Using camera trap surveillance networks to model factors affecting Argentine black and white tegu (Salvator merianae) occupancy in southern Florida

Argentine black and white tegu – *Salvator merianae*

- Native range – subtropical regions of South America

Photo: IUCNredlist.org
Argentine black and white tegu – *Salvator merianae*

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- Native range – subtropical regions of South America
- Largest and most temperate species of tegu
- Broad habitat use
- Omnivorous, active foragers
Tegus in Florida
Why should we be concerned?

- Invading Miami-Dade County near important biological resource sites
  - Everglades National Park (ENP)
  - Florida Power and Light Turkey Point Power Plant (TP)
  - Crocodile Lake National Wildlife Refuge (CLNWR)
Threat to native wildlife

- Small mammals
- Turtles
- Ground-nesting birds
  - Endangered Cape Sable seaside sparrow
- Crocodylians
  - Threatened American crocodile
Nest Predators
Research Objective

• Predict areas of tegu occurrence in South Florida using a camera trap surveillance network
  • 2016 camera trapping data
  • Multi-agency data collaboration
  • Occupancy modeling
Methods – Camera Trapping
Methods – Camera Trapping

• Passive method, but time consuming

• 69 total cameras in Miami-Dade County in 2016
  • UF – 40 cameras
  • USGS/NPS – 29 cameras

• 32 cameras (46%) observed a tegu at least once
Methods – Occupancy modeling

• What is it?
• Simply:
  • Tegu is present at site and will be detected by the camera
  • Tegu is present and will NOT be detected by the camera
  • Tegu absent from the site
Methods – Occupancy Modeling

• Single season occupancy model

<table>
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<tr>
<th>Detection Covariates</th>
<th>Site covariates</th>
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<tr>
<td>Quadratic effect of temperature</td>
<td>Habitat type</td>
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<td>Average precipitation</td>
<td>Distance to water source</td>
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<tr>
<td>Presence of baited trap</td>
<td>Distances from two core areas in Miami-Dade County</td>
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Core Areas

- Redland Rock Pit
  - Point of discovery

- 424th St/US-1 Intersection
  - Management effort focus
  - Major path of dispersal
Results

• Most predictive model –
  • Occupancy as a function of distance to 424th St/US-1 Core Area
  • Detection as a function of quadratic effect of temperature

What does this mean?
Results

Occupyance as Function of Distance to Core Area

2016 Camera Locations
- UF
- USGS/NPS

Core Areas
- Redland Rockpit
- 424th St/US-1
Results

Temperature ➤

Probability of detection ➤
Summary

• Sites closer to the 424th St/US-1 core area display a higher probability of tegu occurrence

• Higher probability of detecting a tegu at a site increases in warmer months, as tegu activity increases

→ Trends supported by other methods
Where do we go from here?

- Refine covariates and build on analyses
  - By scale - local site characteristics
  - Distance to major intersections
  - Spatial distribution model

- Use these results to improve removal and detection methods of black and white tegus in South Florida
  - Can apply models to multiple years
Acknowledgements

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