

BirdWeather PUC
BAT EDITION
Quick Start & Info Guide

Listen above the range of human hearing.

Bird identification you already know — now with bats.

Welcome to the Bat Edition

Your Bat Edition PUC is the same field-proven BirdWeather device you know — now listening above the range of human hearing. Where the standard PUC tops out around the edge of what we can hear, the Bat Edition records deep into the ultrasonic, capturing the echolocation calls of bats passing overhead and identifying them automatically.

Everything you already do with birds still works exactly as before. Bats are added *alongside* your birds — you choose whether the device listens for birds, bats, or both. Detections appear in the same live feed, on the same map, and in the same app you use today, with bat detections clearly marked in **purple** so they're easy to spot.

What's in this guide

Mobile App — switching listening modes (Birds-Only → Birds + Bats → Bats-Only), reading the feed, filtering by behaviour, and exploring ultrasonic spectrograms.

Web App — the BirdWeather Live Map in Bat mode, with species ranges and station activity.

The Classifier — what the bat classifier can identify today, and how its conservative design keeps results trustworthy.

Roadmap — what's coming next, including Android.

1 · The Mobile App

The BirdWeather app drives everything on your PUC. This section walks through finding the Bat Edition controls, switching what the device listens for, and getting the most out of bat detections.

Get the app

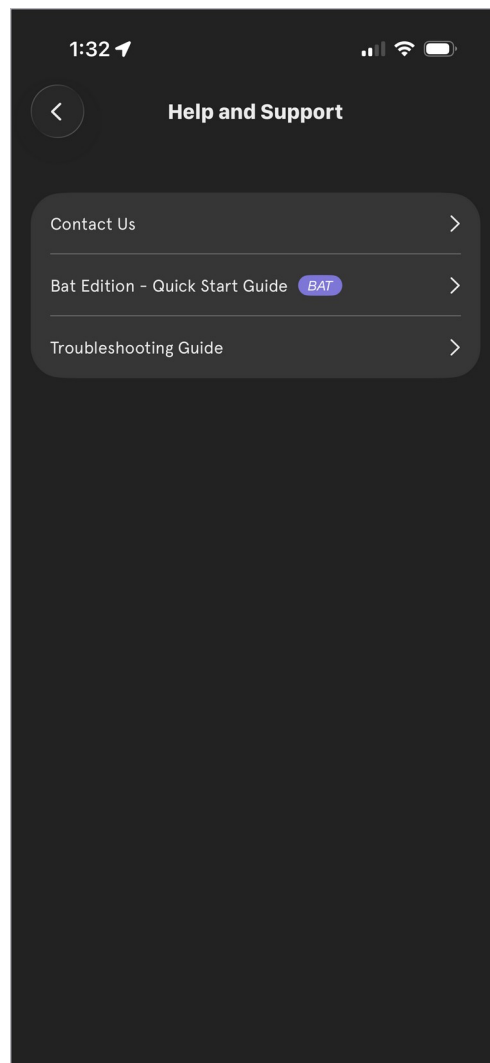
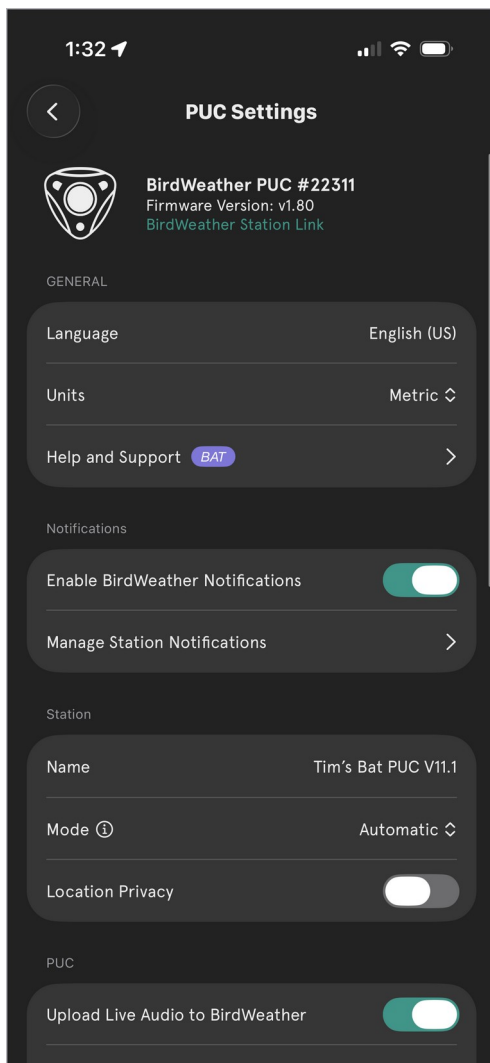
The Bat Edition is supported on both iOS and Android. Make sure you're running the latest version:

- **iOS** — **app v2.28.0 (639)** or later, on the App Store.
- **Android** — **app v1.32.0 (422)** or later, on Google Play.

Finding your Bat Edition settings

Open your station and tap the gear icon to reach PUC Settings. Two things mark this as a Bat Edition device:

- A **BAT** badge next to **Help and Support**, which opens the Bat Edition Quick Start Guide right inside the app.
- A **BIRD + BATS** section containing the **Listening Mode** control — the heart of the Bat Edition.



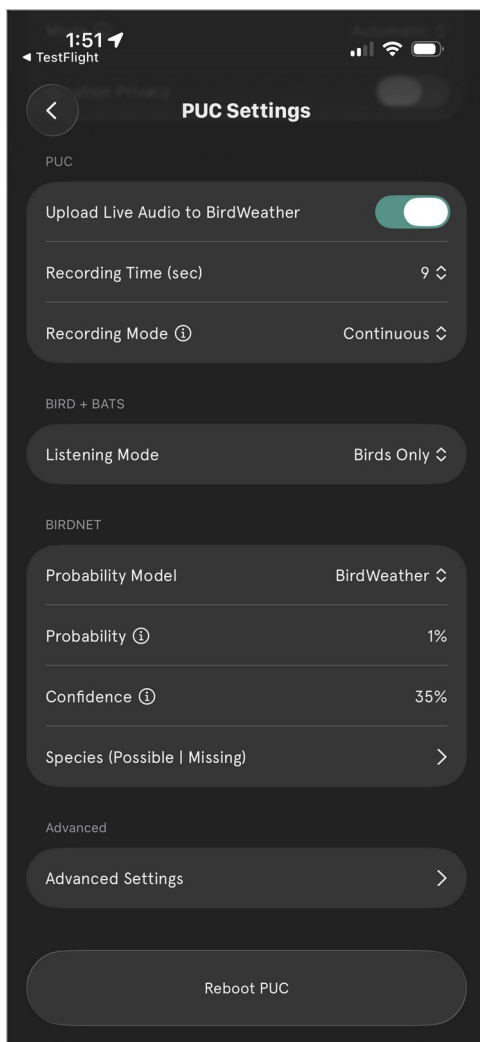
PUC Settings — note the BAT badge on Help and Support Help and Support — the Bat Edition Quick Start Guide lives

here

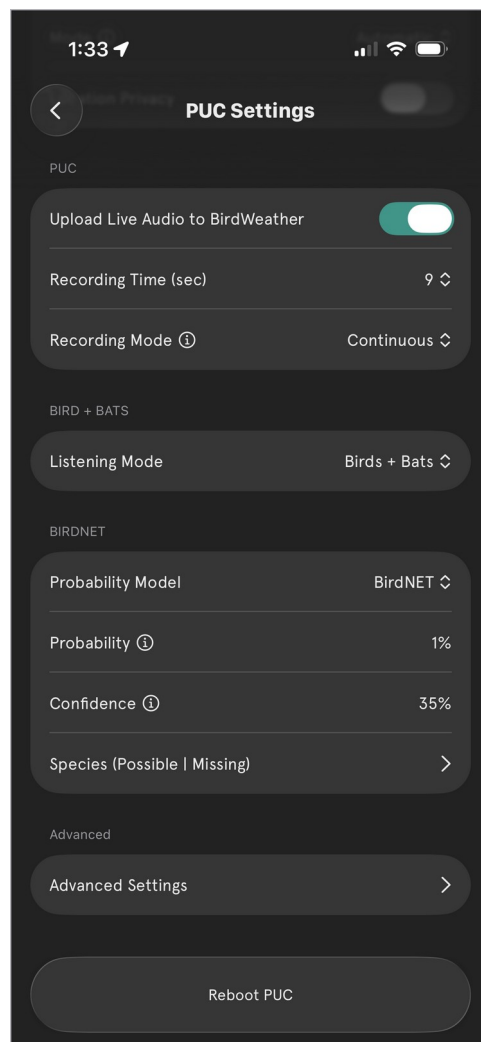
Switching listening modes

By default, every PUC ships in **Birds Only** mode — so your experience is unchanged until you decide to listen for bats. To change it, open **PUC Settings**, find the **BIRD + BATS** section, and tap **Listening Mode** to cycle through the three options:

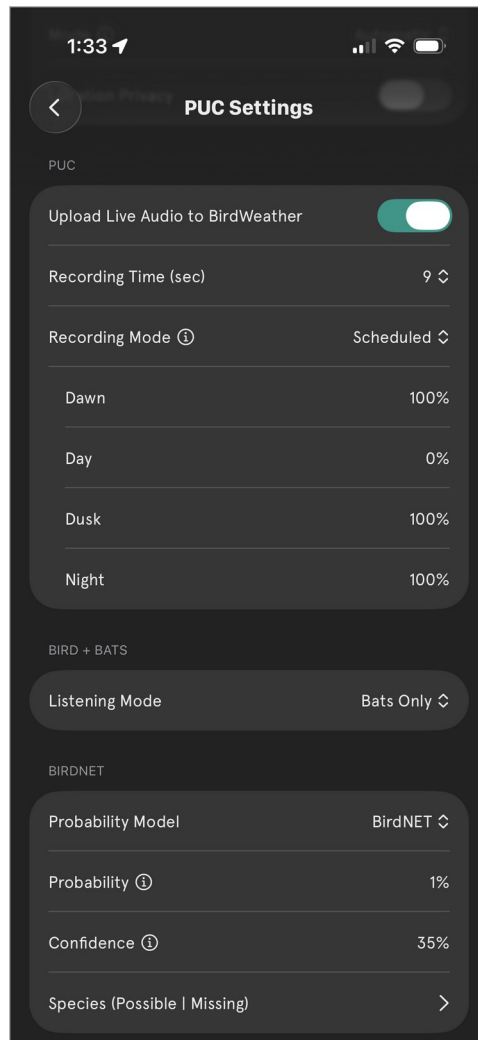
Mode	Best for	What it does
Birds Only	The classic experience (default)	Standard BirdNET bird identification. The ultrasonic range is ignored. This is how your PUC arrives.
Birds + Bats	Most users	Listens for birds and bats at the same time. You get your full bird feed plus bat detections — the best of both worlds.
Bats Only	Dedicated bat monitoring	Focuses entirely on the ultrasonic band for bat detection. Use this when a station is deployed specifically for bats.



Birds Only — the default mode every PUC ships with



Birds + Bats — birds and bats detected together



Bats Only — the device dedicates itself to the ultrasonic band

Bat detection runs in LIVE mode (for now)

Full bat support is currently available when your PUC is **live** — connected and streaming to BirdWeather with **Upload Live Audio to BirdWeather** switched on. In this mode, bats are detected, identified and shown in your feed in real time.

Bat support for **SD-card recording and offline upload** — for stations that log to the card while away from a connection — is coming in the next update. Until then, keep a bat-monitoring PUC live to capture detections.

Recording Mode & Scheduled listening

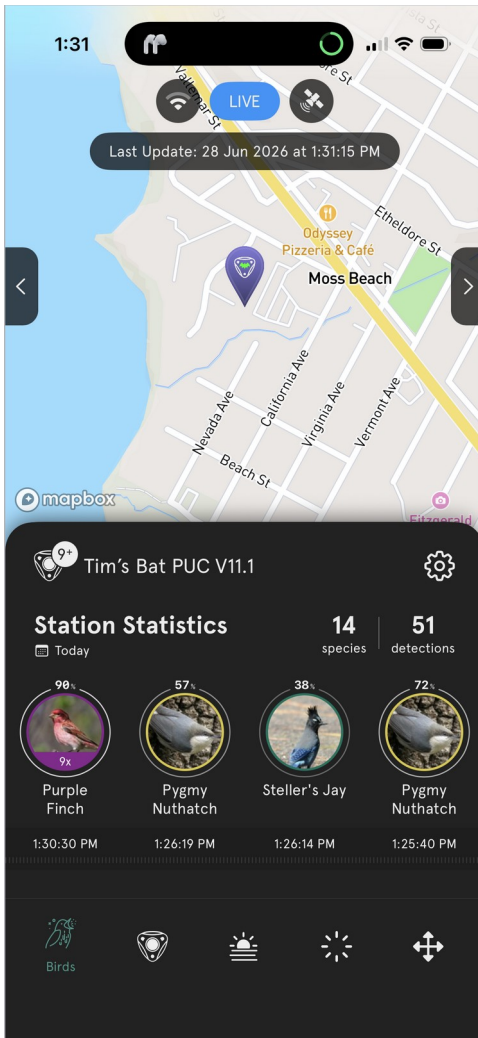
Bats are nocturnal, so the **Recording Mode** control pairs naturally with bat listening. Set it to **Continuous** to capture around the clock, or **Scheduled** to weight recording toward Dawn, Dusk and Night (when bats are active) and ease off during the Day — useful for conserving power and storage on a bat-focused station.

After changing settings

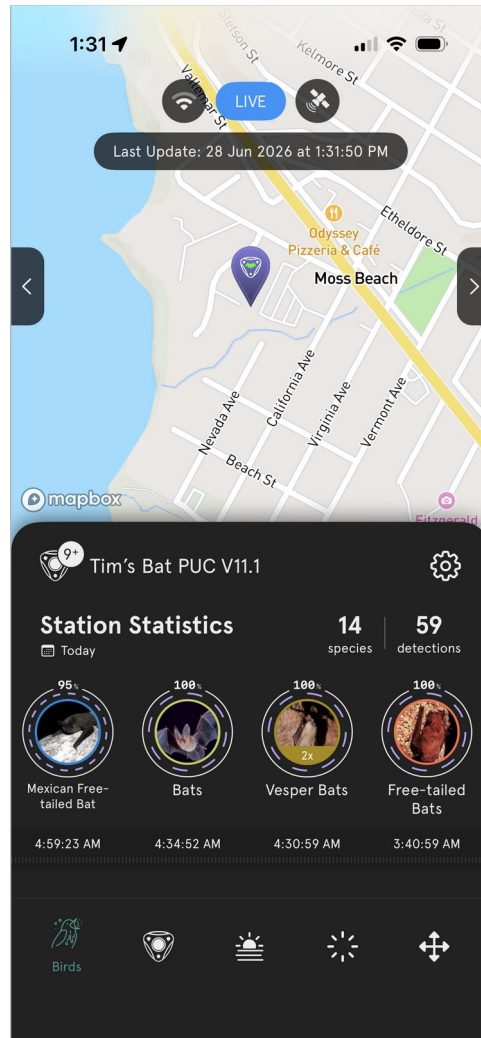
If a change doesn't seem to take effect, use **Reboot PUC** at the bottom of PUC Settings to restart the device cleanly.

Reading the live feed

Your station's home screen shows **Station Statistics** — today's species and detection counts — above a scrolling feed of recent detections. With bats enabled, bat detections join the same feed your birds already appear in.



Bird detections — Purple Finch, Pygmy Nuthatch, Steller's Jay

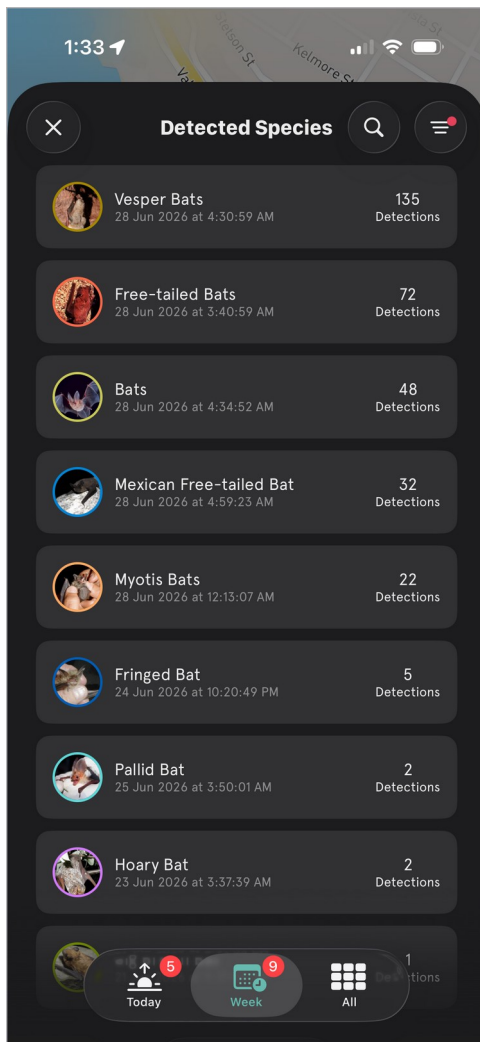


Bat detections in the same feed — Mexican Free-tailed, Vesper & Free-tailed Bats

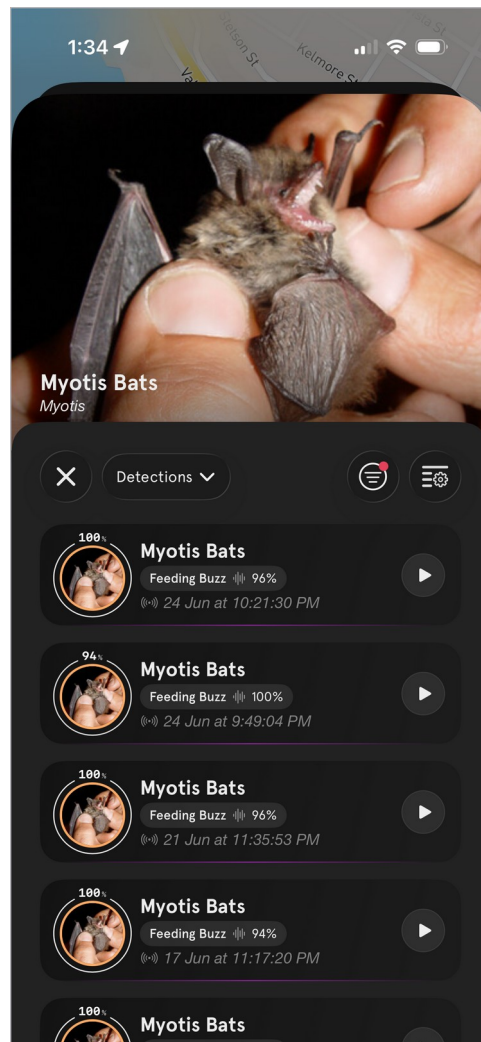
Bat results carry a **purple** accent ring and map pin so you can tell at a glance whether a detection is a bird or a bat. Tapping any detection opens its detail view, spectrogram, and audio.

Browsing detected species

The **Detected Species** list rolls up everything your station has heard, ranked by detection count, with **Today / Week / All** filters along the bottom. Opening a species shows every individual detection, each tagged with the behaviour the classifier identified and a confidence score.



Detected Species — counts across Vesper, Free-tailed, Myotis and more



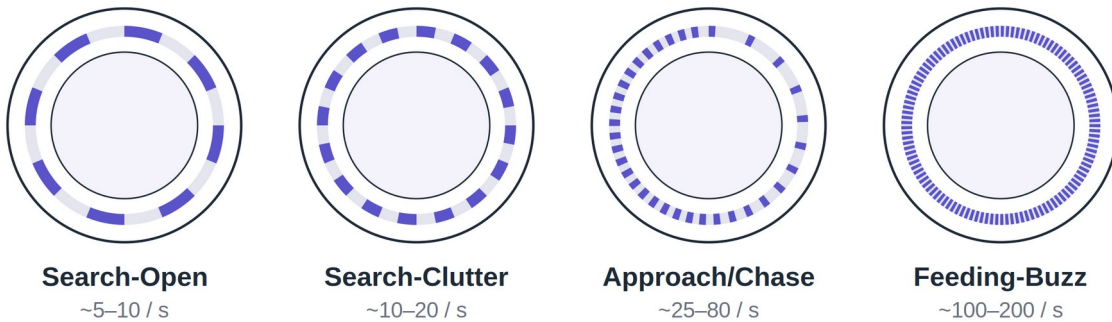
A single species' detections, each tagged Feeding Buzz with a confidence score

Filtering by behaviour

The Bat Edition doesn't just identify *what* a bat is — it identifies *what it's doing*. Open the filter and, under **Classification** → **Bat**, you can narrow the feed to a specific echolocation behaviour:

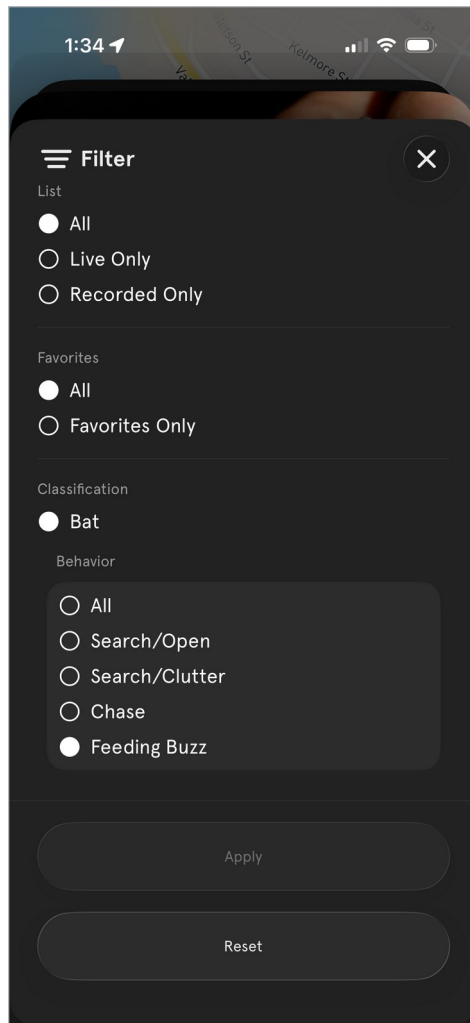
- **Search / Open** — a bat cruising open air, searching for prey.
- **Search / Clutter** — navigating among vegetation or other obstacles.
- **Chase** — actively pursuing an insect.
- **Feeding Buzz** — the rapid burst of calls at the moment of capture — the sound of a bat catching a meal.

These behaviours form a natural sequence, and you can read them in the cadence of the call. As a bat closes in on prey it calls *faster and faster* — from a relaxed handful of pulses per second while cruising, tightening through the chase, to the rapid machine-gun burst of a feeding buzz at the moment of capture. In your feed, each detection's ring echoes this rhythm: longer, slower marks for an open-air search, compressing toward a near-solid ring for a buzz.



The four bat behaviours, read as pulse cadence — slow and spaced when searching, near-continuous at the feeding buzz

Behaviour is detected for **any** bat call, independent of whether the species itself could be named — so even an unidentified bat can be logged as a Feeding Buzz.



Filtering bat detections by behaviour — here, Feeding Buzz

Exploring ultrasonic spectrograms

Every detection includes a **spectrogram** — a visual picture of sound, with time running left-to-right and frequency bottom-to-top. Bat calls live far above the range you can hear, so the Bat Edition spectrogram reaches up to **125 kHz** — well above the calls of over 99.9% of bats.

Why 250 kHz in, 125 kHz on screen

The Bat Edition **defaults to sampling audio at 250 kHz** — chosen as the sweet spot between frequency resolution and capturing the full call of more than 99.9% of the world's bats. By a basic rule of digital audio (the **Nyquist limit**), a recording can represent frequencies up to half its sample rate, so the spectrogram displays up to **125 kHz**. That's the number you'll see labelled in the corner of every bat spectrogram.

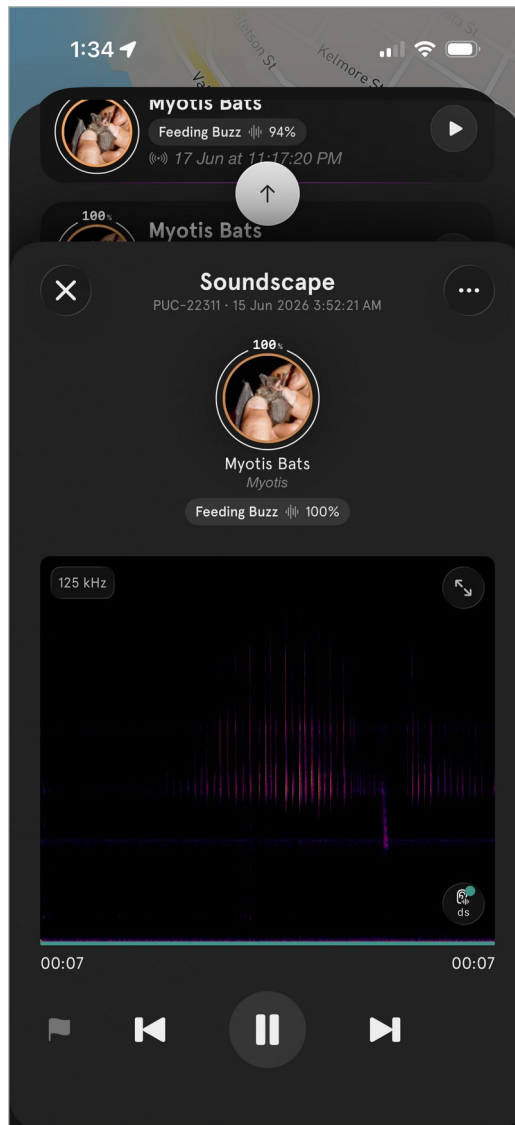
We plan to unlock higher sample rates as we complete more testing of the full signal chain — from the microphones through to the classifier — so the calls of the remaining very-high-frequency species are captured just as reliably.

Two microphones, best signal wins

Your Bat Edition has **two ultrasonic microphones**. For every detection, the PUC automatically compares both and keeps the recording with the strongest **signal-to-noise ratio (SNR)** — the loudest, cleanest capture of the call. You don't have to do anything; the spectrogram and audio you see are already the better of the two.

The detection view

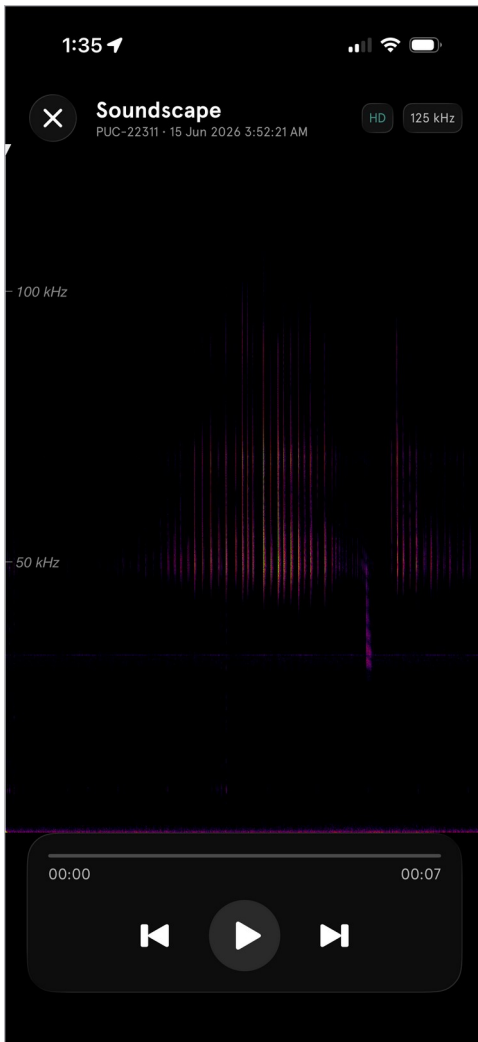
Tap a detection to open its **Soundscape** view. You'll see the identified species, its behaviour tag and confidence, and the spectrogram with a frequency-range label (e.g. *125 kHz*) in the corner. Use the play controls to hear the call — pitched down into audible range — and the expand arrows to go full-screen.



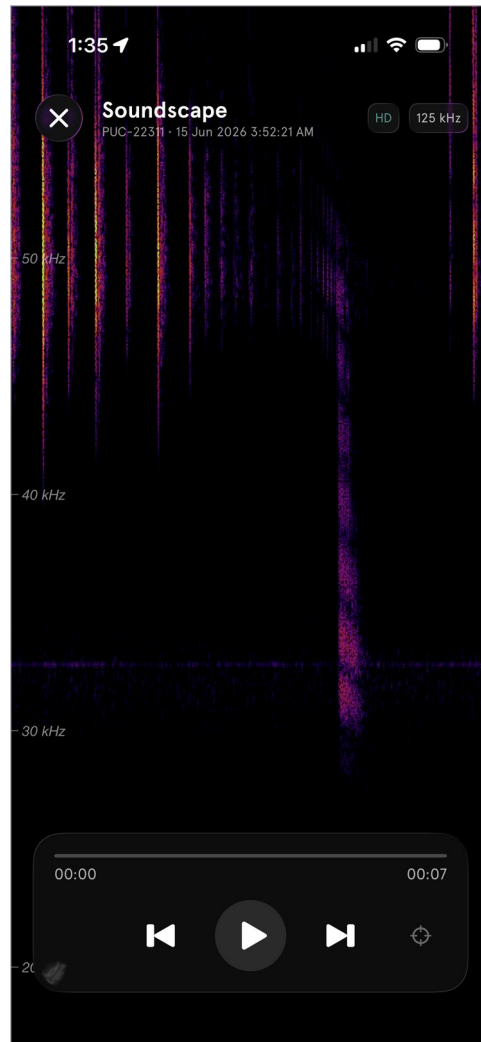
Detection view — a Myotis feeding buzz, with its spectrogram and playback controls

Full-screen & zoom

Go full-screen for a larger view, toggle **HD** for finer detail, and pinch to zoom into a specific frequency band. The full view shows the whole call sweeping down from above 100 kHz; zooming in on the 30–50 kHz region reveals the fine structure of individual pulses — exactly the detail the classifier uses to tell species apart.



Full-screen — the complete call across the 0–125 kHz range, HD enabled



Zoomed to 30–50 kHz — individual pulses and their fine structure

Reading a spectrogram

Bright vertical streaks are individual echolocation pulses. Their *height* tells you the frequency, their *shape* (a steep sweep vs. a flat tone) reflects the call type, and a sudden *tight cluster* of pulses is the signature of a feeding buzz.

2 · The Web App — Live Map in Bat Mode

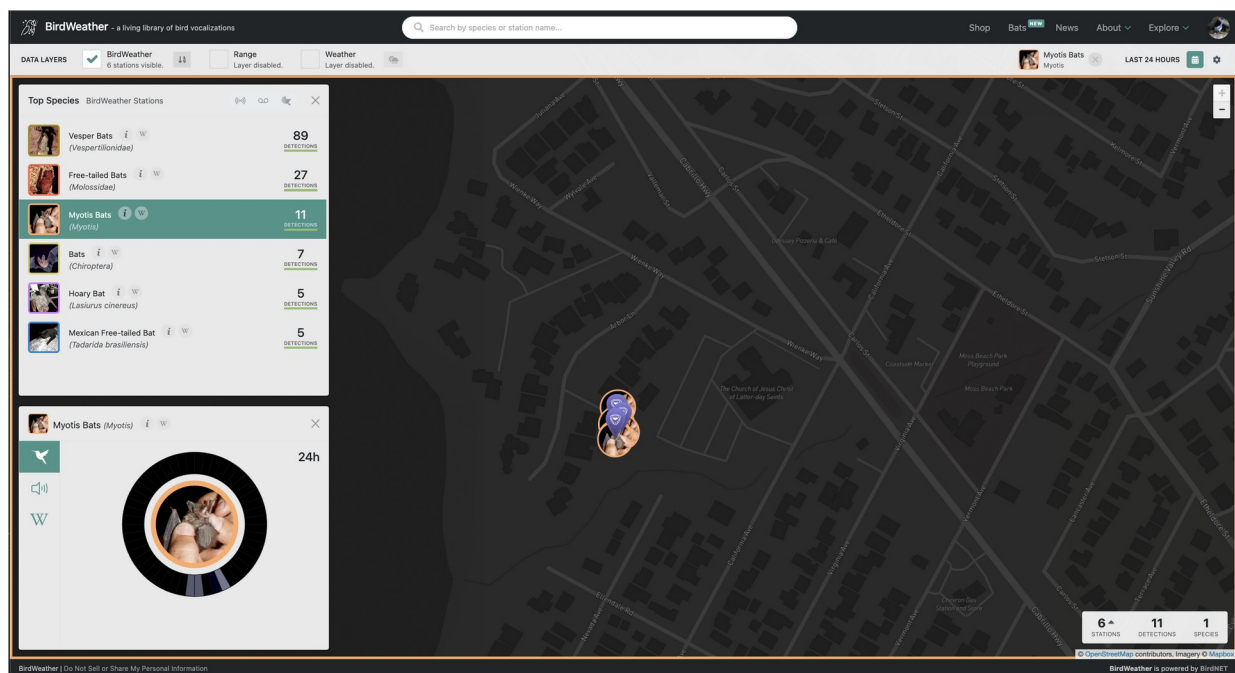
The BirdWeather Live Map works in the browser too, and it has a dedicated Bat mode. Open it at:

app.birdweather.com/bats

This opens the map already filtered to bats. You'll see live **Top Species** for nearby BirdWeather stations — grouped from broad families like *Vesper Bats* (Vespertilionidae) and *Free-tailed Bats* (Molossidae) down to named species — with detection counts and recent activity.

Station activity

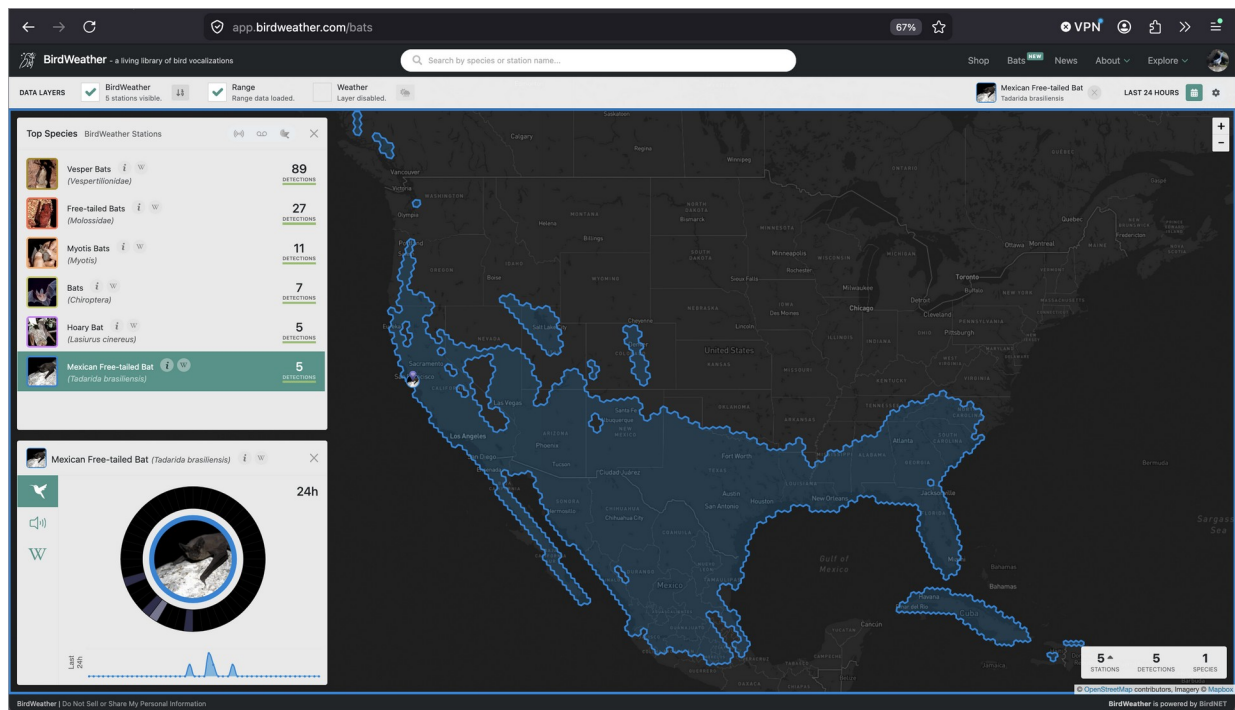
Zoom to a station to see exactly which bats it's hearing and how often. The activity dial shows detections over the last 24 hours, and the species list ranks everything the station has picked up.



Live Map in Bat mode — Top Species for a station, with Myotis Bats selected

Species ranges

Enable the **Range** layer and select a species to overlay its known distribution on the map. Below, the *Mexican Free-tailed Bat* (Tadarida brasiliensis) shows its broad range across the southern U.S. and Mexico — helpful context for judging which species are plausible at your location.



The Range layer — Mexican Free-tailed Bat distribution across North America

3 · How the Classifier Works

The bat classifier identifies species from the shape of their echolocation calls. It's built on a simple principle that keeps its answers trustworthy: **commit at the finest level it can actually resolve, and never guess.**

Species, genus, family — and behaviour

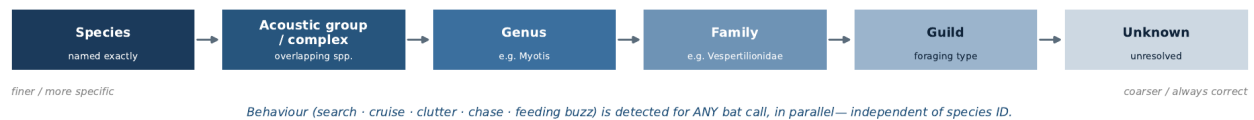
Many bats are genuinely difficult — sometimes impossible — to separate by sound alone, because different species share nearly identical calls. Rather than inventing a precise species ID it can't support, the classifier steps *out* to a coarser level it can stand behind:

- **Species** — named exactly, when the call is acoustically separable.
- **Acoustic group / genus / family** — when species overlap too closely, it reports the group, genus (e.g. *Myotis*) or family (e.g. *Vespertilionidae*) instead.
- **Behaviour** — detected for *any* bat call in parallel, independent of species ID.

A genus- or family-level result isn't a failure — it's the honest, correct answer. This is why you'll see entries like *Vesper Bats* or *Myotis Bats* in your feed rather than a falsely precise species name.

How coverage works — species, genus, family & behaviour

The classifier commits at the FINEST level it can resolve — it never needs the exact species to be useful. When a call can't be pinned to a modelled species (close sympatric overlap, or a species we don't model individually) it steps out to a coarser level rather than guessing:



What we model

Level	Modelled	What a result at this level means
Species	215	Named to species when acoustically separable
Genus	60	Labels any species in that genus — including ones not modelled individually
Family	11	Covers essentially all echolocating microbats
Behaviour	universal	Search · cruise · clutter · chase · feeding buzz — for ANY bat call

Share of each region's bats we can identify to AT LEAST each level

(the umbrella — each level can only rise vs the previous; totals are published estimates)

Region	To species (named exactly)	To genus (or finer)	To family (or finer)
North America	41/47 (87%)	~89%	89%
Europe	44/50 (88%)	~98%	100%
Australia	50/75 (67%)	~87%	100%

Families covered & out of scope

Coverage	Family	Why it's in / out
Covered (11)	Vespertilionidae, Molossidae, Emballonuridae, Rhinolophidae, Mormoopidae, Miniopteridae, Hipposideridae, Noctilionidae, Megadermatidae, Mystacinidae, Rhinopomatidae	Echolocating microbats (the FM / QCF / CF calls the detector keys on)
Out of scope	Phyllostomidae (New-World leaf-nosed bats)	Faint broadband whisper-clicks, outside our FM / QCF range — out of acoustic scope, not non-echolocating
Out of scope	Pteropodidae (Old-World fruit bats)	Non-echolocating fruit bats — do not echolocate at all

The classifier commits at the finest level it can resolve — stepping out rather than guessing

What's supported today

The current classifier (v26.1) models **215 species** across **60 genera** and **11 families** — covering essentially all echolocating microbats worldwide, with the strongest coverage in regions where BirdWeather is most active.

BirdWeather™ — Bat Classifier — Supported Bat Species

Version v26.1 · 2026-06-22

Family / Genus / Species — acoustic identification coverage

215

Species

60

Genera

11

Families

9

Acoustic complexes

Species by family

Family	Species
Vespertilionidae	128
Molossidae	30
Emballonuridae	22
Rhinolophidae	15
Mormoopidae	6
Miniopteridae	4
Hipposideridae	4
Noctilionidae	2
Megadermatidae	2
Mystacinidae	1
Rhinopomatidae	1

Species by region

Region	Species
Australia	50
Europe	44
N. America	41
Africa	34
Cen. America	30
S. America	28
Asia	28
Mexico	21
New Zealand	2

BirdWeather™ Bat Classifier v26.1 — generated 2026-06-22

Supported bat species by family and by region (classifier v26.1)

Identification coverage by region

Region	To species	To genus (or finer)	To family (or finer)
North America	87%	~89%	89%
Europe	88%	~98%	100%
Australia	67%	~87%	100%

Share of each region's bats identifiable to at least each level. The umbrella widens at each coarser level.

Conservative by design

We have deliberately tuned the classifier to be **very conservative at this early stage**. It would rather give you a correct genus or family than a confident-but-wrong species. As the model matures and we gather more verified recordings — including from your own stations — coverage and species-level precision will keep improving.

In short: when the app names a species, you can trust it. When it reports a group, that's the classifier being honest about what the sound can actually tell us.

Note: two bat families are intentionally out of scope — *Phyllostomidae* (New-World leaf-nosed bats), whose faint broadband clicks fall outside the detector's range, and *Pteropodidae* (Old-World fruit bats), which don't echolocate at all.

4 · Powering the Bat Edition

Powering & charging the PUC

Unlike earlier versions, the Bat Edition PUC is designed around **3.6 / 3.7 V lithium-ion rechargeable batteries**. We chose a removable design so you can get to the PUC's microSD card and swap the batteries when they eventually need replacing.

You can power and charge the PUC from **any USB-C power source**. For 24×7 operation, we recommend running the PUC continuously from an **outdoor-rated USB-C adapter**, with the batteries acting as a backup if power is ever interrupted.

Recommended adapters for continuous operation

Pick a weatherproof USB-C supply suited to where your station lives:

- **AC (mains power)** — a.co/d/bNQYMAM
- **Solar** — a.co/d/9gla2wW

3.6 / 3.7 V lithium-ion batteries

We tested a number of options and landed on **Keppower**, which — shockingly — lived up to their capacity claims, have excellent integrated protection, and as a bonus include built-in USB-C charging ports so you can charge them outside the PUC if you like.

Product page: keppower.com.cn (**P1413TC**)

Available from a number of places:

- **Alibaba** — Keppower P1413TC 14500 3.6V 1300mAh
- **illumn.com** — Keppower P1413TC 1300mAh protected, USB-C

What to put in your PUC

Whatever brand you choose, make sure they are **3.6 / 3.7 V protected lithium-ion button-top rechargeables**. Unlike the Bird version, the Bat Edition will **not** operate on 1.5 V (AA) batteries.

5 · Roadmap

The Bat Edition is early, and it's evolving quickly. Here's where things are headed.

PUC Firmware

Bat detection improves as the PUC's firmware does, so the app will occasionally prompt you to install a new build on your device. **Bat detection on your PUC begins with the V1.81 firmware** — until your device has updated, it hasn't been listening for bats, so you won't see bat detections in your feed or history yet. That's expected.

Updating to V1.81

You may see a **Firmware Update available for V1.81** message in the app. Before you install it:

- **Make sure your PUC is connected and live** — it should be streaming to BirdWeather with **Upload Live Audio to BirdWeather** switched on. A stable live connection lets the update download and flash reliably.
- **Tap to update** — start the firmware update and let it run to completion. Keep the device powered and within WiFi range while it installs and restarts.

Once the PUC restarts on the new firmware, it begins listening for bats automatically — from that point on, detections will start appearing in your feed whenever your station is live.

Classifier

- **Expanding classifier coverage** — more species, higher species-level precision, and refinements driven by verified field recordings.
- **Continued tuning** — as confidence grows, the classifier will resolve more calls to species while keeping its honest, no-guessing approach.

Questions or feedback?

Open **Help and Support** in the app (look for the **BAT** badge) and tap **Contact Us**. You're helping shape one of the first consumer-grade ultrasonic bat monitors — and we're glad to have you listening.

Happy listening — from the BirdWeather team 🦇