

# Opossum Python Project Update

Michael Cove and Jeremy Dixon  
NC Museum of Natural Sciences  
Crocodile Lake National Wildlife Refuge



22<sup>nd</sup> Annual Meeting



Everglades Cooperative Invasive Species Management Area



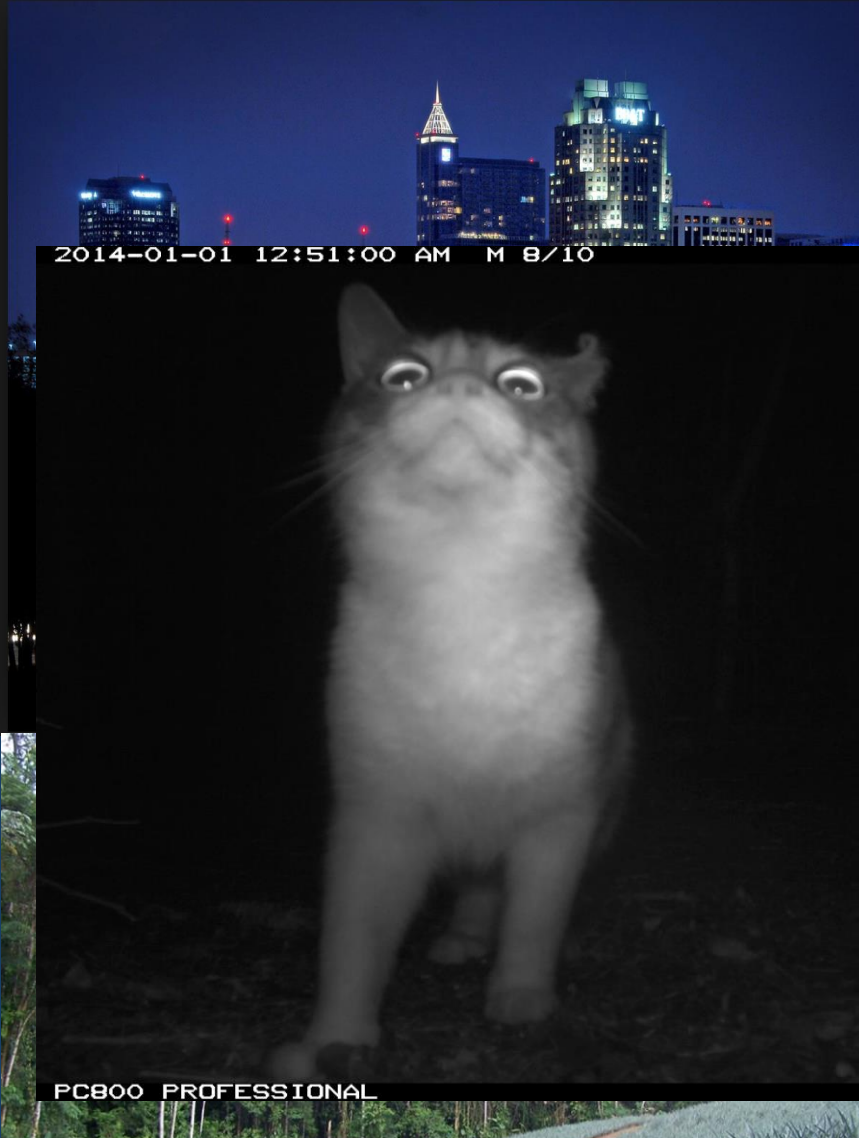
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# Ecosystem Engineers



Pack rats (*Neotoma* spp.): Keystone ecological engineers?

Walter G. Whitford<sup>a</sup>, Yosef Steinberger<sup>b,\*</sup>



## Invasional meltdown: Invader–invader mutualism facilitates a secondary invasion

PETER T. GREEN,<sup>1,4</sup> DENNIS J. O'DOWD,<sup>2</sup> KIRSTI L. ABBOTT,<sup>2</sup> MICK JEFFERY,<sup>3</sup> KENT RETALICK,<sup>3</sup>  
AND RALPH MAC NALLY<sup>2</sup>

2014-09-15 11:20:38 PM M 7/10



PC850 PROFESSIONAL

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2014-02-19 12:54:42 AM M 1/10

22°C



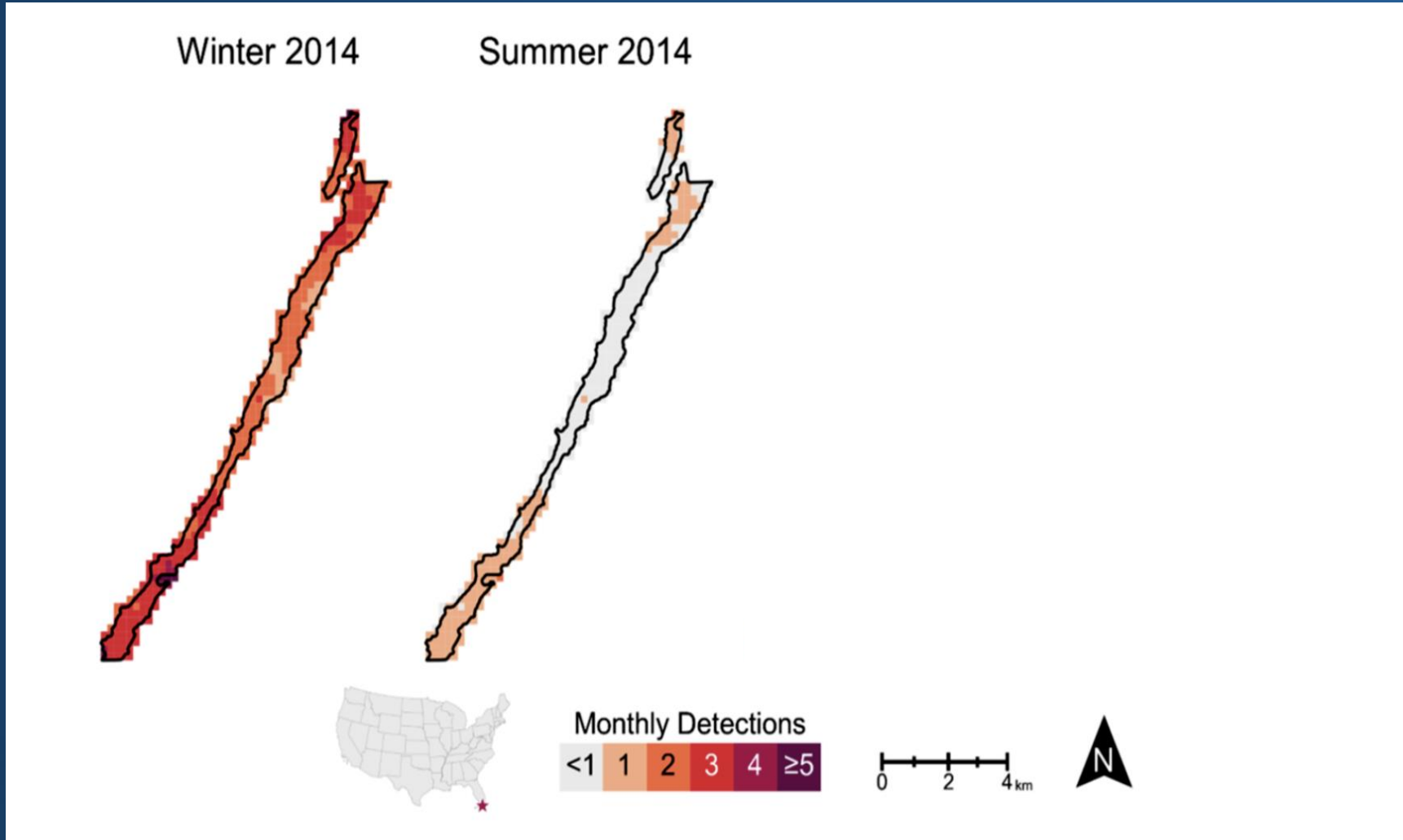
PC800 PROFESSIONAL

RECONYA



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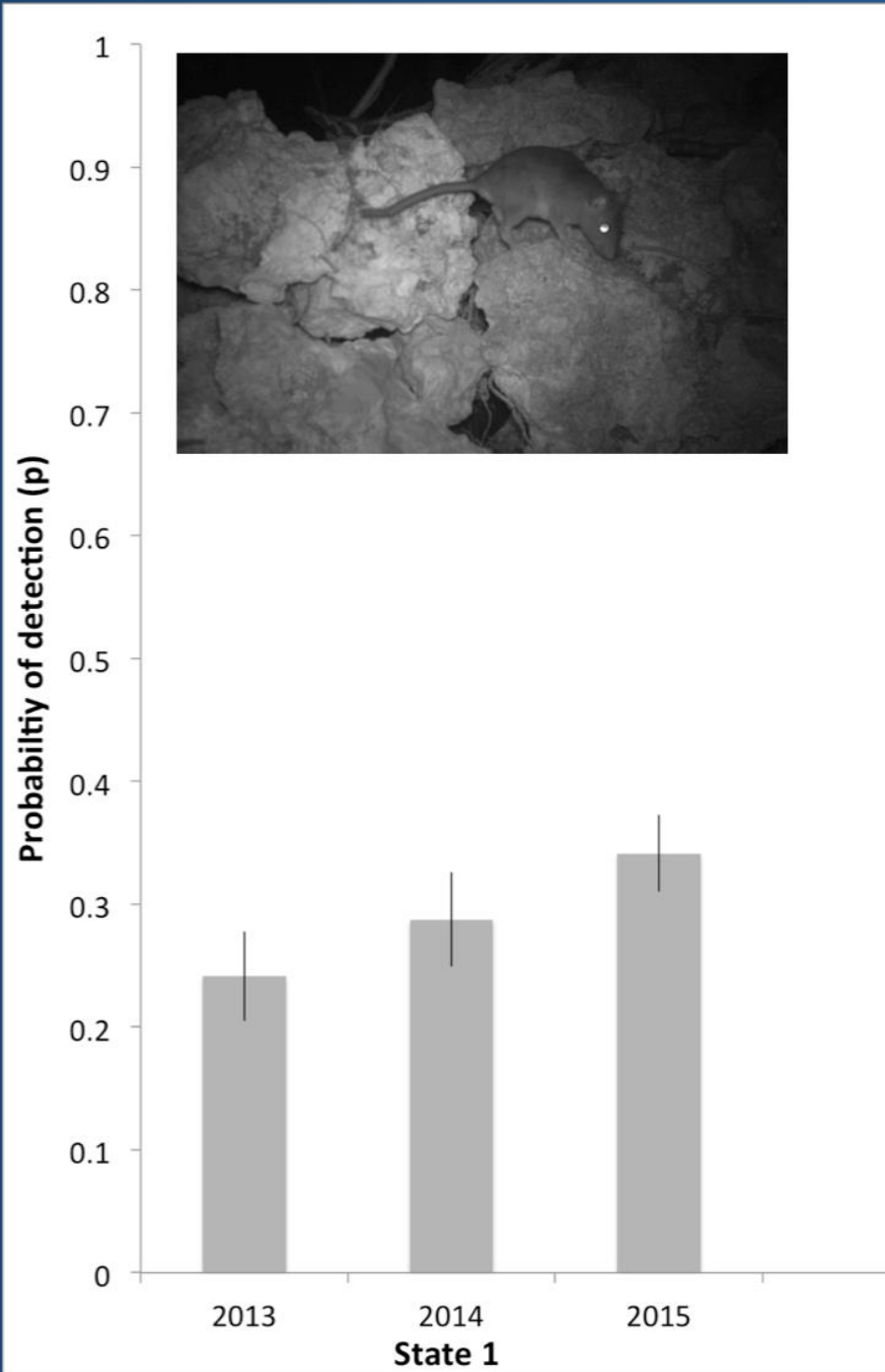
# Declines in Cats over Time

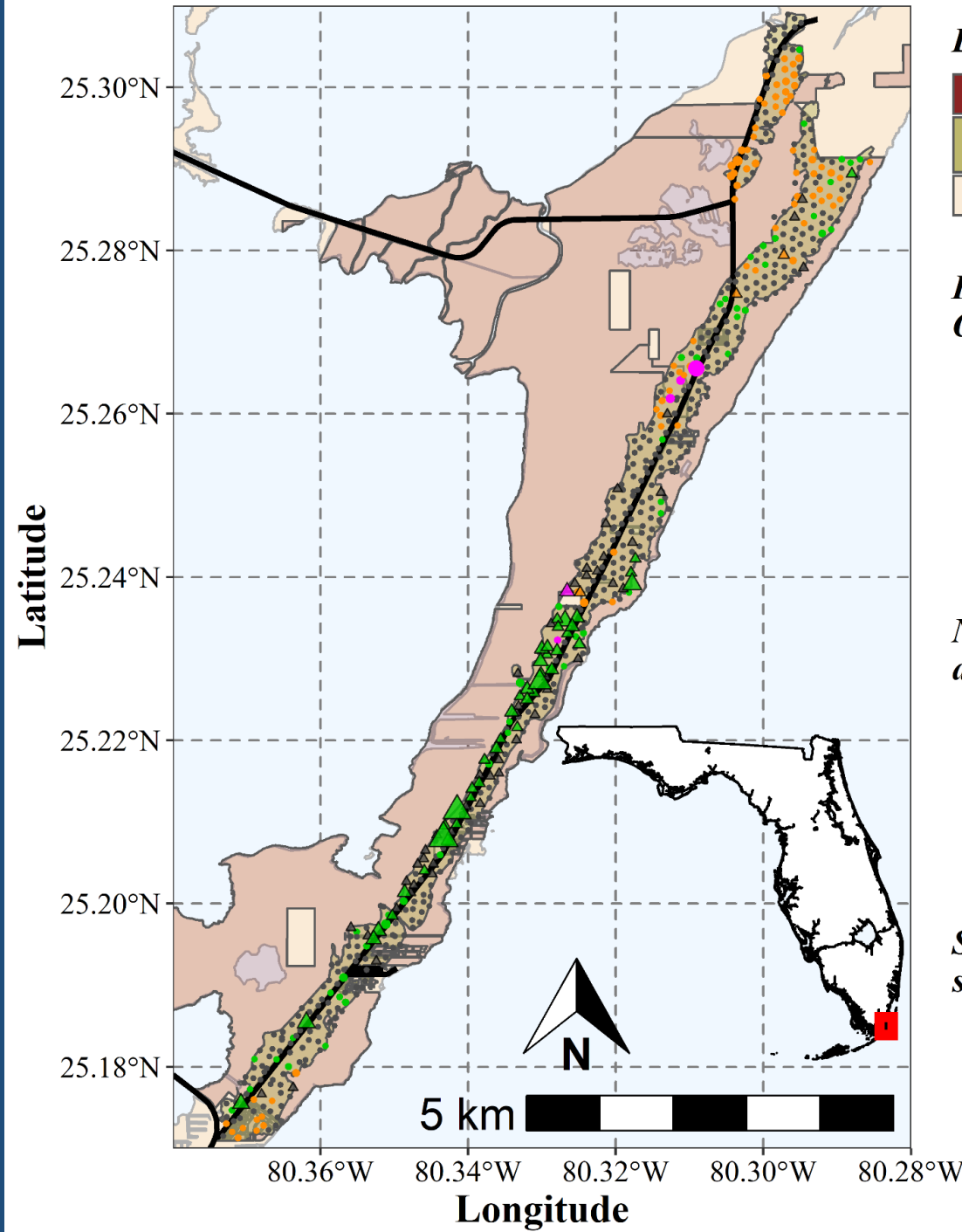


Herrera et al., 2022

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**Land Use**

- Protected Land
- Standing hardwood hammock
- Unprotected Land

**Rodent Site Occupancy**

- Neither
- Key Largo woodrat
- Black rat
- Both

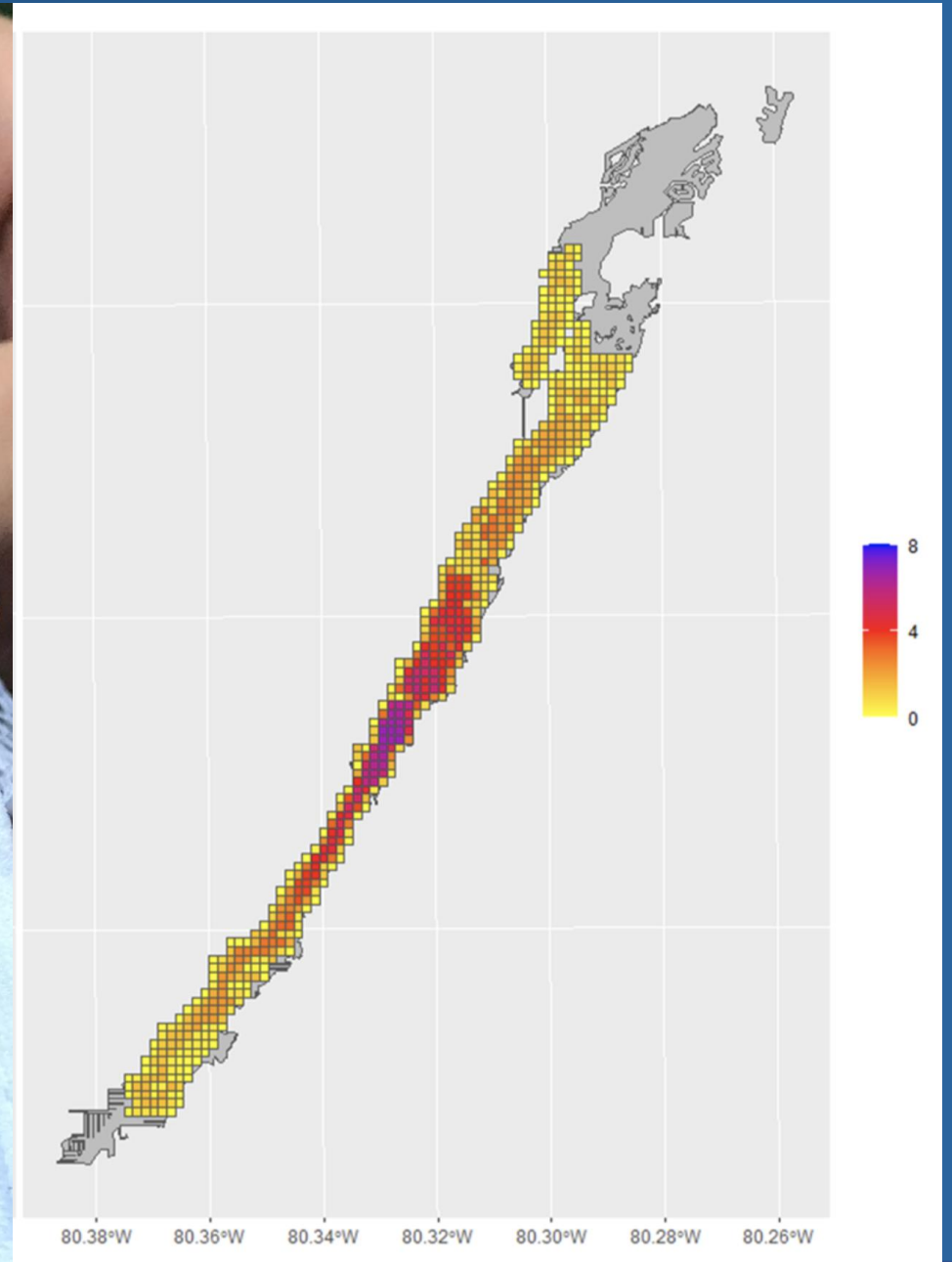
**Number of detections**

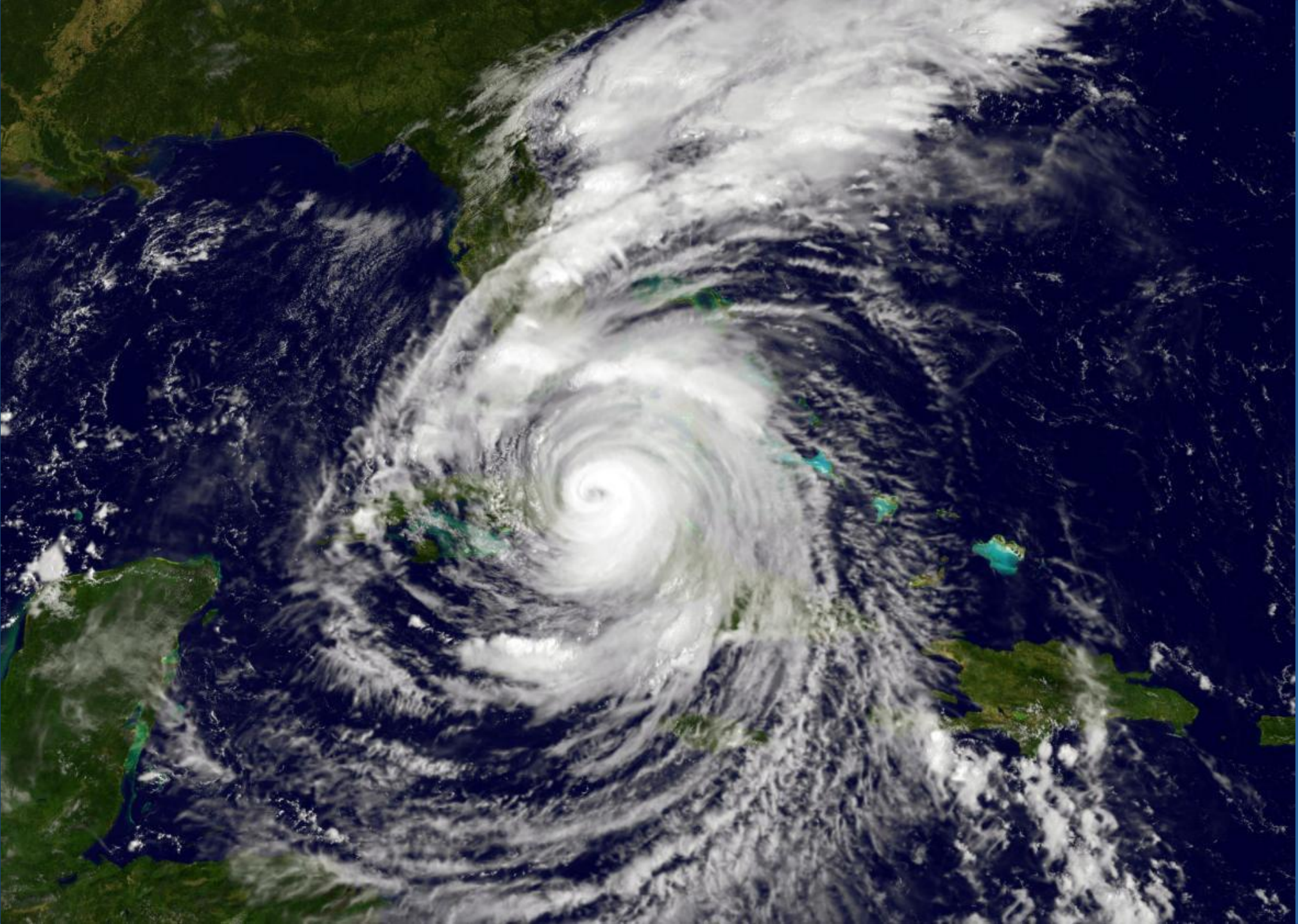
- 0
- 10
- 50
- 100+

**Stick stacking**

- No stick stacking
- Stick stacking

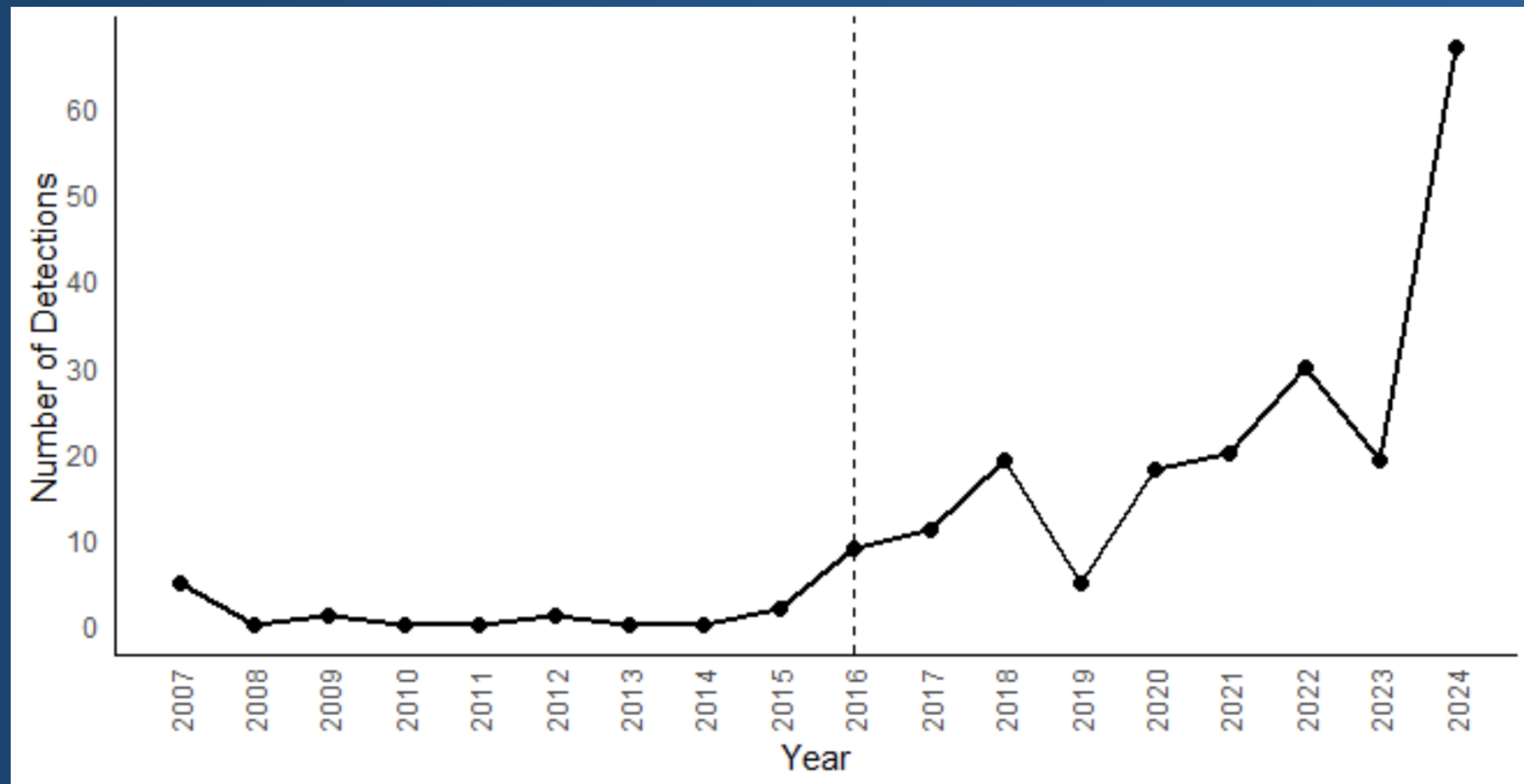
# Integrated SCR-Occupancy







# Python Prevalence





Lord et al., 2023



# Detecting Pythons



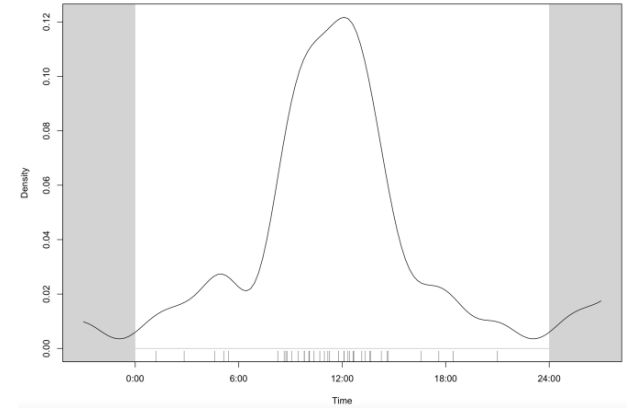
Motion-Triggered Detection



Timelapse Detection



### Diel Activity Patterns



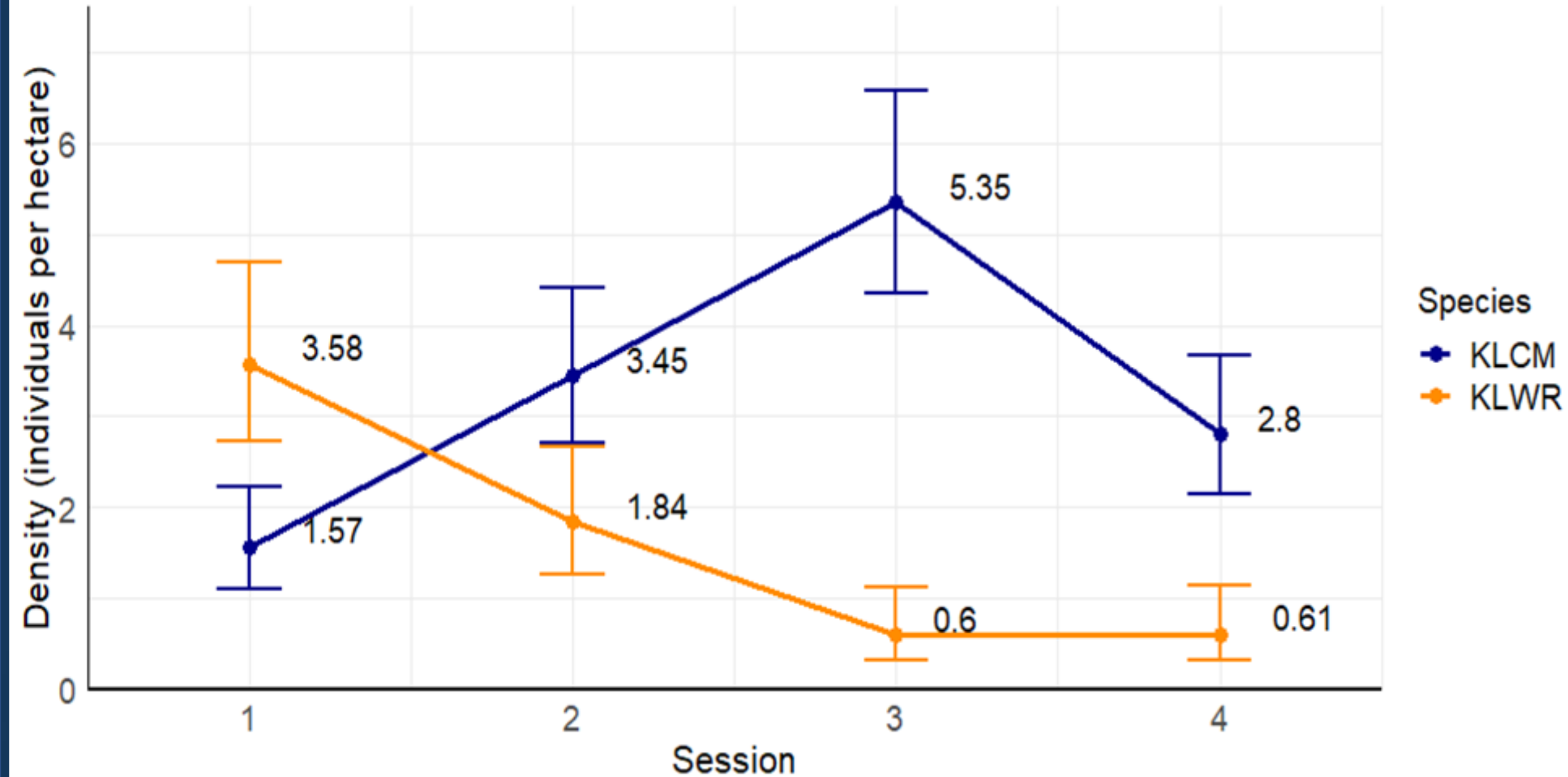
### Optimized Detection Surveys



Cove et al., 2023

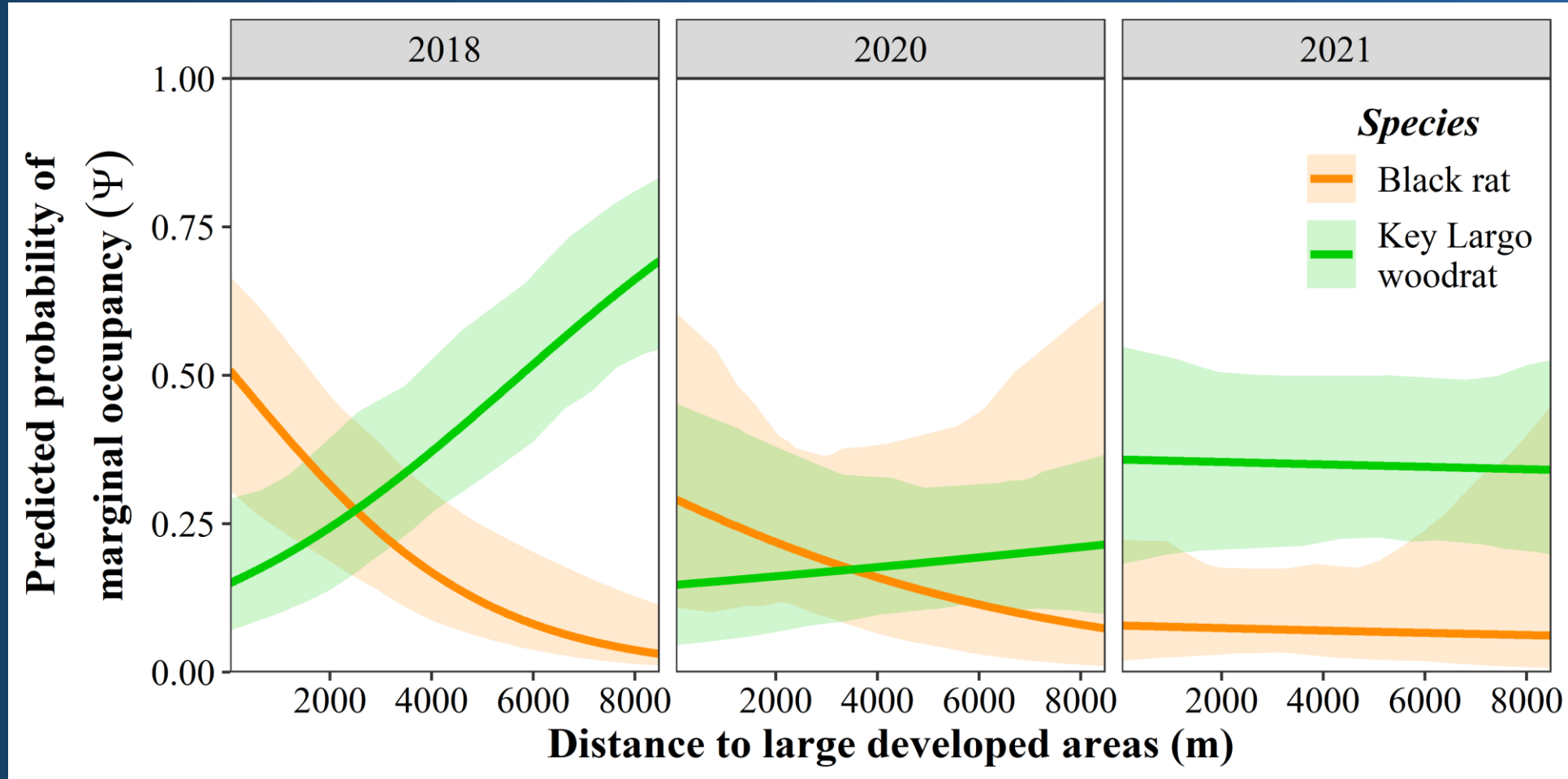


# KLCM and KLWR Density Estimates by Session



# Enigmatic Declines of *Rattus*

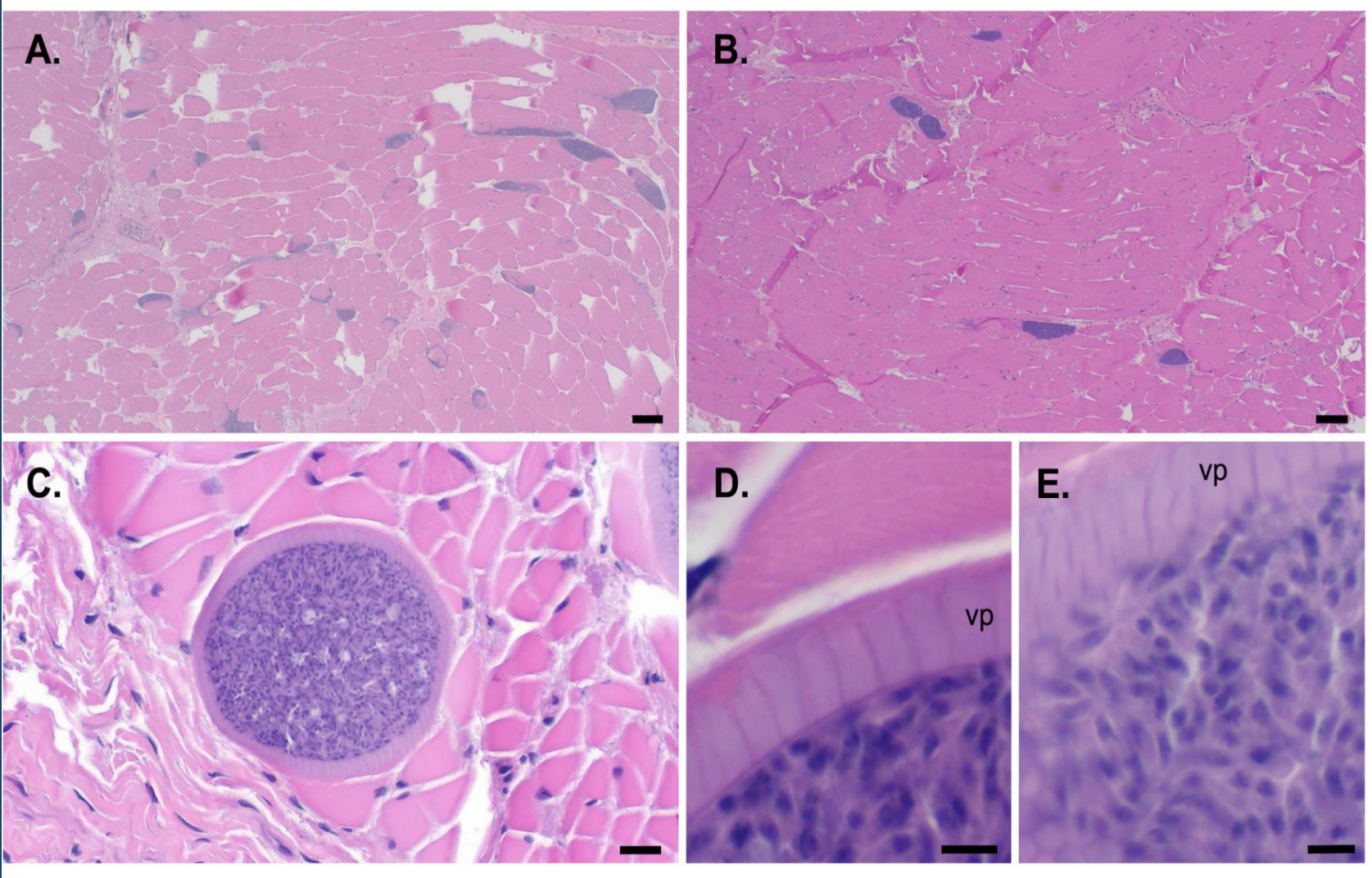
- Apparent collapse of *Rattus* releases KLWR



McDonald et al., 2024

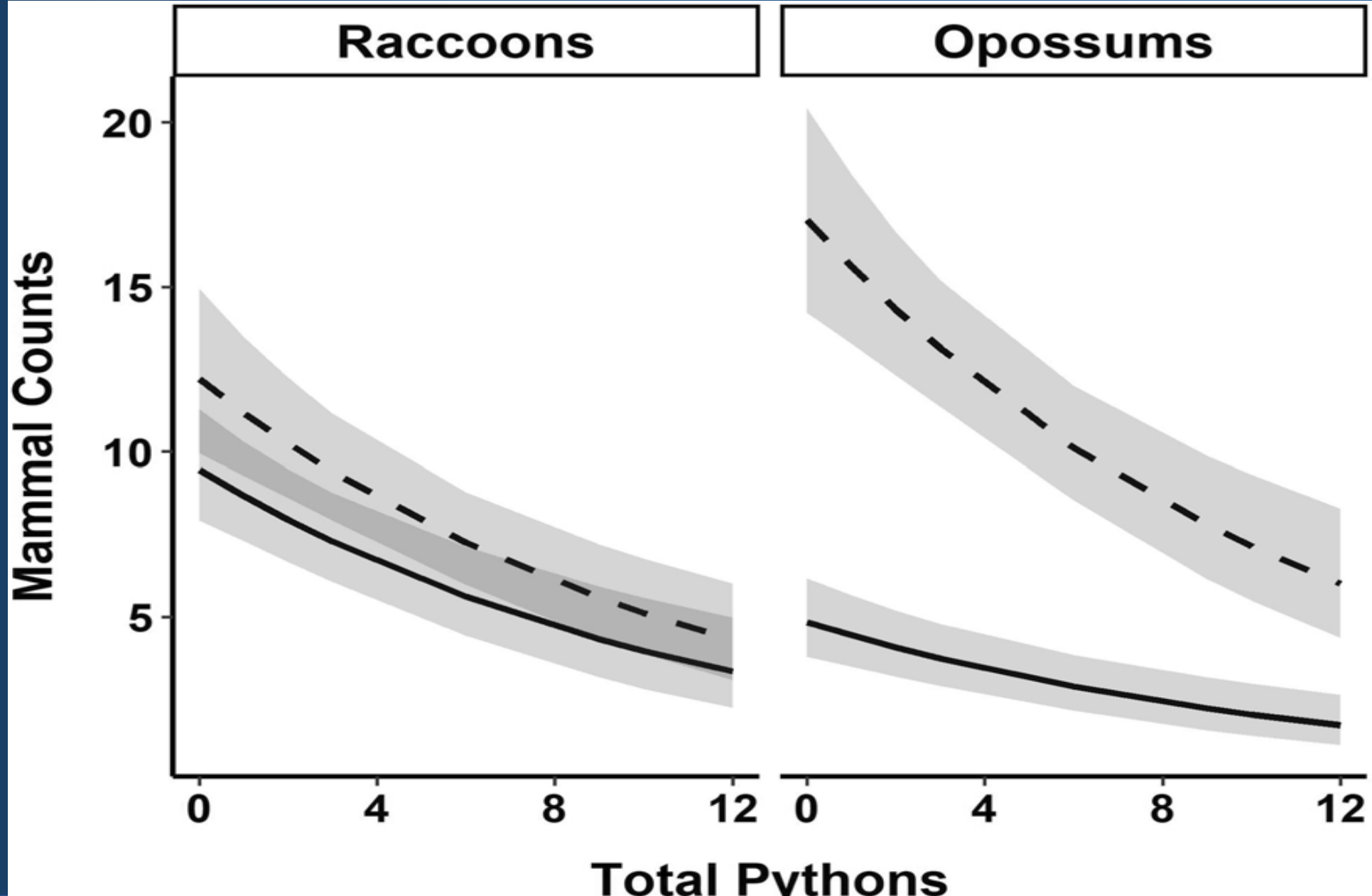


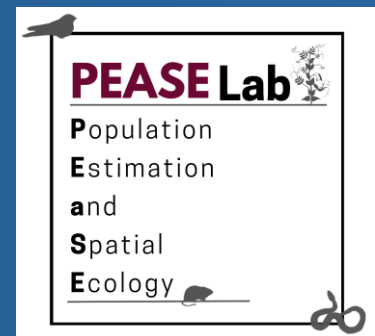
# The Rise of *Sarcocystis* spp





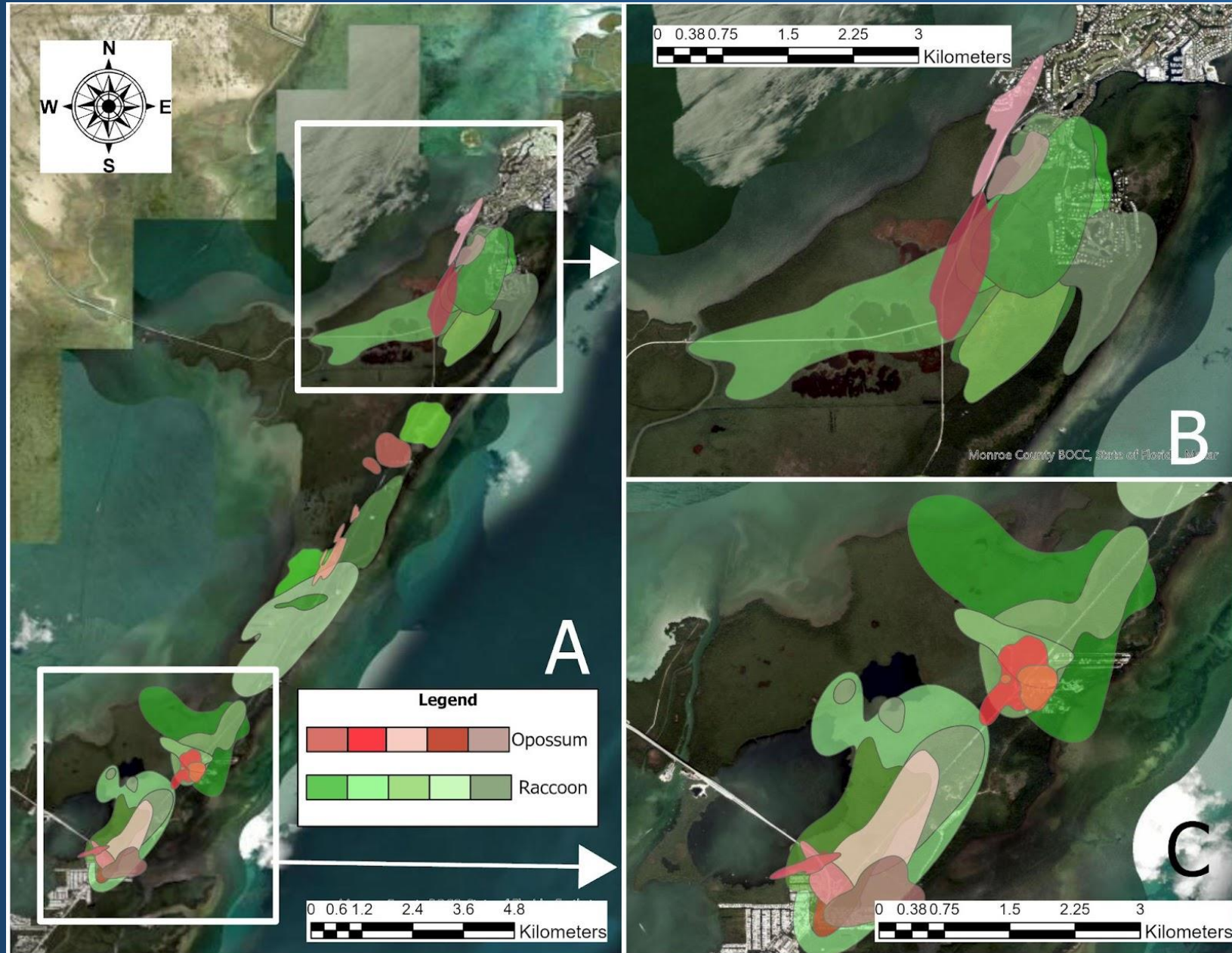
# What about Mesopredators?

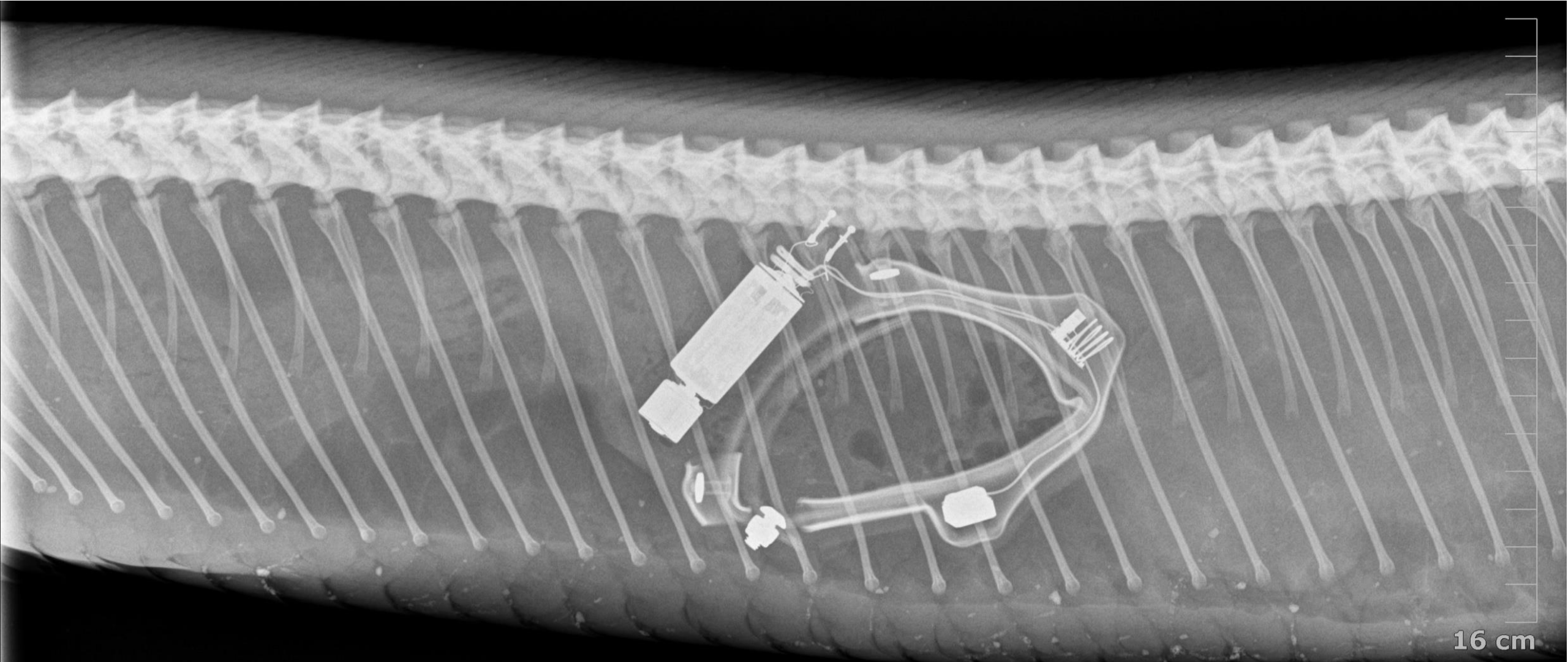




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# Mesopredator Natural History





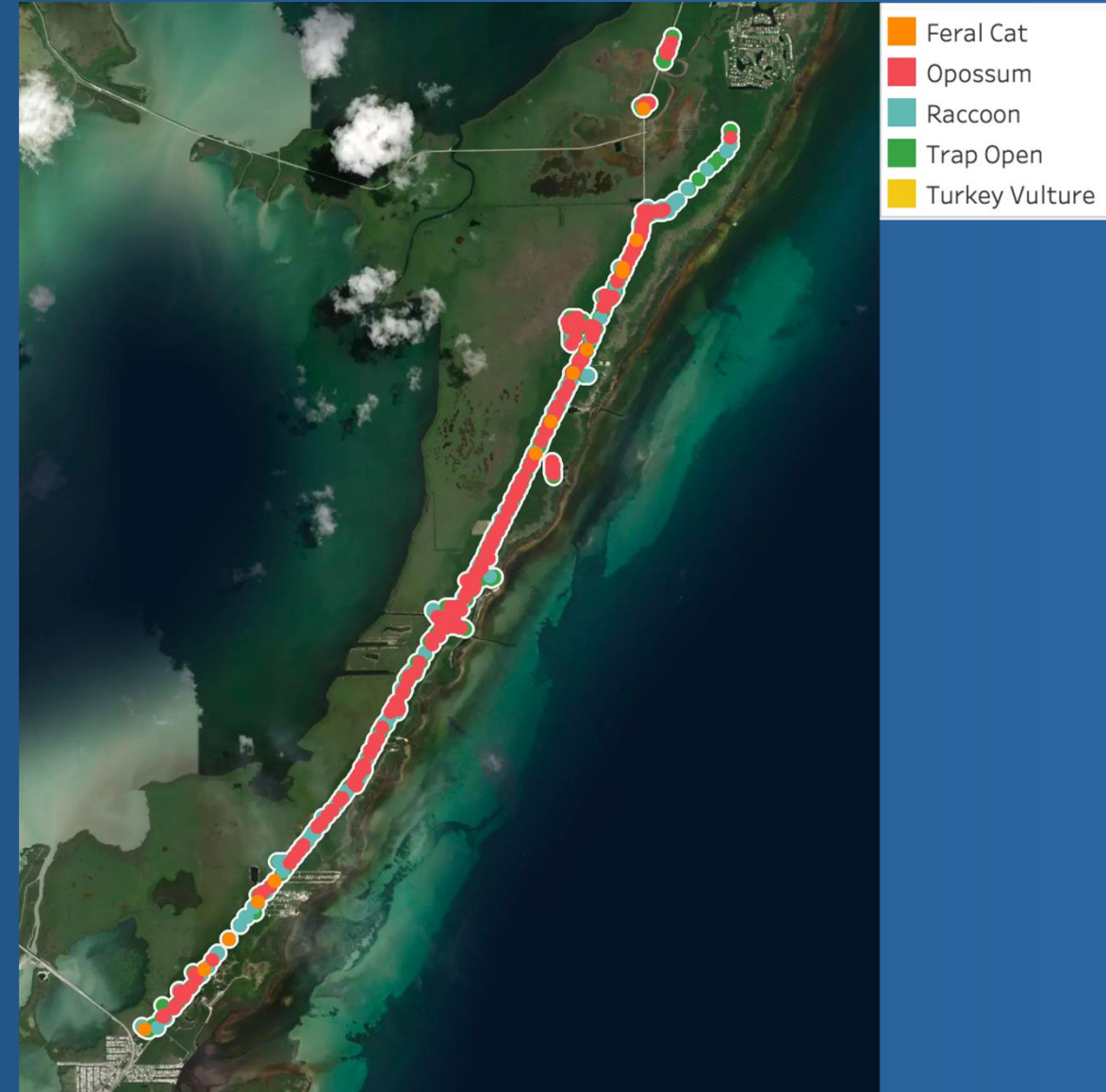
16 cm

Welleby Veterinary Hospital  
Radiology  
55 kVp  
3.0 mAs  
100mA

WL: 07041  
WW: 13950  
SNAKES  
WHOLE PROJECTION(VD)

# The OPP Trapping Effort

4,080 trapnights



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# Data Collection



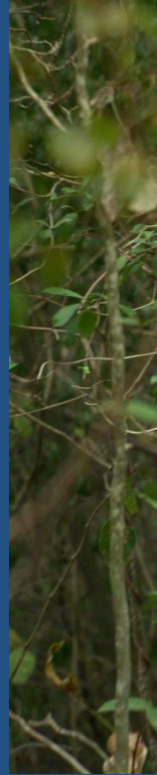
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# Collared Opossums

- 216 tagged
- 116 M
- 100 F
  
- 142 collared



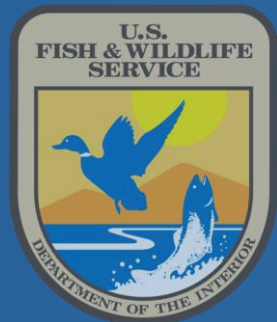
# Tracking Individuals



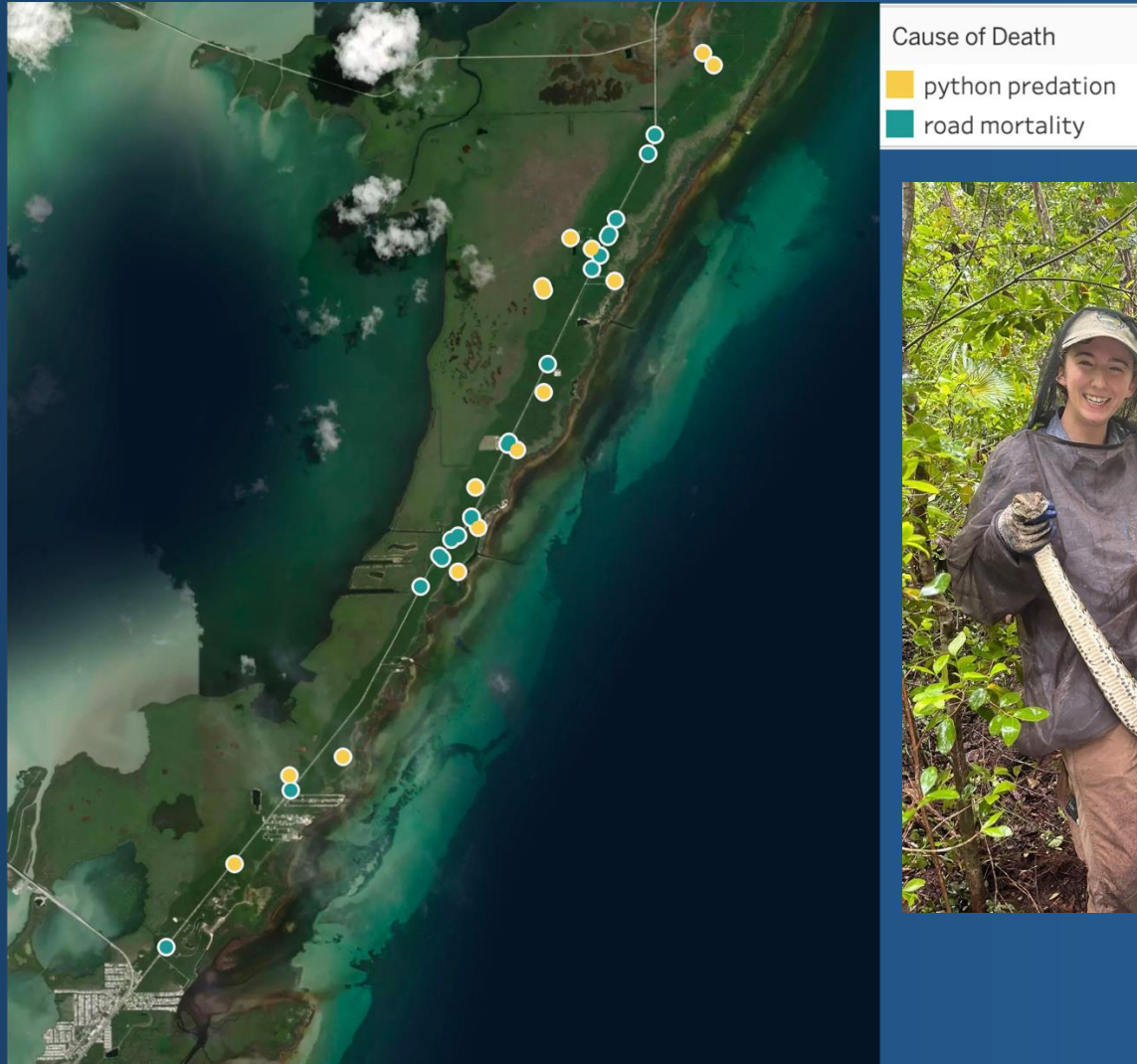
# Group Effort!



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# Cause-Specific Mortalities



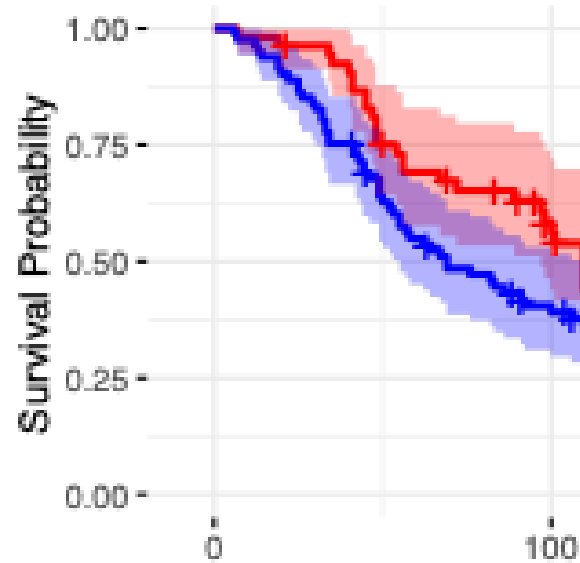
# Survival Estimates

146 collared opossums



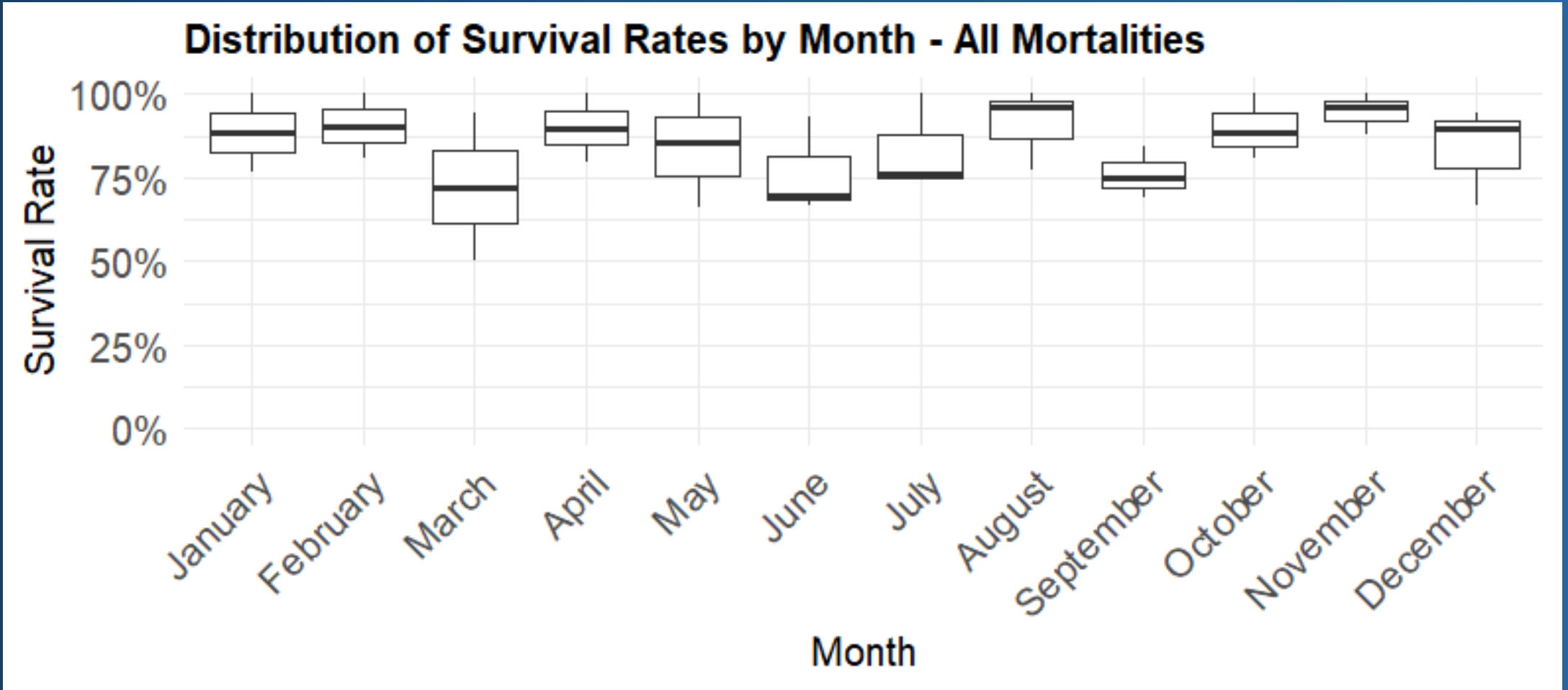
Kaplan–Meier Survival Curve by sex

Strata + fem + mal



Time (days)

# Monthly Cause-Specific Survival



# Comparing Methods



Table 1. Mean lengths (total and SVL) and weights of Burmese pythons (*Python bivittatus*) collected in Key Largo, FL, USA stratified by survey methods, 2023-2025

Method	Mean Total (cm)	Mean SVL (cm)	Mean Weight (g)	Total
Contractor	143.97	127.47	3,041.37	31
DOR	113.49	111.47	2,405.92	26
Incidental	239.24	210.37	9,606.72	28
Python prey	301.21	268.43	15,327.73	11
<b>Total</b>	<b>186.75</b>	<b>170.16</b>	<b>6725.20</b>	<b>96</b>

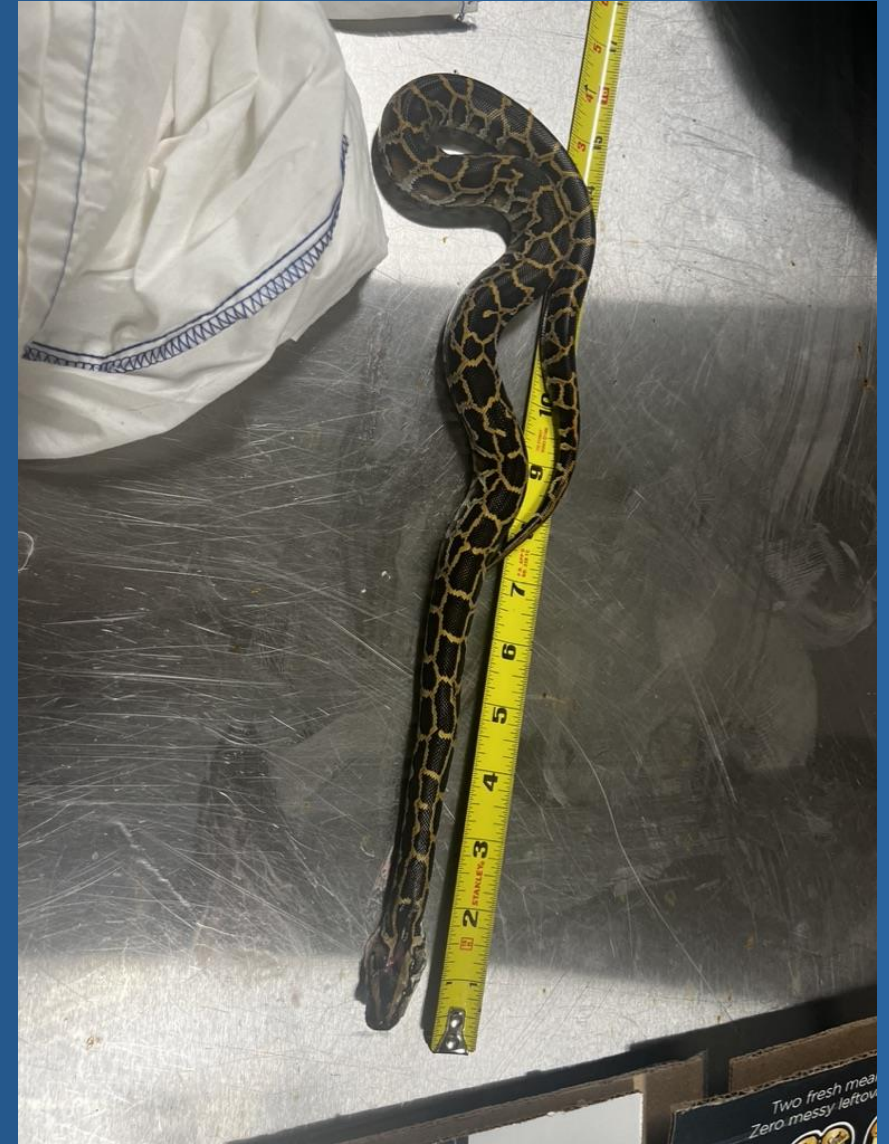


# Population Models

**Adult Female Survival**

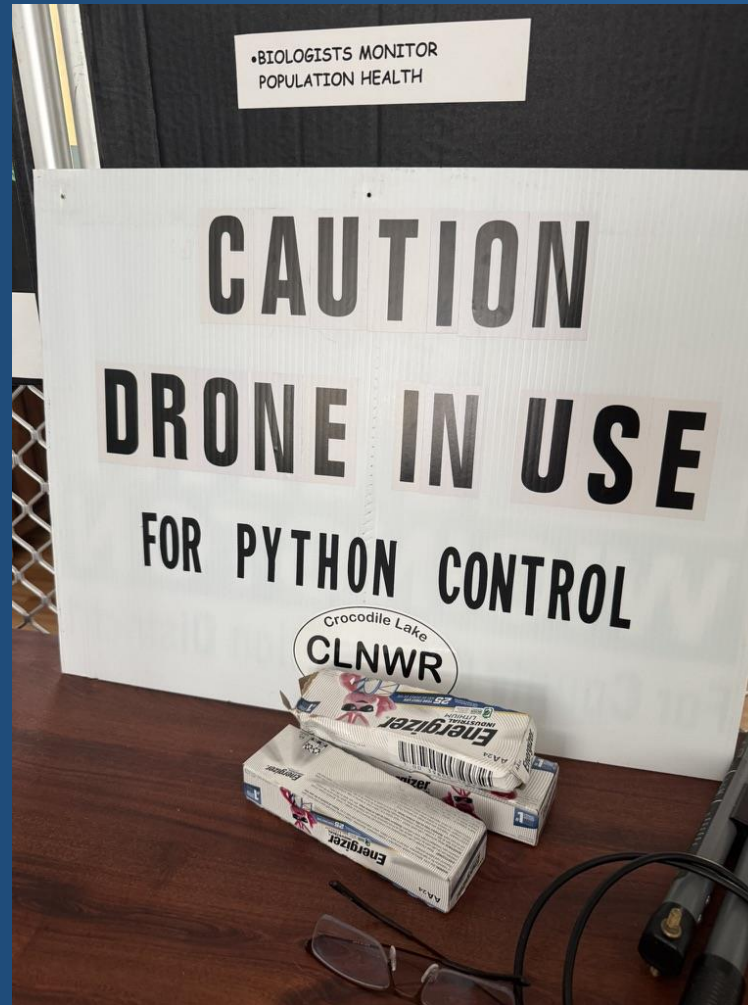
**Fecundity**

**Juvenile Survival**

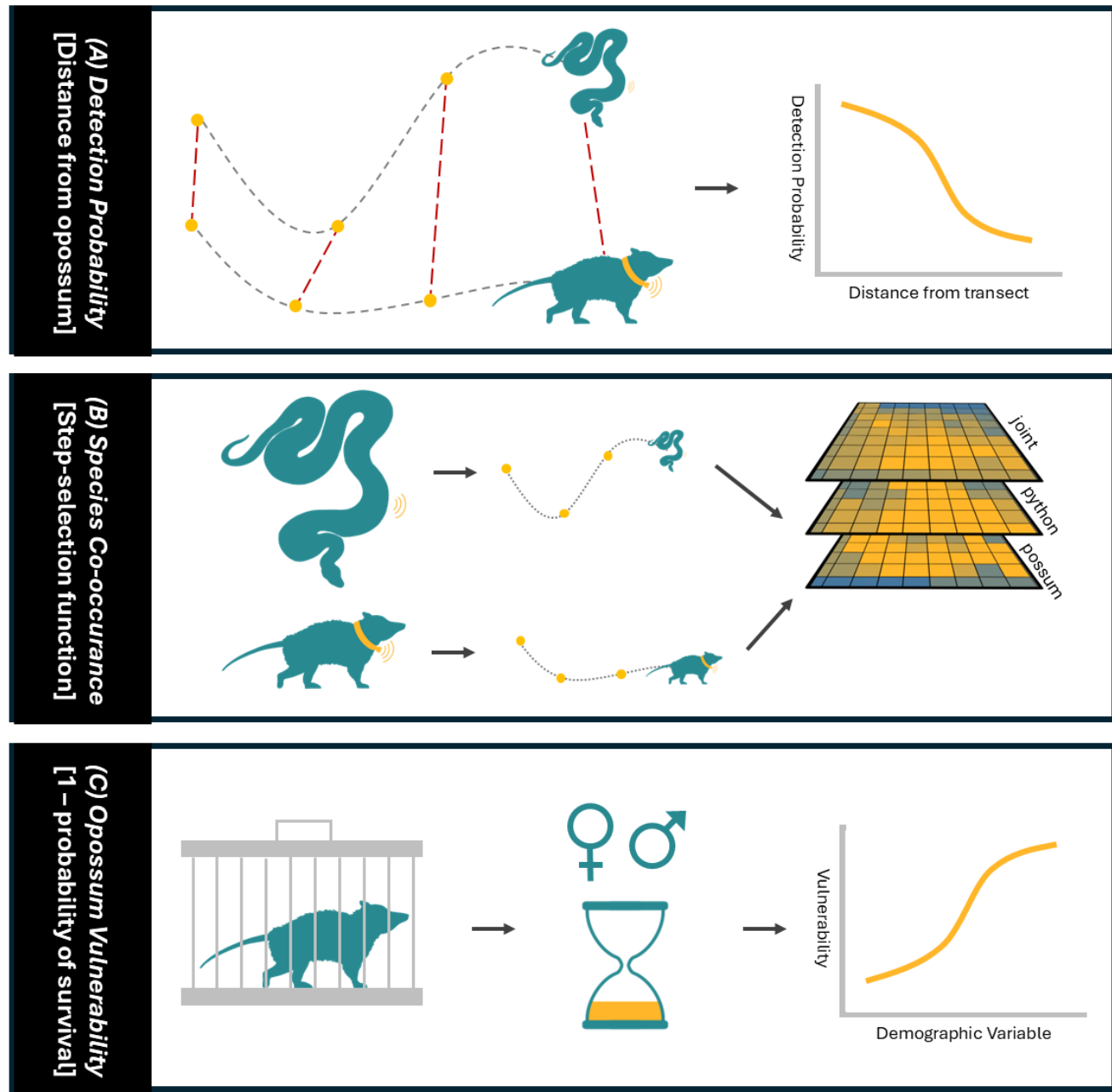


# Future Work

- Is this scalable?
- Should we scale it?
- Integrating data



$$N_{\text{pythons}} = \text{Detection Probability} \times \text{Species Co-occurrence} \times \text{Opossum Vulnerability}$$



# An Identity!



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## Questions?





