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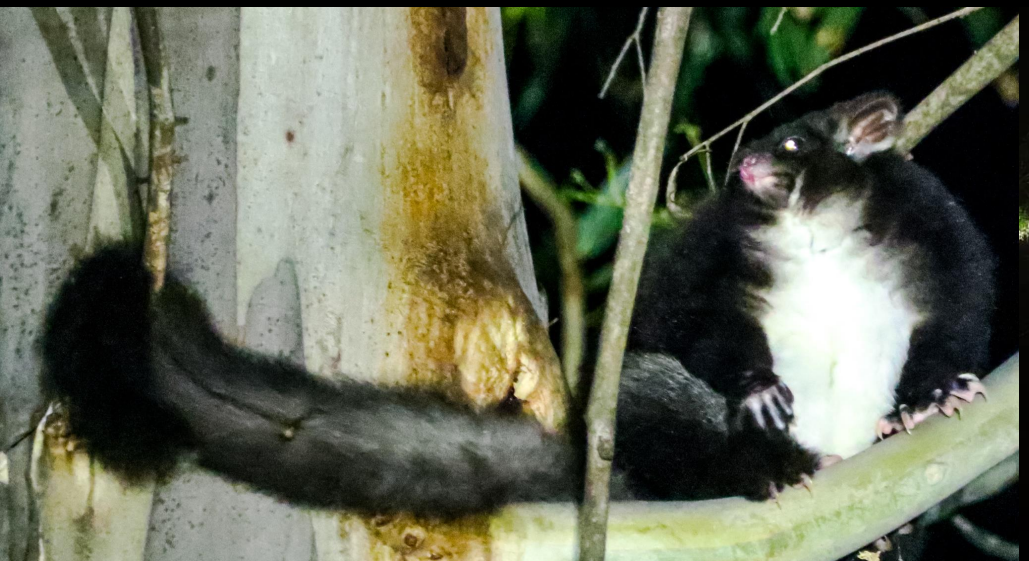
Drone-based thermography for arboreal fauna surveys

Dr. Benjamin Wagner & Bill Paul
benjamin.wagner@unimelb.edu.au
bill.paul@vicforests.com.au

The University of Melbourne & VicForests




We recognize and acknowledge the traditional owners of lands on which we meet today, work, and where our research is conducted, the Yugambeh, Wurundjeri, Gunaikurnai, Taungurung and Bidwell people. We pay our respects to the Elders past, present and future.

Krefft's glider

Yellow-bellied glider

Feathertail glider – PC: Kris Bell

Greater glider

The greater glider – *Petauroides volans*

Distribution

Conservation Status

International (IUCN)

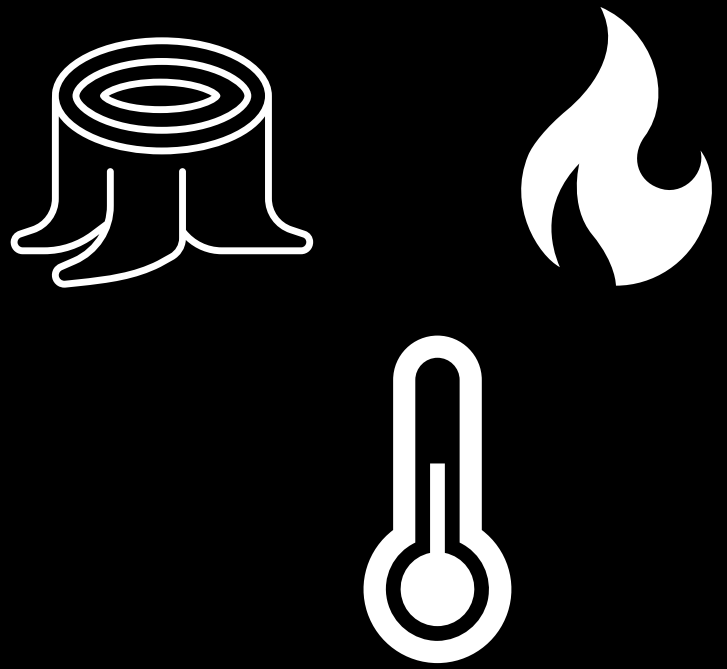
RED LIST
VULNERABLE
VU

Federal : Endangered (since 2022)

Australian Government
Department of Climate Change, Energy, the Environment and Water

Environment Protection and Biodiversity Conservation Act 1999

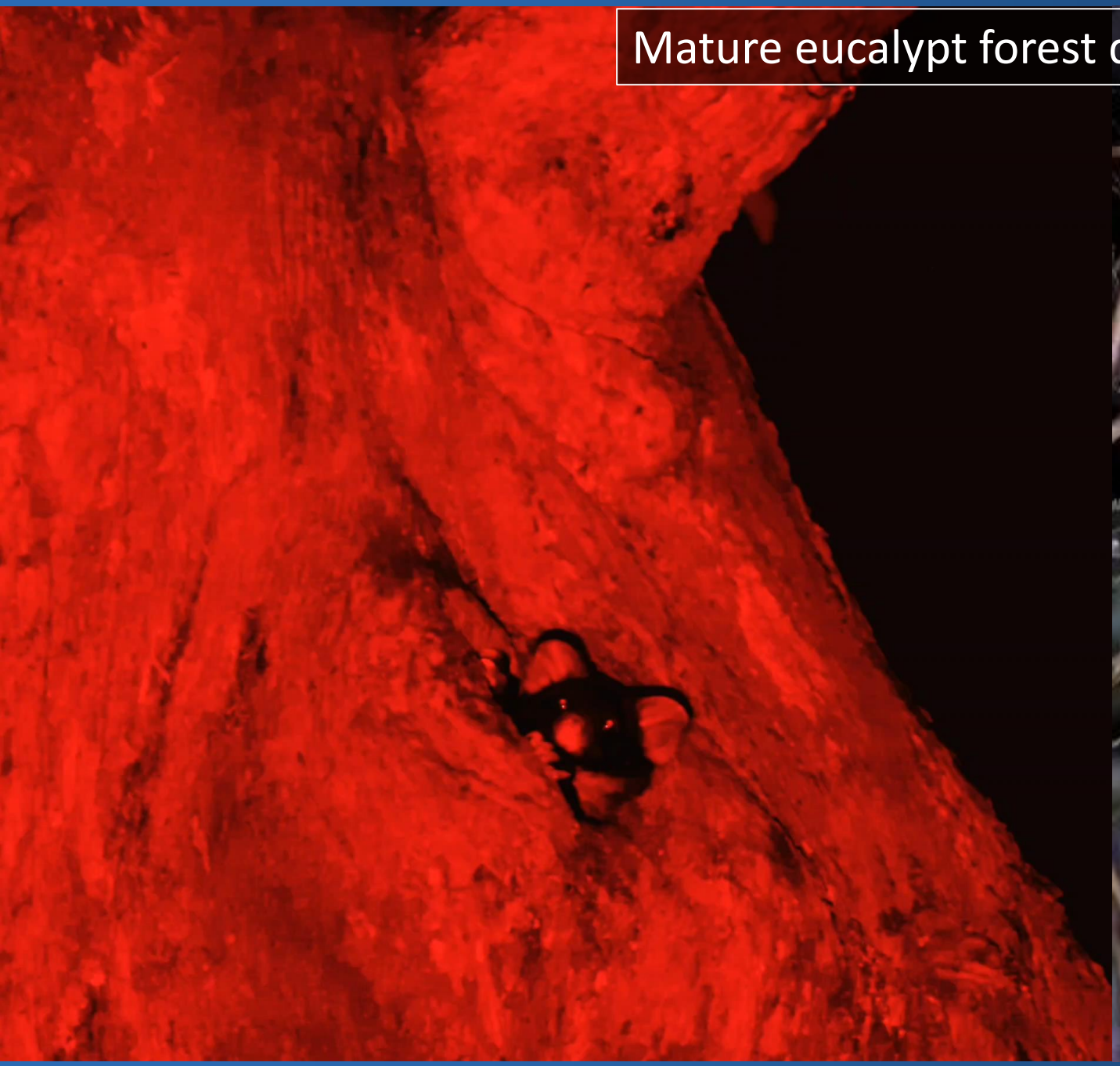
Major threats




PC: Pavel German

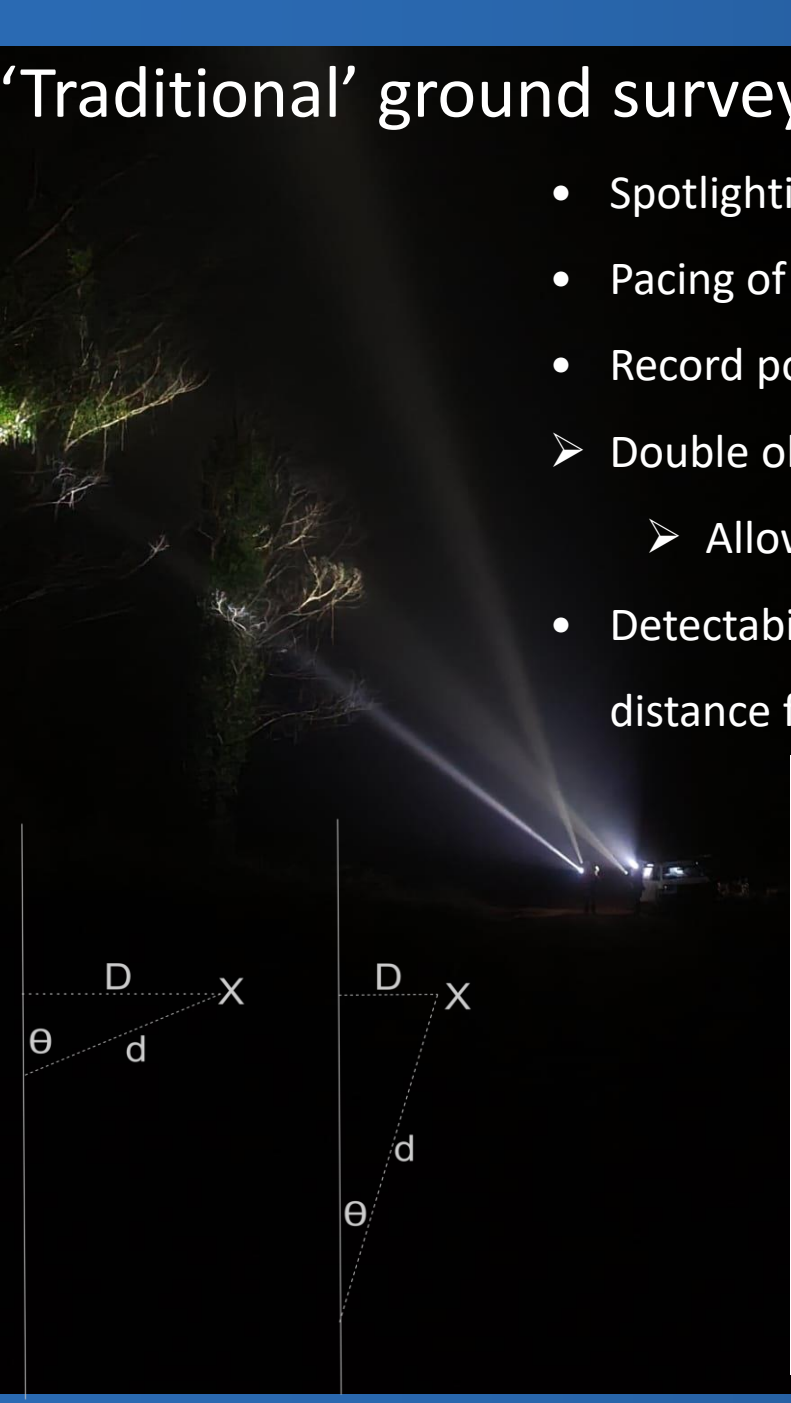

PC: Maria Cardoso

Mature eucalypt forest dependency

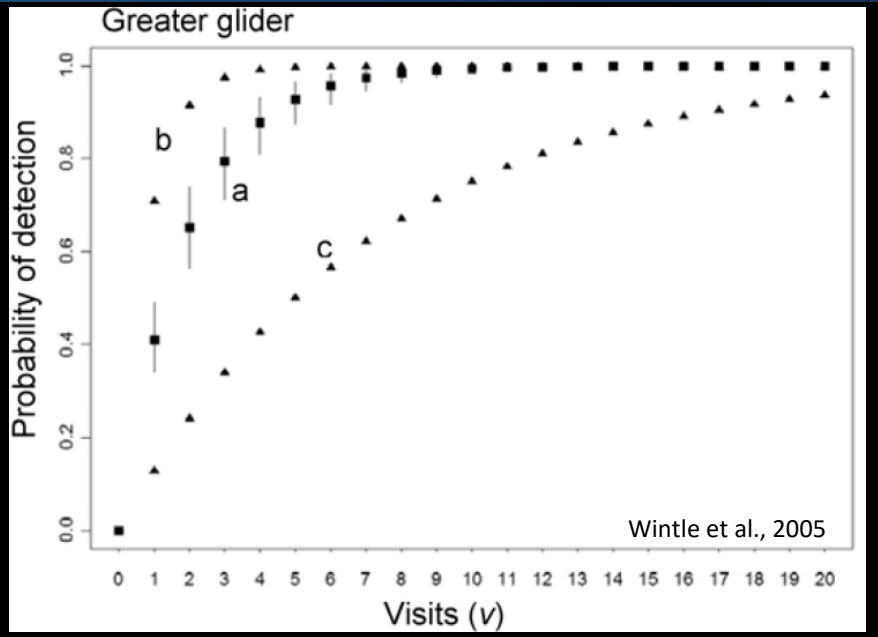


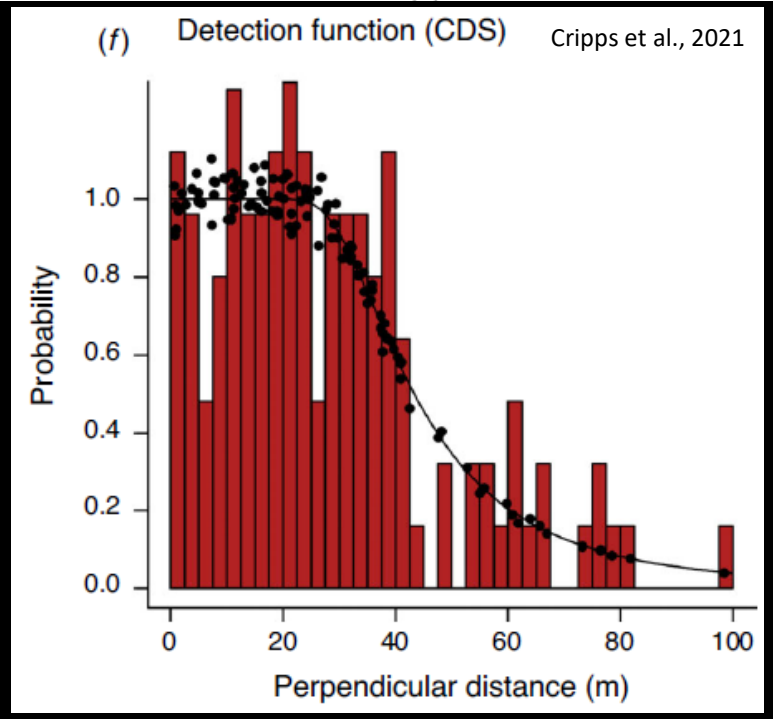
‘Traditional’ ground surveys – spotlighting

- Spotlighting along a fixed transect
- Pacing of ~10 mins per 100 meters
- Record position, bearing and distance to animal
- ➢ Double observer distance sampling
  - ➢ Allows abundance calculations
- Detectability dependent on number of visits and distance from transect

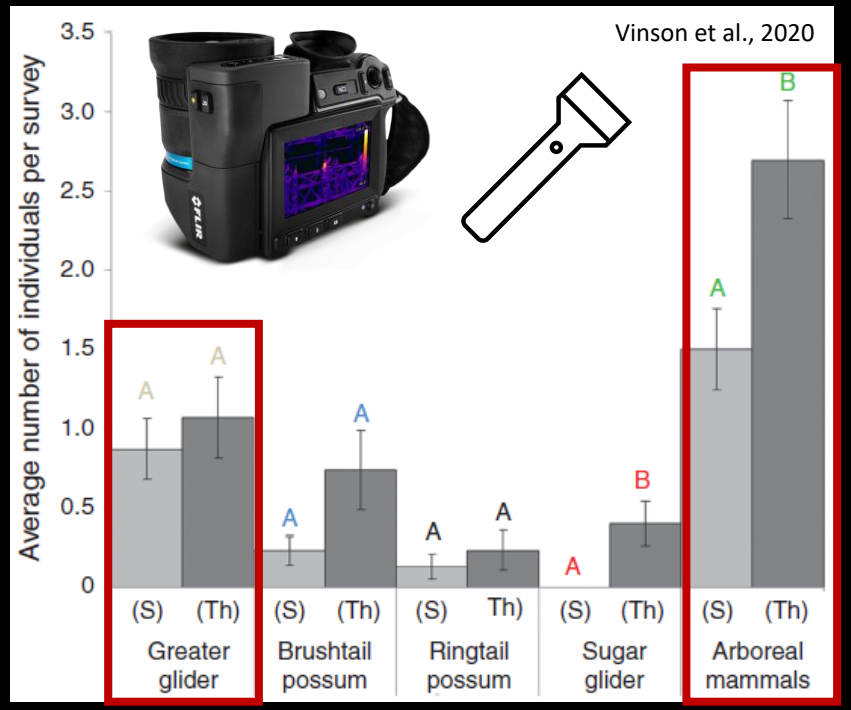


Transect spacing/Distance from transect	Probability of missing based on respective distance from transect
25 m	13 %
50 m	27 %
75 m	46 %
100 m	-

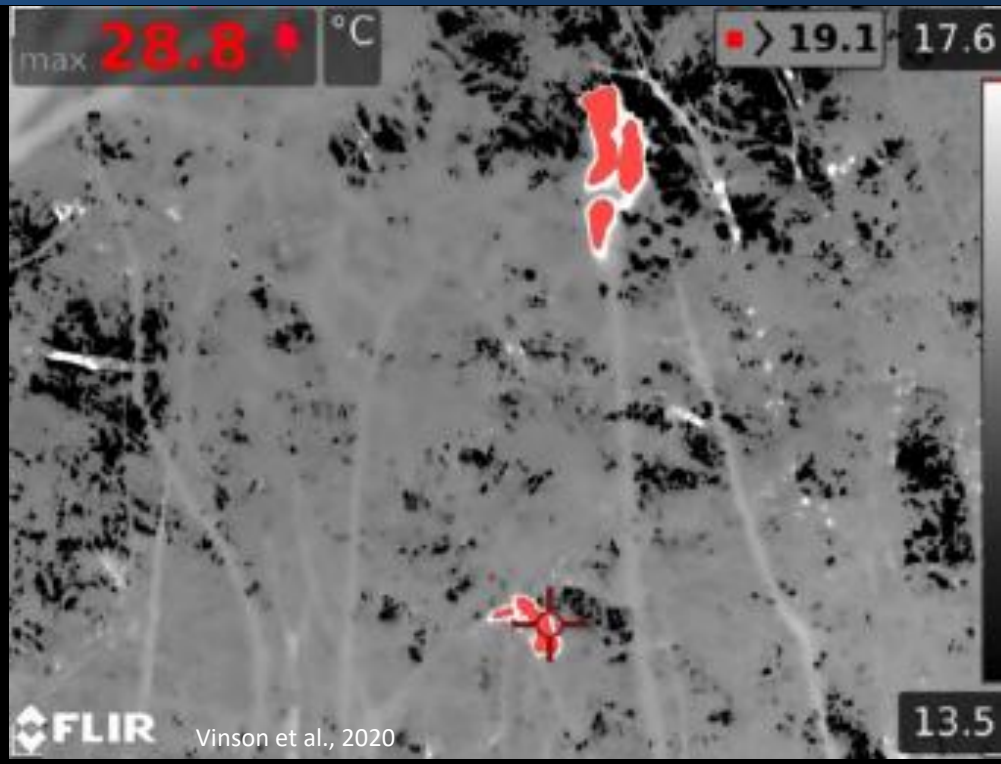


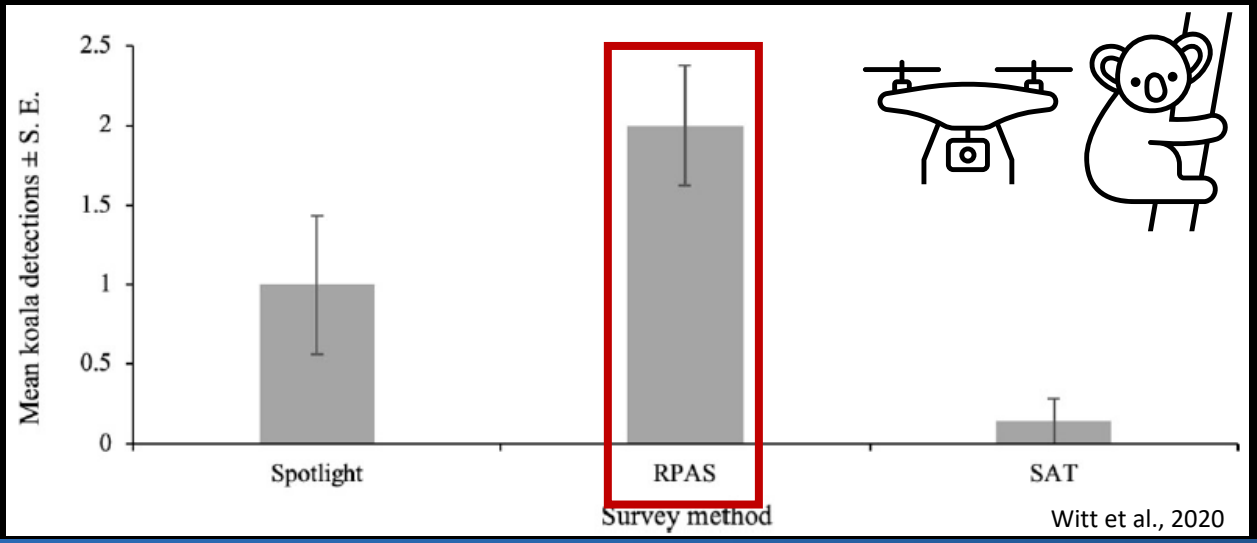


Thermography and drones



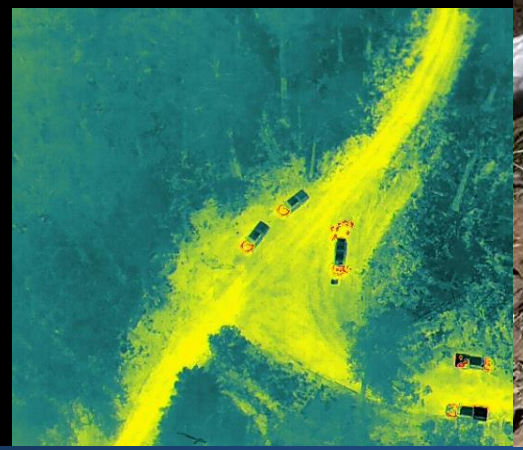
- Heat-signature based survey methods can improve detectability
- Ground based thermography did not improve greater glider detections
- Aerial thermography highly effective for koalas
- No literature on drone thermography for greater gliders





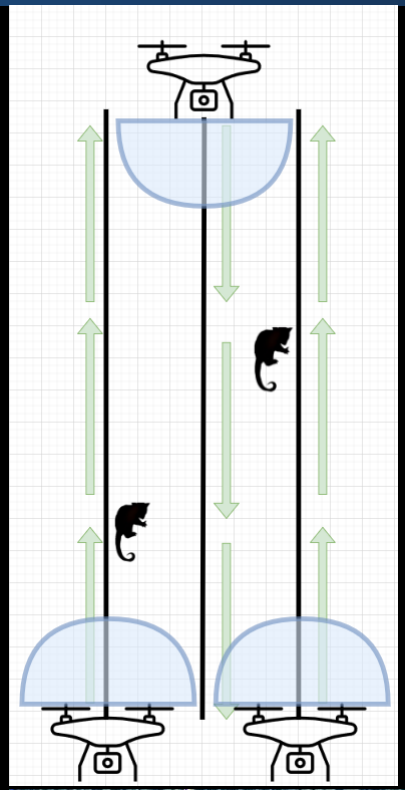
Developing new methods

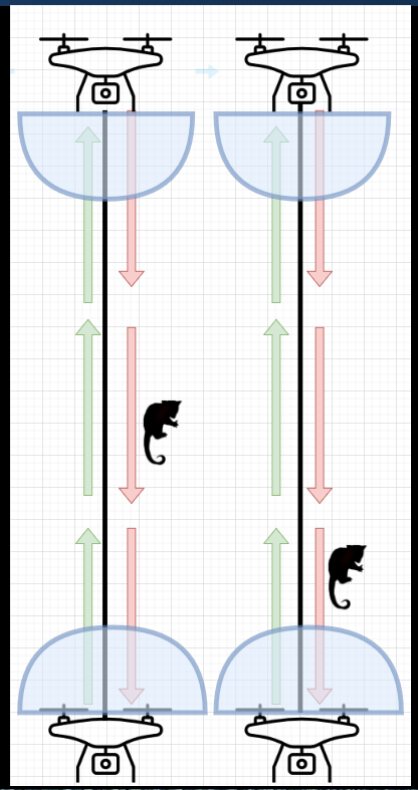
- Drone-based thermography to survey for arboreal fauna
  - Focus on threatened species (e.g. greater glider, yellow-bellied glider)
- Equipment adapted from aerial surveys for koalas in plantations
- Key equipment:
  - Drone with long flight time and distance
  - Thermal camera with integrated range-finder and zoom lens
  - Integrated flood or spotlight
- Systematic surveying of target area
  - Flight time up to 45 mins (per battery set)
  - 500-750 meters flight distance from operator
  - Low airspeed (5-10 km/h)



Developing new methods.

- Start methods shorty after dark
  - Best detection outcomes if surveying an entire coupe in one night
- Application of either a lawnmower or back-and-forth survey pattern
  - Use roads an tracks to launch and land
  - Relocate to ensure maximum survey coverage
  - EVLOS and/or BVLOS required
- Record drone's flight track to calculate area coverage
- For each observation record GPS waypoint
  - Collect video footage for threatened species and observations that can't be ID'd
  - Record time of observation and use appropriate naming convention for waypoints
  - Final ID to be conducted by trained individuals based on video footage
- Repeat surveys up to two times if no observations were made
- Any areas that can't be reached by drone need to be surveyed on foot





Observations

Observations

Krefft's glider

Species observations:

- Southern greater glider
- Yellow-bellied glider
- Krefft's glider
- Feathertail glider
- Common & Mt. brushtail possum
- Common ringtail possum
- Koala
- Leadbeater's possum
- Wombat
- Sambar deer
- Foxes, feral dogs & cats

- Southern boobook
- Powerful owl
- Diurnal birds

Koala

Yellow-bellied glider

Common Ringtail possum

Research


Flight path

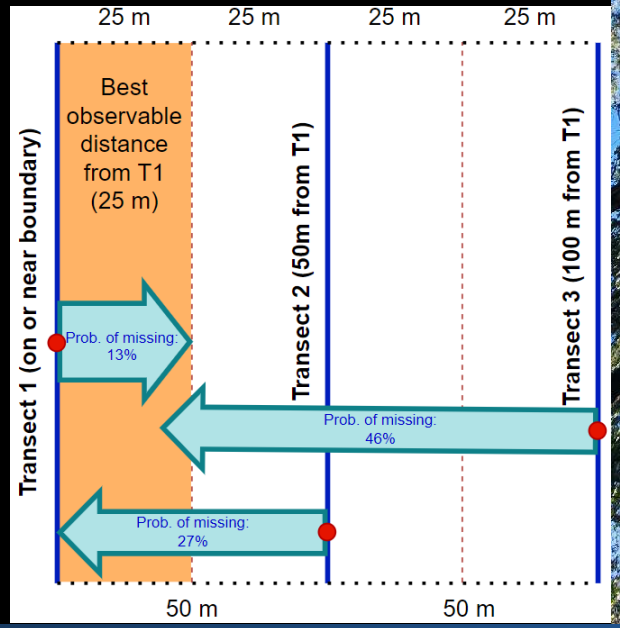

Drone observations

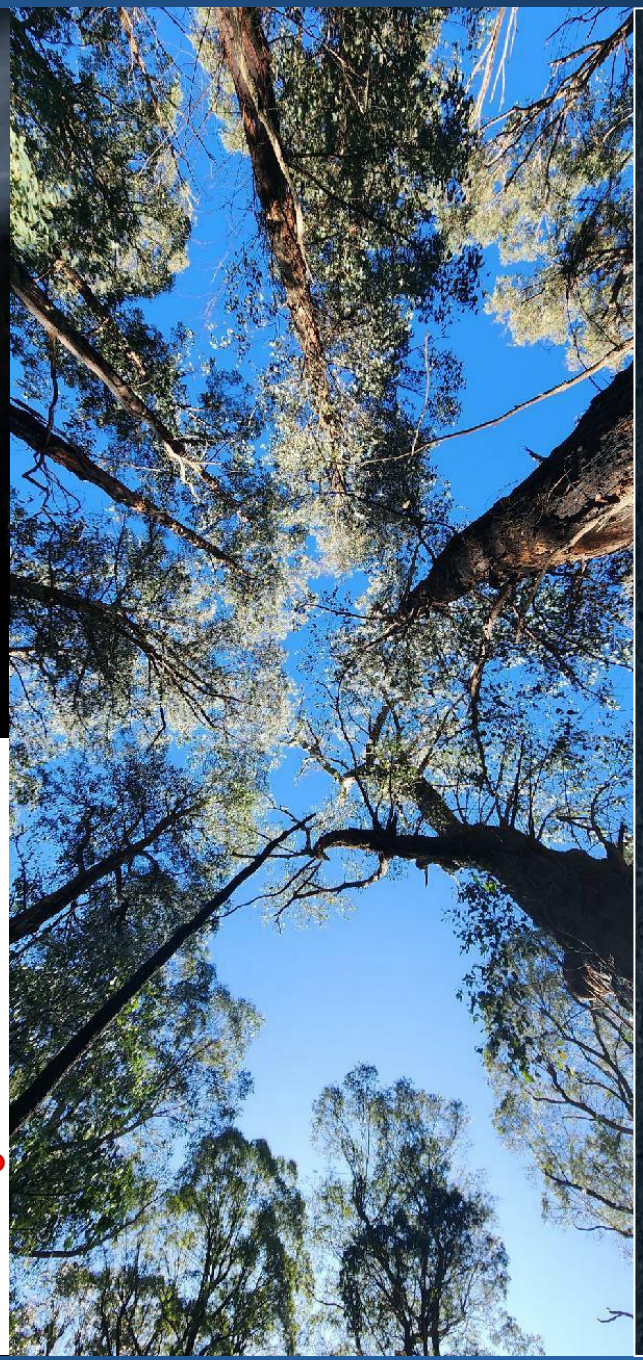

Southern greater gliders

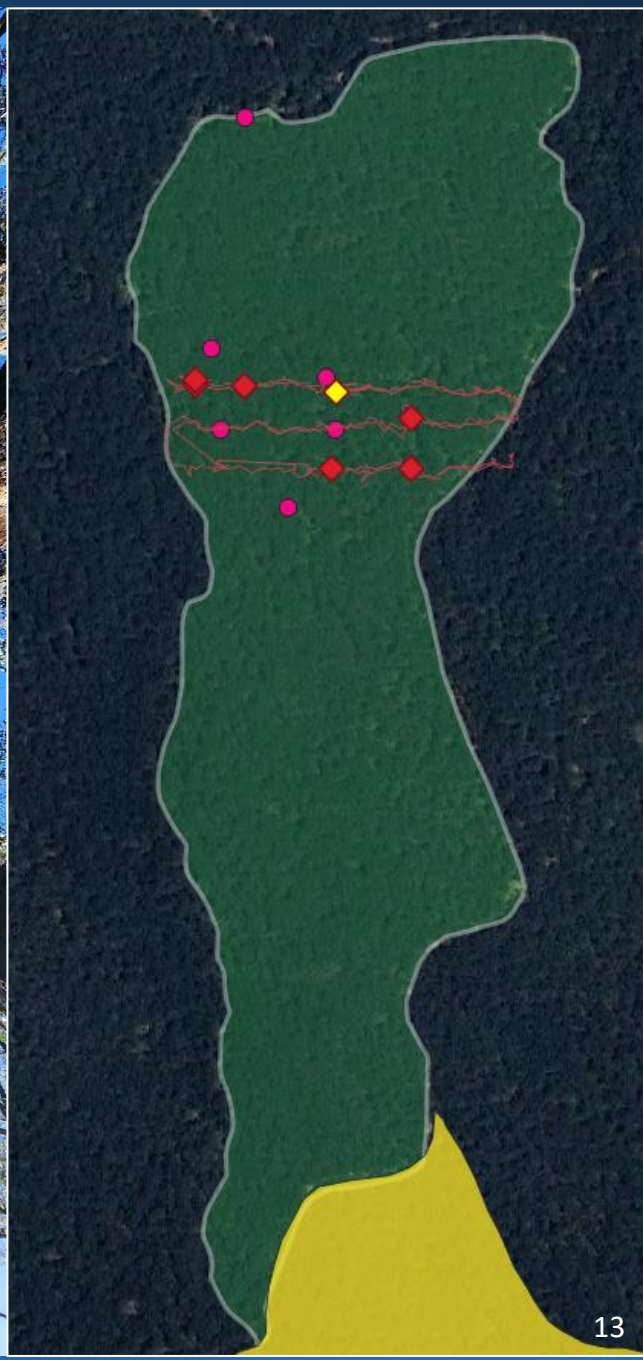

Spotlighting observations

Research - fieldwork

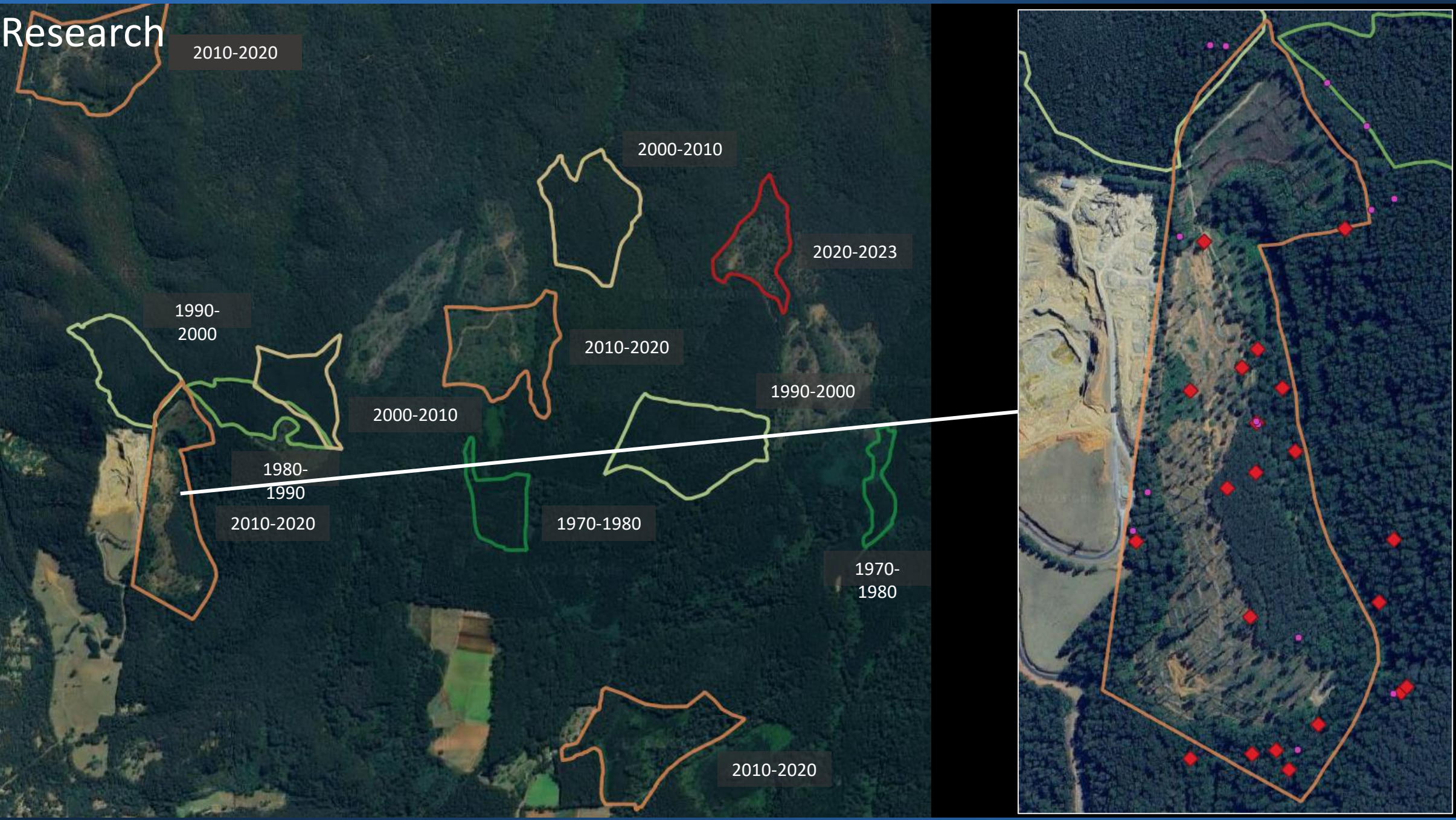
- Spotlighting surveys on 30 sites
- 3 transects, ~10ha area
- Vegetation surveys during the day
  - Determine veg. density effects on detectability
- Comparison of detection rates
- Assessment of animal behaviour
  - Recorded behaviour during spotlighting observation
  - Assessment of behaviour from drone footage







Research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Project partners and funding

The University of Melbourne – School of Agriculture, Food and Ecosystem Sciences
Dr. Benjamin Wagner, Dr. Raphael Trouvé, A/Prof. Craig Nitschke
Contact: benjamin.wagner@unimelb.edu.au

VicForests
Bill Paul, Alex Van Der Meer Simo, Mike Ryan, Jess Peart
Contact: bill.paul@vicforests.com.au

Department of Energy, Environment and Climate Action (DEECA)
Dr. Sarah Garnick
Contact: sarah.Garnick@deeca.vic.gov.au

Ecology and Restoration Australia – www.eramus.com.au
Alana Begg & Dr. Jo Isaac
Contact: admin@eraus.com.au

PC: Christoph Parsch