

Greater Glider & Yellow-bellied Glider Surveys and On-ground Action – Noosa & Cooloola



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Several areas of known habitat for greater gliders & yellow-bellied gliders were affected during the 2019 fires.

However, our understanding of populations in the region is extremely poor.

The full significance of 2019 fires to the regional population was unknown.



Pics – Rachel Lyons

Project Aims

- Increase knowledge of greater gliders in the local community – through a workshop, fact sheet and community surveys
- Increase knowledge of locations of greater gliders in the area (previously scant records)

Phase 1 – Test the use of a trained greater glider scat detection dog against visual night-spotting survey techniques to improve survey detection methodologies

Phase 2 - Install 50 greater glider nest boxes in critical locations

Phase 3 - Undertake audio-surveys of yellow-bellied gliders in the Cooloola Fire Area



Pics – Rachel Lyons

Detection Trial Project Motivation #1

Study by Lindenmayer (et al) 2001 '*How effective is spotlighting for detecting the greater glider*'.

Investigated the effectiveness of spotlighting for detecting known radio-collared individuals in radiata pine plantation near Tumut, New South Wales.

'Petauroides volans is generally regarded as a species that is readily detected by spotlighting because it has bright eyeshine and is relatively large and slow moving.'

A sobering outcome of our study was the low success rate for spotlighting detections of P. volans.' (Lindenmayer (et al) 2001)

- Patch level surveys – 26% success rate.
- Pass / transect surveys – 8% success rate.



Pics – Rachel Lyons

Detection Trial

Project Motivation #2

- Recent large lineal development project had only 1 individual detected during night spotting surveys of its proposed impact areas, despite the area being locally known as a significant habitat for both GGs & YBGs.
- Consequently, the impacts of the proposal were deemed to be insignificant, and no further assessment was provided in the EPBC referral with no measures put in place in the EPBC approval process.
- So far, to our knowledge, **11 greater gliders** have been removed from cleared habitat trees and have been relocated.
- Permanent isolated population



Pic – Jasmine Connors



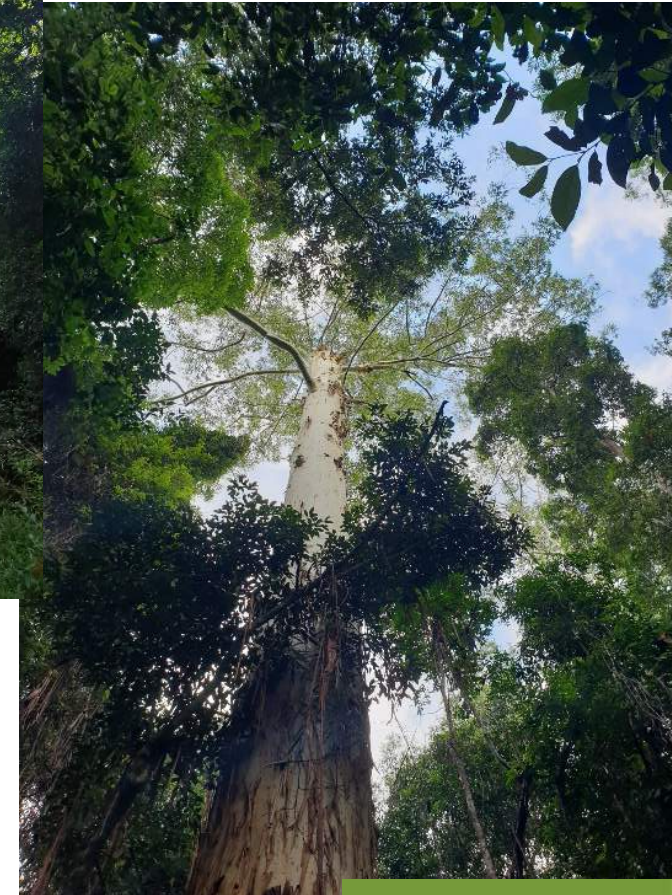
Pic – Rachel Lyons

Surveys....Why So Difficult?

- Many GG forests are typically tall (~40m), multi-strata and often very dense / impenetrable at ground layer. Difficult to see canopy.
- Greater gliders make little to no calls or noise.
- Scratch marks are indistinguishable and usually at mid-upper canopy level.
- Thermal drone / scope detection is largely ineffective due to low heat signals and high ambient temperatures year-round.
- Scats are very small (for people to find) and degrade quickly.

So.....

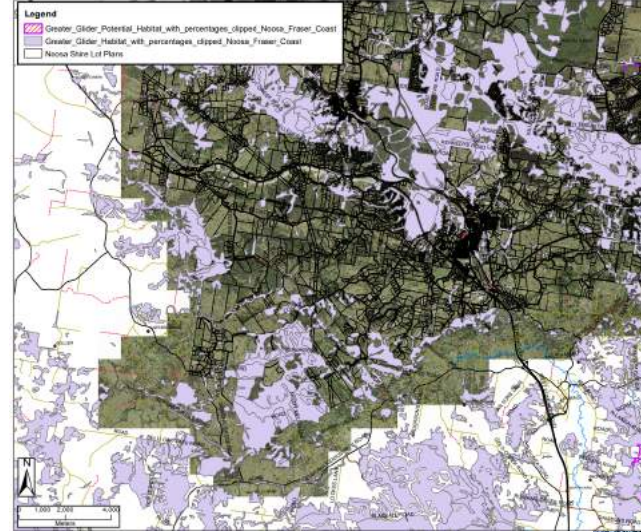
- Need to test an alternate survey approach!



Pics – Rachel Lyons

Phase 1 – Site Survey Selection

- Initial site selection – utilised the '*Greater Glider habitat mapping for Qld 2021*' – QLD Herbarium.
- Assessed > 25 sites with a requirement that there be at least 2 visible hollow bearing trees/stags within each 300 m transect area.
- Identified the top 16 sites for survey work.
- Habitat Assessment subset – Species & HBT/Stags



Pic – Rachel Lyons

Site Survey Methods

- Opted to use the 300 m x 50 m transect lines x 30 person minutes as the spotlighting survey method. Similar to the '*Greater Glider Habitat Resource Assessment in the Burnett Mary*' Report.
- Needed safe and accessible sites- Community involvement (WH&S) and time(\$'s).
- Due to permeability difficulties in our Noosa forest types, opted for narrow existing tracks / walking trails as the transect line.
- Utilized the survey sheets and methods of the *Terrestrial Vertebrate Fauna Survey Guidelines for QLD*.



Pic – Keira McGrath

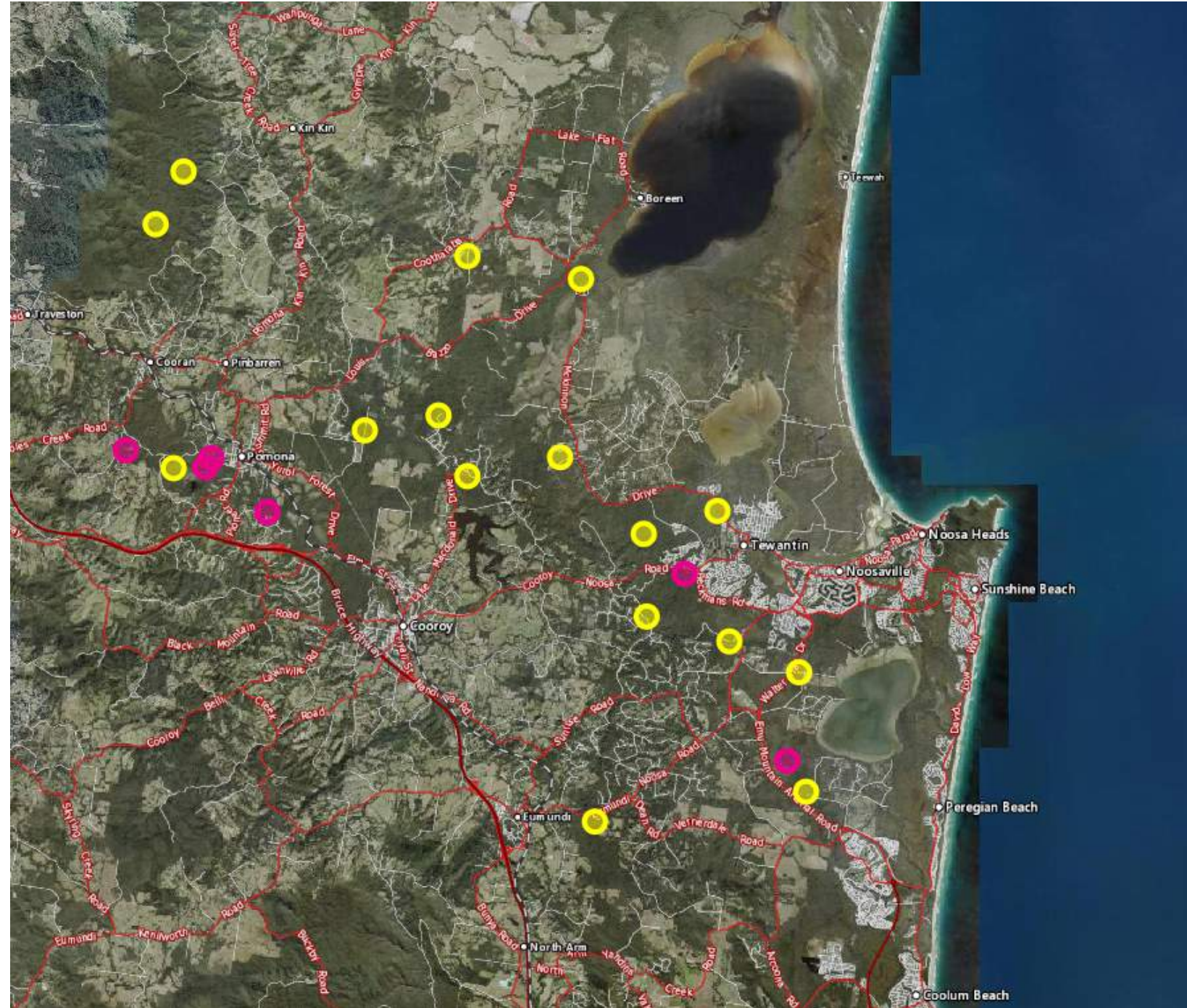


Pic – Rachel Lyons



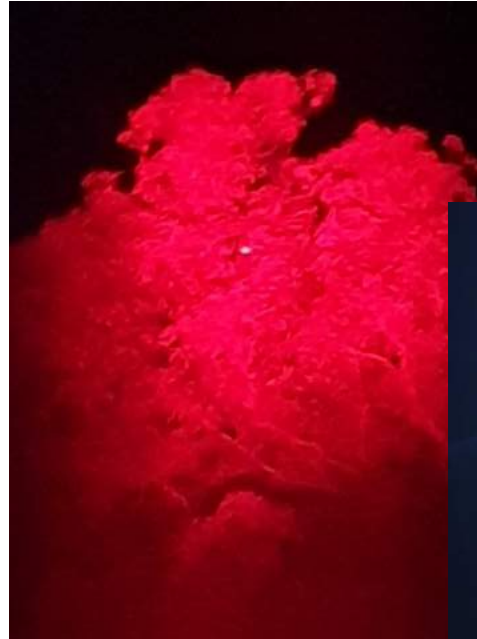
Survey Locations

- Known GG locations
- Survey Sites

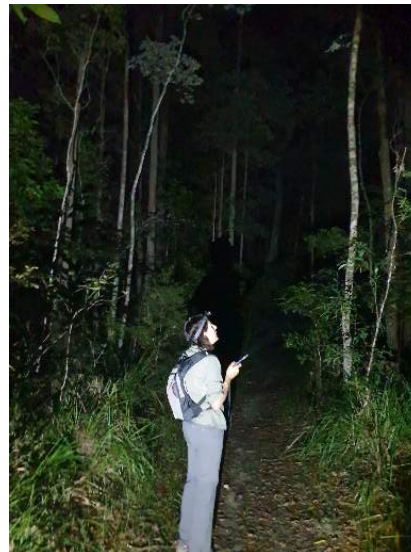


Spotlight Surveys

- Two spotlight surveys for each site – both undertaken before Detection Dog Scat Survey event.
- Different nights – one survey < 1 hour after sunset and other >1 hour after sunset.
- 300 m x 50 m x 30 person minutes – double pass.
- As community volunteers were requested to be involved up to **>7 times the survey effort (in person minutes)** than standard.
- Had consistent 'principal surveyor'.
- GGs spotted at 4 of the 16 sites, either within the transect or near the transect. 1/16 spotted by principal surveyor.



Pics – Rachel Lyons



Pic – Paul Revie

Greater Glider Scat Detection Dogs – Exploring Another Survey Option

- 2019 drought and fires saw an influx of greater gliders coming into the 'care' system.
- Opportunity to collect scat from 4 rehabbing individuals and store local tissue samples from deceased individuals for future use.
- Scats were provided to a few dog trainers in 2020. Nicky Wright and 'Ada' from Morekos Kennels rose to the occasion.



Pics – Rachel Lyons



Greater Glider Scat

- Small but copious in one defecation – 'scatter'.
- Degrades very quickly in the environment – difficult in the wet weather this year!
- Tapered both ends – highly variable in size and shape.
- Distinct from all other arboreal folivore mammals in locality.



Pics – Rachel Lyons



Pic – Nicky Wright



Scat Detection Dog Surveys

- Same 300 m transects.
- No information provided to handlers as to results of night surveys.
- Detections were flagged.
- 'Scat finders' then donned gloves, headlamps and magnifying glasses to locate detected scats.
- Scats were collected for assessment.

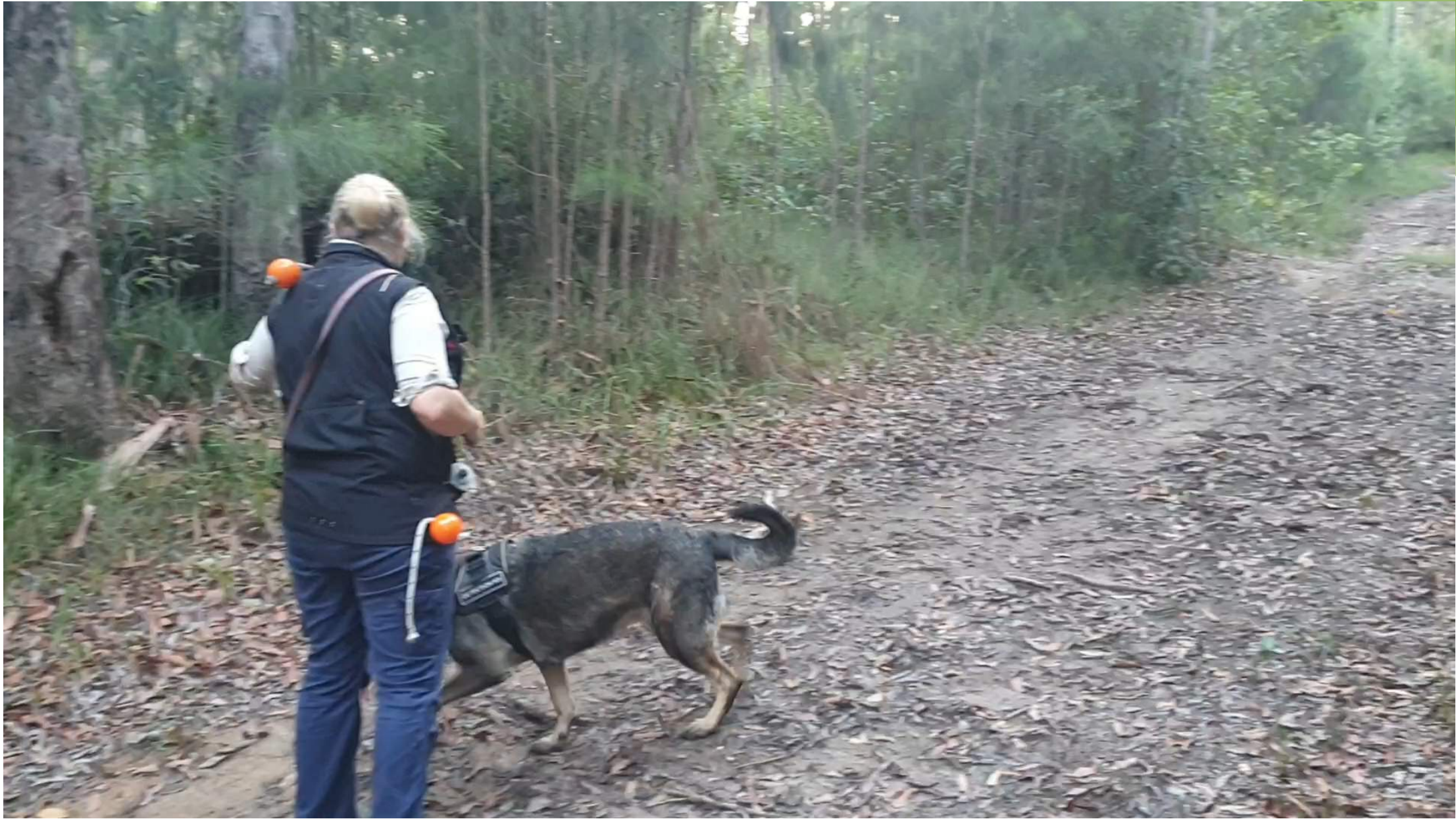


Pics – Rachel Lyons



Pic – Paul Revie





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Pic – Keira McGrath



Pics – Paul Revie & Rachel Lyons



Scat Processing

- Scats were collated according to site and distance along the transect.
- Tree species above collected scat were documented.
- We connected with Federation University (Dr Fiona Hogan) regarding Scat DNA verification.
- Simultaneous GG scat DNA Project in East Gippsland with Cassandra Briggs (PHD Candidate).
- Scat sent to Federation University for DNA analysis along with local GG tissue samples for genomic sequencing – bonus outcomes for both studies!
- Will receive results later this year. Will provide invaluable information for this project and information on the genetics of our local population.

Pic – Paul Revie

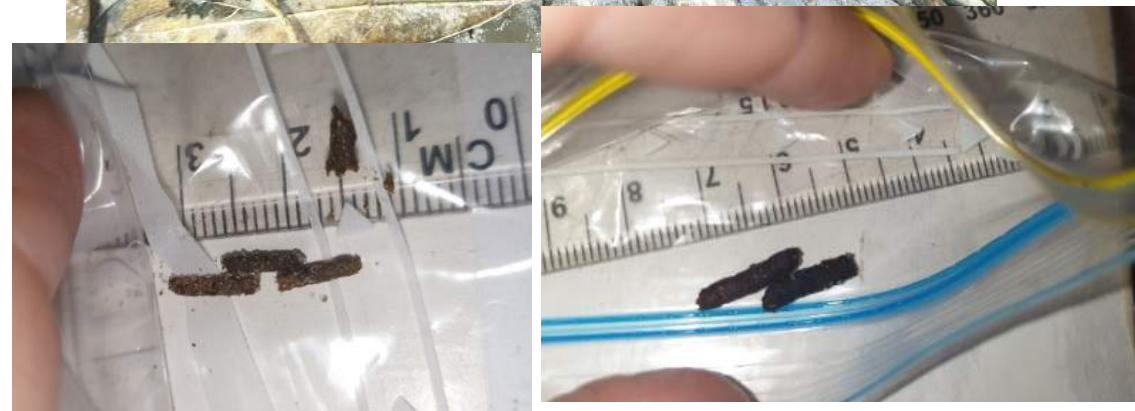


Pic – Rachel Lyons



Scat Anomalies ... Food for Thought?

- 'Ada' the wonder dog is also trained in koala and quoll detection.
- Ada detected on several sites a scat that was clearly not GG, koala or quoll.
- Scat was ID'd by experts as stick insects, raising the possibility of stick insects being part of incidental or targeted diet?
- Detection of worm castings was likely worm consumption of greater glider scat.
- Both easily distinguishable from GG scat.



Pics – Rachel Lyons

The Results



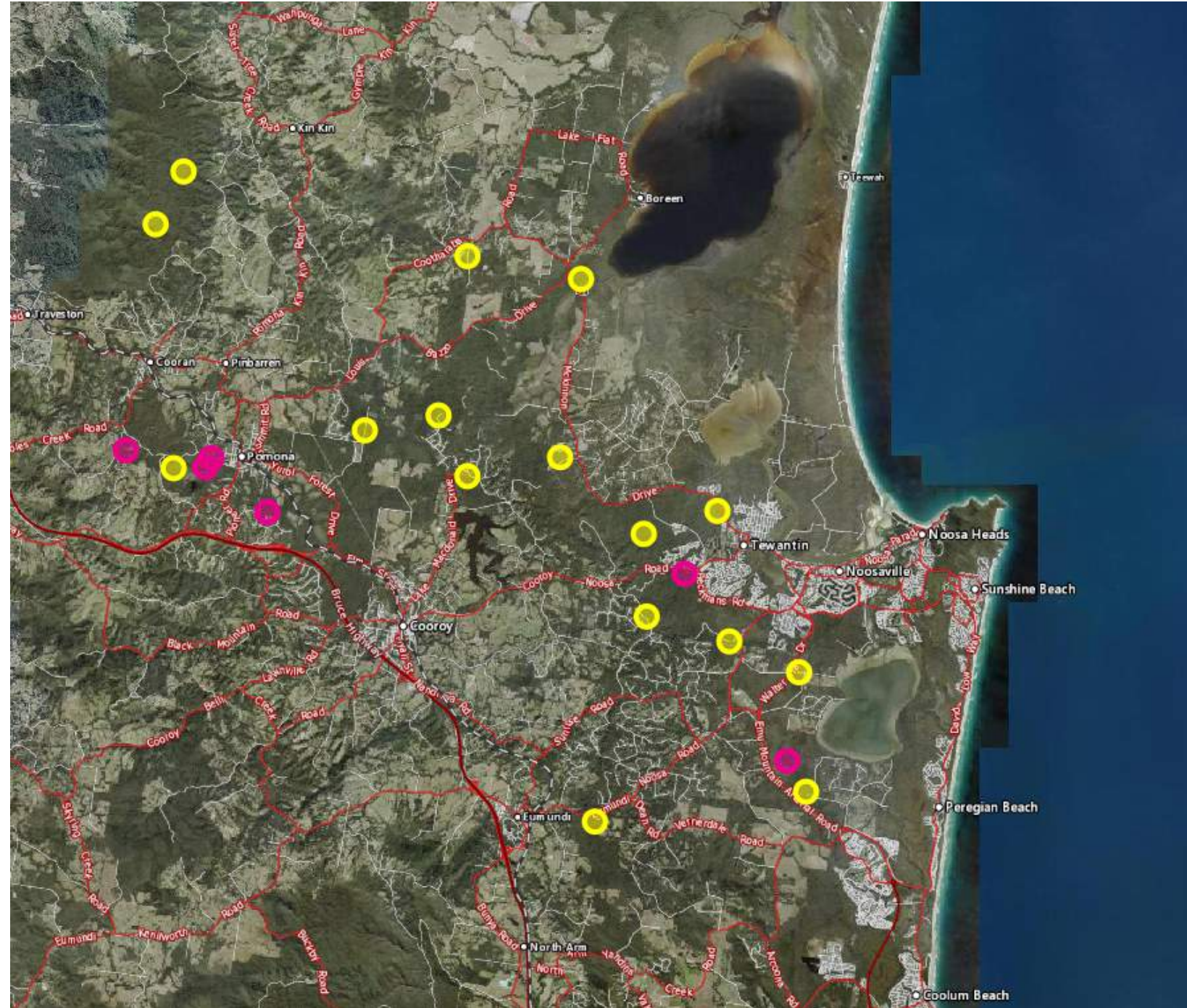
- Awaiting DNA analysis of scat – preliminary findings
- **1/16** OR **6.25%** seen by principal surveyor.
- **4/16** OR **25%** detection with visual spotlighting (average of 3.8 x survey effort across sites vrs standard).
- **10-13/16** OR **62.5% – 81.25%**, potential detection with scat detection dog - awaiting DNA confirmation

Survey Site	Night Survey #1		Night Survey # 2		Detection Dog - Scat Detection
	Principal Surveyor #1	Community Survey #1 (Ave 3.8 x Effort)	Principal Surveyor #2	Community Survey #2 (Ave 3.8 x Effort)	
Porters	Yes - 1	Yes - 2	Yes - 1	Yes - 1	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Davis Rd	No	No	No	No	UNLIKELY
Norrie's Place	No	No	No	No	UNLIKELY
Teen Missions	No	No	No	No	POSSIBLE - DNA Analysis required to confirm
Forest Acres	No	No	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Old Tewanin Rd	No	No	No	No	POSSIBLE - DNA Analysis required to confirm
Harry Springs	No	No	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Lake MacDonald	No	No	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Lower Tinbeerwah	No	No	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Eumundi	No	No	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Sunrise Road	No	No	No	No	UNLIKELY
Doonan NP	No	Yes - 1 near	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Monak Rd Weyba	No	No	No	No	POSSIBLE - DNA Analysis required to confirm
Kellehers	No	Yes - 1	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Mothar Mtn 1	No	Yes - 1	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders
Mothar Mtn 2	No	No	No	No	LIKELY - Scats are of shape, size and consistency to be believed to be that of Greater Gliders



Survey Locations

-  Known GG locations
-  Survey Sites



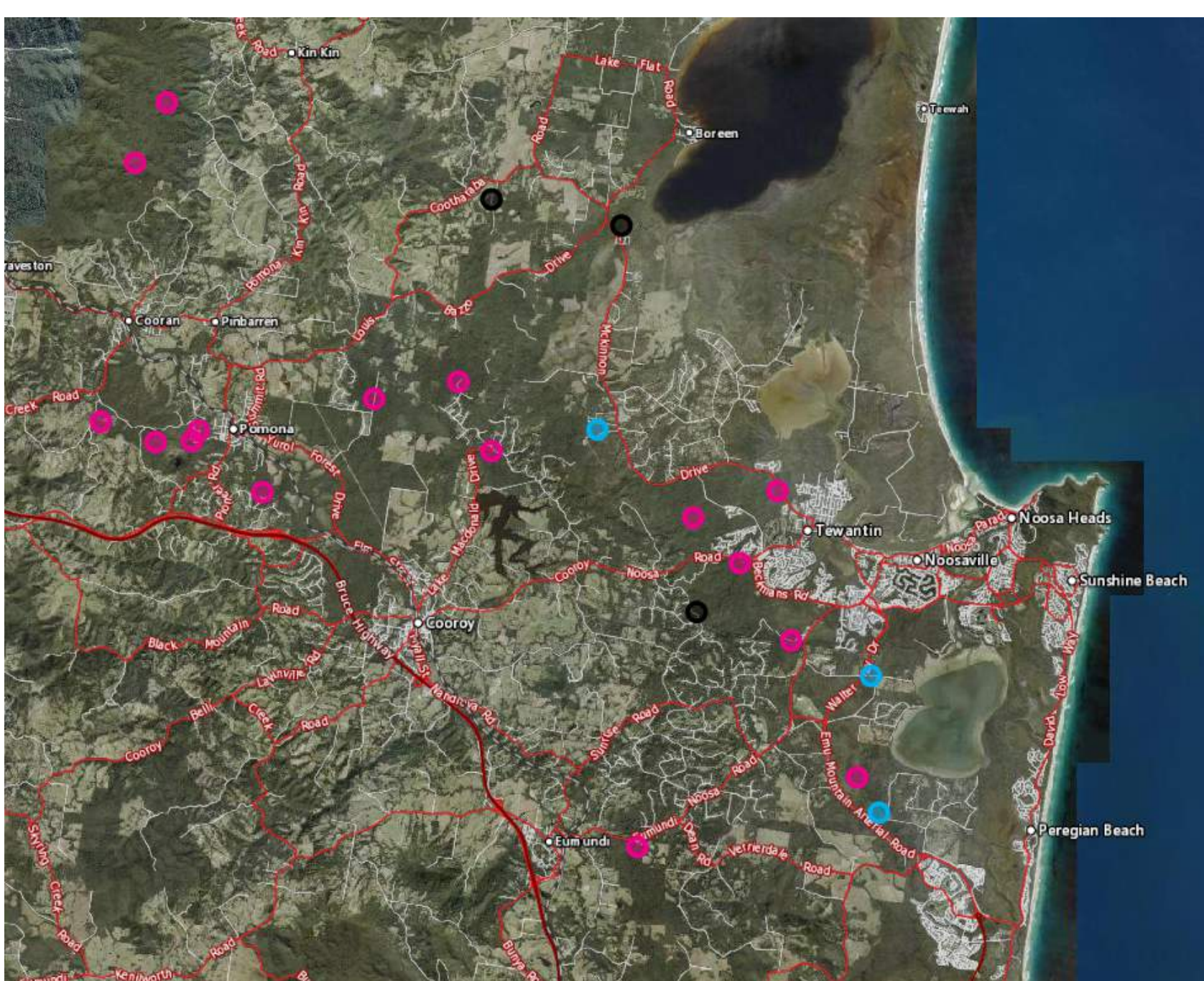


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Results Distribution

- Substantially increase in known locations of greater gliders
- Identifying that the coastal range, Cooroora Mountain and Woondum Tablelands have significant GG habitat value.

- GG record
- Possible GG record
- Unlikely GG record



Food Tree Species – Consistent Results

- Tree species above found scat were noted.
- These help inform diet information for local area.
- Heavy dominance of *Corymbia intermedia* on many sites as resting/ food trees.
- Tree species found are consistent with '*Guide to Greater Glider Habitat in QLD*' 2022
- Tree species results will be finalised once Scat DNA work is completed.



8) Lake MacDonald						
Lake MacDonald	-26.37043, 152.93344	18/06/2022	20m	<i>Corymbia intermedia</i>	LM1	GG
Lake MacDonald	-26.37043, 152.93344	16/06/2022	35m	<i>Syncarpia glomulifera</i>		2 GG
Lake MacDonald	-26.37043, 152.93344	16/06/2022	100m	<i>Corymbia intermedia</i>	LM3	small stick insect?
Lake MacDonald	-26.37043, 152.93344	16/06/2022	250m	<i>Syncarpia glomulifera</i>		5 very small piece
Lake MacDonald	-26.37043, 152.93344	16/06/2022	260m	<i>Syncarpia glomulifera</i>	LM6	? Semi degraded

Phase 2 – Greater Glider Nest Box Installation



- Survey Results identified there were critical linkages missing between some populations and risk of genetic isolation
- Installation of 50 nest boxes of **three designs** across 10 private properties will provide critical corridor links through regrowth vegetation.



Pics – Rachel Lyons

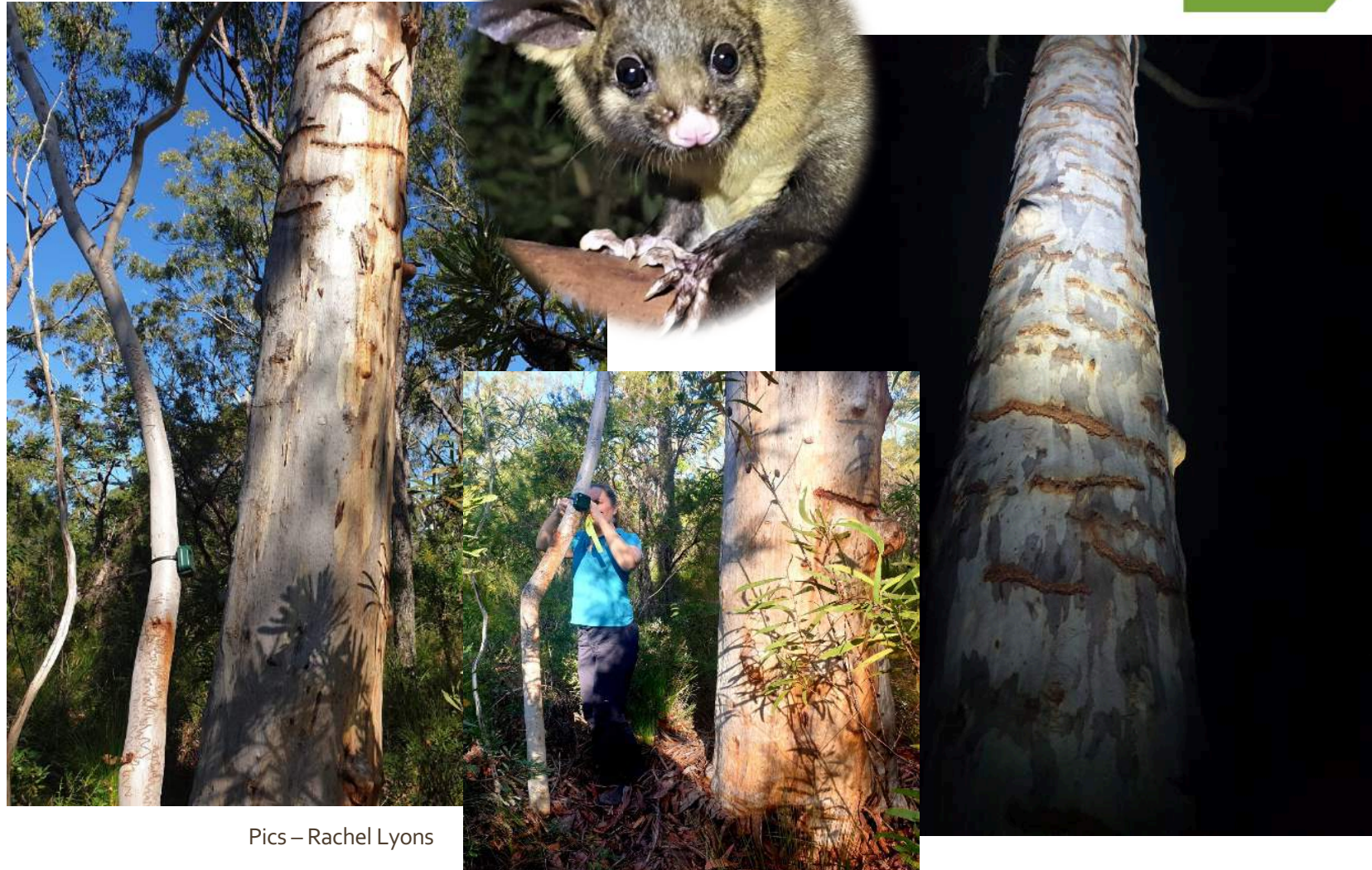


Pic – Tosh Tucker



Phase 3 – Audio Surveys of Yellow-bellied Glider Habitat in Cooloolo NP

- AudioMoth acoustic surveys were undertaken at 20 sites in Western Cooloolo NP
- Planned sites were inaccessible due to flood / weather access issues. western Cooloolo only.
- Auto-recognition software analysis by Josh Bowell (Yellow-bellied Glider Project). Awaiting results.



Pics – Rachel Lyons

Tracking Forward...

- DNA scat analysis results
- Genome sequencing & genetic profile data results by Federation University.
- 6 more spotlighting & detection dog surveys in area funded by Qld Govt. grant.
- Ongoing nest box monitoring
- Strategic corridor planning and ongoing nest site augmentation in regrowth habitat.
- Change to 'Best Practice' survey methods for GG's



Pic – Paul Revie



Pics – Rachel Lyons



Thank you !