An Integrated Approach to Adaptive Management of Invasive Reptiles: Detecting Detection

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U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

USGS science for a changing world

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What is detection?

Why is it important?

How can we estimate it?

How can we improve it?

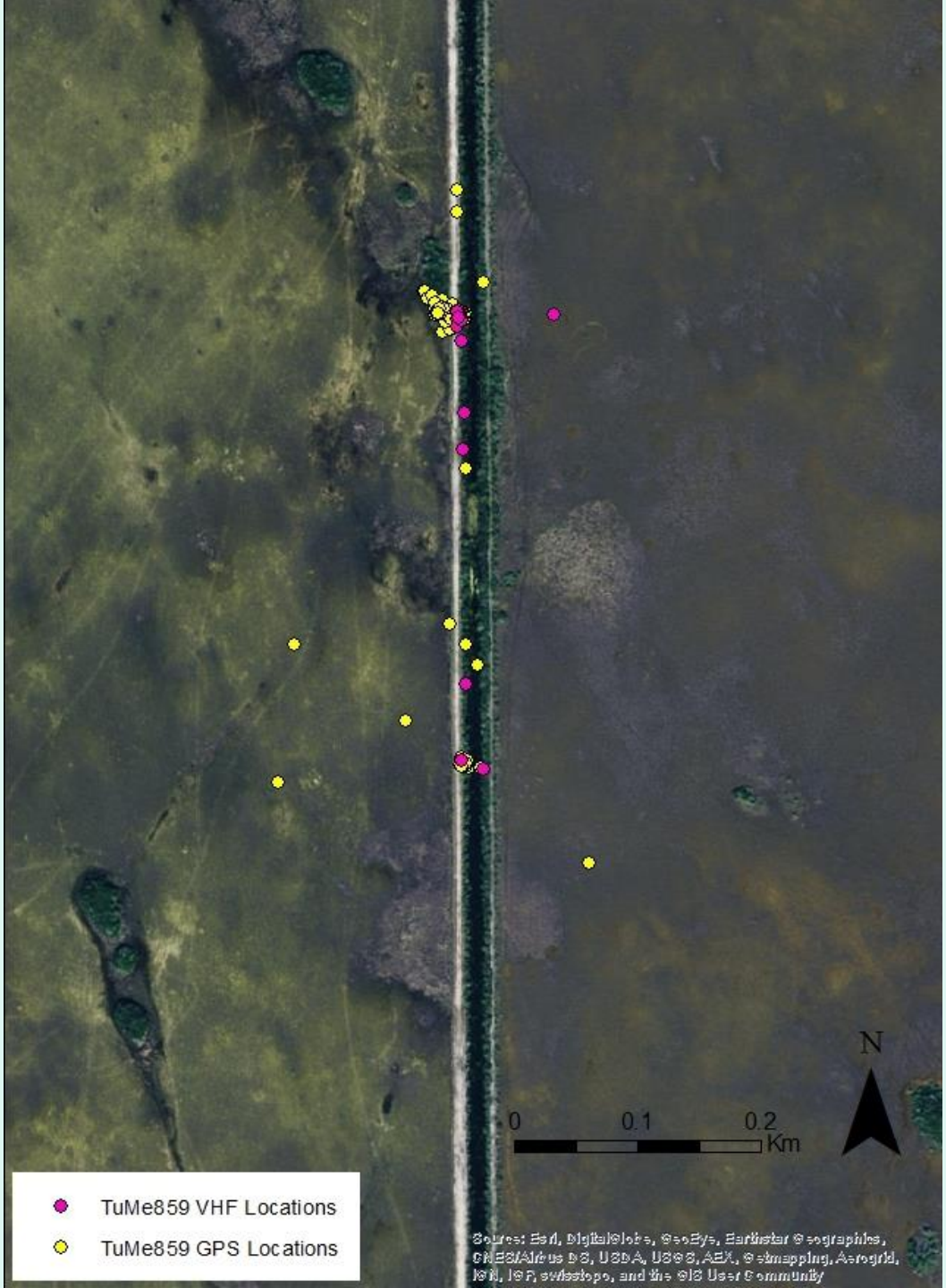
What do we do next?

What is detection = detectability = probability of detection = P_{detect}?

- P_{detect} = the probability of seeing a python on the condition that one is present
- P_{detect} is a function of habitat, behavior, and observer method and skill

Coming Attraction - Estimating Pdetect for Tegus

- Pilot study to evaluate effectiveness of GPS telemetry to obtain detailed data on movements and habitat use of tegus
- Combine with camera and live trapping data to estimate Pdetect and population trends


TuMe859 VHF Locations
TuMe859 GPS Locations
0
0.1
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Km
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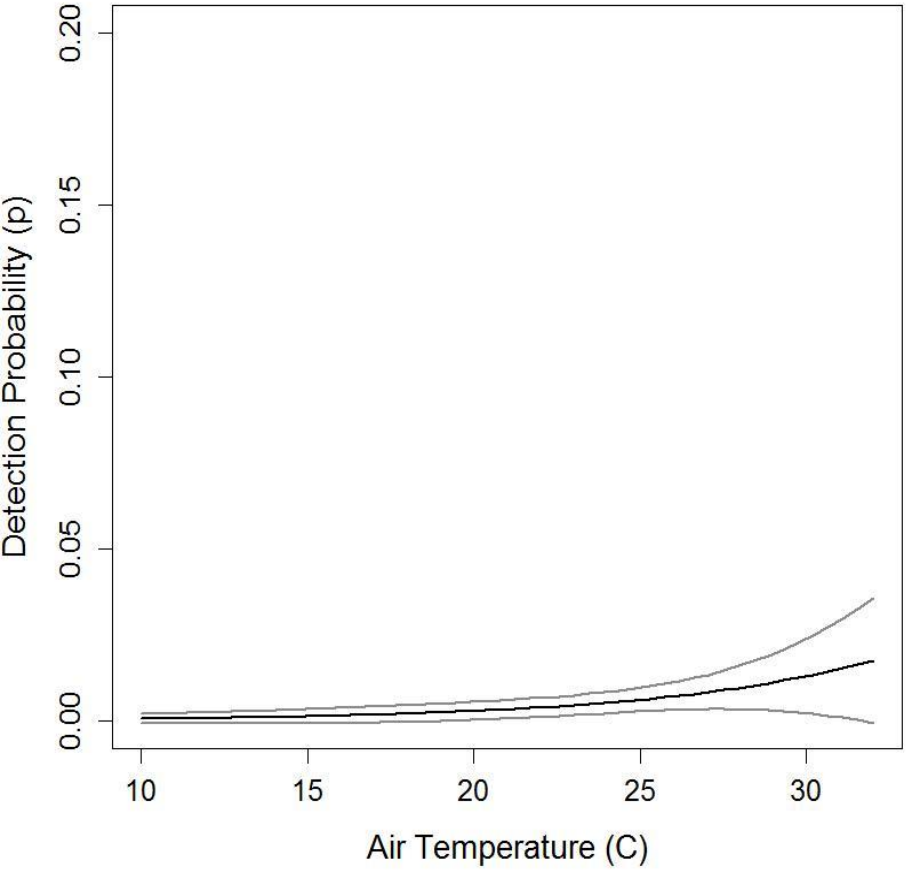
Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

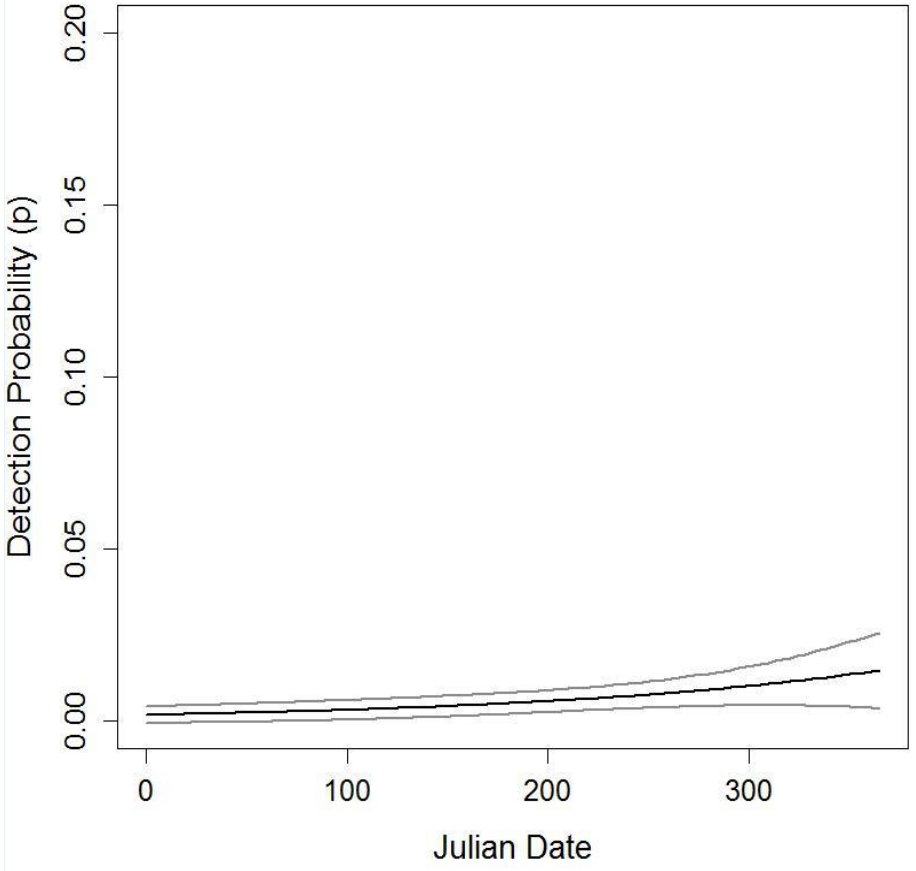
Feature Presentation

Can we use past removals of pythons to inform and improve our current ability to detect and remove pythons?

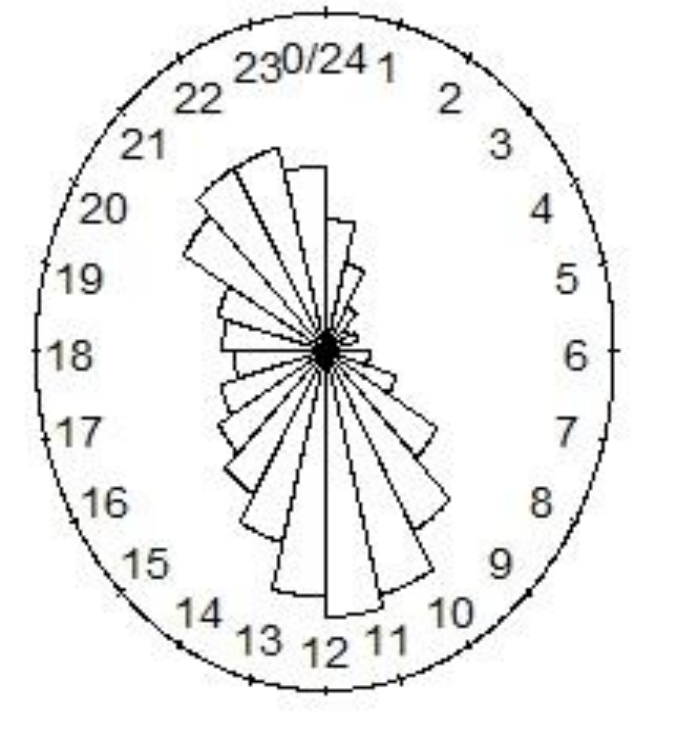
- Weekly EIRAMP data from ENP (presence and absence) – occupancy modeling
- Combined DOI and FWC data base (presence only) – circular statistics of number of removals
- Data from FWC permittees (presence and absence) – logistic regression of Psuccess (next time)

Date and Temperature, and Pdetect

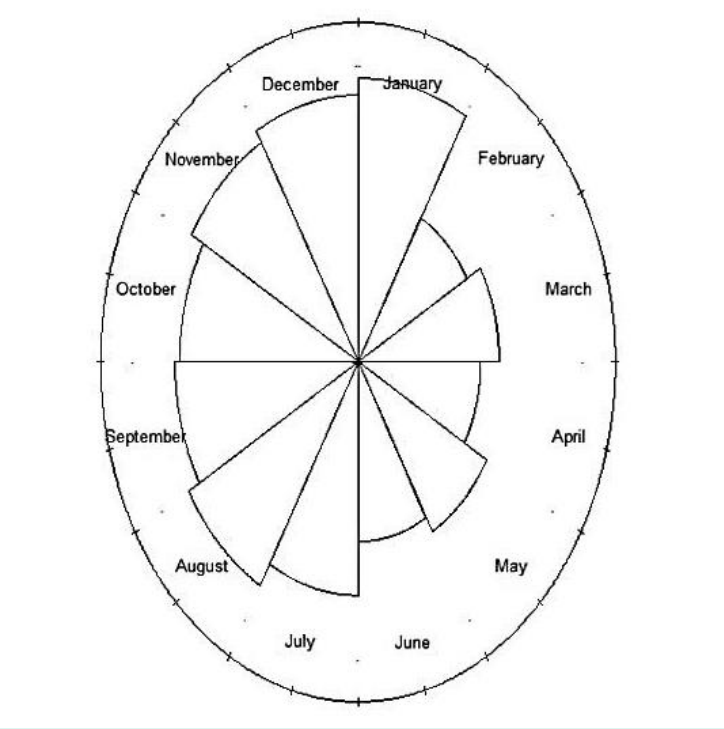




Date and Time, and Number Removed

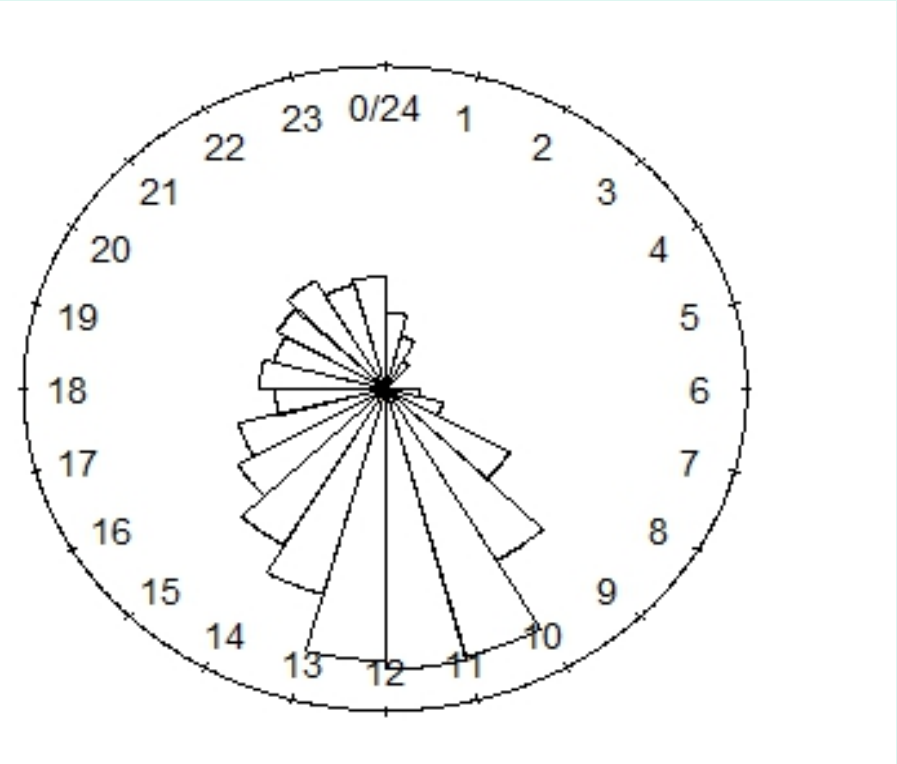


Hour

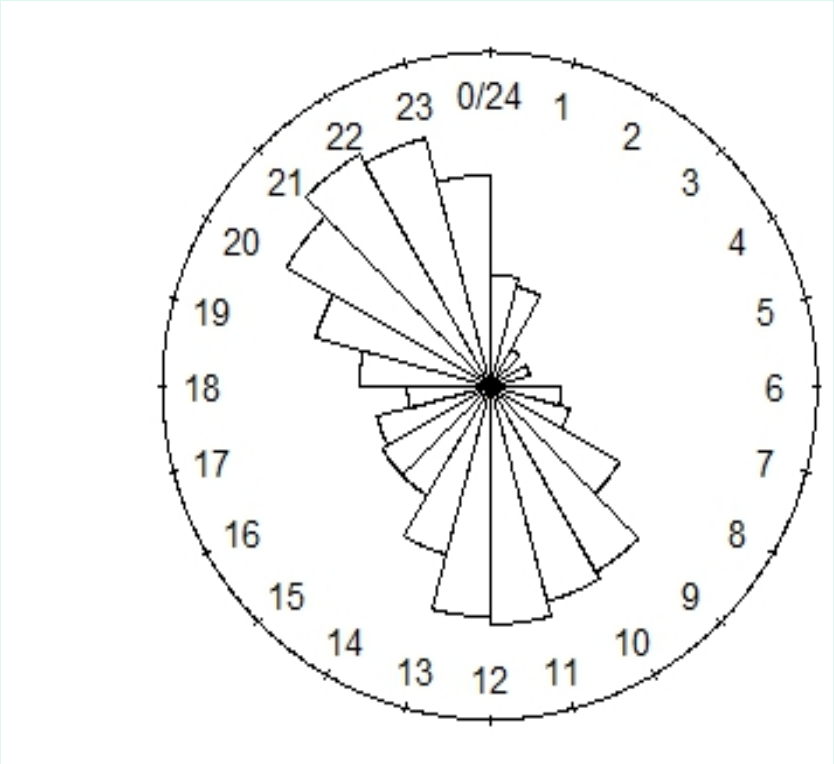


Month

Date and Time, and Number Removed



Dry Season

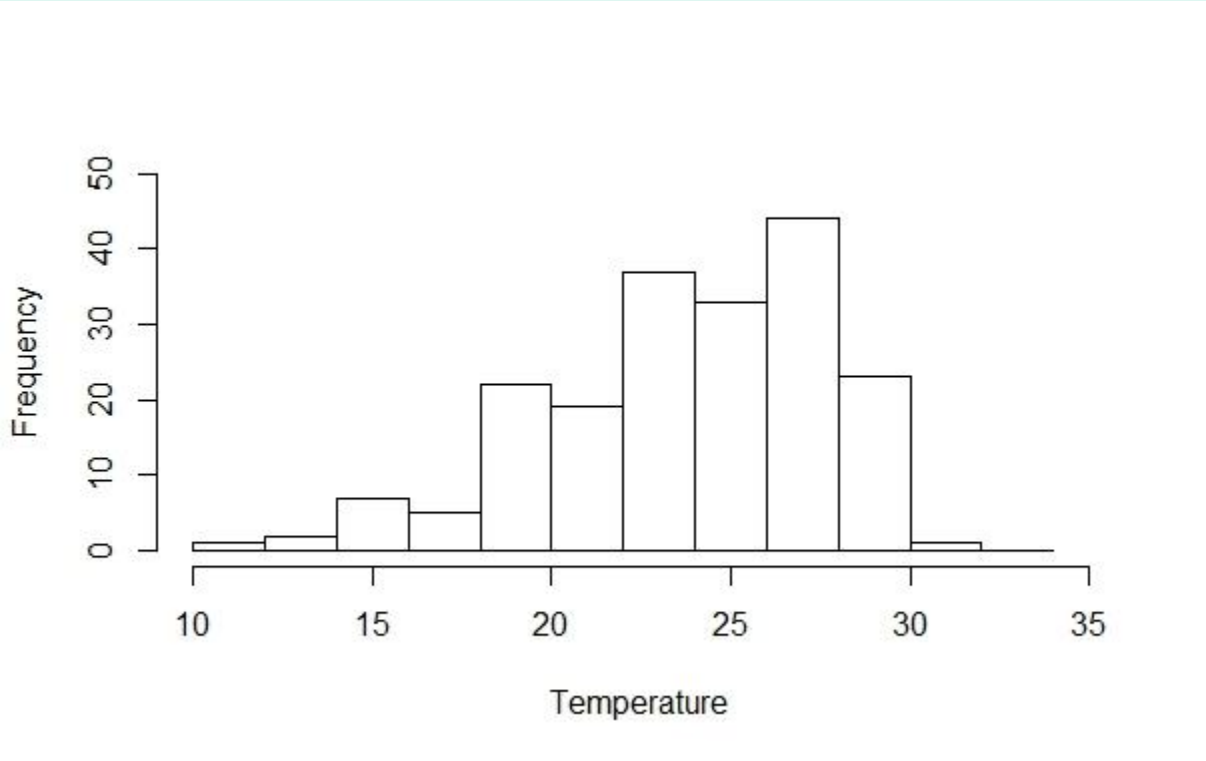


Wet Season

Date and Time, and Number Removed

- Most adults are removed in December and January
- But most adult females are removed in August
- Most hatchling pythons are removed in August
- Most bang for buck – survey for pythons in December and January during the day, and day and night in August

Temperature, Wind, and Humidity and Number Removed



- Most pythons are removed when it is warm, humid (not raining), and calm

Survey Prescription and Evaluation

- Conduct surveys during the day in winter and day and night during the summer when it is warmer than 20^0C, humidity is greater that 60%, and wind is less than 6km/hr
- We are evaluating effectiveness of the prescription in two ways
  - We are doing day and night surveys along C-110
  - We are closely managing 7 python-catchers who we have equipped with GPSs and a standard methodology

Preliminary Survey Results

- C-110 - 61 surveys during December 2012 to June 2013, 496 person/hr – 0 pythons
- C-110 - 36 surveys during December 2014 to July 2015, 170 person/hr – 7 pythons
- 2 catchers have been active, 70 surveys during March to July 2015, 541 person/hr – 30 pythons
- Have we improved detection and removal or are there more pythons, or both?

Findings and Next Steps

- GPS telemetry will improve our understanding of movement and habitat use of invasive species.
- We can learn from past removals of invasive species to improve our current ability to remove them.
- Time to take next steps and test effectiveness of drones, Irula tribesmen, and detector dogs to further improve our ability to detect and remove invasive reptiles.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The End


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