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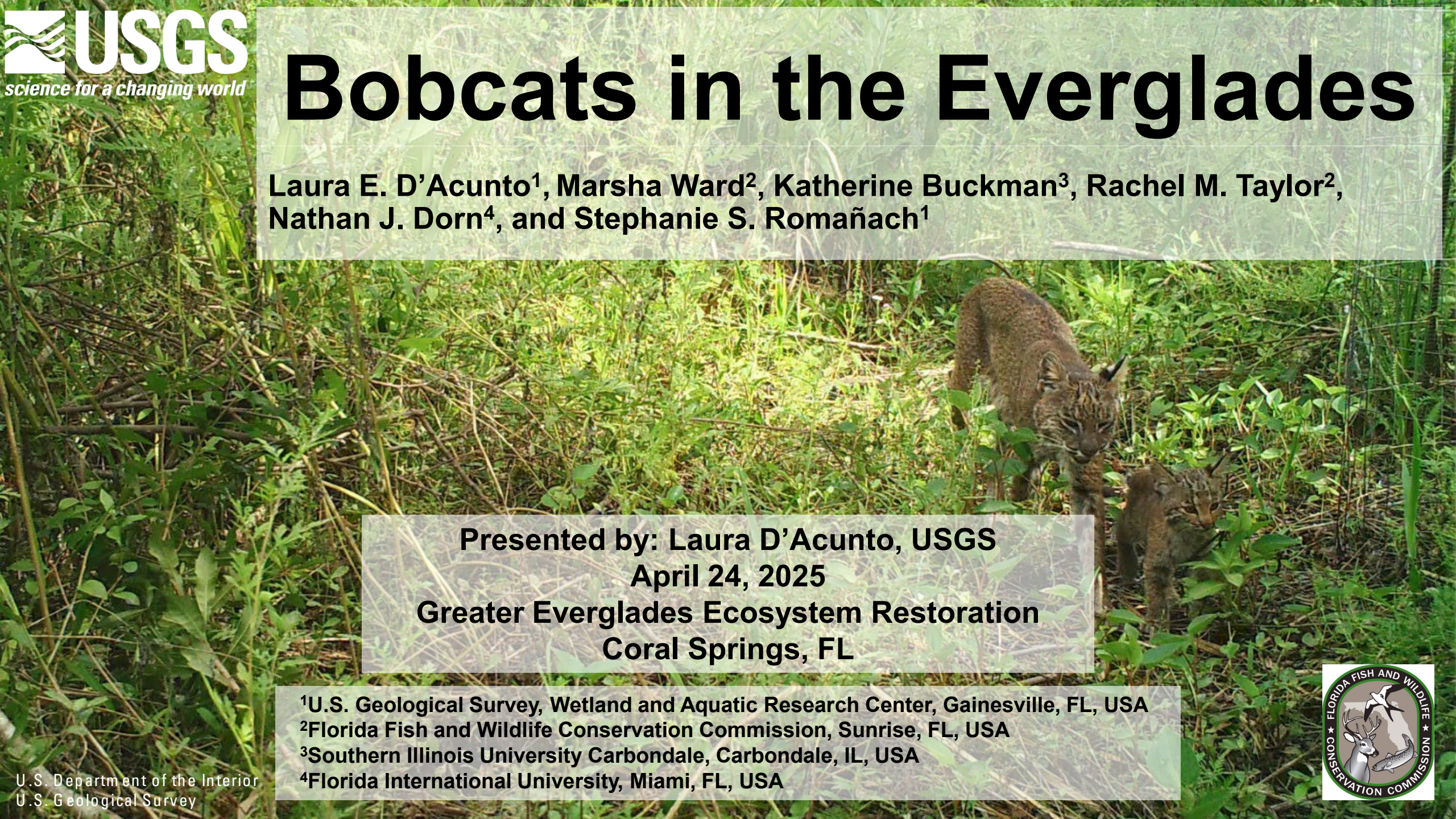
Bobcats in the Everglades

Laura E. D'Acunto[1], Marsha Ward[2], Katherine Buckman[3], Rachel M. Taylor[2], Nathan J. Dorn[4], and Stephanie S. Romañach[1]



Presented by: Laura D'Acunto, USGS
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[1]U.S. Geological Survey, Wetland and Aquatic Research Center, Gainesville, FL, USA
[2]Florida Fish and Wildlife Conservation Commission, Sunrise, FL, USA
[3]Southern Illinois University Carbondale, Carbondale, IL, USA
[4]Florida International University, Miami, FL, USA

U.S. Department of the Interior
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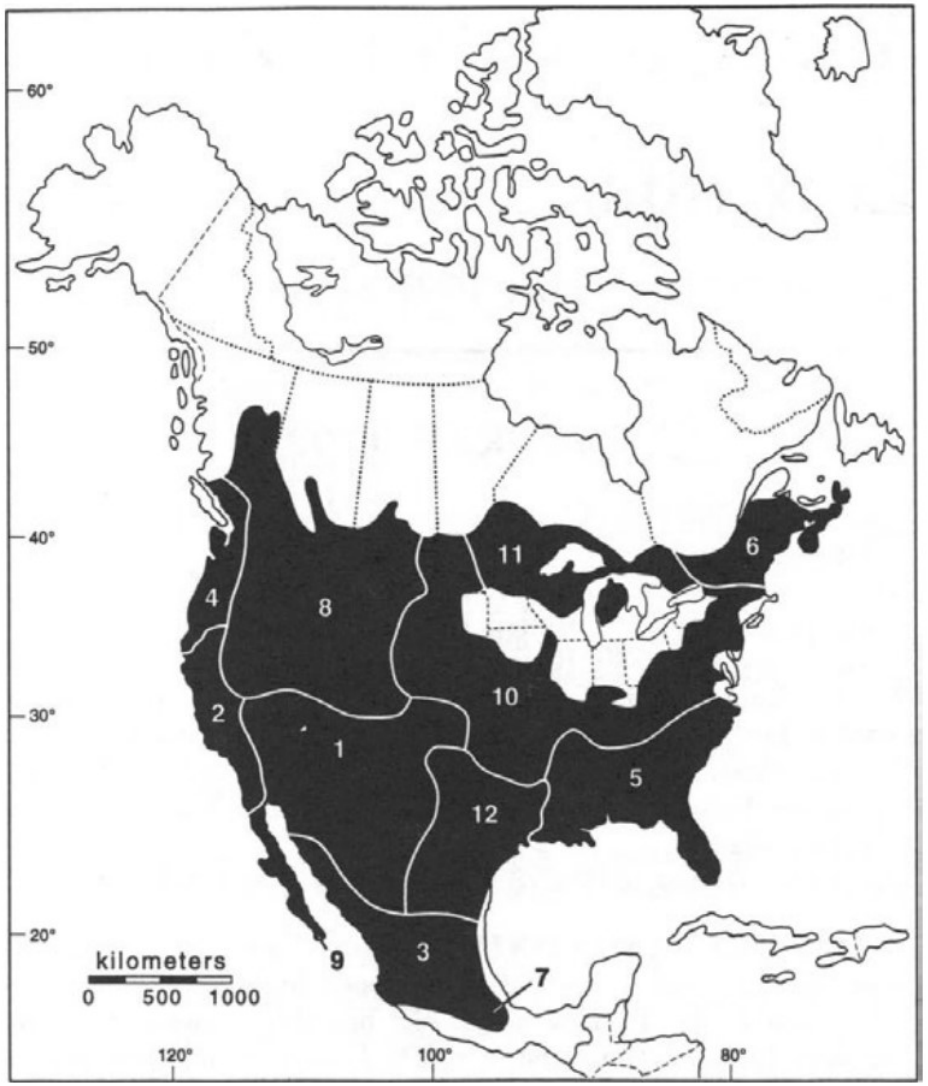
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Bobcats (*Lynx rufus*)

- Generalist mesopredators.
- Populations have declined & rebounded multiple times across range.
- Ecology differs depending on environment: agriculture, forests, wetlands – but typically reflect prey abundance.



Range map of the bobcat from Larivière & Walton 1997.

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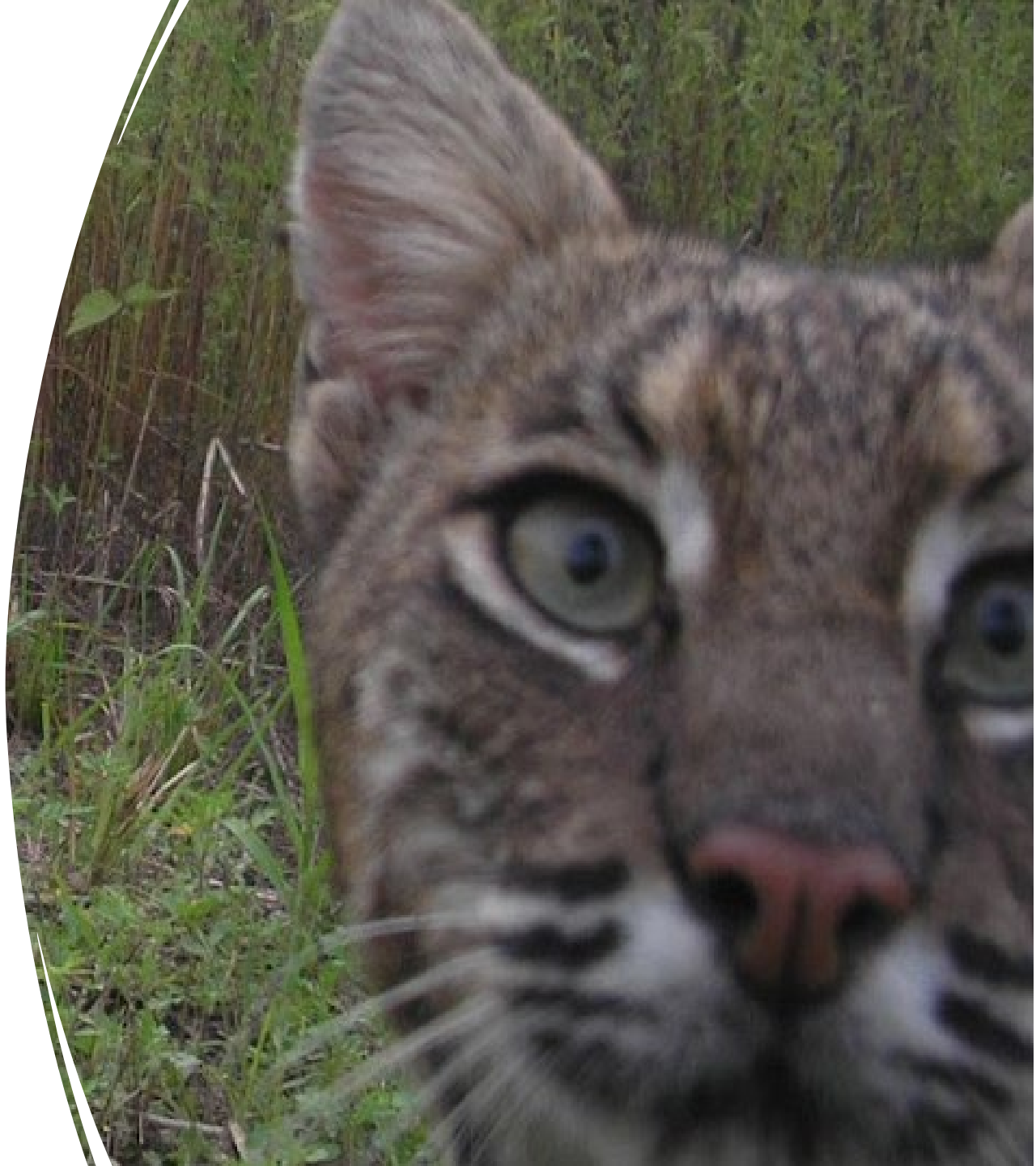
Everglades Bobcats

- Commonly found on tree islands, levees, and ridges of the Everglades. This talk focuses on tree islands.

- Monitored by FWC via trail cameras (tree islands) and spotlight surveys (levees and ridges).

- Relatively little is known about how Everglades restoration activities may impact bobcat habitat use.

- Bobcat distribution in the Everglades may be influenced by hydrologic conditions, landscape configuration, and trophic pressures from invasive species.



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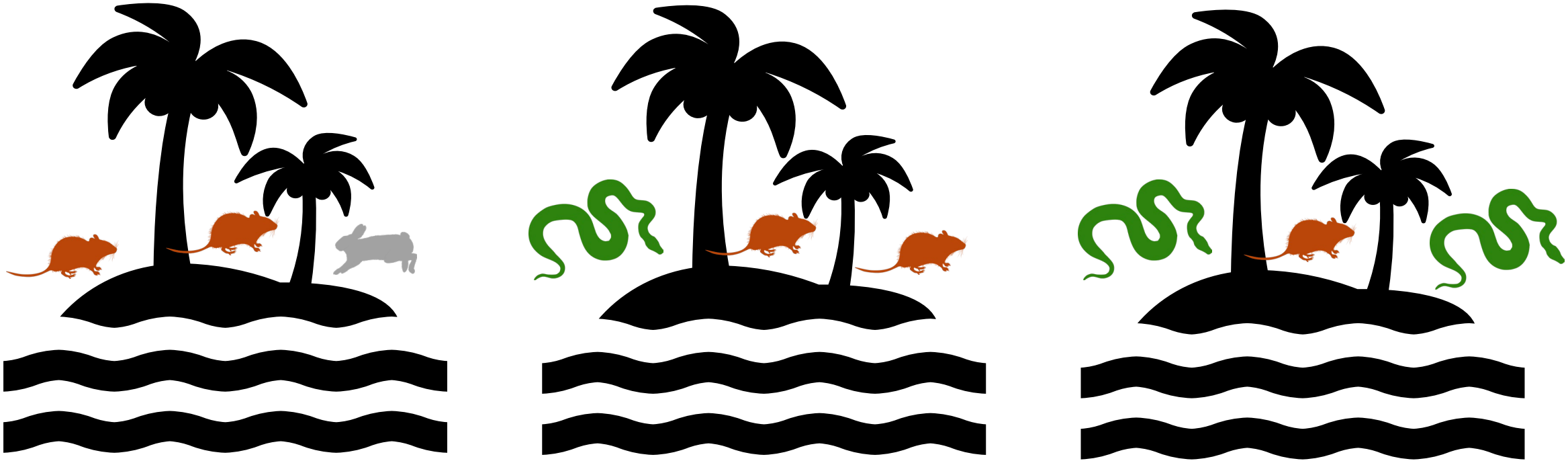
Invasive Species

- Invasive Burmese pythons are changing bobcat prey abundances across the landscape (Dorcas et al. 2012; Taillie et al. 2021).



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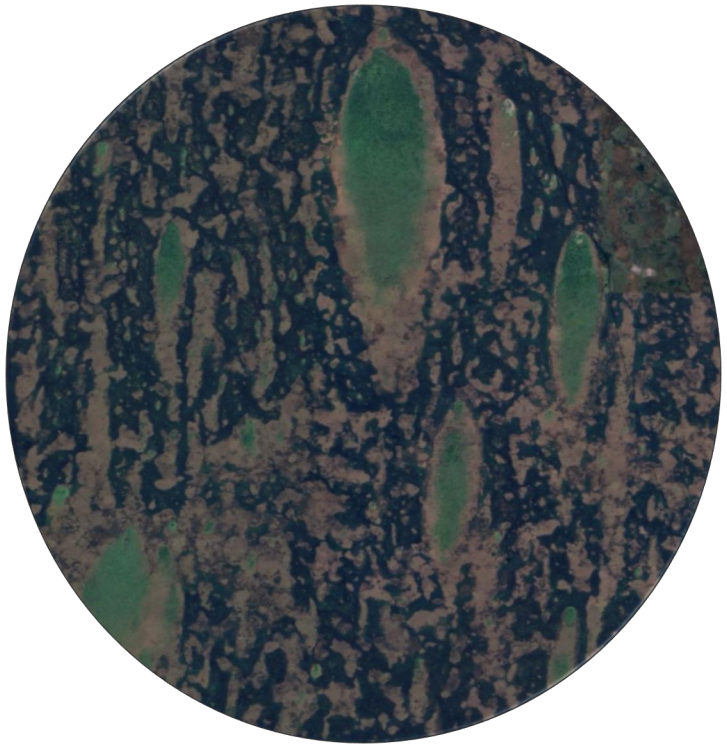
Landscape Configuration

- Tree island size or density could impact bobcat habitat use through prey availability or ease of movement between islands.



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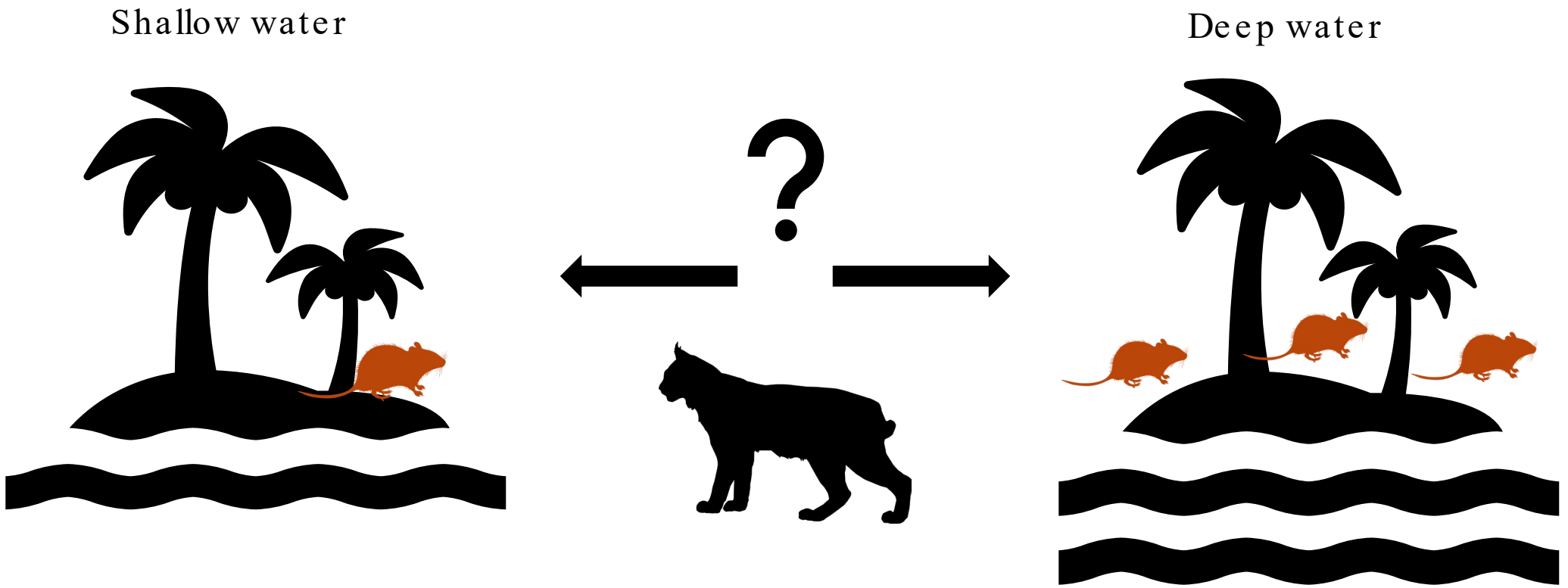
Hydrology

- Small mammalian prey respond to hydrology in the Everglades (Gaines et al. 2002; Romañach et al. 2020).
- Water depths may influence bobcat movement among tree islands.



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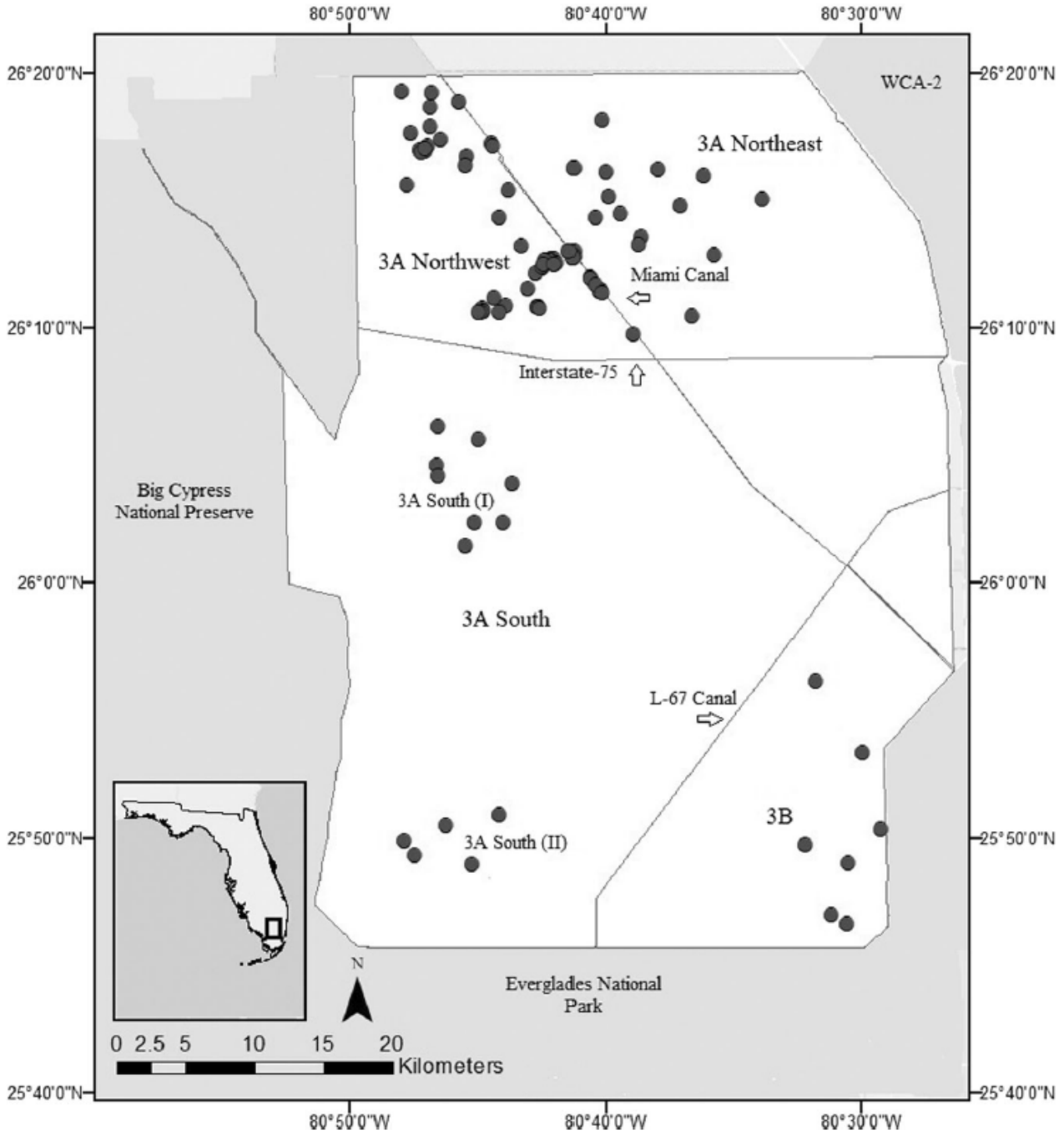
Data Collection

- Data collected by FWC personnel, mainly as part of a monitoring program documenting wildlife use of tree islands through high water events.
- Trail cameras on 87 tree islands (including 13 Miami Canal spoil mounds).
- Tree islands were 0.03 – 232.87 ha in size (median size of 0.5 ha).
- Sampled between 2005 – 2019.



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Data Analysis/Results

- Occupancy modeling.
- In bold are covariates included in the top models, asterisks indicate covariate beta estimates with confidence intervals that did not overlap 0.

Detection Variables
Time since camera deployment*
Reproductive season
Number of cameras on tree island*

Occupancy variables	
Sampling Year	-
Area of sampled tree island (ha)	Landscape configuration
Distance to nearest tree island	
Sum of surrounding upland area (ha) within 2 km	
Sum of surrounding upland area (ha) within 3.5 km	
Tree island density within 2 km*	
Tree island density within 3.5 km	
Total tree island edge within 2 km	
Total tree island edge within 3.5 km	
Mean water depth (derived from EDEN)	Hydrology
Hydroperiod (derived from EDEN)	
Python density* (derived from model)	Invasive species

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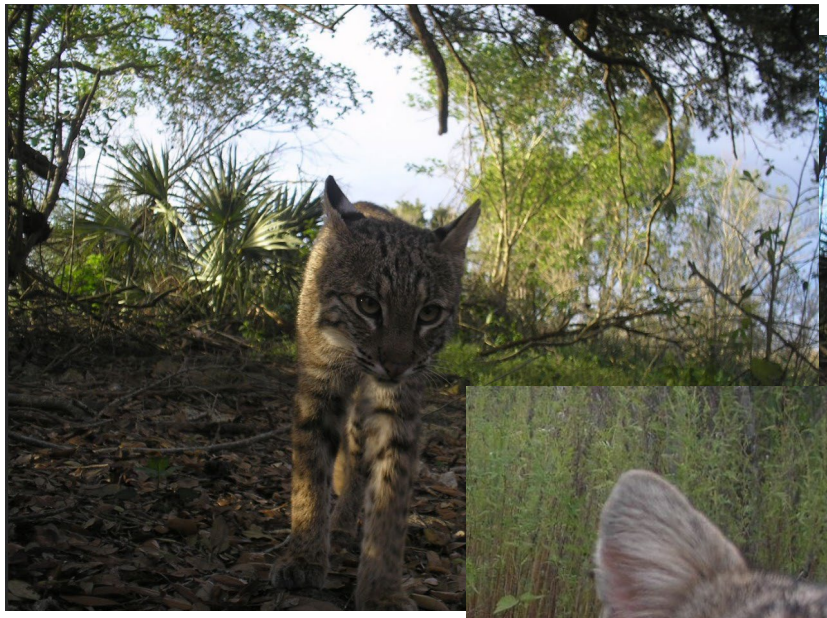
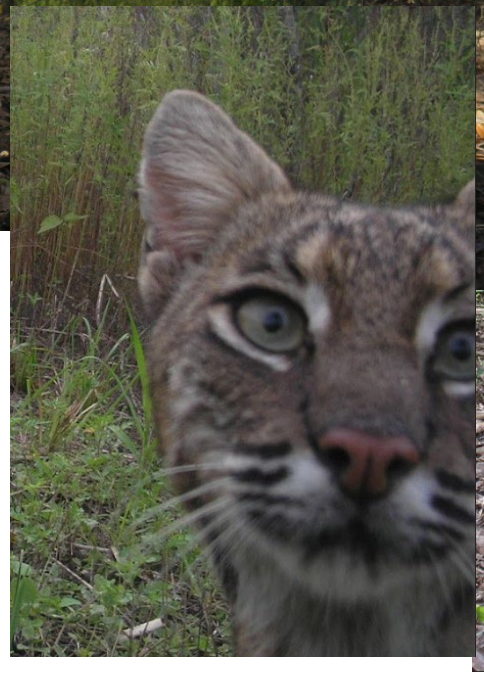
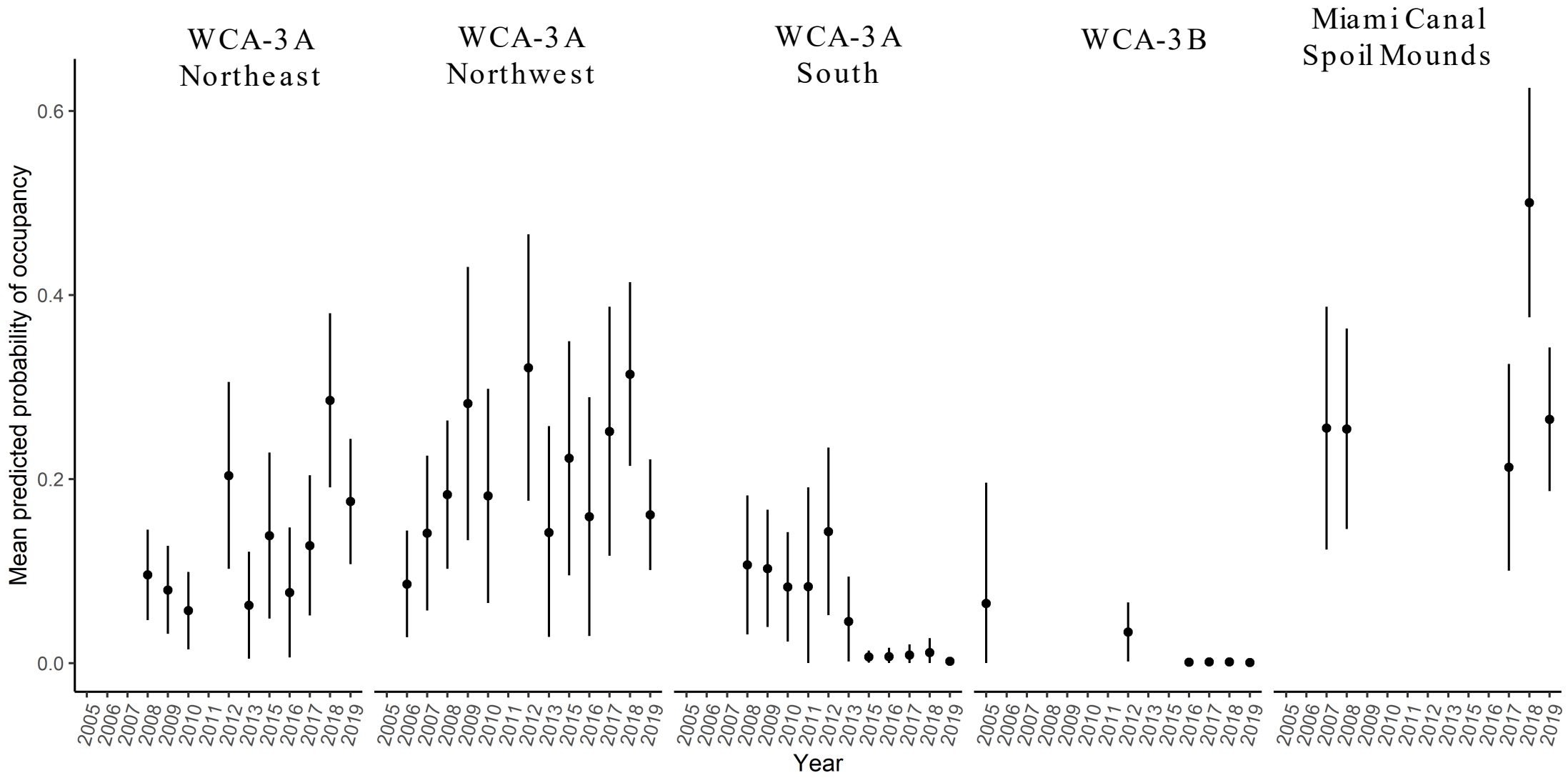
Results

- 1,855 bobcat photos at 33 of the 87 tree islands.





Results



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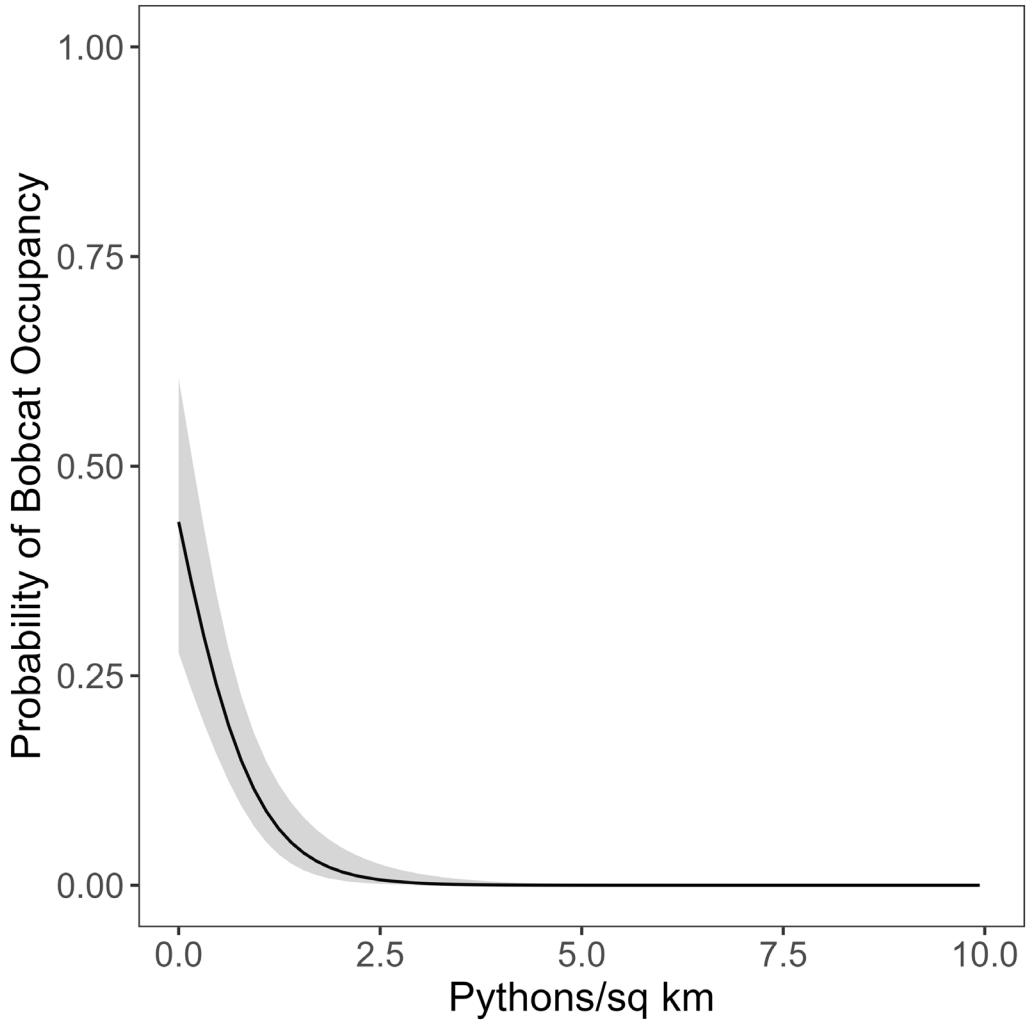
Results – Python effects



- Bobcat occupancy is significantly diminished after simulated python densities reach ~ 3 pythons/km^2.
- Exact mechanism unknown: prey depletion or avoidance?

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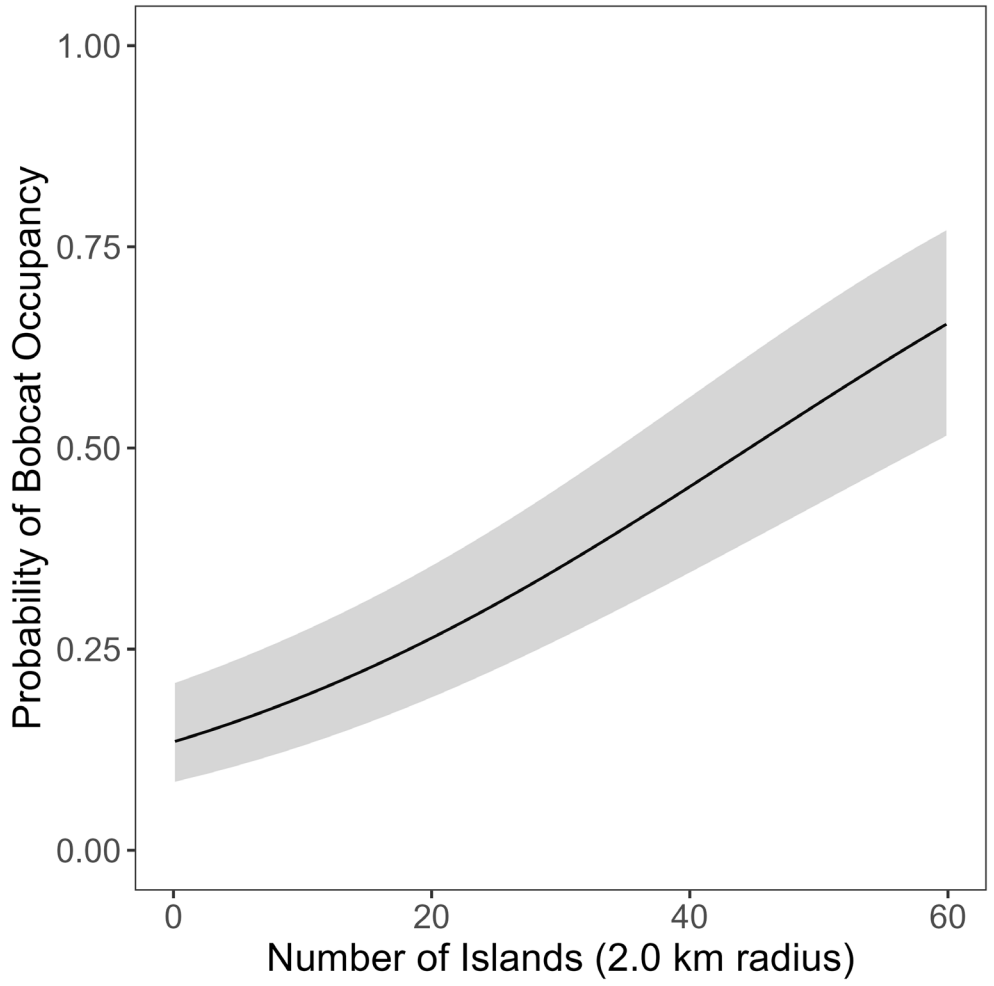
Results – Landscape effects



- Bobcat occupancy significantly increases with higher densities of tree islands.
- May be related to habitat quality and correlated with tree island density.

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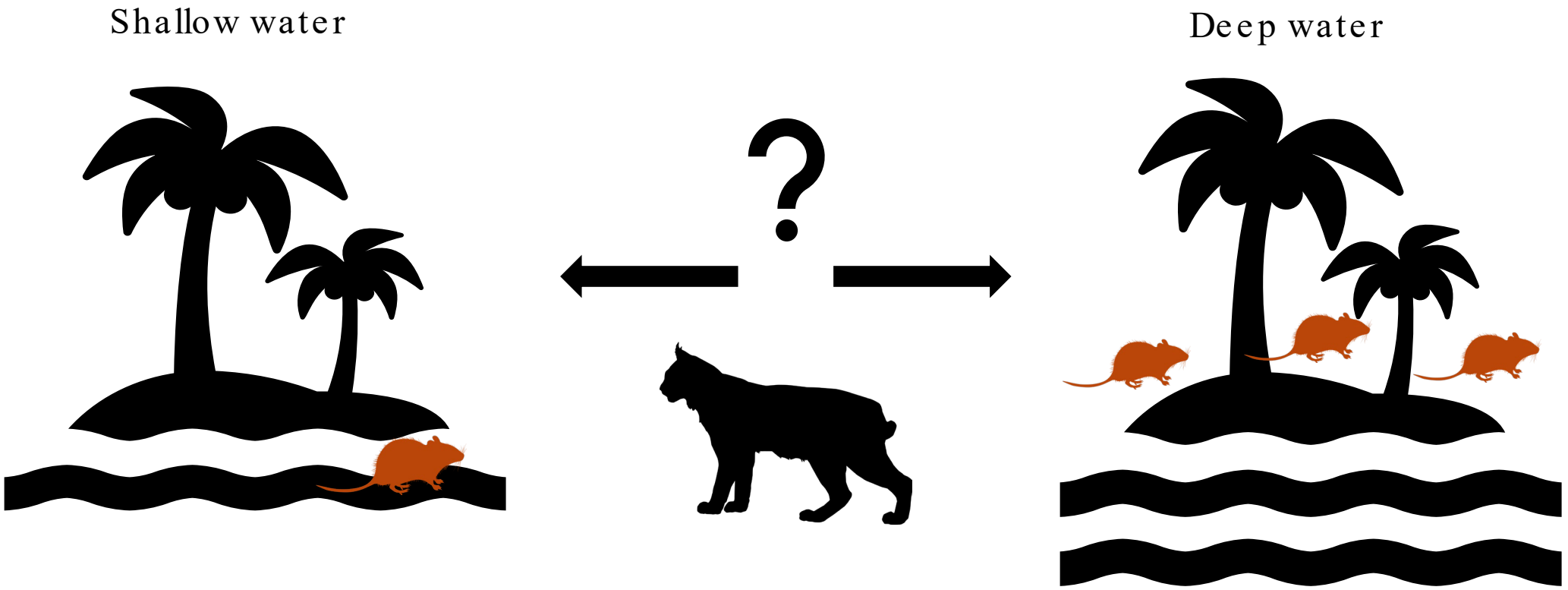
Results – Hydrology

Some evidence that hydrology explains variation in occupancy, but the effect is too uncertain.

- *Sampling bias (more sampling during conditions < 50 cm).*
- *Strength of the python relationship.*



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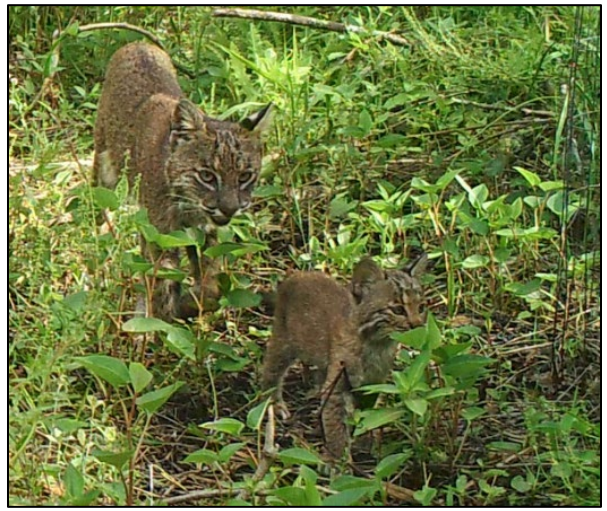
Final Thoughts

- Pythons are probably impacting bobcat use of the Everglades.
  - FWC is launching a radio-collar study to investigate bobcat movement in high and low python invaded areas.

- Density of tree islands plays a role in bobcat occupancy.
  - Looking at tree island habitat quality may elucidate this connection further.

- Bobcats do not seem strongly impacted by variation in water depth, but depths > 50 cm were underrepresented.



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Thank You!

For more details, check out the paper:

Buckman, K.M., D'Acunto, L.E., Romañach, S.S., Taylor, R.M., and Dorn, N.J. 2023. Bobcat occupancy, tree islands, and invasive Burmese pythons in an Everglades conservation area. Journal of Wildlife Management, e22529. https://doi.org/10.1002/jwmg.22529.

Contact me:

ldacunto@usgs.gov

FIU FLORIDA INTERNATIONAL UNIVERSITY

FLORIDA ATLANTIC UNIVERSITY

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All bobcat photos used in this presentation were collected by the Florida Fish and Wildlife Conservation Commission