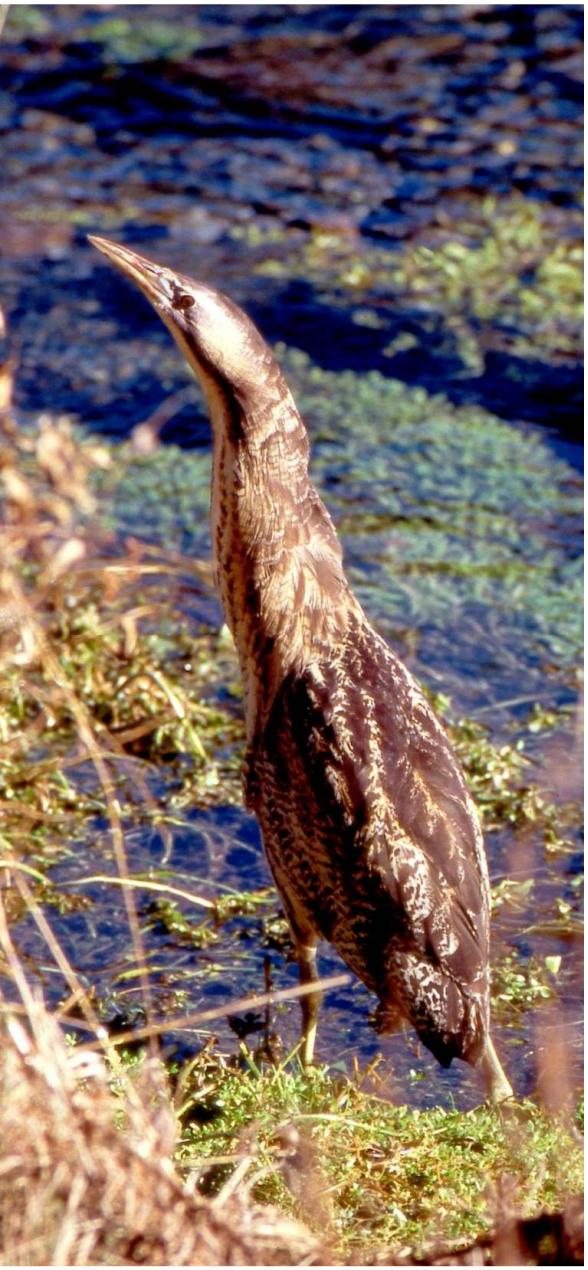

Bird monitoring

Acoustic recorders and data interpretation

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Number 1: Objectives!!

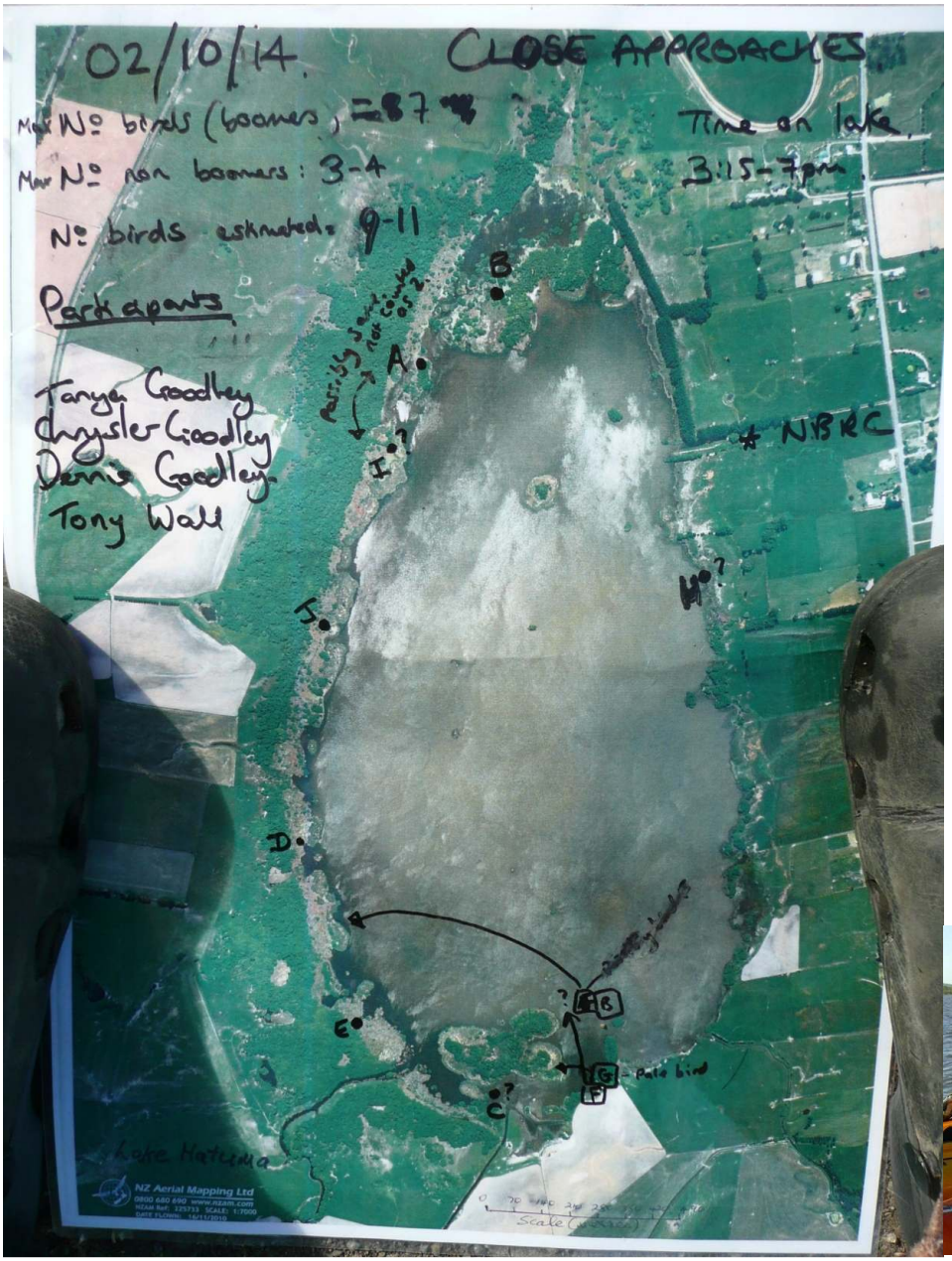
- Baseline/inventory
- Monitoring (changes over time)
  - Response to management
  - Identify/confirm threats
- Research – demographics/identify triggers/identifying population limiters

Number 2: Methods

Protocols for the inventory and monitoring of populations of the endangered Australasian bittern (*Botaurus poiciloptilus*) in New Zealand

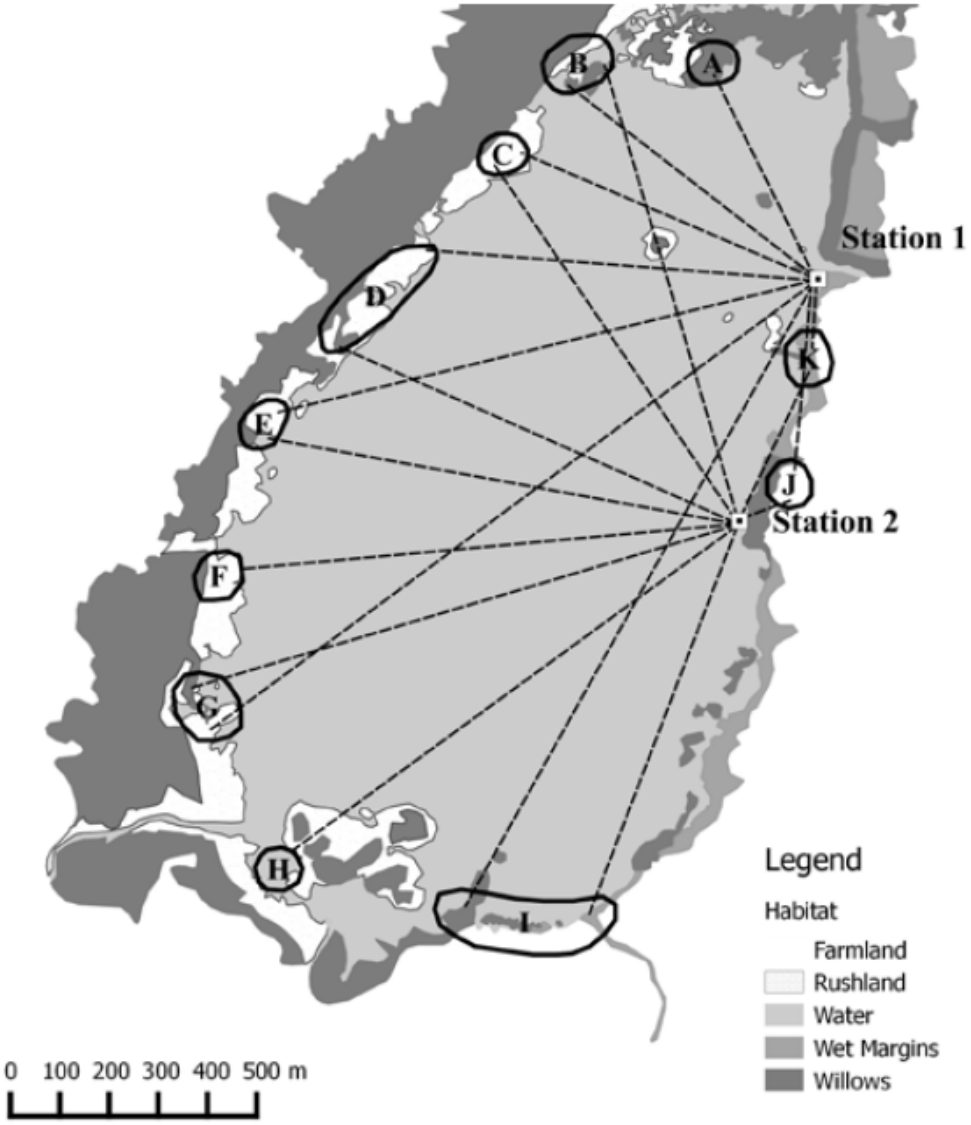
Number 2: Methods

- Close approaches
- Acoustic triangulation
- Call-rate per unit time
- NOREMARK
- Radio-tracking



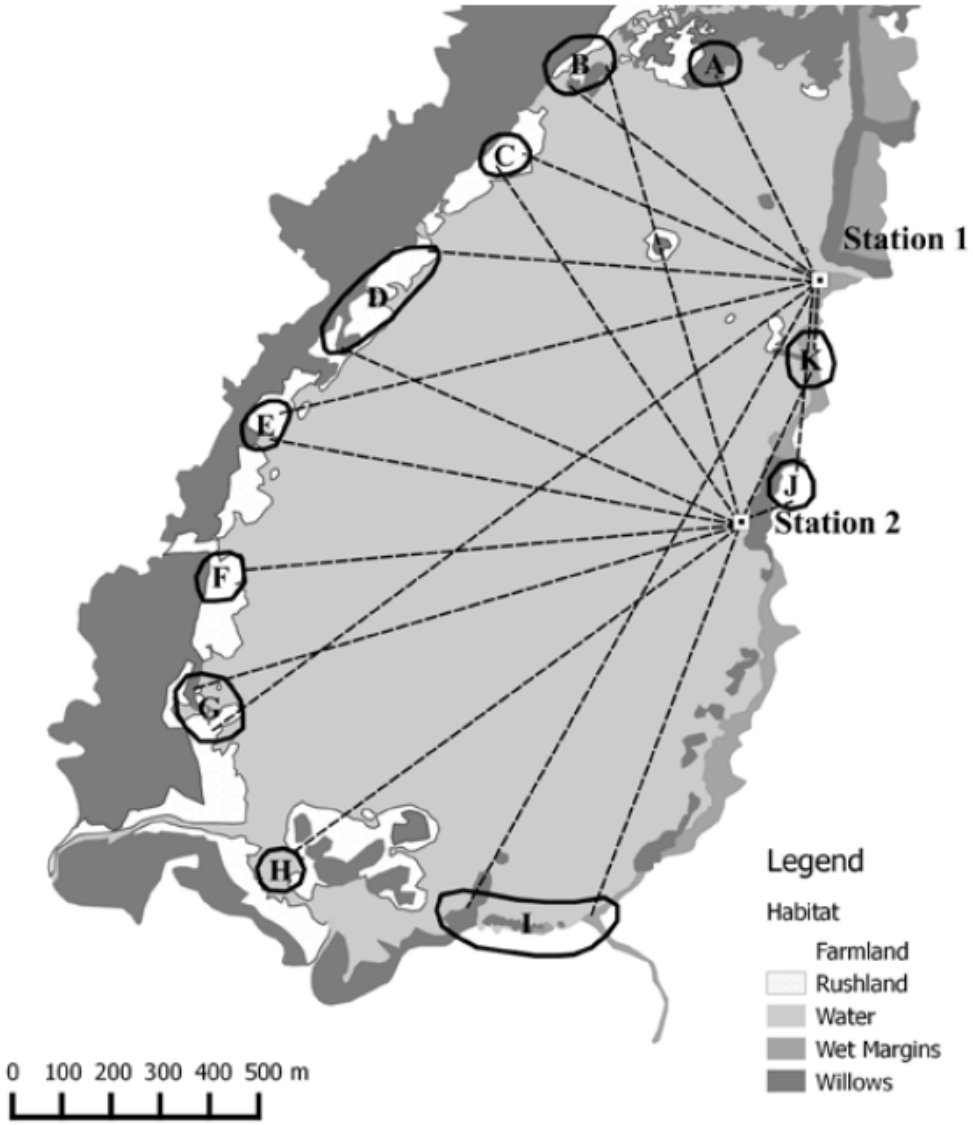
Methods – Close approaches

- Accurate locations
- Situational
- Requires quiet transportation
- 3-4 hours



Methods – Acoustic triangulation

- Less accurate locations
- Situational – density and wetland size dependent
- Requires less people
- Less time (< 1 hr)



Methods – Acoustic triangulation

Areas of uncertainty:

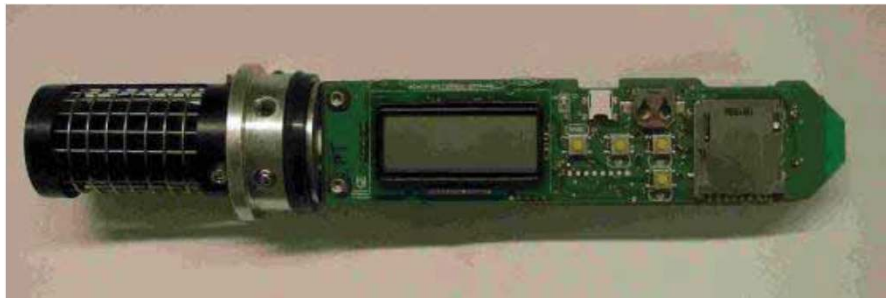
1. Was Bird A 1 or 2 birds? Station 1 has best ability to distinguish.

2. Was there one or two birds in the southeastern corner of the lake? Neither has good angle but call characteristics (e.g. times of calls, number and frequency of booms). Concluded (correctly) that it was the same bird.

3. Were birds G and H one or two birds? Station 2 had a greater ability to distinguish therefore concluded (correctly) that these were two separate birds.

Methods – Call-rate per unit time

- Less accurate locations
- Situational – density and wetland size dependent
- Cost effective

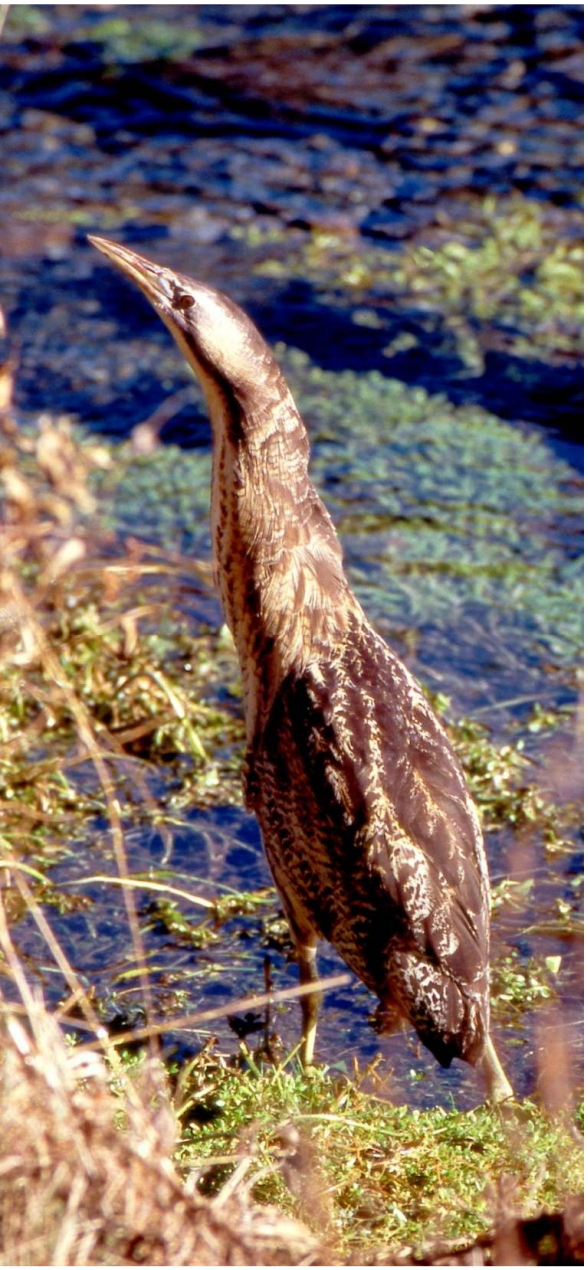


Methods – NOREMARK

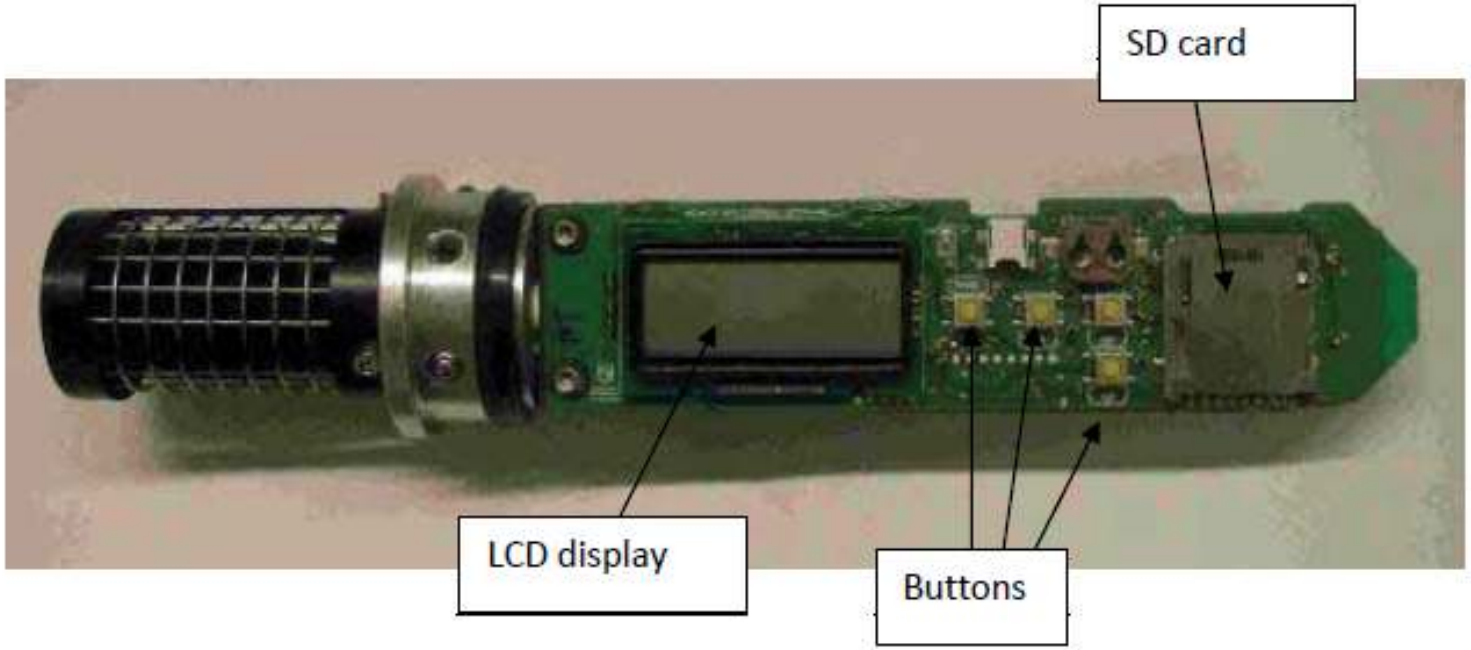
- Accounts birds not calling
- Requires radio-tagging
- Cost effective (once tagged)
- Good if population change is sudden

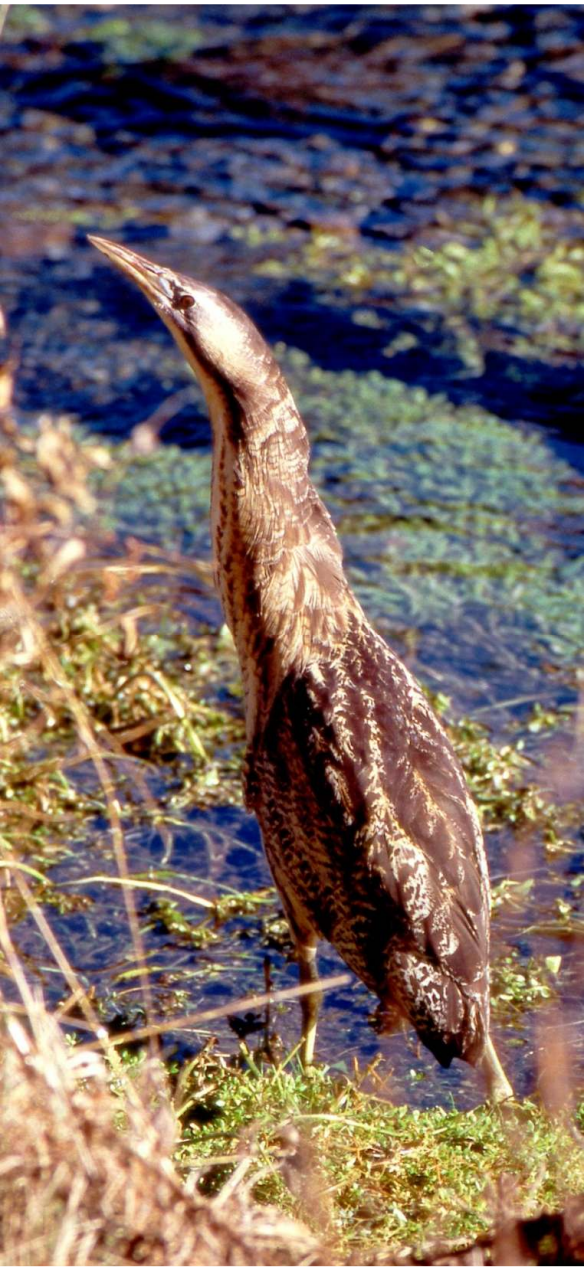
Methods – Radio-tracking

- Accurate locational data
- Survival
- Habitat characteristics
- Home range movements
- Behavioural characteristic



Specifics of monitoring using acoustics





Deployment

- 1.5 m
- On stake or tree
- Away from disturbances

Received: 19 March 2018 | Revised: 6 April 2018 | Accepted: 22 April 2018
DOI: 10.1002/ece3.4199

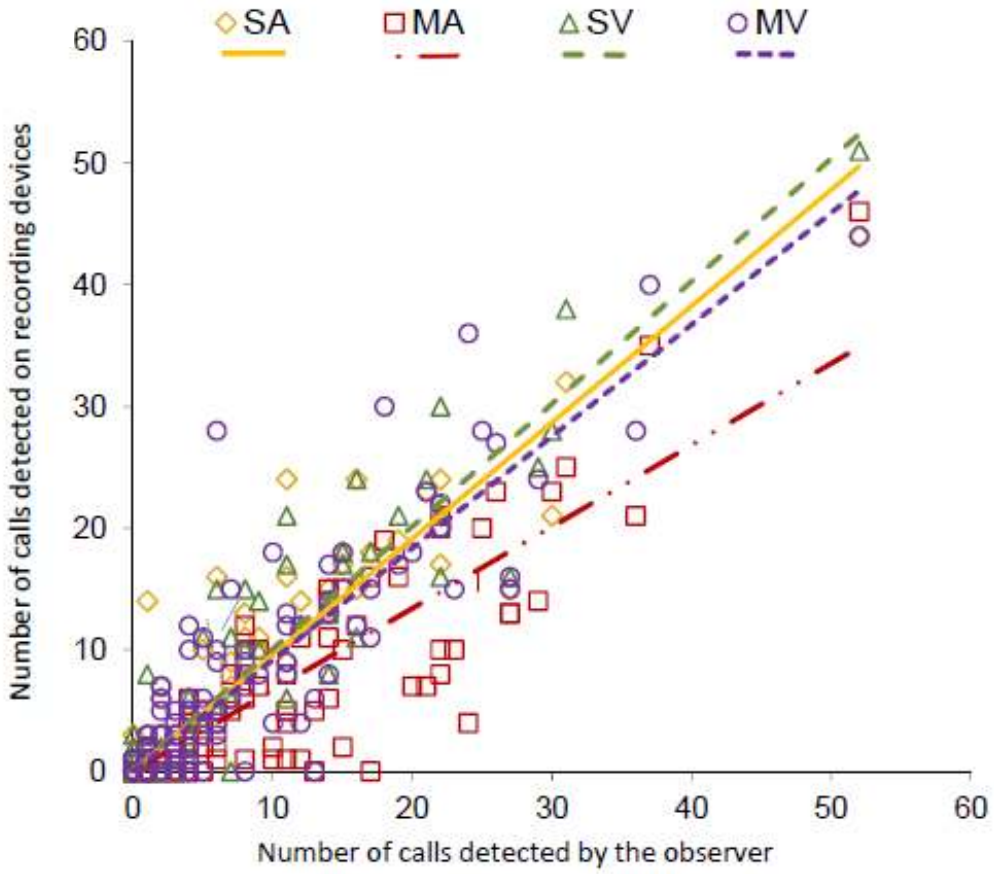
ORIGINAL RESEARCH

WILEY Ecology and Evolution Open Access

Cost-benefit analysis of acoustic recorders as a solution to sampling challenges experienced monitoring cryptic species

Emma M. Williams[1,2,3] | Colin F. J. O'Donnell[3] | Doug P. Armstrong[2]

Analysis - options



Analysis – visually scanning