Acoustic surveys for Western Ground Parrots

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Introduction

The Critically Endangered Western Ground Parrot (*Pezoporus flaviventris*) is rarely seen. Monitoring population trends is essential but challenging because of their cryptic nature.

Methods

Acoustic field surveys:

- Listening by human observers
- Autonomous Recording Units (ARUs)

ARU analysis:

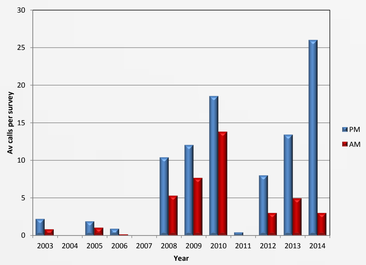
- Manual scanning of spectrograms
- Trialling automated call recognition software

ARU advantages – can record for months and can also be deployed in remote areas that humans can't easily survey (e.g. by helicopter)

Results

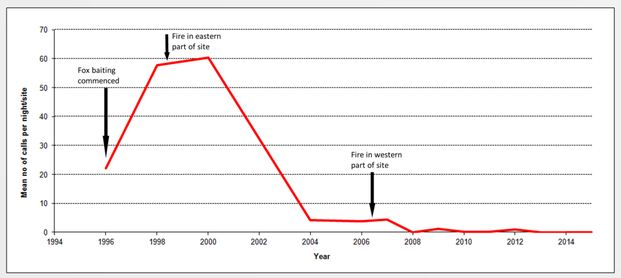
1. Evening surveys more efficient than morning surveys

Conclusion: Knowledge of species biology important in designing surveys



Calling is more reliable and abundant in evening sessions

2. Calling rates vary through time

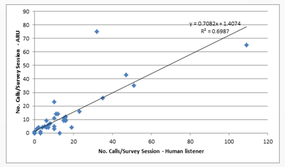


Conclusion: For cryptic species such as WGP, acoustic surveys provide a practical survey method, essential for detecting population trends and informing management decisions

3. ARUs vs human observers

- ARUs can be used to check accuracy of inexperienced listeners
- Comparison of detections rates of ARUs vs experienced listeners

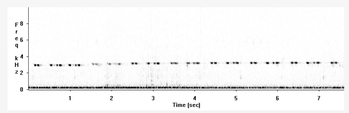
Conclusion: important to understand limitations of techniques

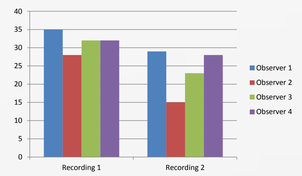


Experienced human listeners detect more calls than ARUs

4. ARU Analysis – Variation in call detection rates between observers manually scanning spectrograms

Conclusion: need to be aware how observer variation may affect results

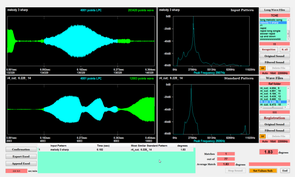




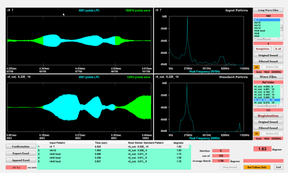
5. ARU Analysis - Recognisers vs humans

Tawny-crowned Honeyeaters have very similar calls which confuses automated recognisers. Current recognisers give 50-100% false positives

Conclusion: software error may mean that human scanning is more efficient



Tawny-crowned Honeyeater vs Western Ground Parrot



Western Ground Parrot vs Western Ground Parrot

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Challenges include:

- the difficulty of distinguishing WGP calls from those of Tawny-crowned Honeyeaters (for both humans and software),
- time required to obtain an adequate library of reference calls for automated recognition,
- time required to develop recognisers or manually scan field recordings, and
- deterioration of microphones during extended field use.

Conclusions

Lessons include

1. the need to understand the ecology of the target species in order to optimise sampling strategies, particularly with respect to temporal activity patterns,
2. survey results differ between humans and ARUs (each will detect some that the other misses, and vice versa); results may also differ between different ARUs, and
3. there is a high error rate (especially false positives) from recognisers we have been able to develop using currently available software, meaning that scanning of spectrograms by a skilled observer may be more efficient.

Despite these difficulties, acoustic surveys (human and ARU) are the only practical way of determining occupancy by WGPs, and also reveal apparently meaningful population trends.

Improved recognisers would increase the efficiency of analysing ARU recordings.