LED can be seen through a small port on the back or underside of the recording unit. **The Status light must be checked during deployment to ensure recording unit is operating correctly.**

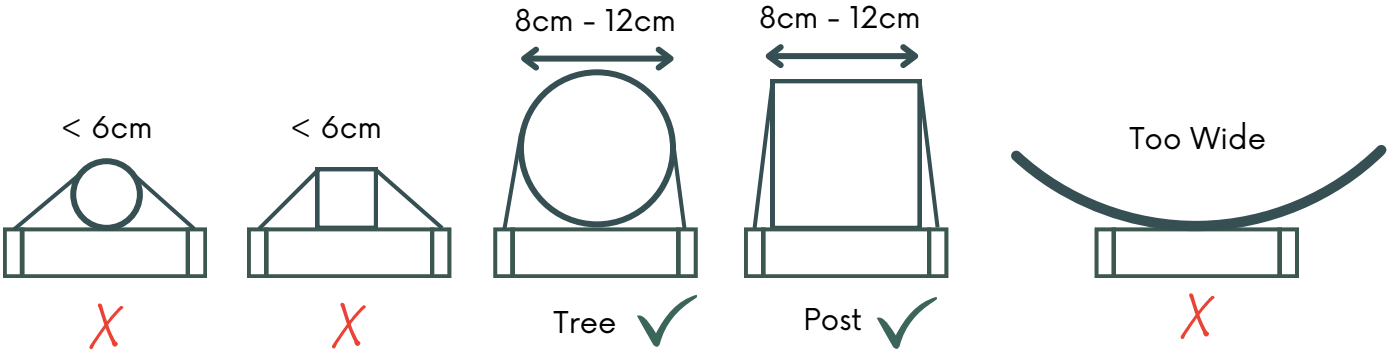


Should any issues arise with the recording units from these checks, replacement units will be promptly dispatched by the Service Provider. Provided Carbon Rewild is informed of any operating status issues no more than three working days after the agreed-upon start date then the agreed-upon start date will be adjusted to be one day after arrival of the replacement unit(s) at the Client's chosen delivery address. It is important to note that **any units damaged due to external factors, during the deployment or survey period, will not be eligible for replacement.**

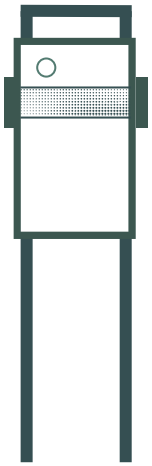
RECORDING UNIT SETUP & RETURN

Carbon Rewild will provide separate guidance on finding a suitable recording location. Once the recording location(s) have been determined, you will need to have a suitable fixing point to attach the recording unit, which is commonly a post or tree. This fixing points need to be accessible, and be a suitable width to attach the device.

The post or tree should be approximately the same width as the recording unit, preferably with a width of 8cm - 12cm. The fixing point should not be narrower than 6cm, or there is a risk the strap cannot remain securely tightened for the monitoring period. Attaching to wider trees is also not advisable, as the strap may not be long enough, and they can block sound from the surrounding environment.



The strap for the recording unit should be tightened as much as possible, to ensure the recording unit remains fixed in the same position during the monitoring period. The recording units can be setup at a height 1m - 2m from the ground, unless otherwise advised. Recording units can be setup at greater heights (e.g. for bat surveying), although this should only be conducted if suitable safety equipment is used with the necessary risk assessments conducted. Users are deploying recording units at their own risk.



At the end of the monitoring period, the recording units must be safely retrieved from the site and suitability prepared for shipment in the original packaging by the Client for courier collection. The recording units must be made available for return within 10 working days of the survey end date.

REPORTING OVERVIEW

Our standard reporting includes the following information presented via written reports and/or on our online dashboard. Please speak to us if you have specific reporting requirements, which need to be defined in advance of the survey.

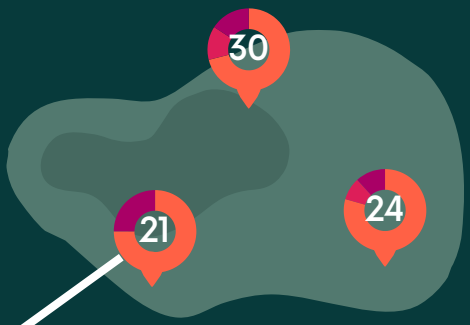
SURVEY SITE RESULTS

SPECIES RICHNESS

CONSERVATION BREAKDOWN OF SPECIES IDENTIFIED

INFORMATION ON KEY SPECIES OF CONSERVATION CONCERN

SPECIES DISTRIBUTION

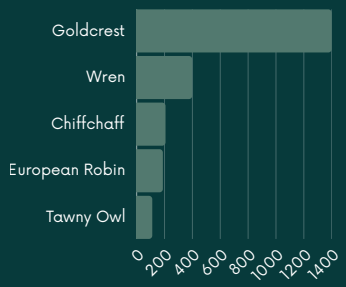


SPECIES BREAKDOWN PER RECORDING LOCATION

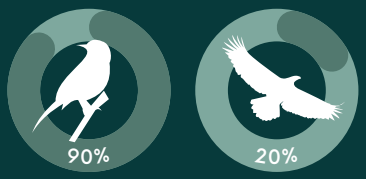
IDENTIFIED SPECIES AND CONSERVATION STATUS

Species	Scientific Name	Conservation Status
Chiffchaff	*Phylloscopus collybita*	green
Magpie	*Pica pica*	green
Robin	*Erithacus rubecula*	green
Long-tailed Tit	*Aegithalos caudatus*	green
Song Thrush	*Turdus philomelos*	amber

SPECIES' ACTIVITY TO BENCHMARK FOR REPEAT SURVEYS



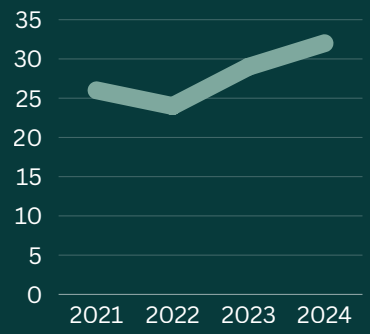
DAYS PRESENT METRICS



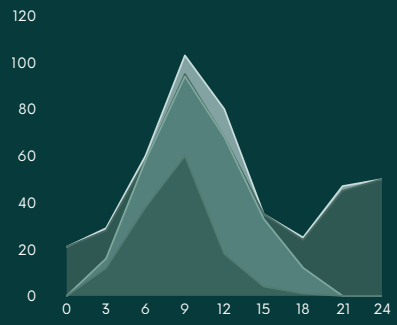
ONLINE DASHBOARD

FURTHER INSIGHTS ARE AVAILABLE VIA OUR ONLINE DASHBOARD

VIEW PORTFOLIO OF SITES AND SURVEYS TO MONITOR BIODIVERSITY CHANGE OVER TIME



MEASURE SPECIES BEHAVIOUR, WITH HOURLY/DAILY IDENTIFICATIONS BREAKDOWN



SURVEY RISKS AND HOW TO REDUCE THEM

Placing sensitive electronics out in nature has always come with an element of risk.

The following is a list of potential events which could lead to adverse outcomes or data loss, what can be done to minimise any risks, and the outcomes of any issues which may occur. We have plenty of experience working in a variety of environments, and so if you have any concerns about your planned or existing setup, please don't hesitate to reach out to the team to discuss.

1. Microphone/Electronics Damage

There are always trade-offs when designing any product or sensor. In Carbon Rewild's case this is particularly important for the microphone's sensitivity. Microphones need to be exposed as much as possible to their environment to maximise sensitivity thereby enabling us to detect as many species as possible, however, they also need to be protected to prevent damage. If the microphones are too protected then that risks reducing the sensitivity and limiting the recording unit's ability to detect species, especially high frequency bird, small mammal and bat species.

Sudden drops in temperature, for example, can lead to condensation of the water vapour present in the air already within the enclosure, and although we have mechanisms to remove this condensation quickly after it forms, if it forms in the wrong location on the electronics then that can lead to microphone degradation or failure.

What we are doing to minimise this effect: We are constantly updating our products to reduce the risk of microphone and electronics damage. We have made significant improvements already, we will continue to do so in the future.

What if this occurs during the survey:
If the recording unit has stopped functioning as expected during the survey period, we will examine the unit for the cause of damage. If it is found that the cause of the resulting damage or data loss is not due to (or not made more likely by) customer misuse or any of the actions covered in section 2 - 7 then credit will be issued against repeat surveys or subsequent surveys.

SURVEY RISKS AND HOW TO REDUCE THEM

2. Vandalism, Theft, or Human Tampering

Units left out in the open are susceptible to vandalism, theft or tampering by people. This is not an uncommon occurrence with ecological monitoring equipment. At best it can lead to minimal data loss (someone turns off the recorder or moves it to a suboptimal position) and at worst there is no data because the unit cannot be retrieved or has been extensively damaged.

What can be done to minimise this effect: There are several things that can be done to reduce the risk of vandalism, theft, or human tampering:

- Situate the recording units away from where people are likely to be. This reduces the risk of people seeing them, and also reduces the chance of people being recorded (which can lead people to be suspicious of the units' presence).
- Steel cable ties can be used to hold the recording units in place. This acts as a deterrent for opportunists. Snips or alternative tools will be required to remove the cable ties, but we will recycle the cable ties if they are returned to Carbon Rewild.
- Tamper proof units are available for certain scenarios. If you think there is a considerable risk of device loss or tampering during the survey period, then speak to the Carbon Rewild team about further options.
- If the recording units will be at risk then it is worth pre-warning any groups or individuals you know will use the site. This can be via various means such as email or signage placed nearby. This can reduce suspicion if people come across the units unexpectedly. Carbon Rewild can provide signage if requested.

What if this occurs during the survey: We cannot offer refunds, replacements or credit for recording units which are not returned or for missing data due to tampering.

3. Privacy Concerns

It is possible that individuals may object to the presence of a unit due to privacy concerns, for example, those who are worried that they are being recorded. This can lead to some people requesting that the recording units be moved or turned off, or the survey stopped.

Carbon Rewild does not intentionally set out to record other people. Neither does it set out to listen to recordings of people that may have been recorded. Our analysis process searches for target species only (such as birds, bats, small mammals), and not human voices. If a recording needs to be listened to by one of our experts for species verification, where a human sound has also been detected, this is flagged by our internal process and the part of the recording with the human voice will be avoided.

SURVEY RISKS AND HOW TO REDUCE THEM

Carbon Rewild is registered with the Information Commissioner's Office and has been directly advised by them that the recording of audio data for wildlife purposes does not constitute a high risk activity (this includes in locations frequented by people). Furthermore if an audio recorder were to be stolen then this does not constitute a reportable data breach.

What can be done to minimise this effect:

- Pre-warning: for example, a mass email to all those who use a location regularly to explain that audio recording units will be installed and assuring them that they are not being intentionally recorded.
- Pre-agreement: if there is a specific individual or group of people who you assume may not be content that the survey is taking place (this may not just be because of privacy concerns), then getting their written agreement well before the survey start date that the survey can take place is advised.
- Signage: placing of signage in the vicinity of the recorder can help reassure people

What if this occurs during the survey:

If you think there is a risk of privacy concerns being raised before or during a survey then speak to the Carbon Rewild team about options. We are able to issue signage for your survey explaining the process in more detail and with relevant contact details should the concerned party want further information.

It is the customer's responsibility to ensure that all privacy concerns are met before the survey has commenced. If privacy concerns are raised during the survey and it is deemed that the survey must be or has been interrupted to accommodate these concerns then no replacements, credit, or refunds will be given to compensate for the loss of data.

4. Damage or Interference from Cattle, Deer or Other Animals

Animals (usually large animals) such as cattle or deer can pose a risk to recording units left in the field. The primary concern is that these animals may rub against the units causing physical damage, interfering with switches, or dislodging them. This can lead to a loss of data or a reduction in the quality of recordings, as the recording unit may no longer be properly oriented to capture sounds effectively.

SURVEY RISKS AND HOW TO REDUCE THEM

What can be done to minimise this effect:

- Elevate the Units: Place the recording units as high as is deemed safe to do so on strong, sturdy branches or posts to reduce the likelihood of large animals reaching them. We recommend this is done safely, and must be achieved without extra equipment (e.g. step ladders). If additional equipment is deemed to be required to place the recording units at a greater elevation, then this is done at the end users own risk, and suitable measures and a risk assessment must be conducted for safe working.
- Strategic Placement: Position the units in areas that are less frequented by large animals, if possible. If animals are within fenced areas, then we recommend placing the units outside of the fenced areas to minimise risk of interference.

What if this occurs during the survey: We cannot offer refunds, replacements or credit for recording units which have been damaged or interfered with by wildlife.

5. Damage or Interference from Extreme Weather-related Events

The recording units have been designed to be weather-proof, and have been tested in various conditions to ensure they can operate across all seasons. However, extreme weather events such as sustained heavy rain, strong winds, or extreme temperatures can still pose risks to recording units placed in the field. These conditions can lead to physical damage to the units such as units being struck by falling trees or branches, or being displaced by strong winds. Other examples of weather-related events are flooding, landslides, wildfires.

What can be done to minimise this effect:

- **Secure Placement:** Position the recording units on sturdy trees or posts that are less likely to sway or break in strong winds. Ensure the units are firmly attached to prevent them from being dislodged during severe weather. We can provide additional cable ties to provide additional support if required.
- **Considering The Location**: Installing units in places away from risky locations especially during times when certain risks are elevated.

What if this occurs during the survey: We cannot offer refunds, replacements or credit for recording units which have been damaged or interfered with by extreme weather-related events.

SURVEY RISKS AND HOW TO REDUCE THEM

6. Damage from Vehicles or Machinery

In agricultural settings, recording units may be at risk of damage from farm vehicles such as tractors, harvesters, or other machinery. These vehicles can accidentally strike or displace units placed in fields where farming activities are ongoing, leading to damage to the recording units.

What can be done to minimise this effect:

- Strategic Placement: Position recording units away from areas of active farming operations, such as pathways used by tractors or zones where crops are planted and harvested. Placing units in field margins or hedgerows can reduce the likelihood of them being in the path of farm machinery.
- Pre-Survey Coordination: Coordinate with the farming teams to understand their schedules and the areas where machinery will be operating. This can help in selecting safer locations for the recording units and avoiding placement in areas where vehicles are expected to pass through. You can remove the recording units temporarily when farming operations are expected to take place; switch the recording units off when removing them, and turn them back on when you can safely return them to their recording location.
- Marking and Signage: Clearly mark the locations of the recording units with visible signage to alert farm workers to their presence. This can help prevent accidental damage by making drivers aware that sensitive equipment is nearby.

What if this occurs during the survey: We cannot offer replacements, refunds, or credit for recording units which have been damaged or interfered with by vehicles or machinery.

7. Damage or Data Loss from Customer Misuse

The units have been designed to be robust but they are not indestructible. The methodology for putting up the devices is designed to be as simple as possible, whilst being as comprehensive as possible. Any data loss which arises from misuse of the units themselves or from not following the methodology as described constitutes customer misuse.

What can be done to minimise this effect:

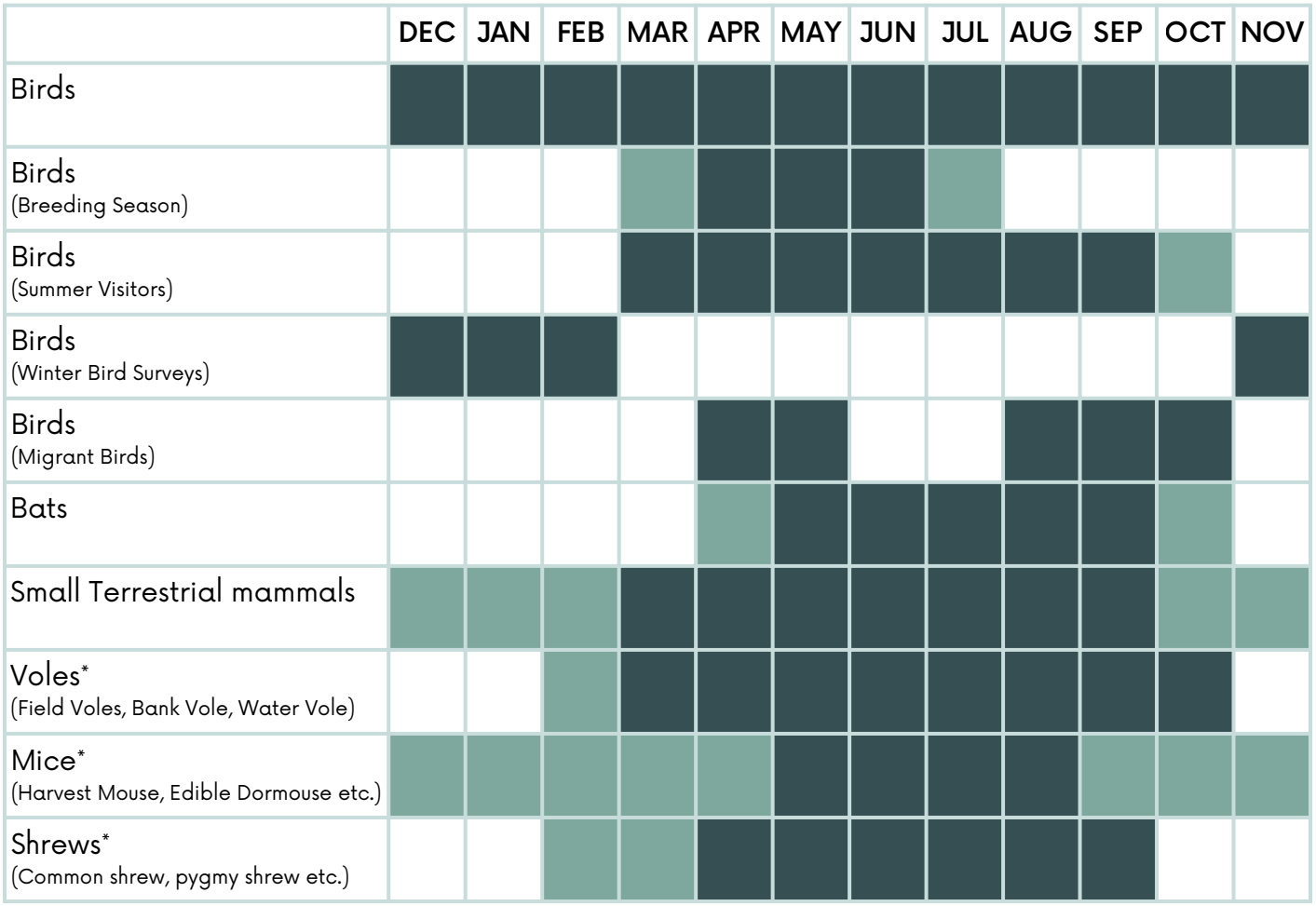
- Please contact us if you think you may have damaged the units. We can assess if a replacement is needed or not.
- Please contact us if you are not sure about the methodology. We can give guidance on your particular query or question.

SURVEY RISKS AND HOW TO REDUCE THEM

What if this occurs during the survey:

- If customer misuse or methodology errors are not reported in the three days following the start of the survey then we cannot offer replacements, refunds, or credit for the recording units (or data loss) in question.

UK BIOACOUSTIC SURVEY CALENDAR



Optimal monitoring period

Acceptable monitoring period. Some species may be less active or present during this period.

* The breeding times of small mammal species vary significantly, please check in advance if you are interested in monitoring specific species.