RAINFOREST CONNECTION

Nonprofit at the cutting edge of conservation technology.

We build and deploy scalable, open-source solutions for biodiversity and illegal activity detection in threatened ecosystems around the world.

Local solutions that power a global acoustic network.

Real-time acoustic sensors stream data to the RFCx platform, where Deep Learning AI is utilized for analysis in order to monitor biodiversity and destructive activities (illicit logging, mining, poaching, etc.).

Our combination of real-time monitoring stations and the RFCx platform will result in **the world's largest collection of soundscapes in which biodiversity will be tracked historically and in real-time across the most remote and important locations around the world.**

Threat Detection

RFCx picks out sounds of destructive activities, such as chainsaws, vehicles, dog barks and gunshots from the soundscape. Once the activity is identified, real-time alerts are sent to local partners on the ground via a Ranger Mobile App or collected to be used as forensic evidence.

This solution is effectively being utilized around the world to **halt illegal logging, poaching, mining and more**.

Biodiversity Monitoring

RFCx acoustic sensors and analytical platforms monitor biodiversity in real-time. This technology has been used to automate species identification of thousands of species, and provides tools that make it easy to add models for thousands more.

This holistic biodiversity monitoring solution is used to empower local partners, researchers, and citizen scientists to better understand and conserve ecosystems. Ecoacoustics analyses are executed using a combination of RFCx offline and online recording devices.

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RFCx SOLUTIONS

PROJECT-SPECIFIC SOLUTIONS FOR MONITORING BIODIVERSITY AND HALTING ILLEGAL ACTIVITIES

HARDWARE

- GUARDIAN
- EDGE

SOFTWARE

- THREAT MONITORING SYSTEM
- ARBIMON
- EXPLORER

SERVICES

- SCIENTIFIC DATA INSIGHTS AND REPORTS
- SURVEY DESIGN AND IMPLEMENTATION
- DATA ANALYSIS
- MACHINE LEARNING MODELING

Guardian: Online

These are connected devices continually streaming acoustic data to the cloud. They provide permanent, continuous, real-time monitoring capabilities.

Guardians consist of a custom board, weatherproof box, directional antenna, microphone, and solar panels specifically adapted to collect the flecks of light that make their way through the forest canopy.

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Edge: Offline

A low-cost, full-spectrum acoustic logger that can listen for sound from audible frequencies well into ultrasonic frequencies, recording uncompressed audio to micro SD cards. They are extremely easy to install, can be configured by an app, and can be used and moved by non-technical people on the ground.

These devices are used for in-depth short-term biodiversity assessments.

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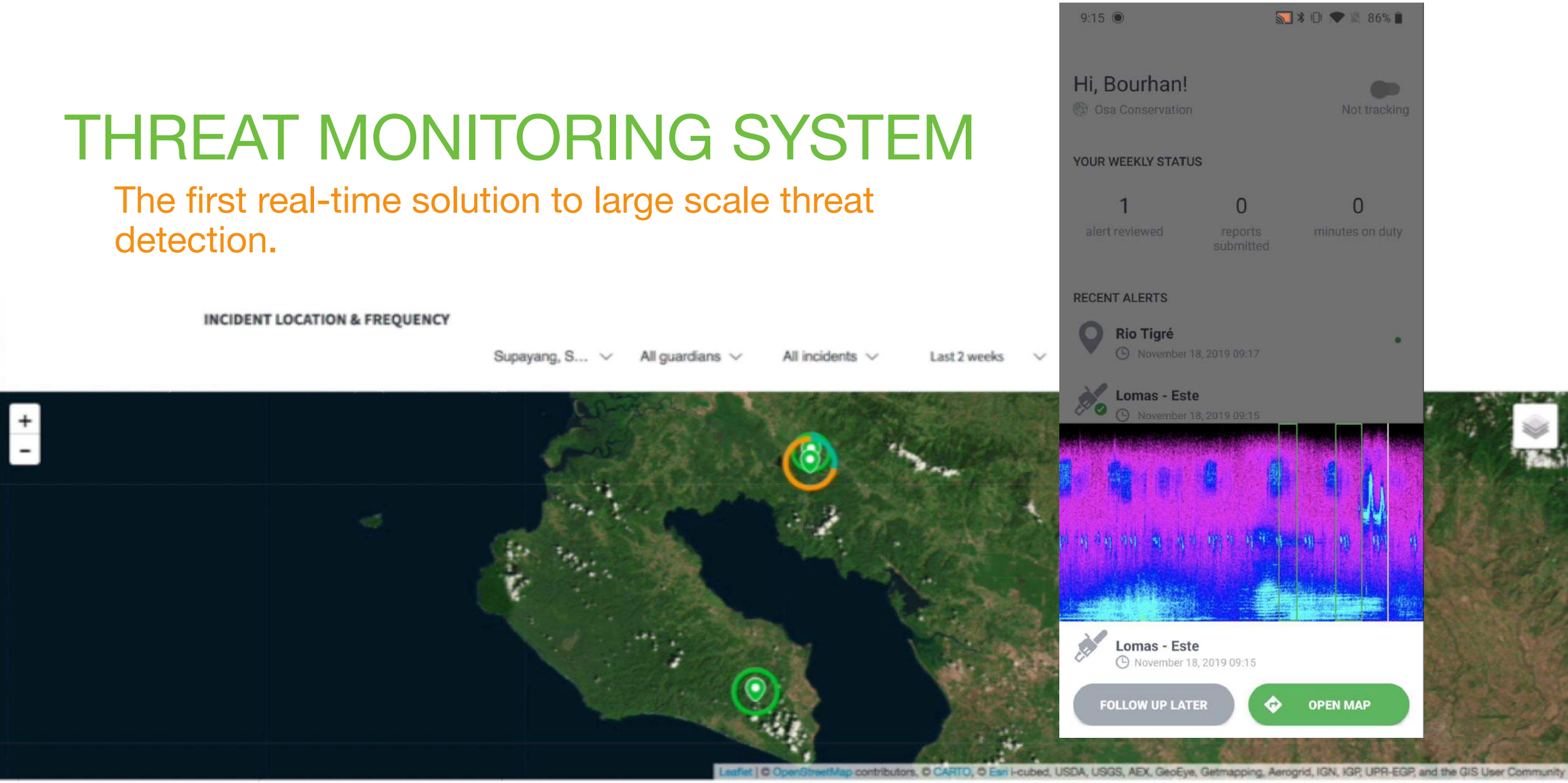
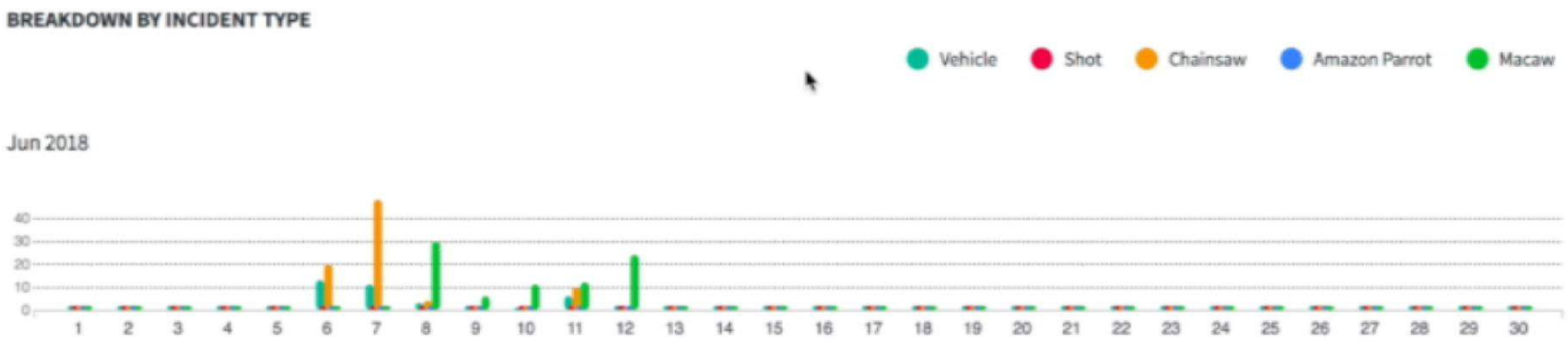
THREAT MONITORING SYSTEM

The first real-time solution to large scale threat detection.

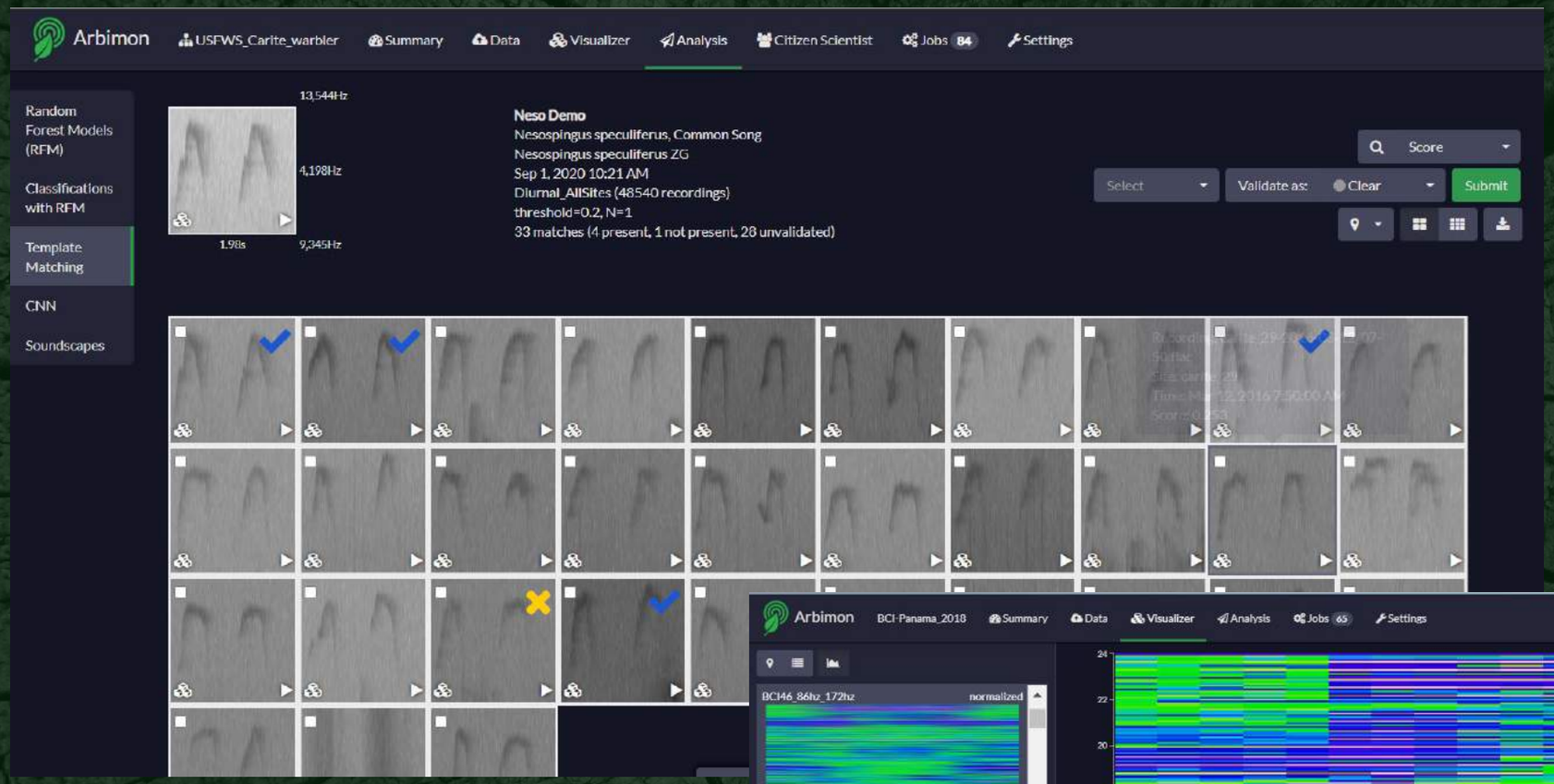


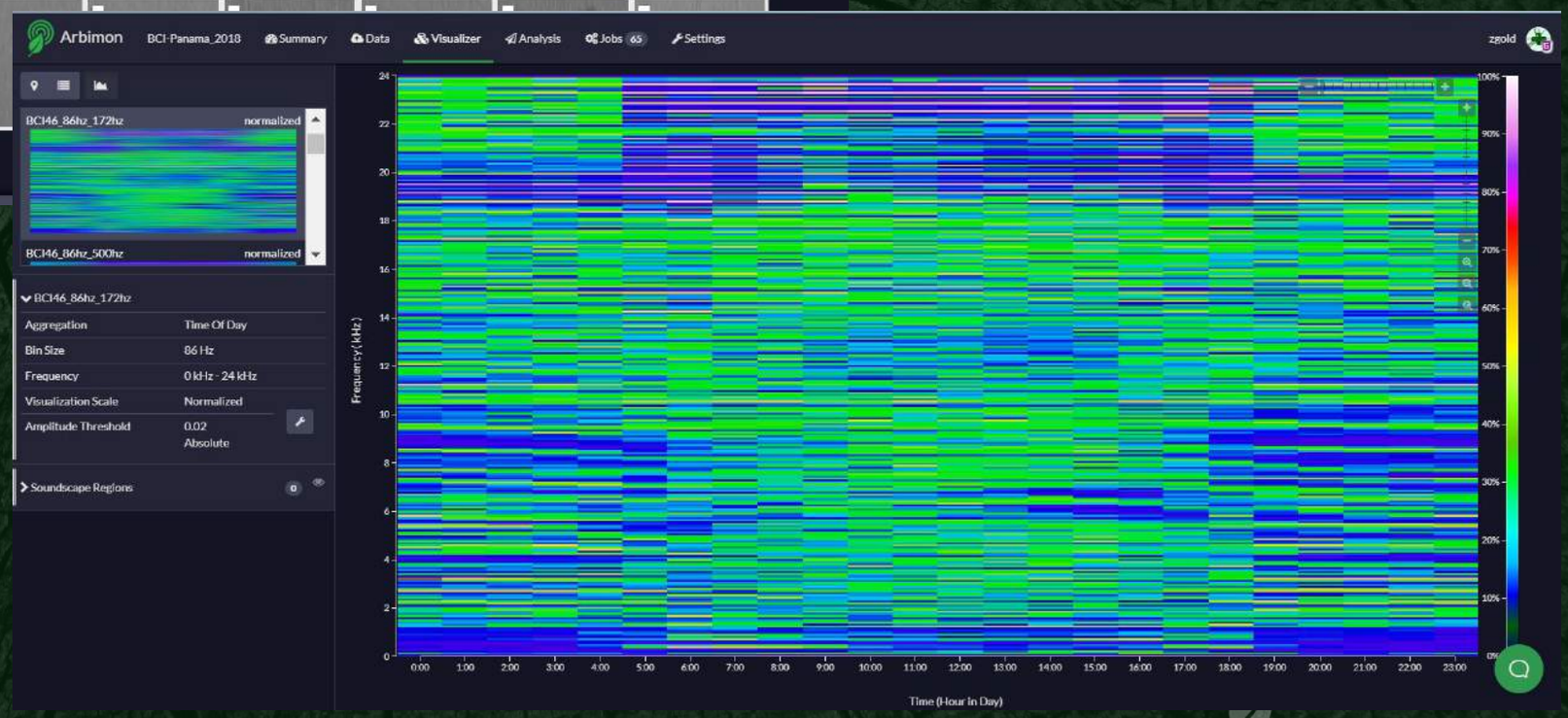


SOFTWARE

ARBIMON

Arbimon allows for fast and easy data labeling using pattern recognition. These models can be used for in-depth analyses and then translated into species-specific or multi-species CNN models.

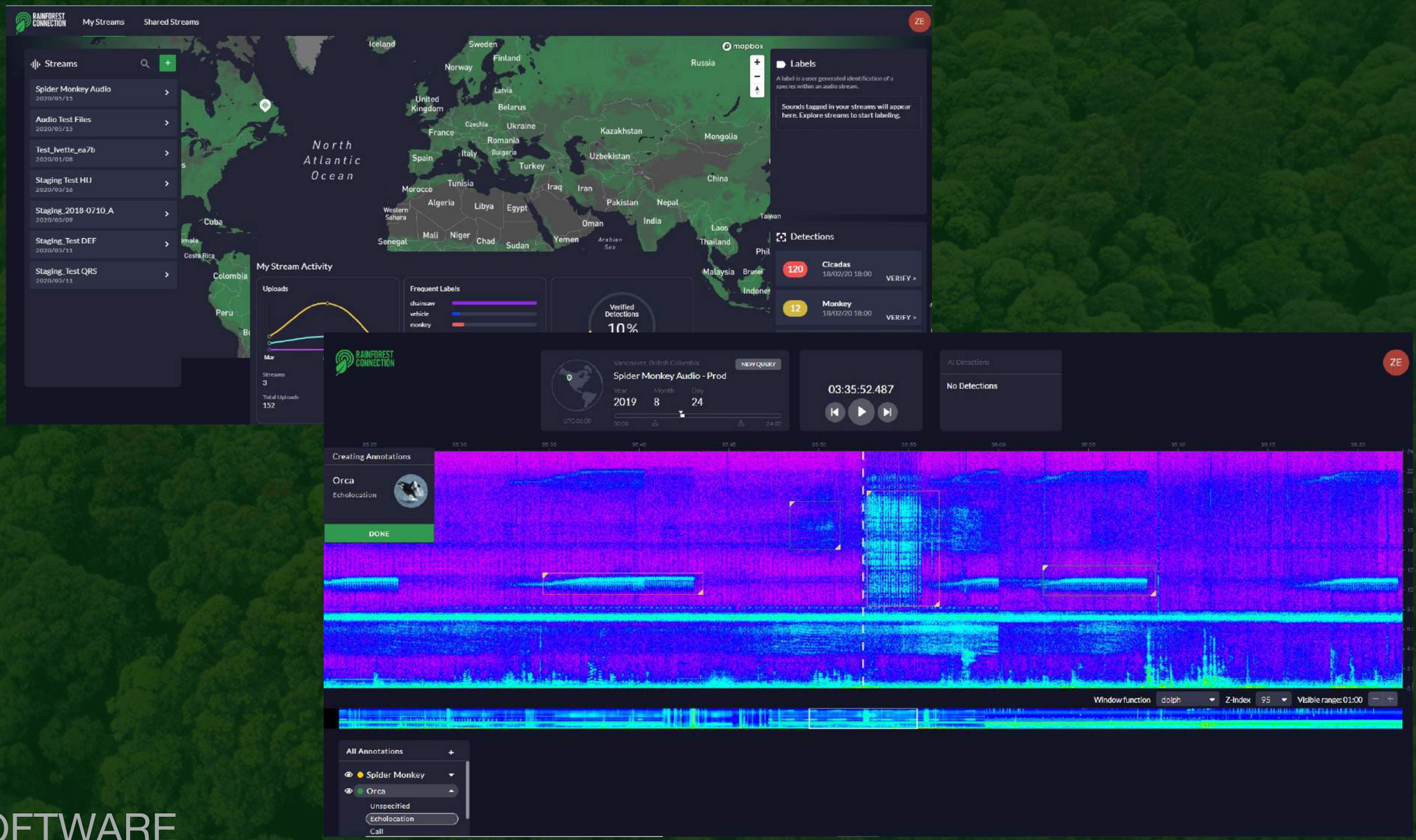




SOFTWARE

EXPLORER COMING SOON

The most advanced online interface for ecoacoustics studies in order to monitor ecosystem health and catalyze new ecological discoveries using AI.



SOFTWARE

Scientific Analysis

The RFCx team includes PhD conservation biologists with decades of experience using acoustics to monitor species for conservation. They specialize in creating models to analyze the acoustics of regions to extract important insights.

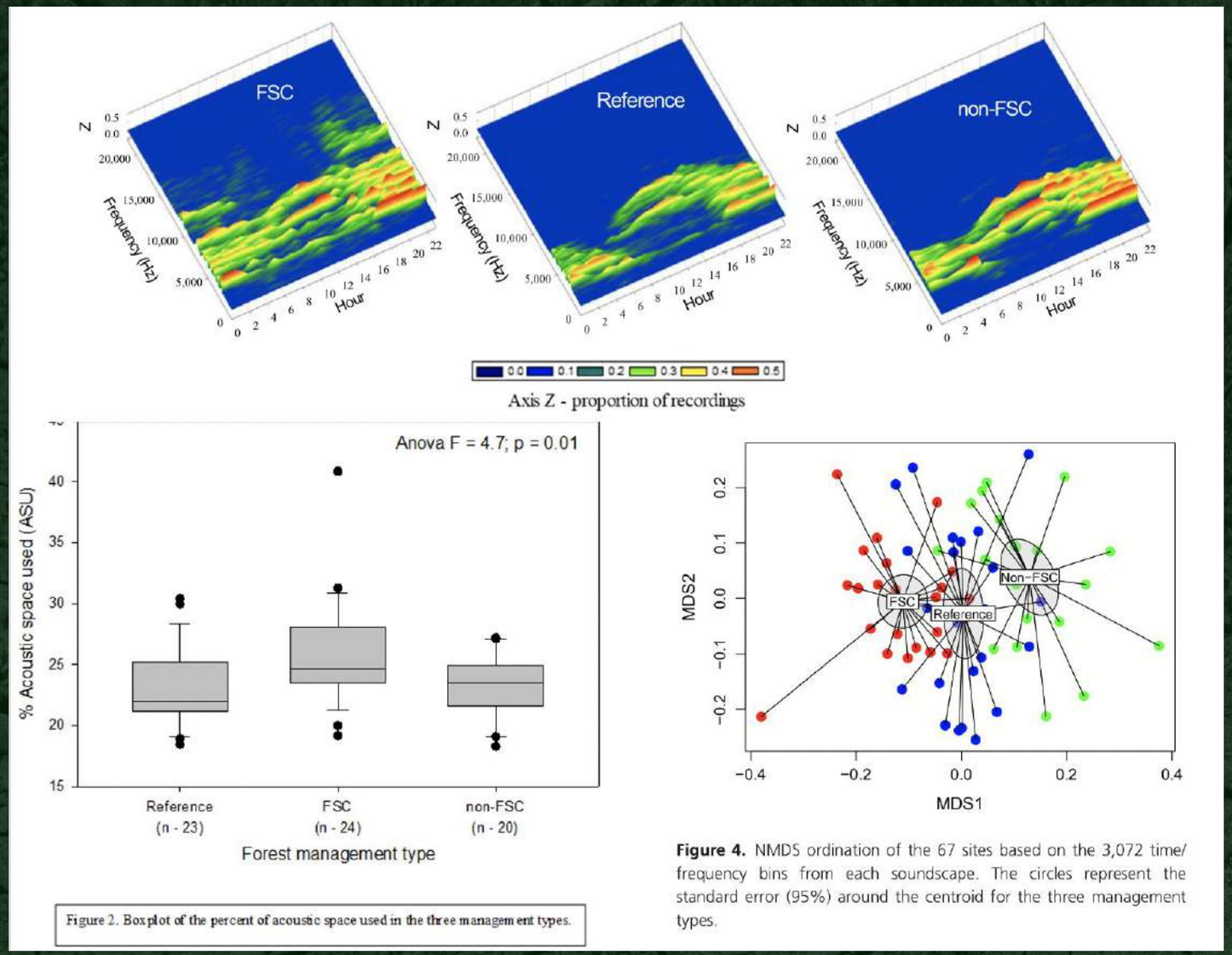
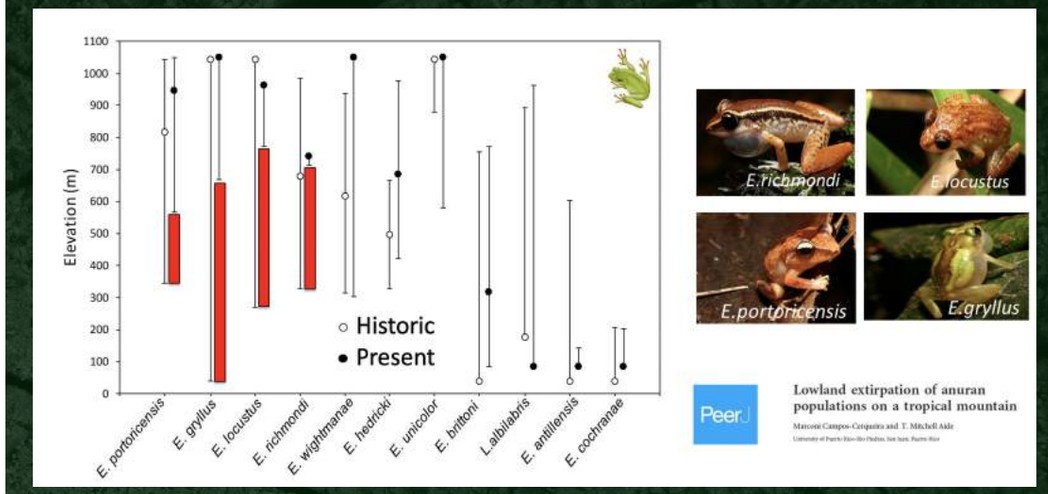
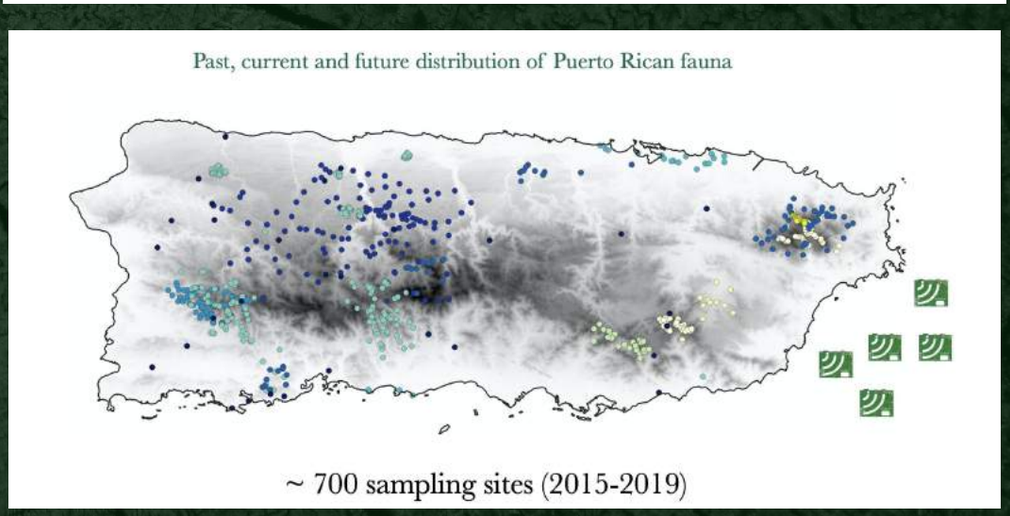


Figure 2. Boxplot of the percent of acoustic space used in the three management types.

Figure 4. NMDS ordination of the 67 sites based on the 3,072 time/frequency bins from each soundscape. The circles represent the standard error (95%) around the centroid for the three management types.

Soundscape Analyses





Species Distribution Mapping

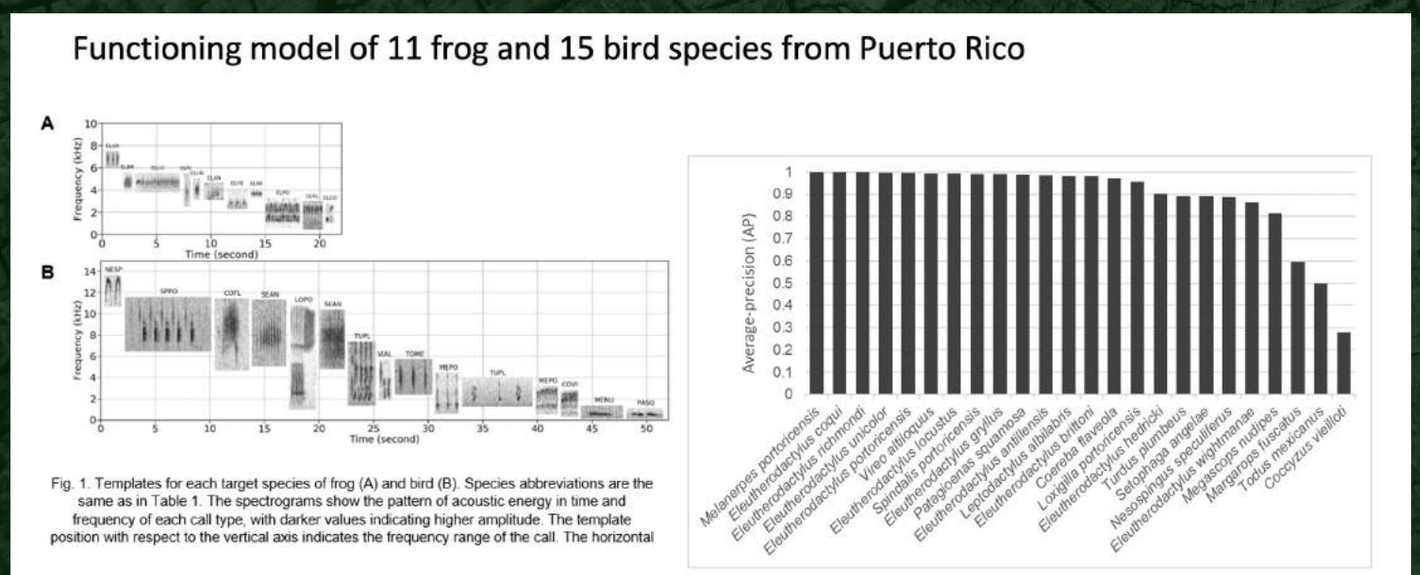


Fig. 1. Templates for each target species of frog (A) and bird (B). Species abbreviations are the same as in Table 1. The spectrograms show the pattern of acoustic energy in time and frequency of each call type, with darker values indicating higher amplitude. The template position with respect to the vertical axis indicates the frequency range of the call. The horizontal

Multi-Species Modeling

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SCIENTIFIC DATA INSIGHTS & REPORTS

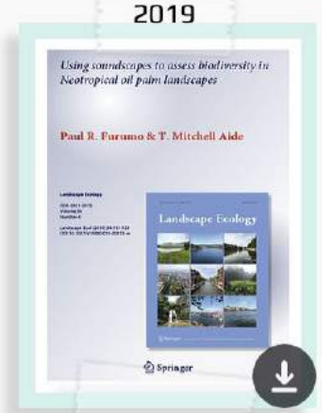
RFCx offers peer-reviewed quality manuscripts, with work published in over 100 peer-reviewed high-level international conservation journals.

2019

How does FSC forest certification affect the acoustically active fauna in Madre de Dios, Peru?

Campos-Cerqueira M, Aide, TM

2019



Using soundscapes to assess biodiversity in Neotropical oil palm landscapes

Furomo PR, Aide, TM

2018

It's time to listen: there is much to be learned from the sounds of tropical ecosystems

Deichmann JL, Acevedo-Charry O, Barclay L, Burivalova Z, Campos-Cerqueira M, d'Horta F, Game ET, Gottesman BL, Hart PJ, Kalan AK, Linke S, Nascimento LD, Pijanowski B, Staaterman E, Aide TM

2017

Changes in the acoustic structure and composition along a tropical elevational gradient

Campos-Cerqueira M, Aide, TM

Survey Design and Implementation

Develop and maintain long-term acoustic surveys that enable efficient and effective monitoring of biodiversity, creating measurable conservation best practices.

Data Analysis

Ability to store, visualize, and analyze large acoustic datasets.

Machine Learning Models

New models can be created utilizing RFCx's technology, AI experts, and network of data scientists.

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Today, RFCx has initiated projects in 38 countries across 6 continents.