



Virtual fences do not affect wallaby and possum roadkill rates

Ron Day, local citizen scientist

Christine Connelly, Victoria University

Duncan Sutherland, Phillip Island Nature Parks



VICTORIA UNIVERSITY



'Virtual fencing'

- Triggered by approaching headlights
- Flashing lights and siren sounds
- Operates at night
- 90% roadkill reduction in ungulates



Evidence of success?

CSIRO PUBLISHING

Australian Mammalogy, 2019, **41**, 205–211

<https://doi.org/10.1071/AM18012>

Roadkill mitigation: trialing virtual fence devices on the west coast of Tasmania

Samantha Fox^{A,B,D}, Joanne M. Potts^C, David Pemberton^A and Dale Crosswell^A

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Review

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animals

Article

A Trial of a Solar-Powered, Cooperative Sensor/Actuator, Opto-Acoustical, Virtual Road-Fence to Mitigate Roadkill in Tasmania, Australia

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Can virtual fences reduce wombat road mortalities?

Hayley J. Stannard^{A,*}, Marie B. Wynan^B, Ray J. Wynan^B, Brendan A. Dixon^C, Sujatha Mayadunnage^C, Julie M. Old^C

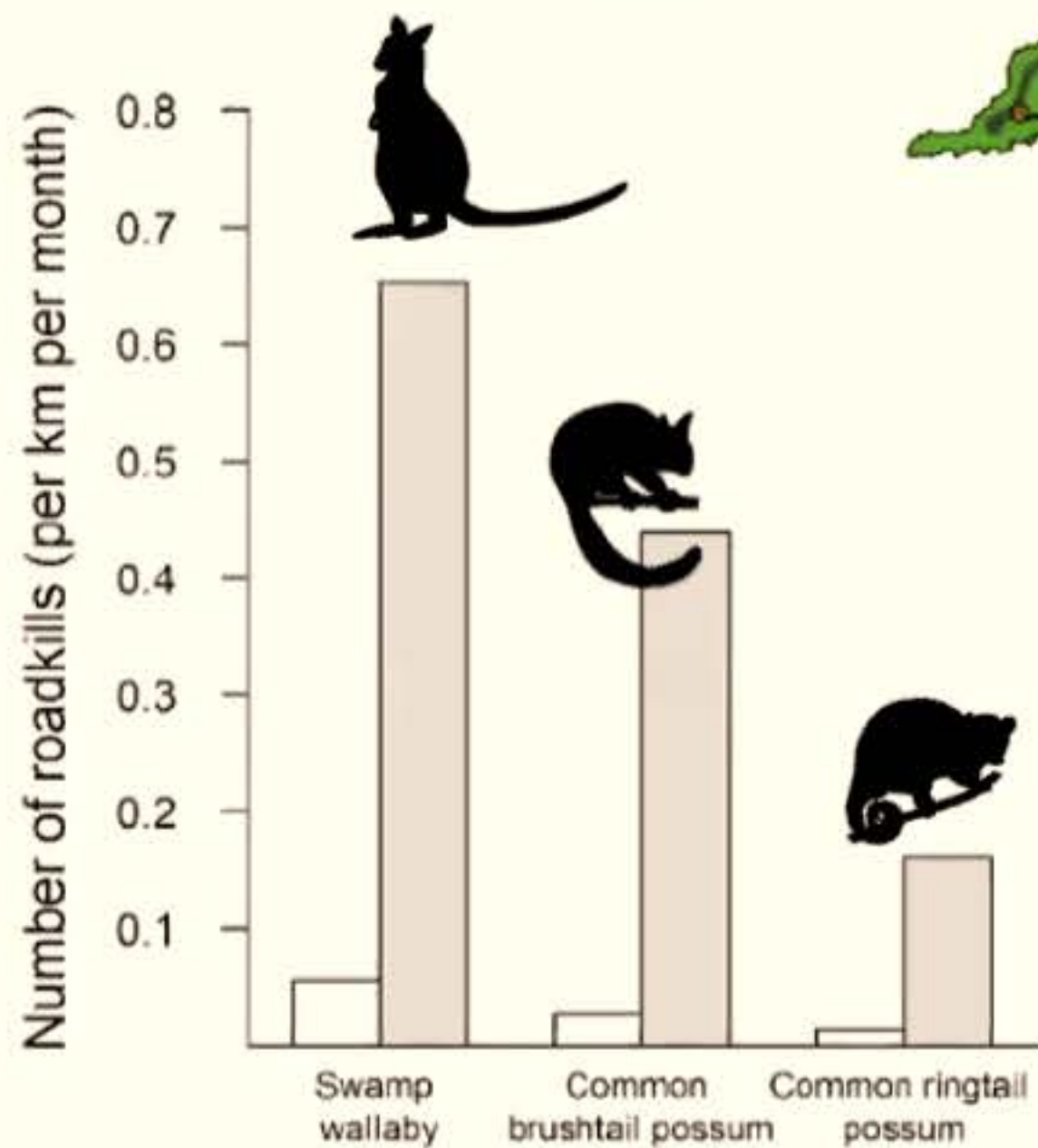
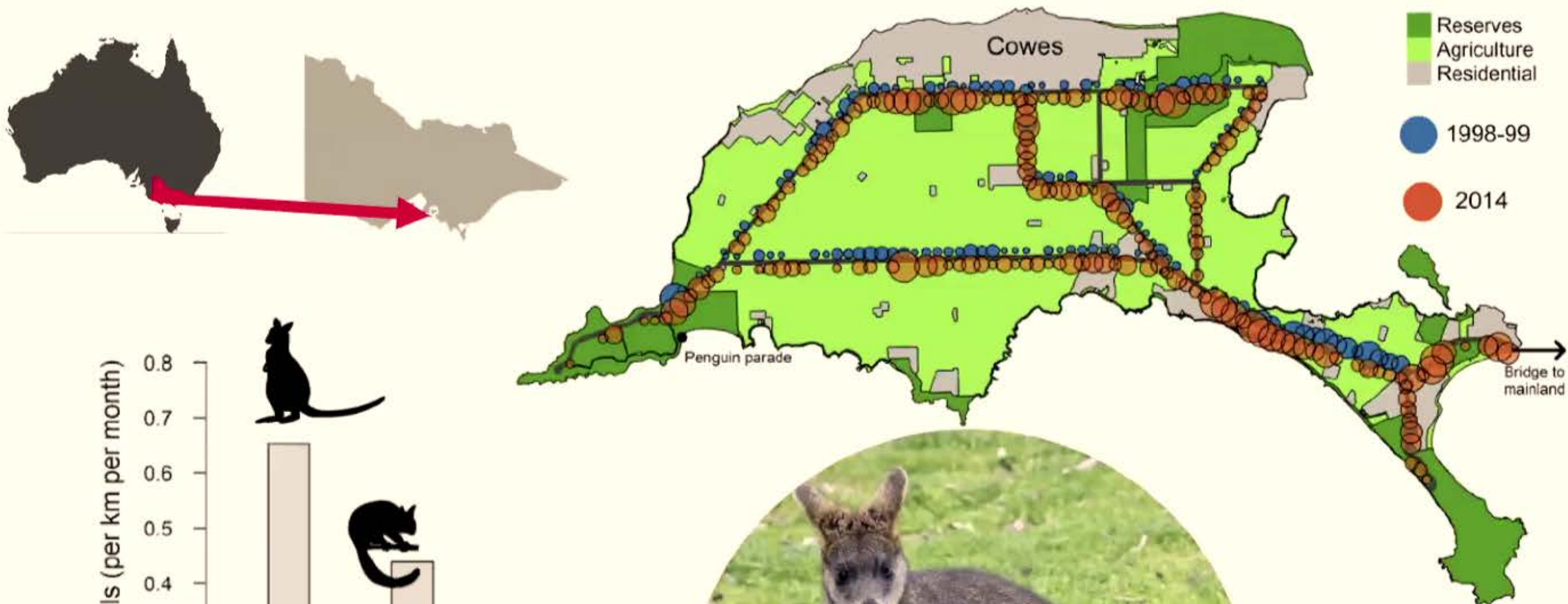
^A School of Animal and Veterinary Sciences, Charles Sturt University, Wagga Wagga, NSW 2678, Australia

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^C School of Science, Hawkesbury Campus, Western Sydney University, Penrith, NSW 2751, Australia

Review

Review



Rendall et al. 2021

Methods

- Site: Cowes-Rhyll Rd, 3.6 km, between conservation reserves
 - Zones: fenced/unfenced sections, buffers
 - Design: three years, BACI (2019-20) → crossover (2020-21)
 - Surveys: 3-4 times per week, geolocated + photo (Ron)
 - Analysis: GAMM, BACI and crossover separately, monthly counts
- roadkill ~ treatment * year + s(survey)*
correlation structure: survey | region



Year one – ‘BEFORE’

All unfenced

Year two – ‘AFTER’

Purple fenced

Yellow unfenced

Year three – ‘CROSSOVER’

Purple unfenced

Yellow fenced

Grey = buffer zones



Methods

- Site: Cowes-Rhyll Rd, 3.6 km
- Zones: fenced/unfenced sections, buffers
- Design: three years, BACI (2019-20) → crossover (2020-21)
- Surveys: 3-4 times per week, geolocated + photo (Ron)
- Analysis: GAMM, BACI and crossover separately, monthly counts

$$\textit{roadkill} \sim \textit{treatment} * \textit{year} + s(\textit{survey})$$

correlation structure *survey* | *segment*

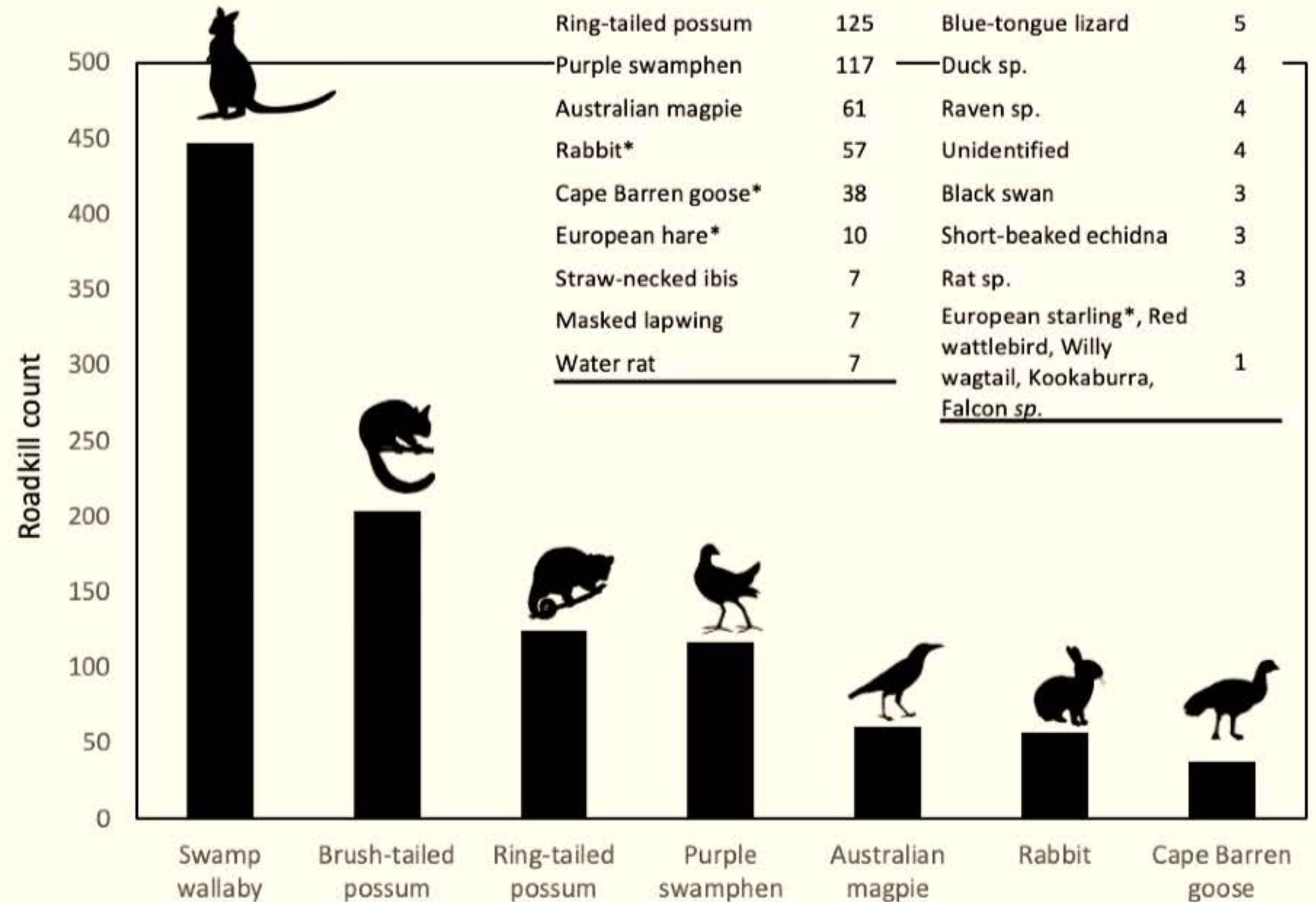
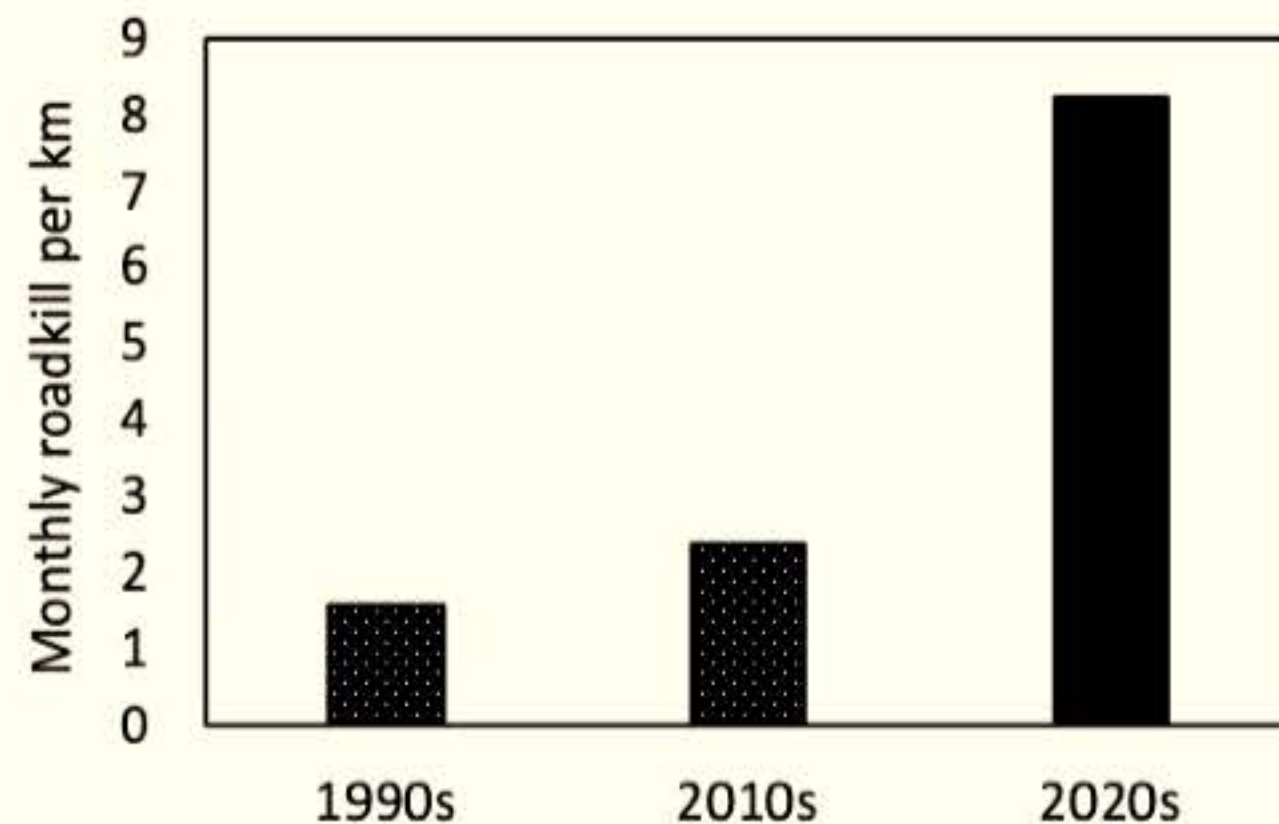
Results

- 1/4/2019 → 30/5/2022
 - 38 months
- 531 surveys by Ron
 - 1,127 roadkill instances
 - 24 species



The toll

- By month:
 - 8.24 / km in 2020s *c.f.*
 - 1.59 / km in 1990s*
 - 2.39 / km in 2010s*



* Note that Rendall et al. (2021) explored a wider area –provided to highlight the extremely high values of roadkill on this stretch of road.

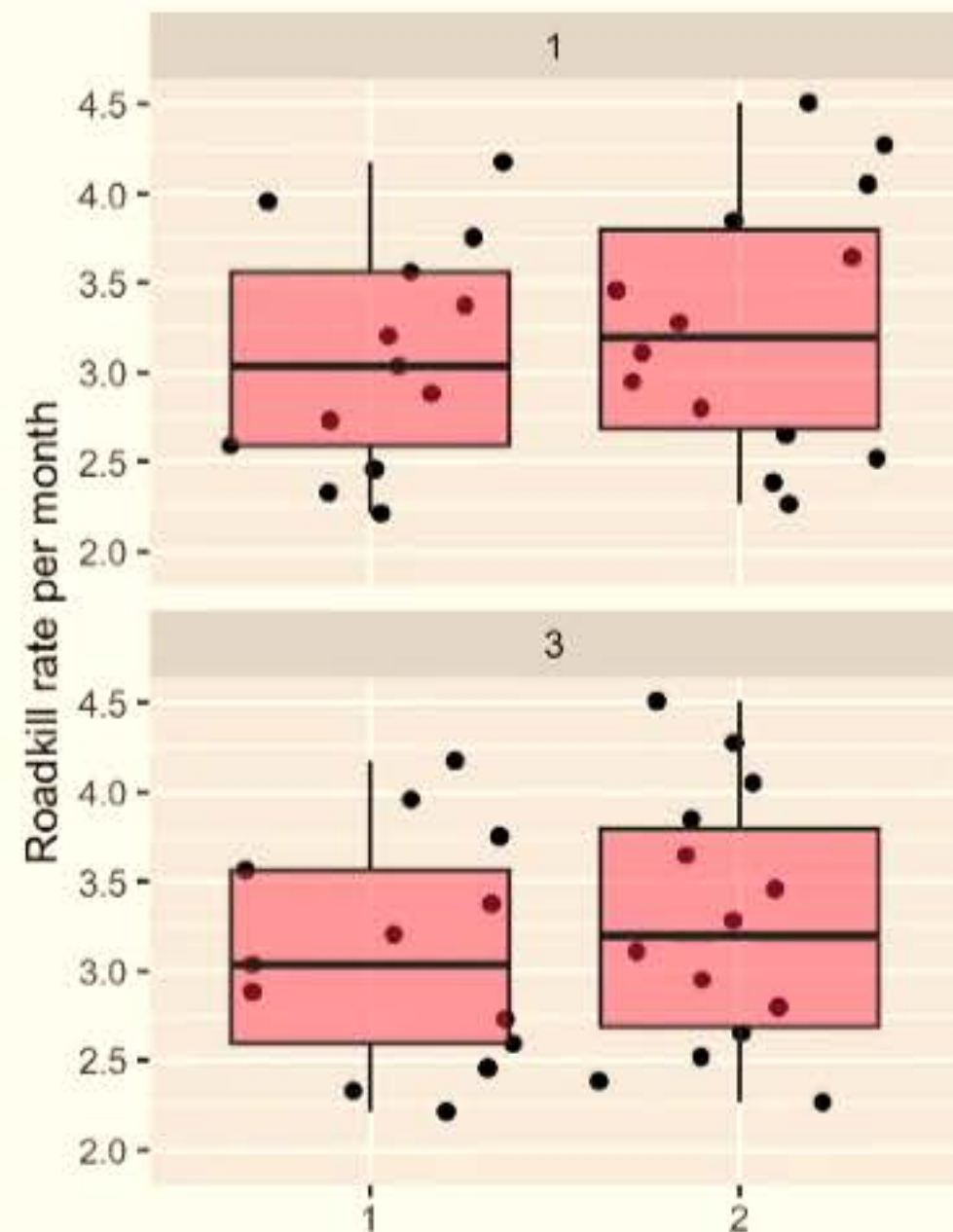
Data for 1990s and 2010s via Rendall et al. 2021

Analysis: total roadkill

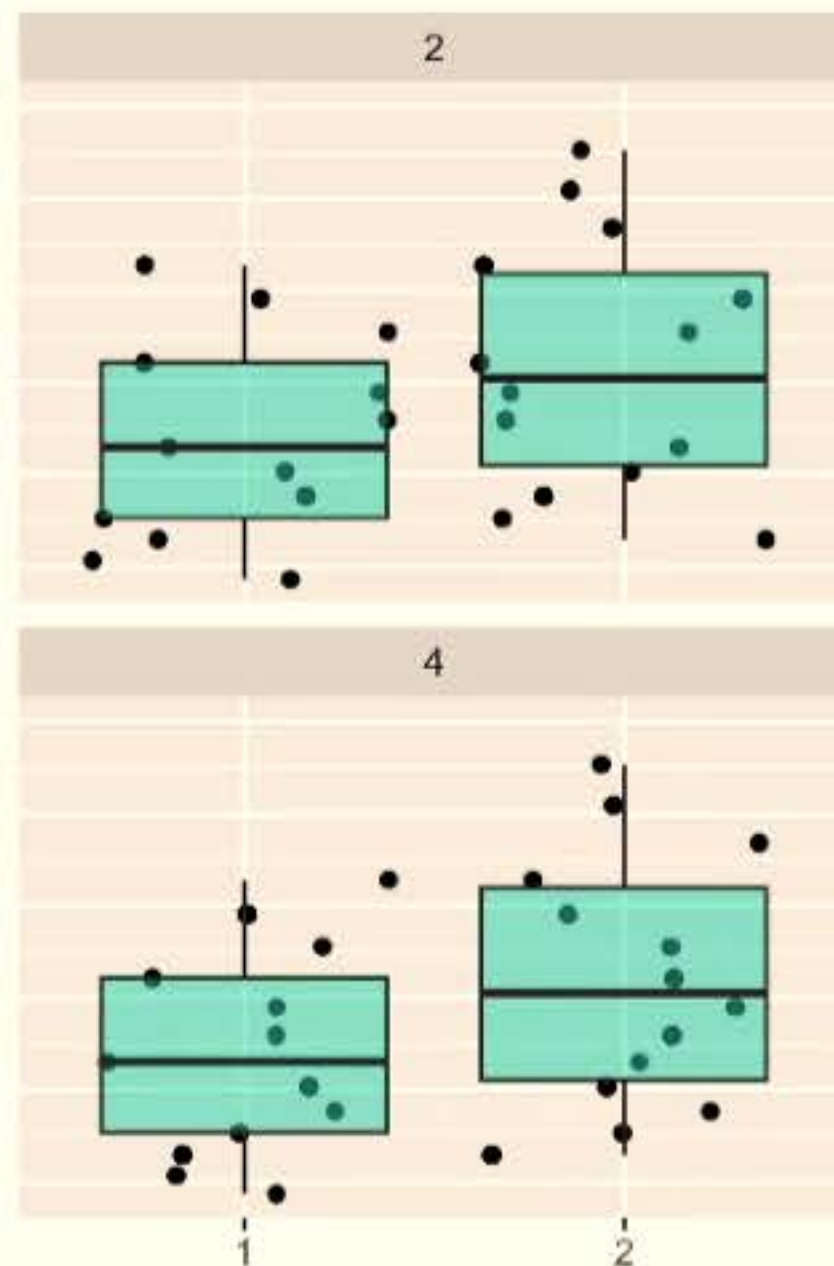


BACI

impact



control

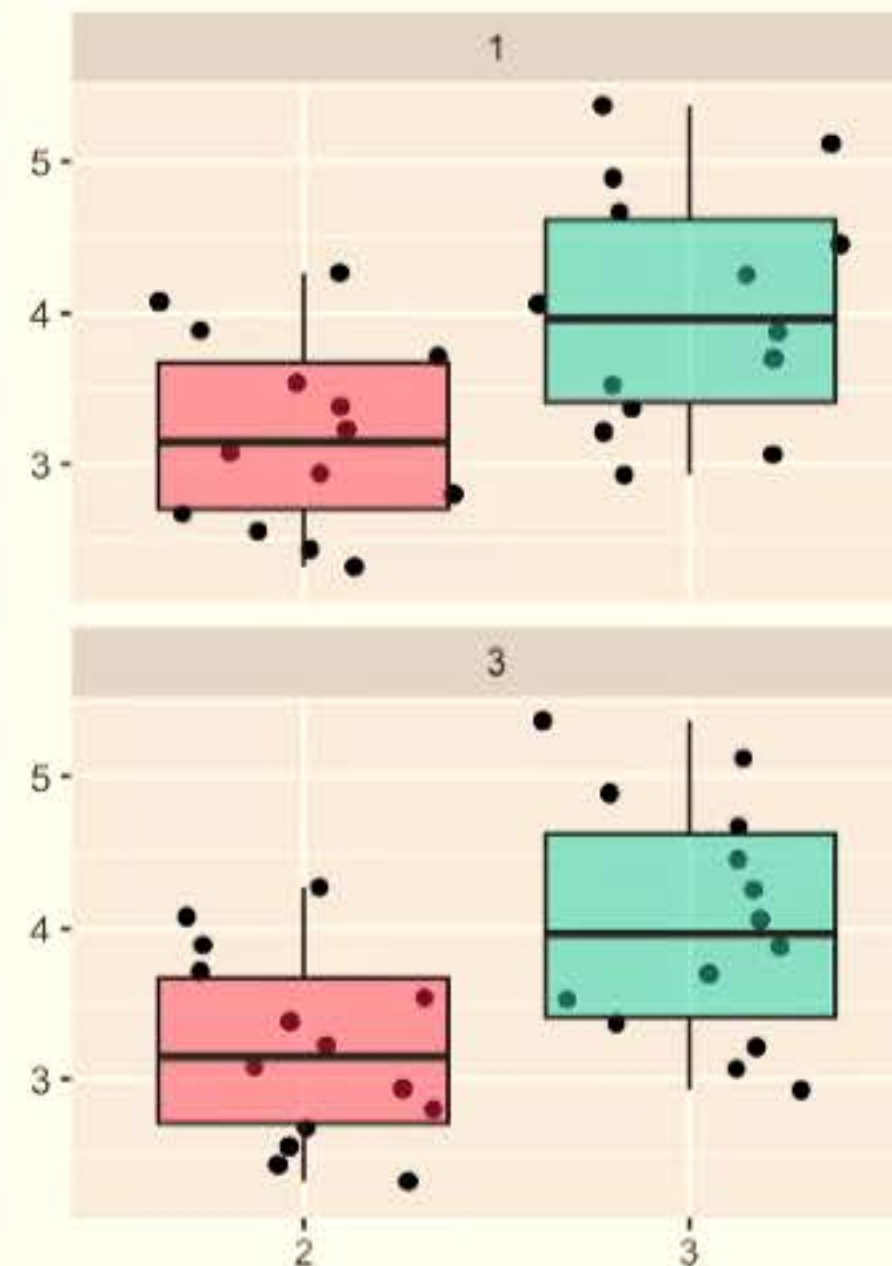


Year

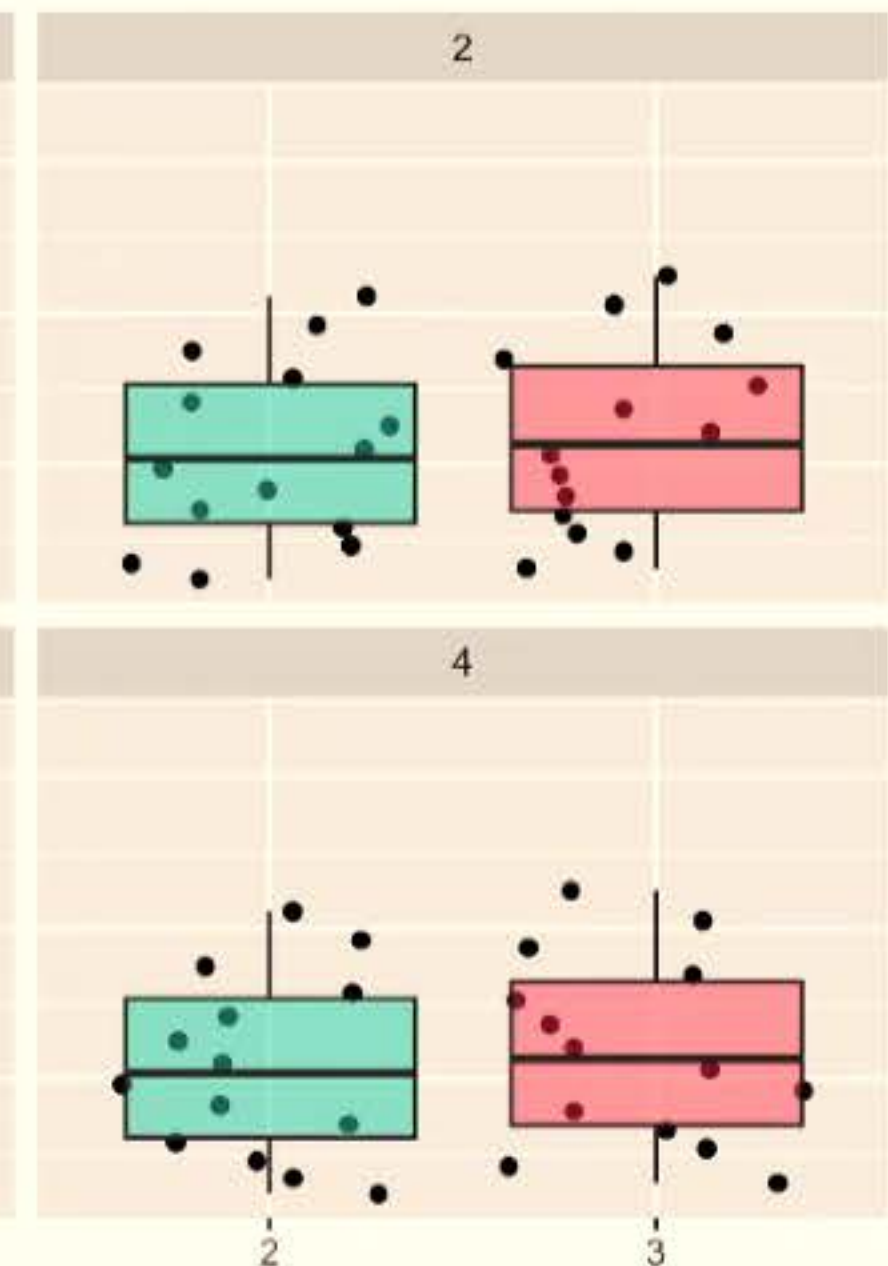
p = 0.7711

CROSSOVER

fenced → unfenced



unfenced → fenced



Year

p = 0.2858

treatment
fenced
unfenced

* Notes: 1) Roadkill rate values are per segment, not per km. 2) All segments were unfenced in Year 1.

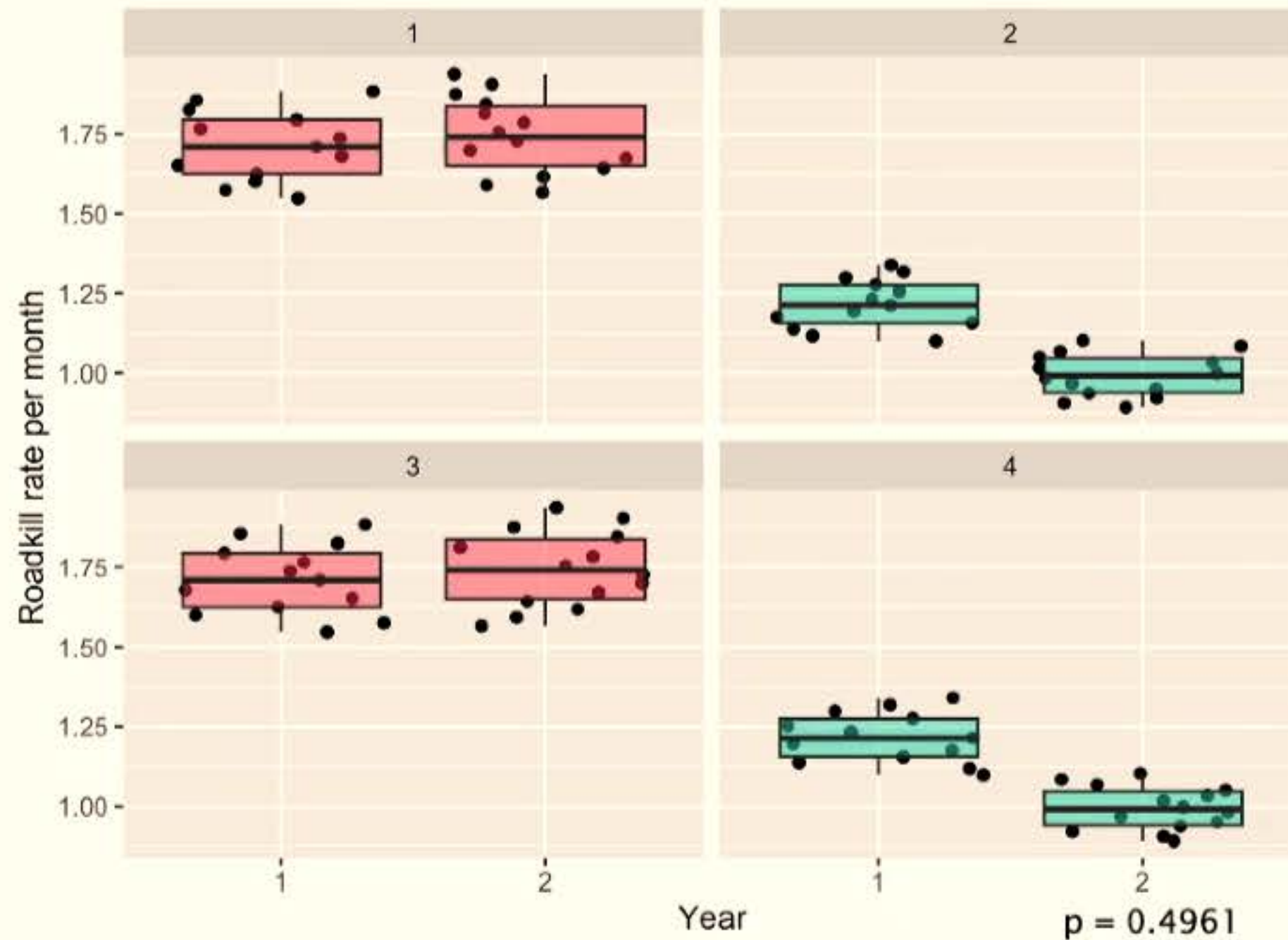
Analysis: wallaby roadkill



BACI

impact

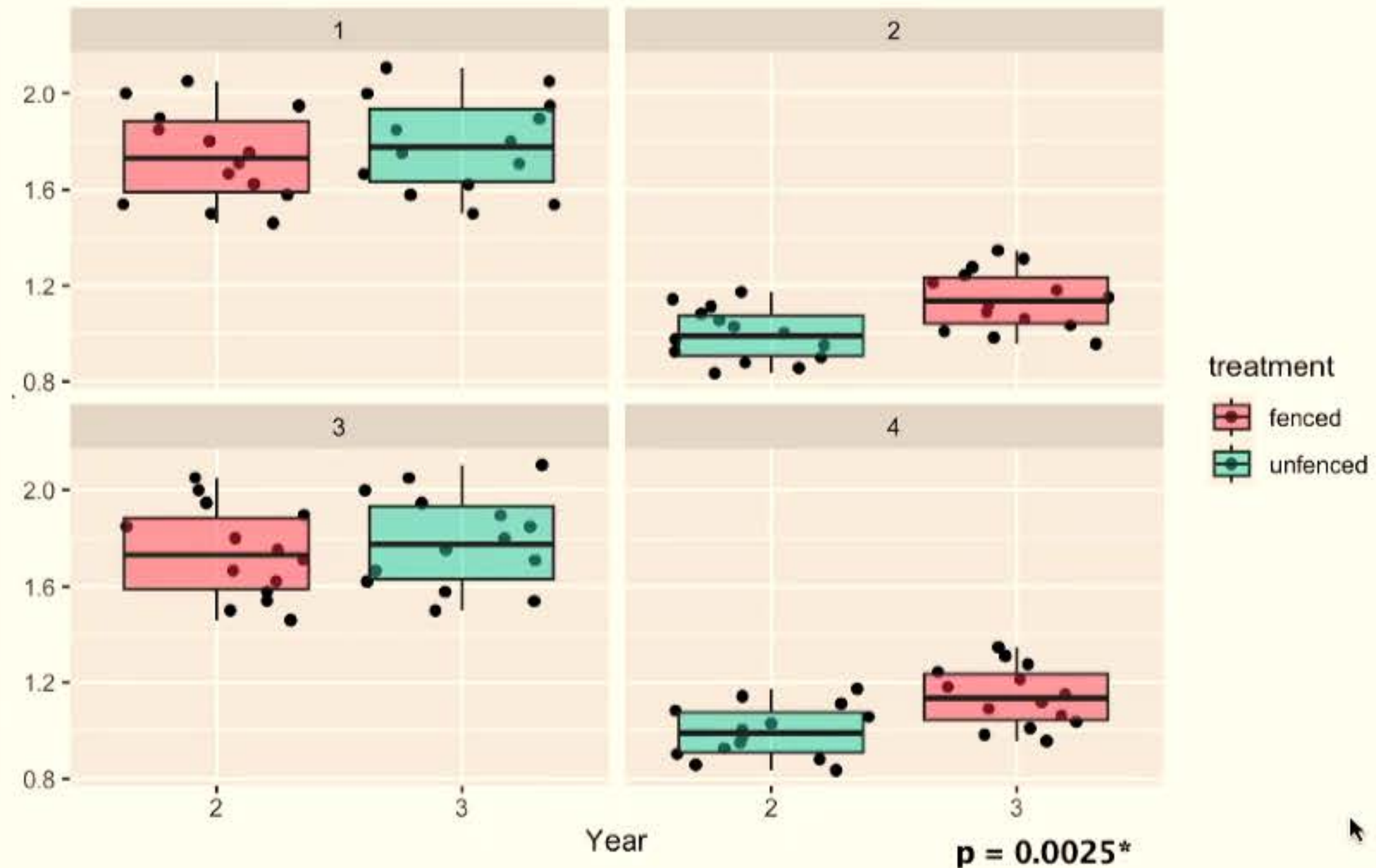
control



CROSSOVER

fenced → unfenced

unfenced → fenced



* Notes: 1) Roadkill rate values are per segment, not per km. 2) All segments were unfenced in Year 1. 3) * indicates significant result.

Interpretation

- **No significant effect of virtual fence**
- Location important
 - road shape, habitat
- More data needed
 - different regions, species
- Habituation?
 - hard!





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