



Everglades Invasive Reptile and Amphibian Monitoring Program (EIRAMP)

Frank J. Mazzotti, Eric Suarez,
and Melissa A. Miller



EIRAMP

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Bring power and convenience to your point
Seamless by design. No more fumbling with
windows.
Elegant and modern. Mentimeter and your
time.

Bring your Mentimeter
Workmail

Your password

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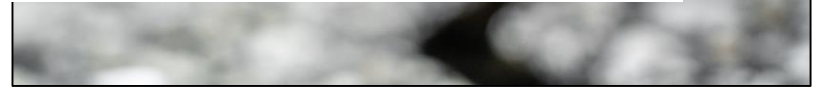
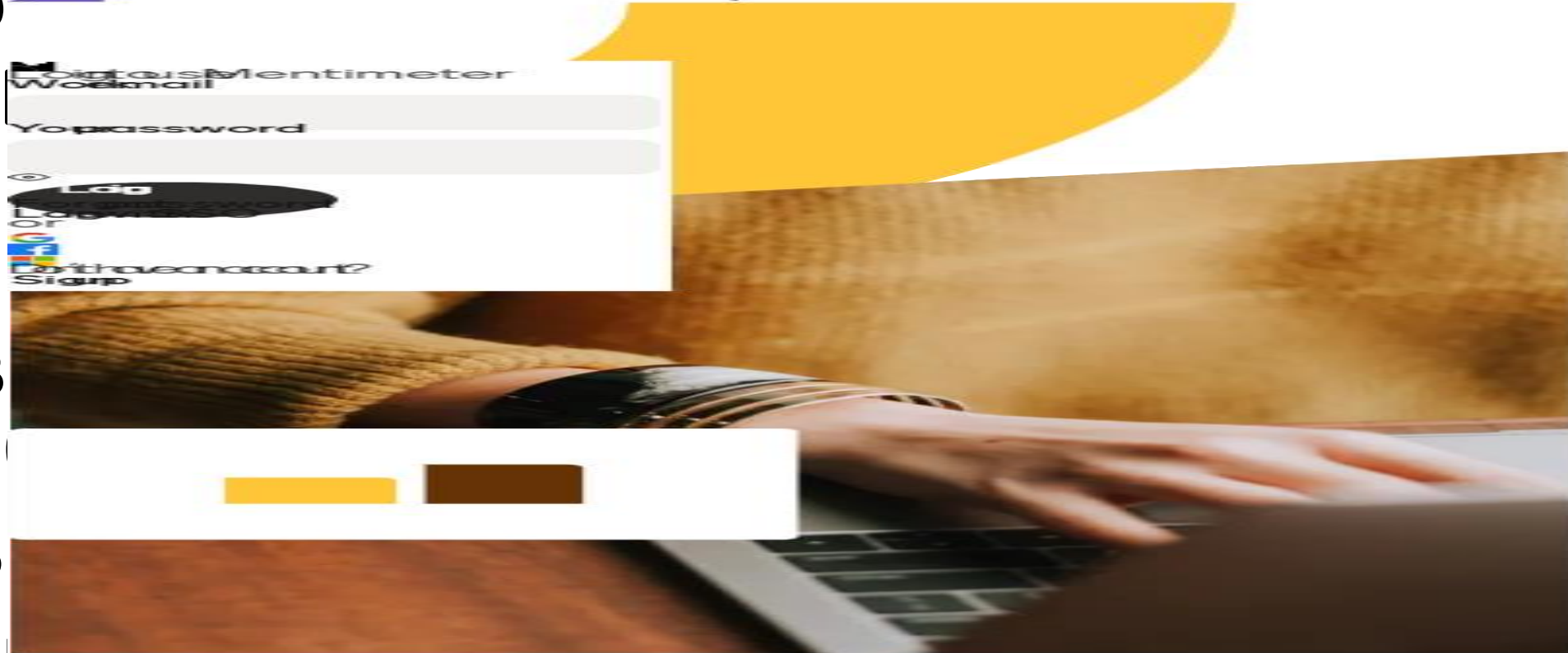
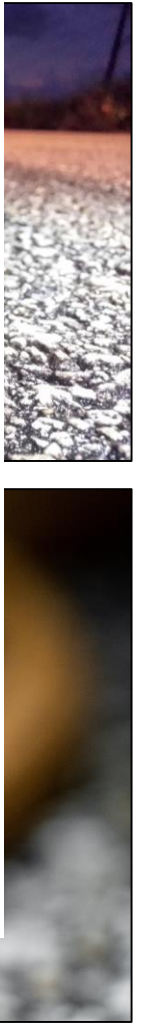
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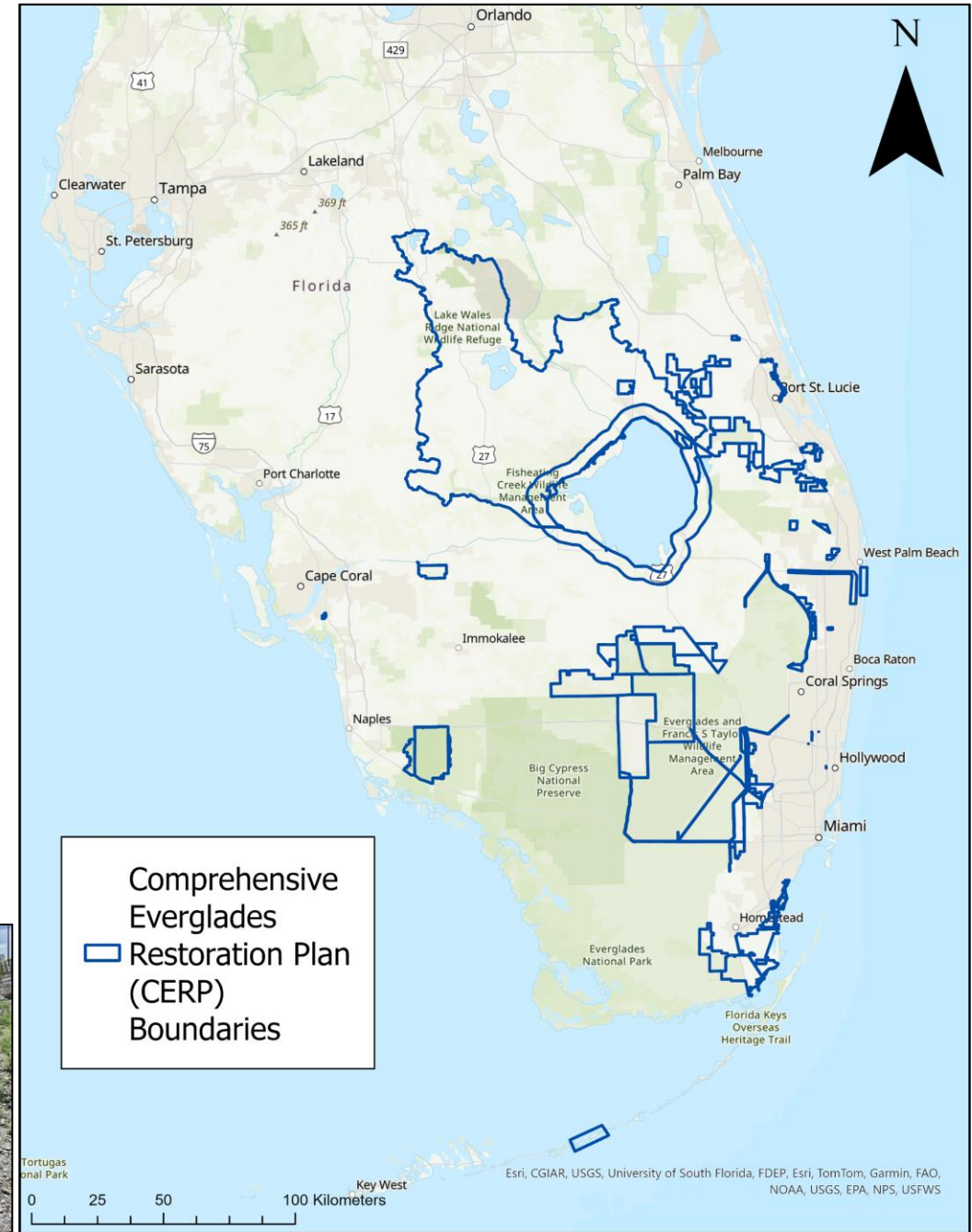
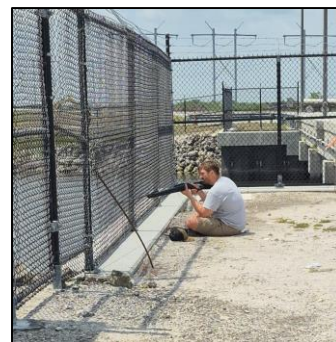
EIRAMP Objectives

- **EDRR** – Active surveillance – new species, new locations, extirpation
- Detect, remove and monitor priority invasive species
- Evaluate status and trends of native species
- Provide CERP support – SFER, SSR, **Report Card (2017), RECOVER CEM, WRDA 2020**
- Provide science support –
 - Specimen and data management
 - **Quantitative analysis**
 - **Research and development**
 - Adaptive synthesis



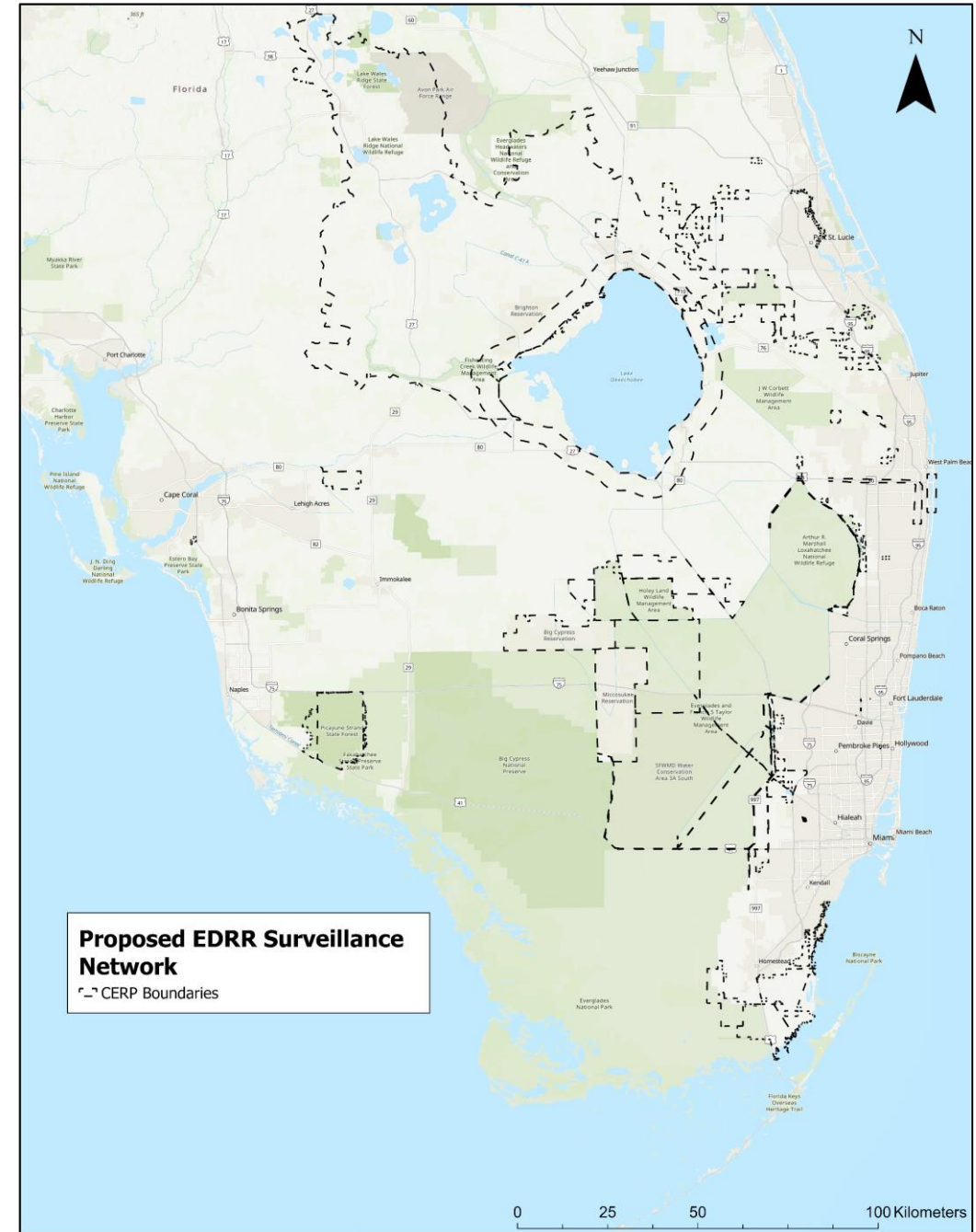
EDRR

- Spatial extent - entire South Florida
Restoration footprint – CERP
- Multiple species, habitats, and locations –
requiring multiple methods
- ED – proactive - what, where, and how
- RR – fast and persistent
- Monitoring, evaluation, adaptation



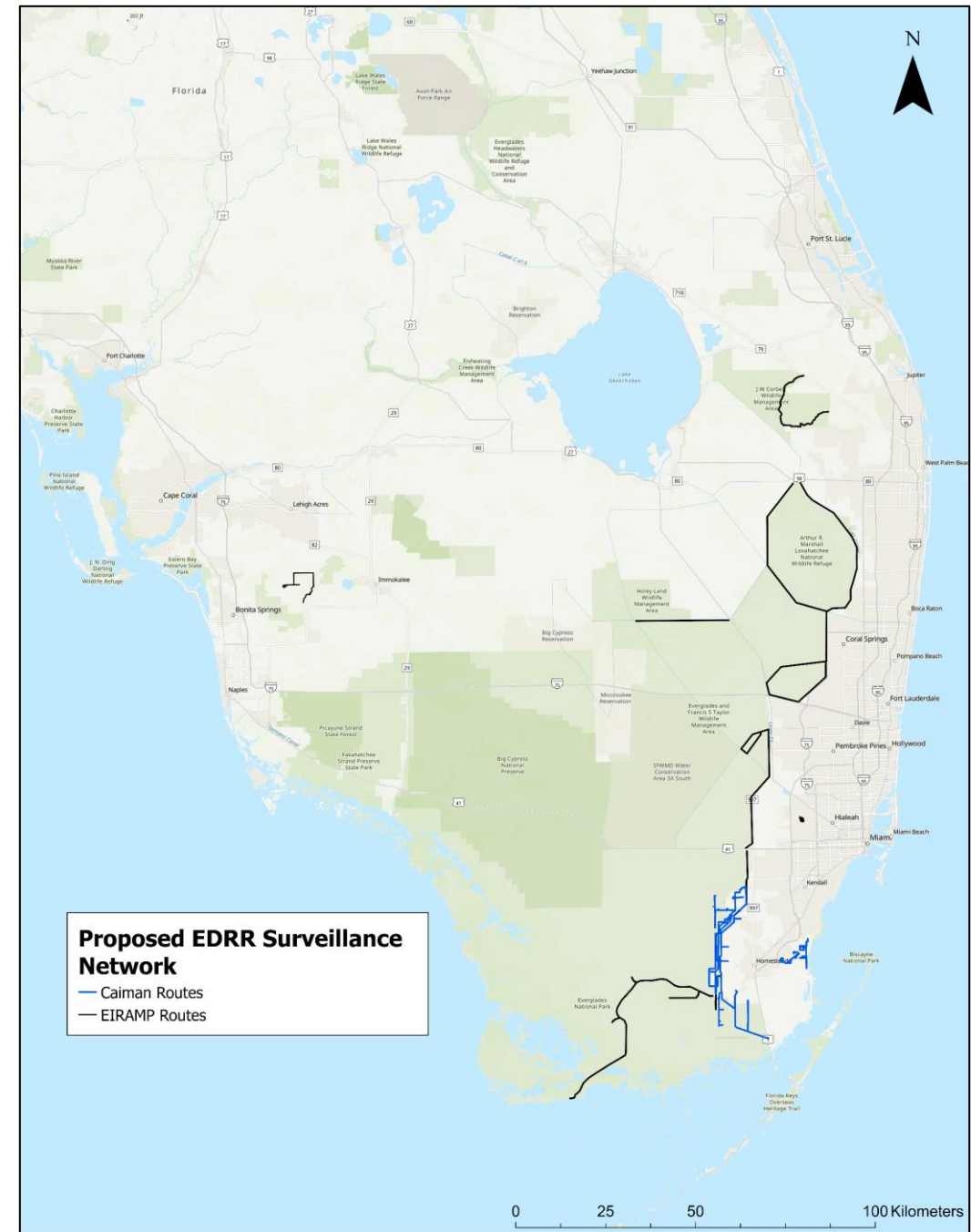
EDRR – Spatial Extent and Multiple Methods

- CERP boundaries – surrounding areas
- Visual and acoustic surveys
- Camera and live traps
- eDNA
- Targeted outreach



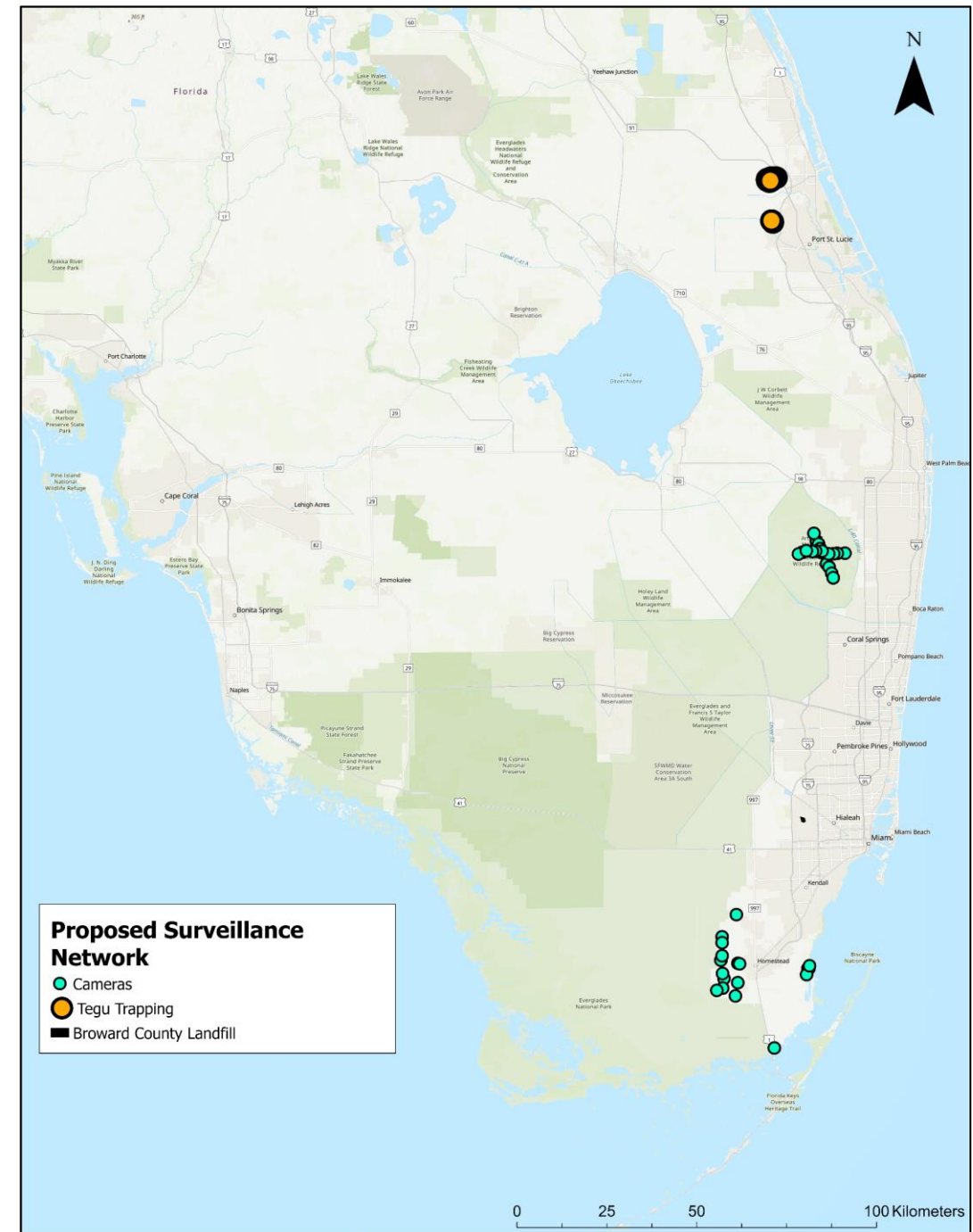
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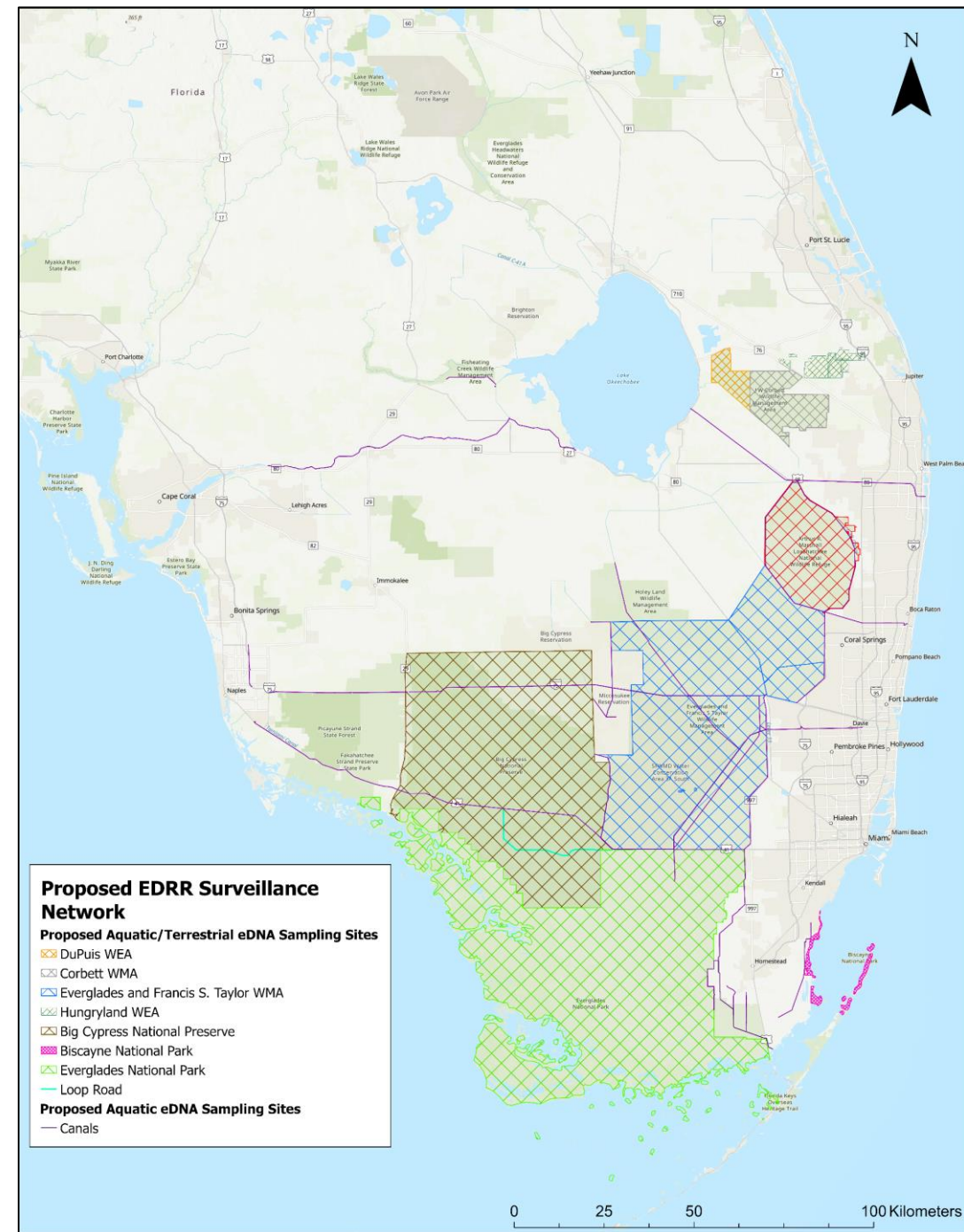
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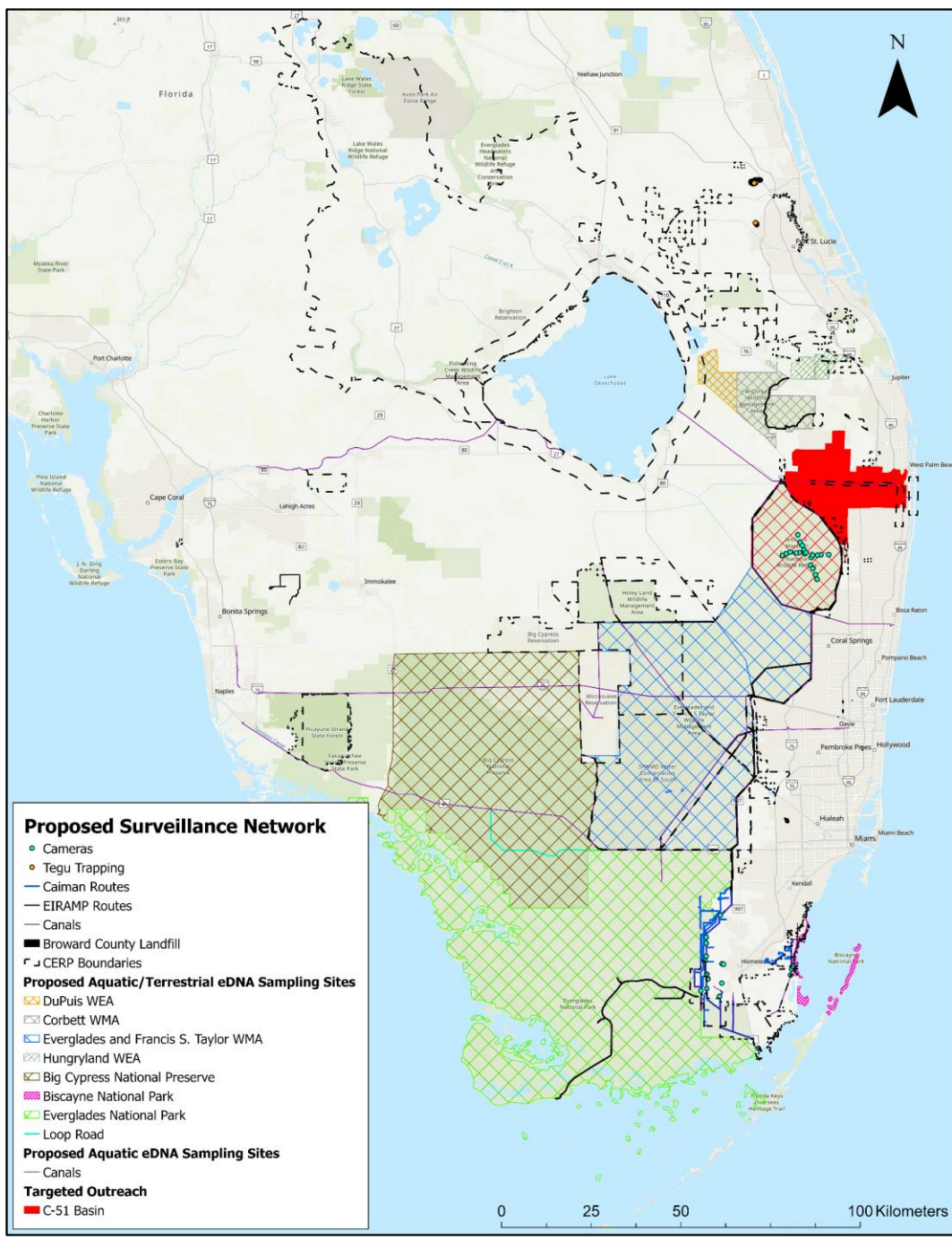
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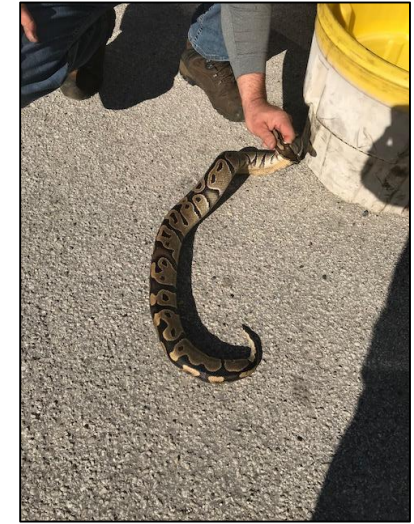
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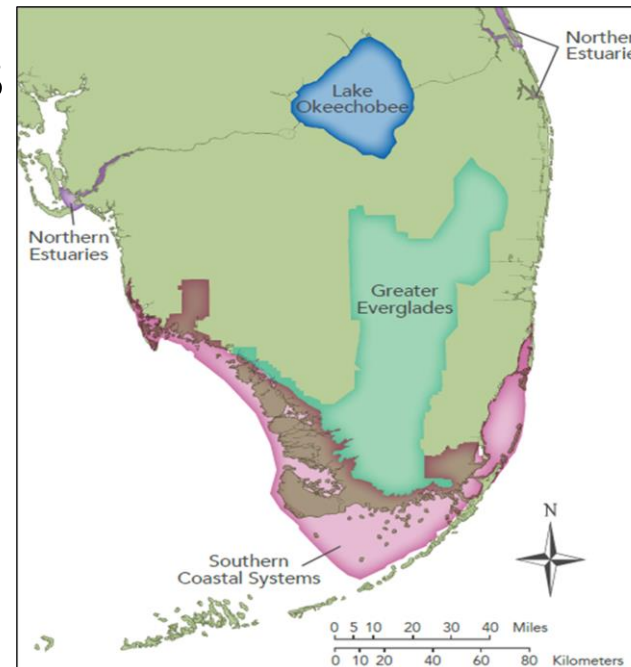
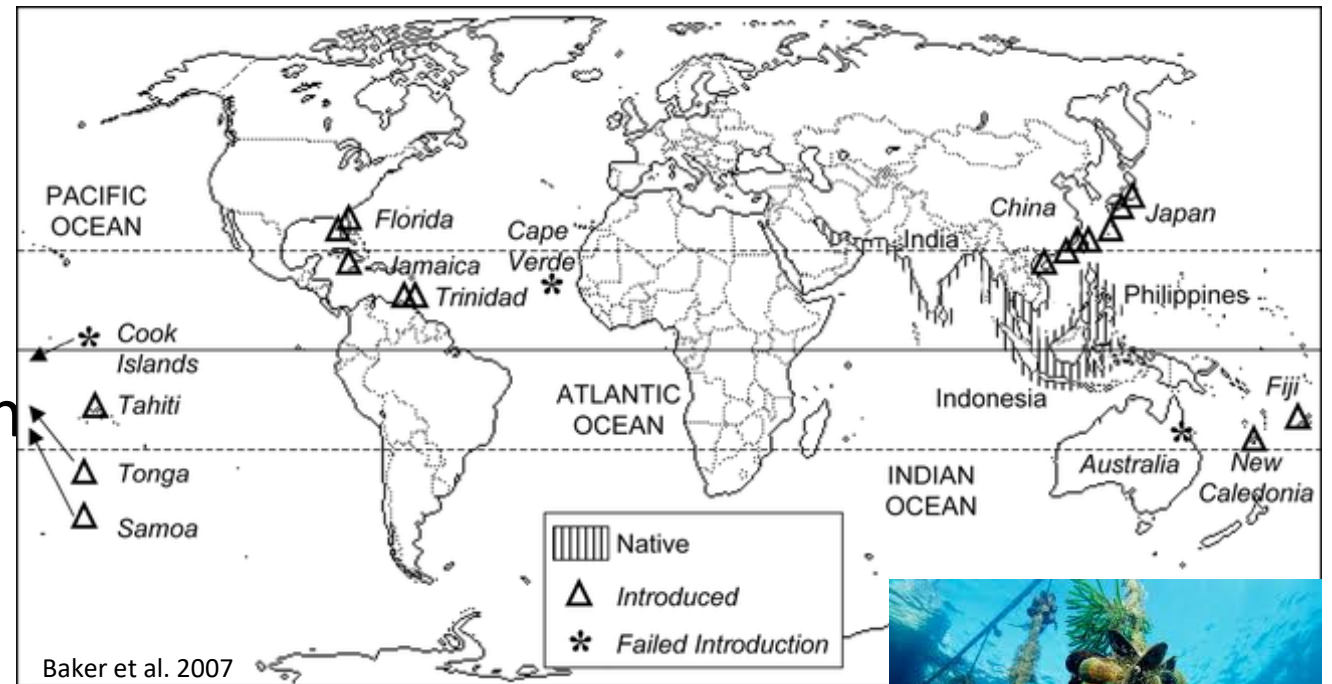
EDRR – Species Selection

- Different methods for different purposes
- As simple as possible but not simpler
- Reactive to agency priorities
- Proactive and scientifically justified
- Selection reptiles for EDRR for CERP/CEPP projects was based on Fujisake et al. 2010, FWC, EDDMaps, and ECISMA
- 12 categories consisting of 35 species – rainbow boas
- Habitat and activity pattern, citizen reporting



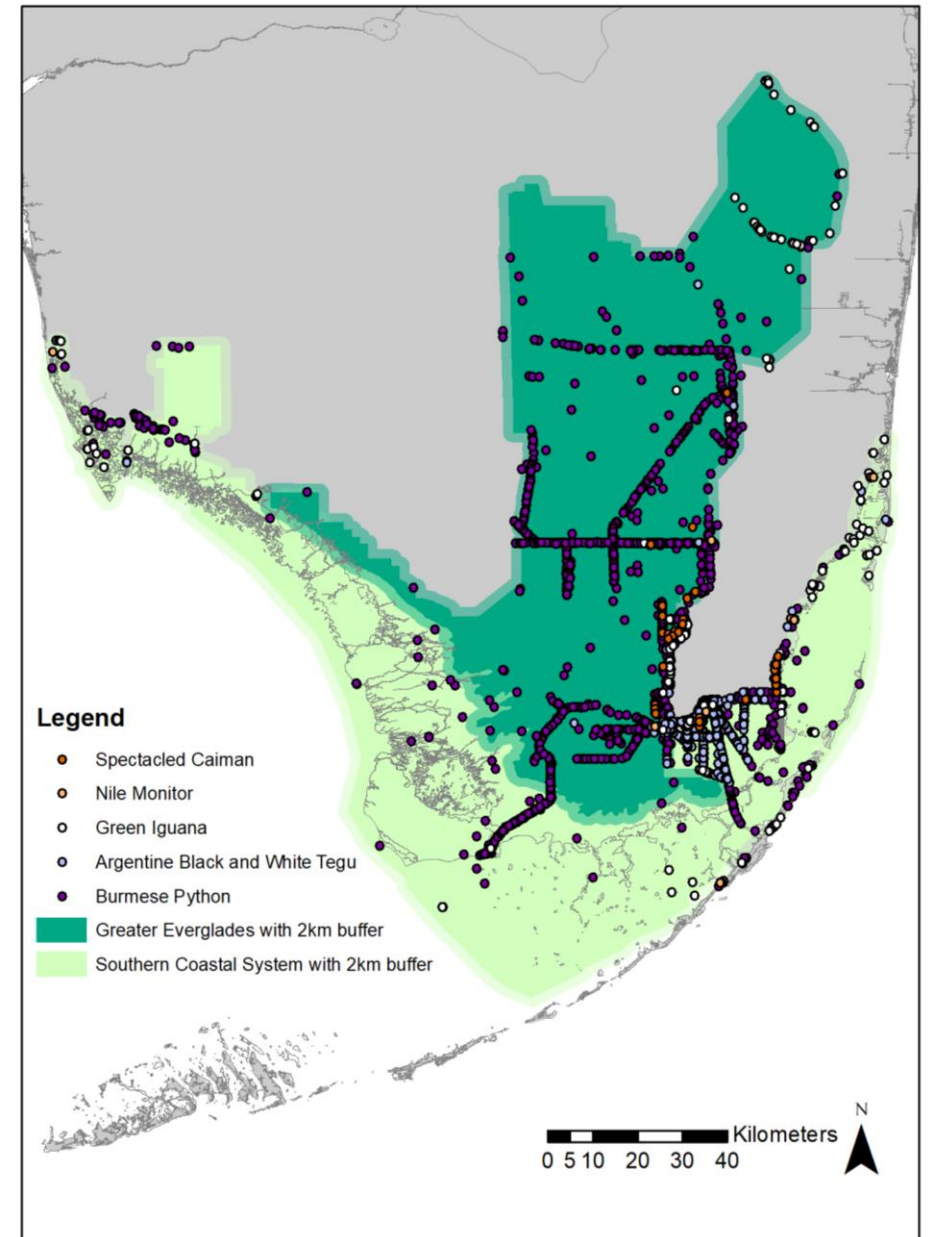
CERP RECOVER CEM

- Species selection needs to be dynamic and selection changes with scale, geography, and taxa
- Systemwide and project based
- RECOVER CEM GE and SCS modules
- Simple, repeatable, scalable, easily applied, and agreed upon (CISMAs)

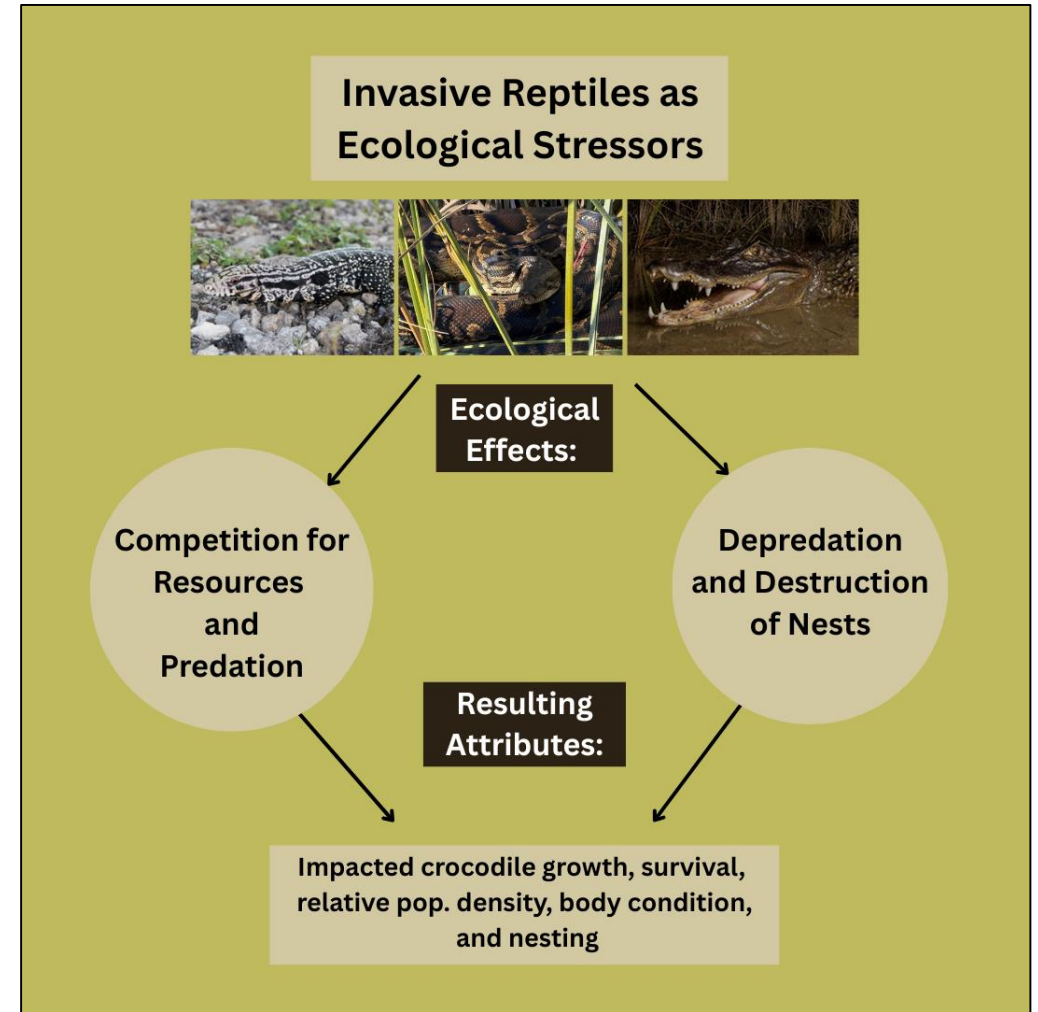
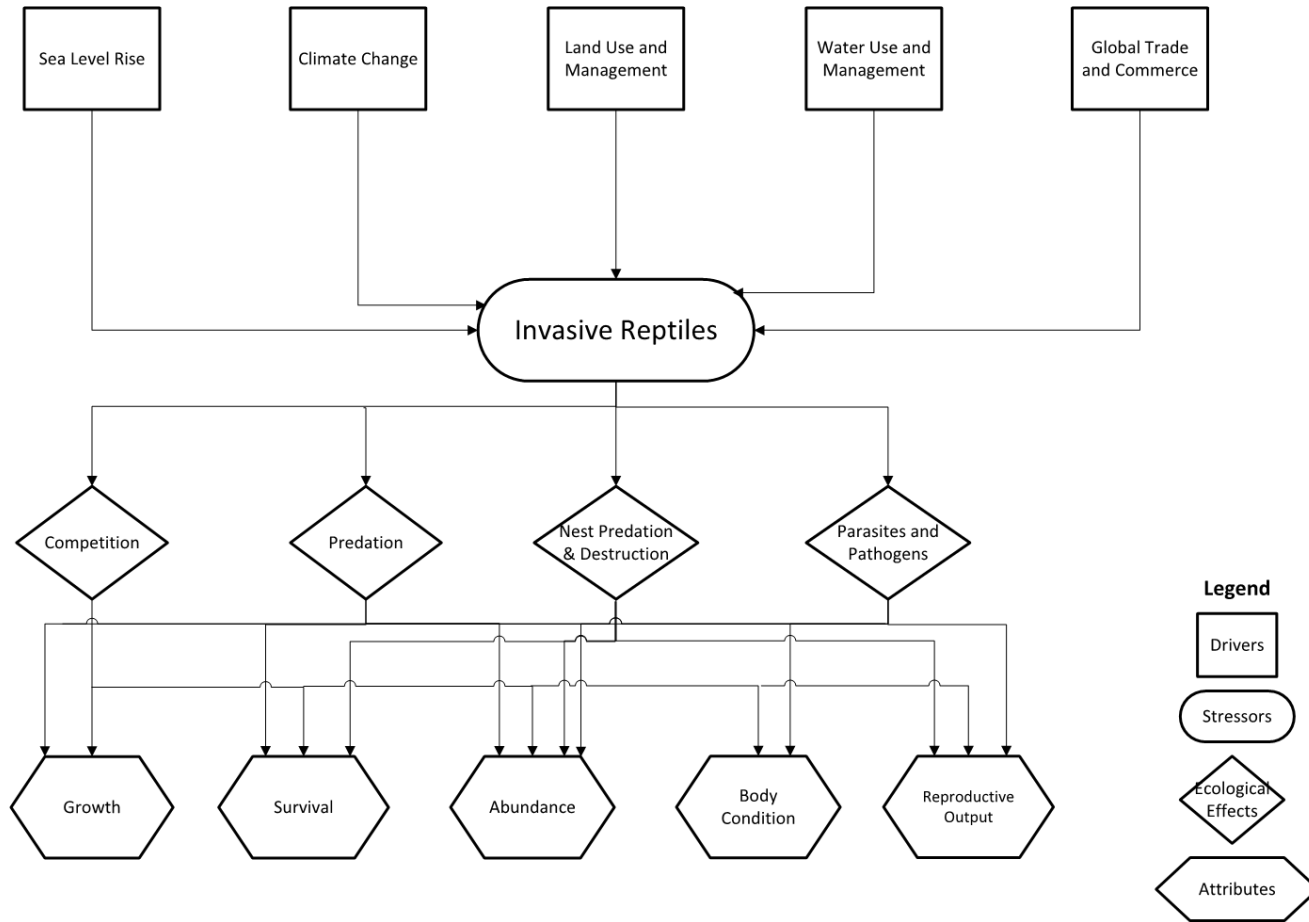


CERP RECOVER CEM

- Four questions
 - Present in the landscape?
 - Potential for impact on CEM attributes?
 - Potential for impact from CERP activities?
 - Information available for evaluation?
- SCS CEM species Burmese pythons, monitors, Argentine Black and white tegus, iguanas, and spectacled caimans. Attribute - American crocodiles



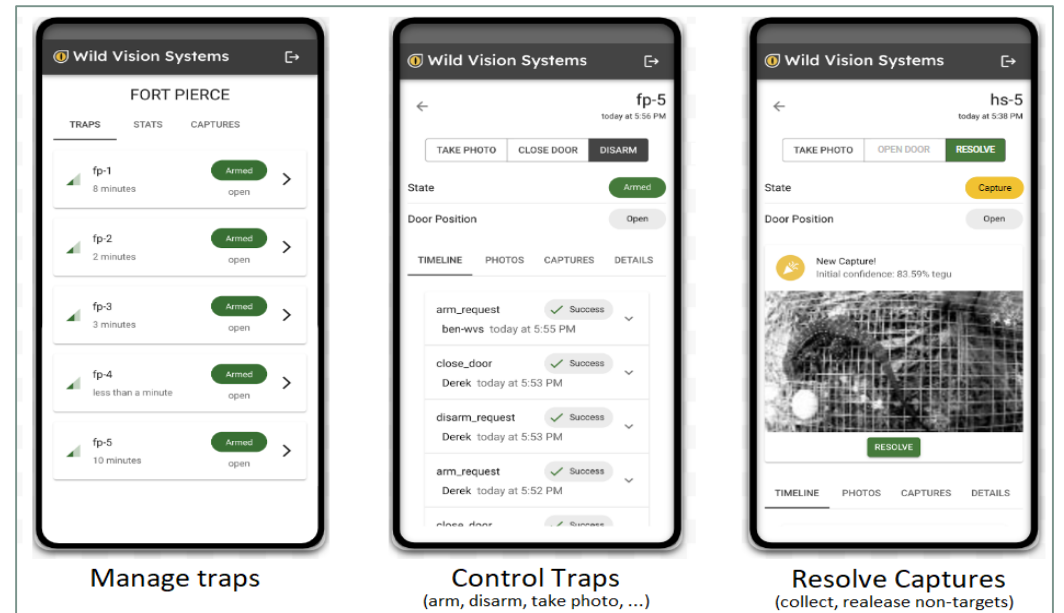
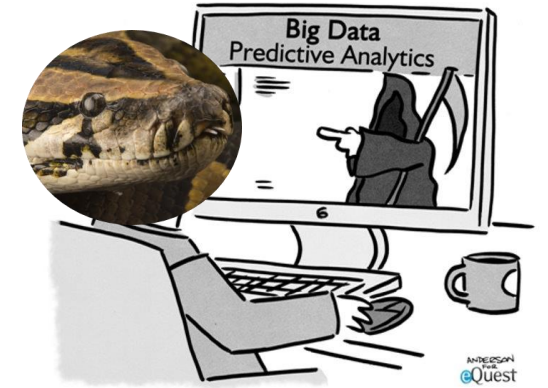
Invasive Reptile HC for SCS CEM



Research and Development

Innovative Tools for Research and Management

- Scout snake program
- AI smart trap for tegu removal
- AI and machine learning to improve python removal
- Targeted outreach
- Mosquito-host dynamics
- eDNA



Manage traps

Control Traps
(arm, disarm, take photo, ...)

Resolve Captures
(collect, release non-targets)

Research and Development – Scout Snake Program

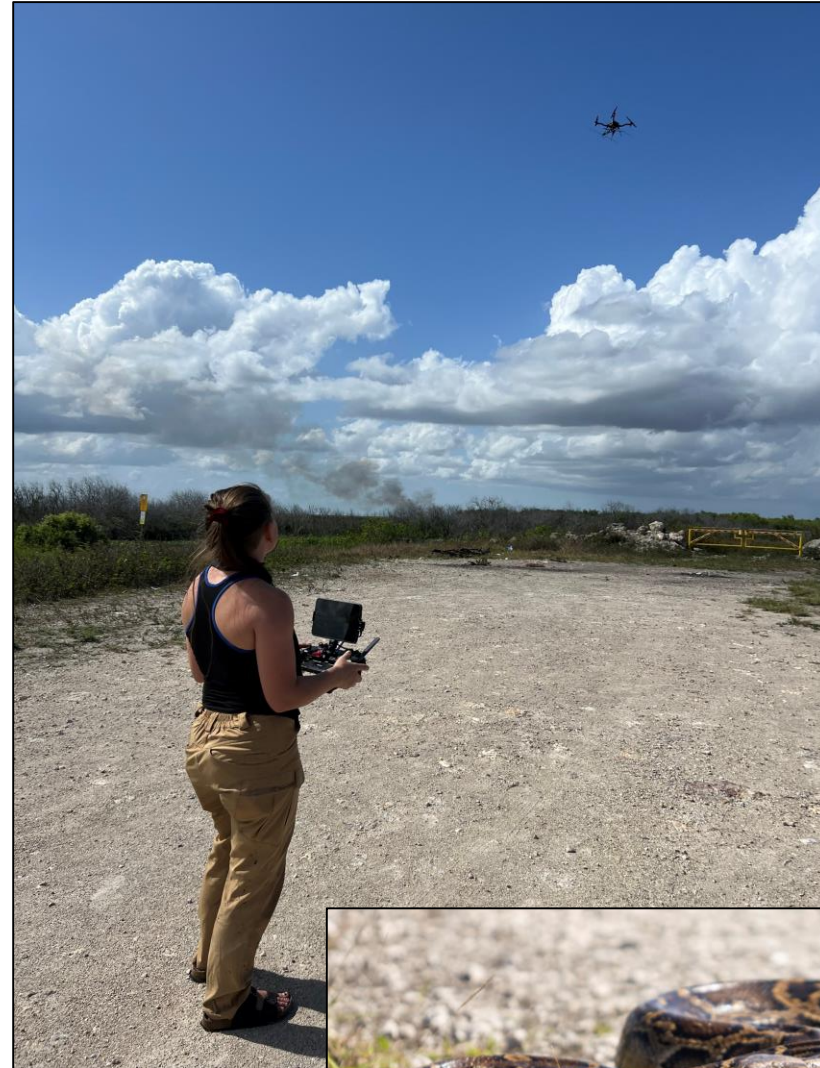
Melissa Miller and Brandon Welty

- Use python spatial ecology to understand patterns of habitat use, movement, and behavior year-round to inform management
 - *Preliminary results EFST WMA* = highly aquatic species! Pythons using vegetation mats to breed in marsh. Water likely helps pythons disperse larger distances.
- Radio-tagged pythons (“scout snakes”) can lead researchers to not just one, but many reproductive adults during breeding season leading to the removal of multiple pythons that might not otherwise have been detected
 - *Preliminary results* = 11 breeding aggregations and 12 breeding pairs



Scout snake program

Assessing innovative tools to reduce costs associated with tracking programs

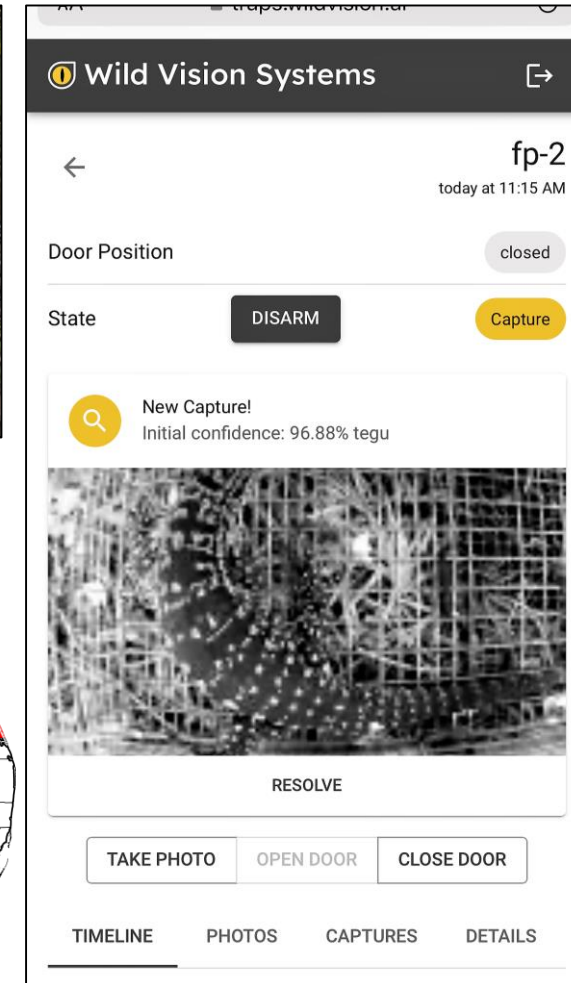
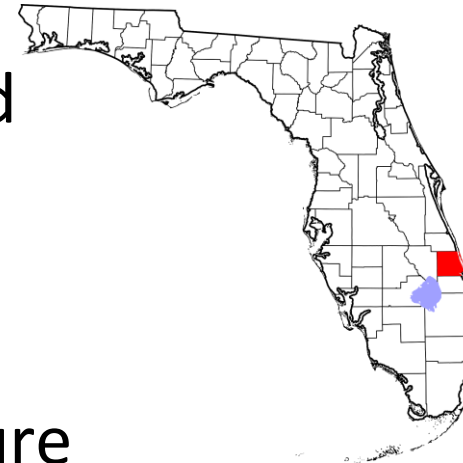


Research and Development – AI tegu trap

AI Smart Traps Pilot Study – Melissa Miller

Wild Vision Systems (WVS) AI smart trap

- Selectively capture target species and eliminate bycatch
- Traps are solar powered and can be checked and operated remotely via web, real-time alerts when tegu is captured
- Field test of efficacy of smart traps for capture of tegus compared to traditional traps (labor reduced by 87%, bycatch reduced by 94%)



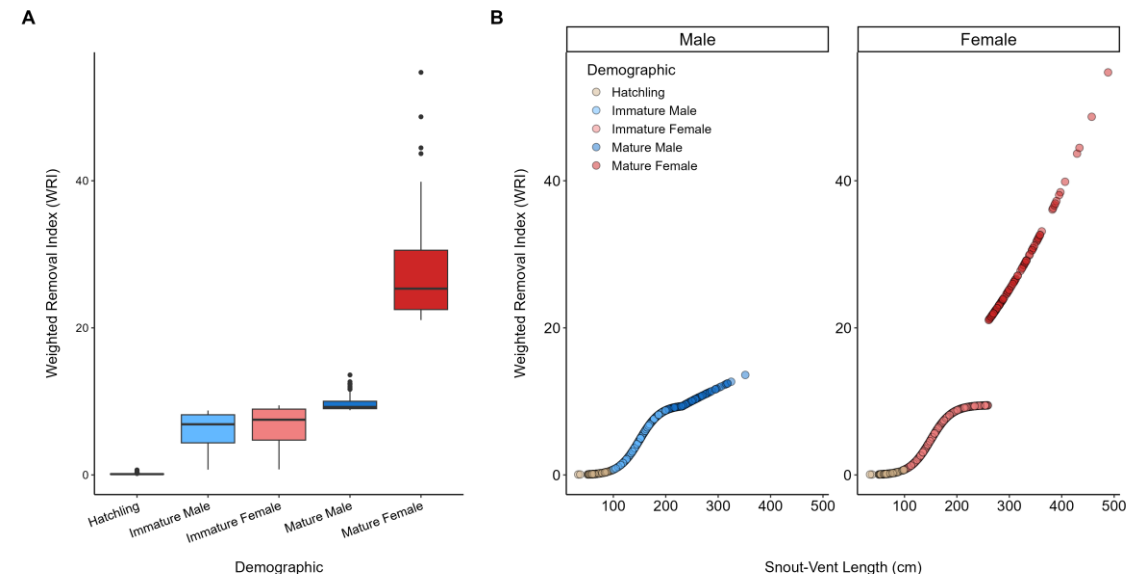
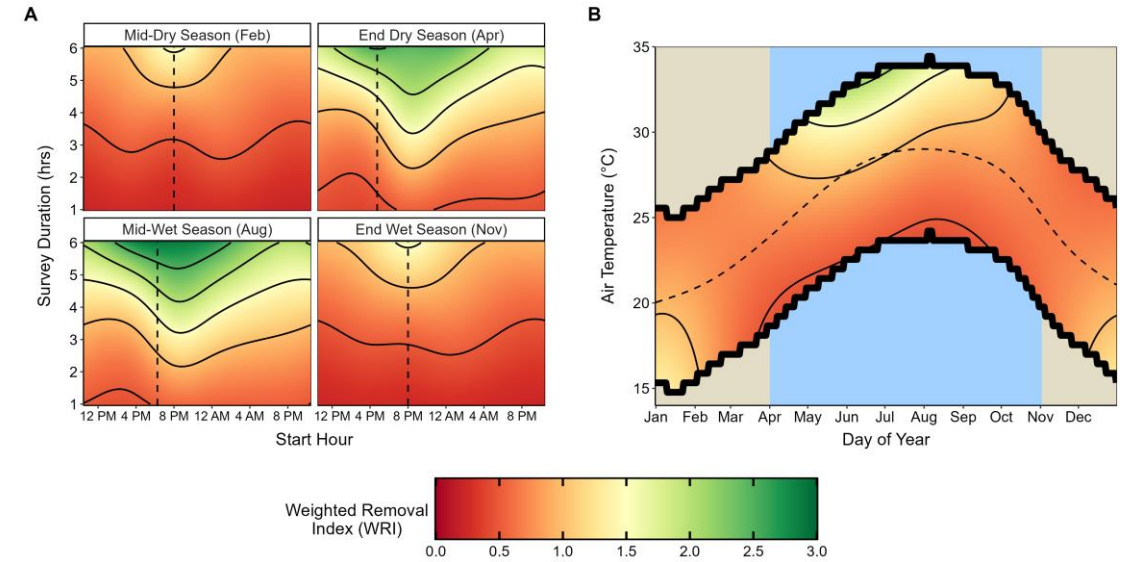
Research and Development – Python Removal

Alex Romer

- Used AI to improve effectiveness of python removal efforts
- Developed a Weighted Removal Index to prioritize removal efforts based on, weather, demography etc.
- Prioritize removal of large females
- Developing a python forecasting




Check out the paper!



Research and Development – Targeted Outreach

- We used TO to increase community involvement in reporting large lizards in C-51 Basin, Palm Beach County
- We used a multimedia approach
- Newspaper articles elicited the most sightings and social media reached the biggest audience
- There was a spillover effect of sightings to surrounding areas
- We recorded Nile monitors, Argentine tegus, and a rhinoceros iguana

**NILE MONITORS:
REPORT SIGHTINGS IN SOUTH FLORIDA
We Need Your Help!**



Monitor Facts

- Large (3-5 feet in length) invasive lizard from Africa
- Dark in color with greenish-yellow markings
- Forked black/blue tongue
- Most likely to be seen in wetlands or along canal banks
- Have long sharp claws, a powerful bite, and a long, muscular, whipping tail
- Opportunistic hunters and scavengers

Photo above: Nile Monitor (*Varanus niloticus*) spotted in SW Ranches (via EDDMaps)




Photo above: Monitor caught in Pembroke Pines (via EddMaps)




Photo credit: Patrick Lynch, South Florida Water Management District.




Photo credit: Bill Bayless


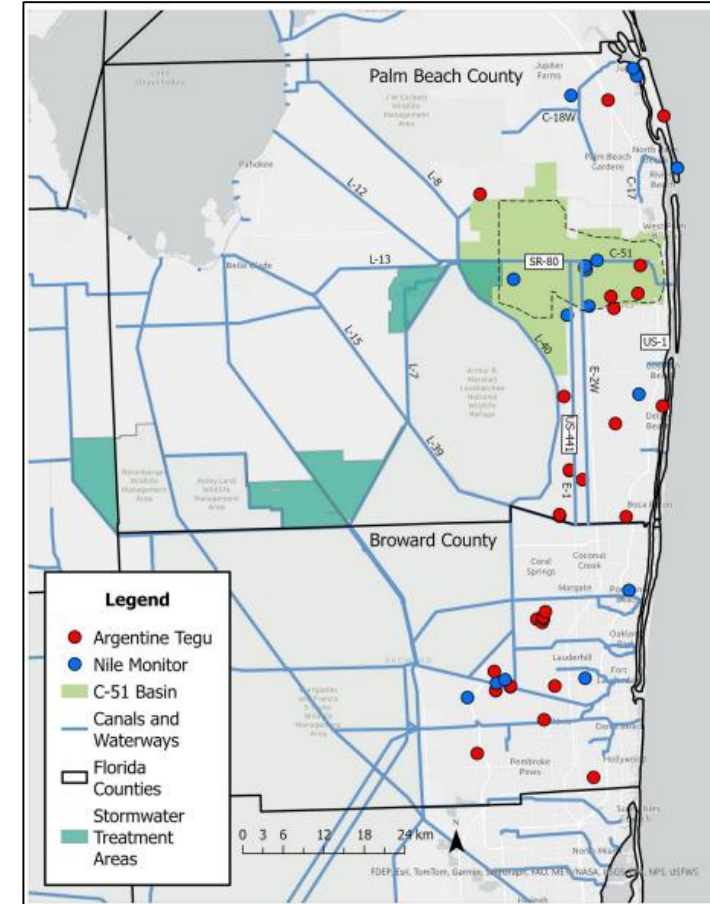


Photo credit: Nick Scobel, University of Florida

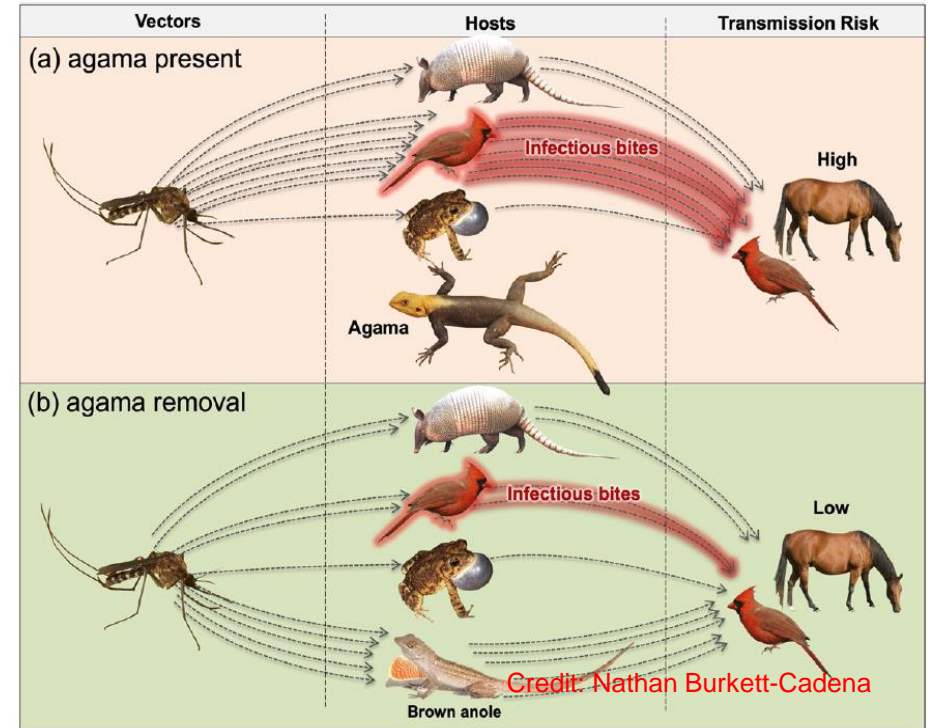


Check out the paper!

Research and Development – Mosquito-Host Dynamics

Current Project (in collaboration with UF | IFAS Florida Medical Entomology Laboratory)

- Assess how Peters's rock agama removal influences brown anole abundance and habitat use
- Evaluate potential cascading effects on mosquitoes' host selection and pathogen transmission



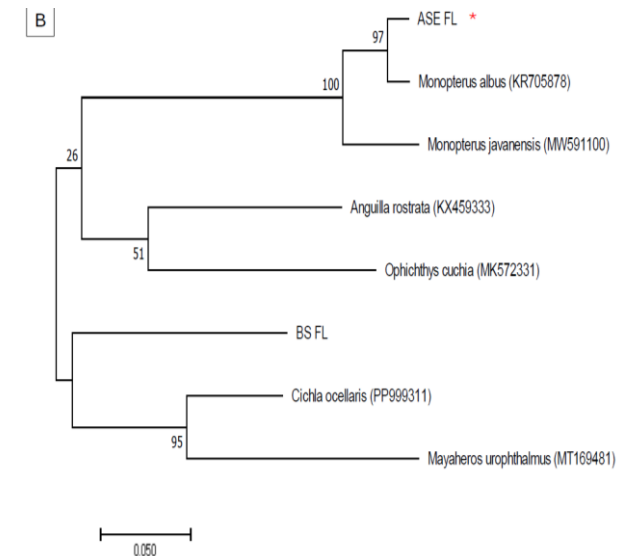
New Project

- Using mosquitos to detect nonnative species
- Use these data to assess potential eradication



Research and Development – eDNA

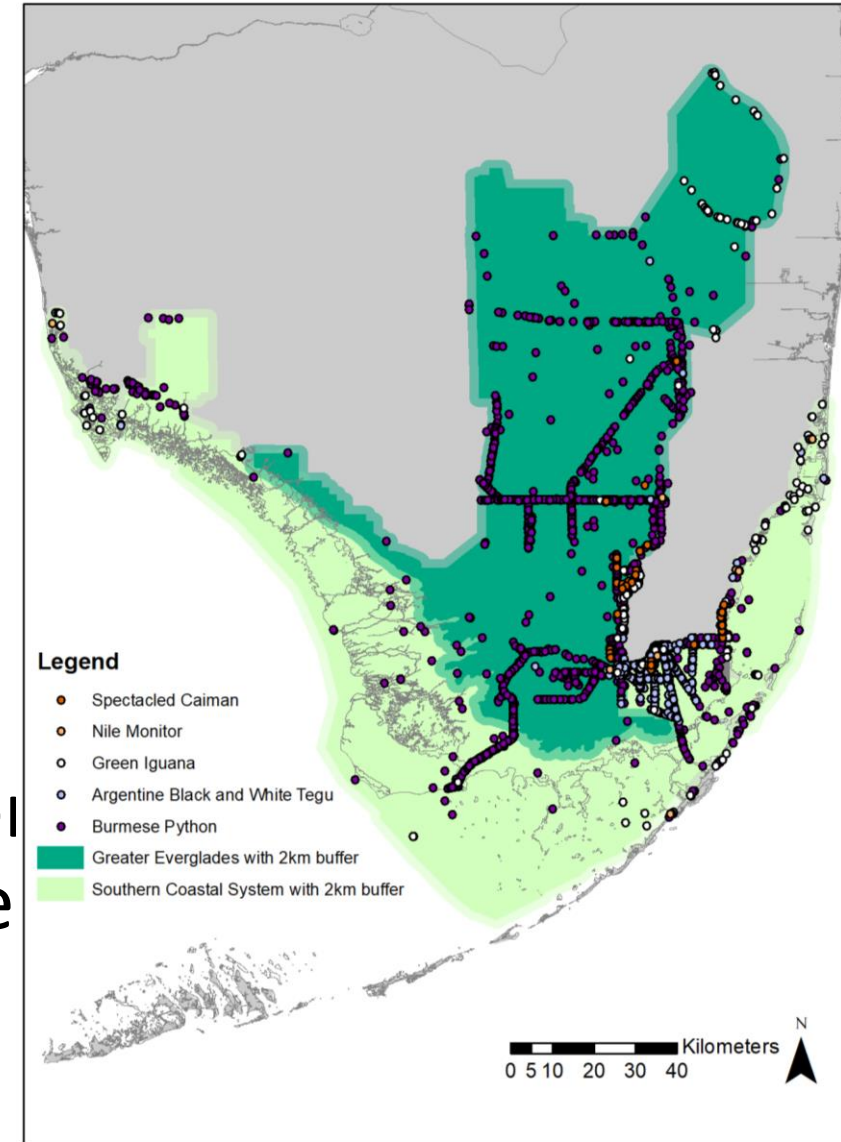
- Development of a tool to detect lower amounts/concentrations of invasive species DNA
- Development of a protocol to define uncertainty
- Test under semi-controlled environments
- Use in the field as EDRR tool

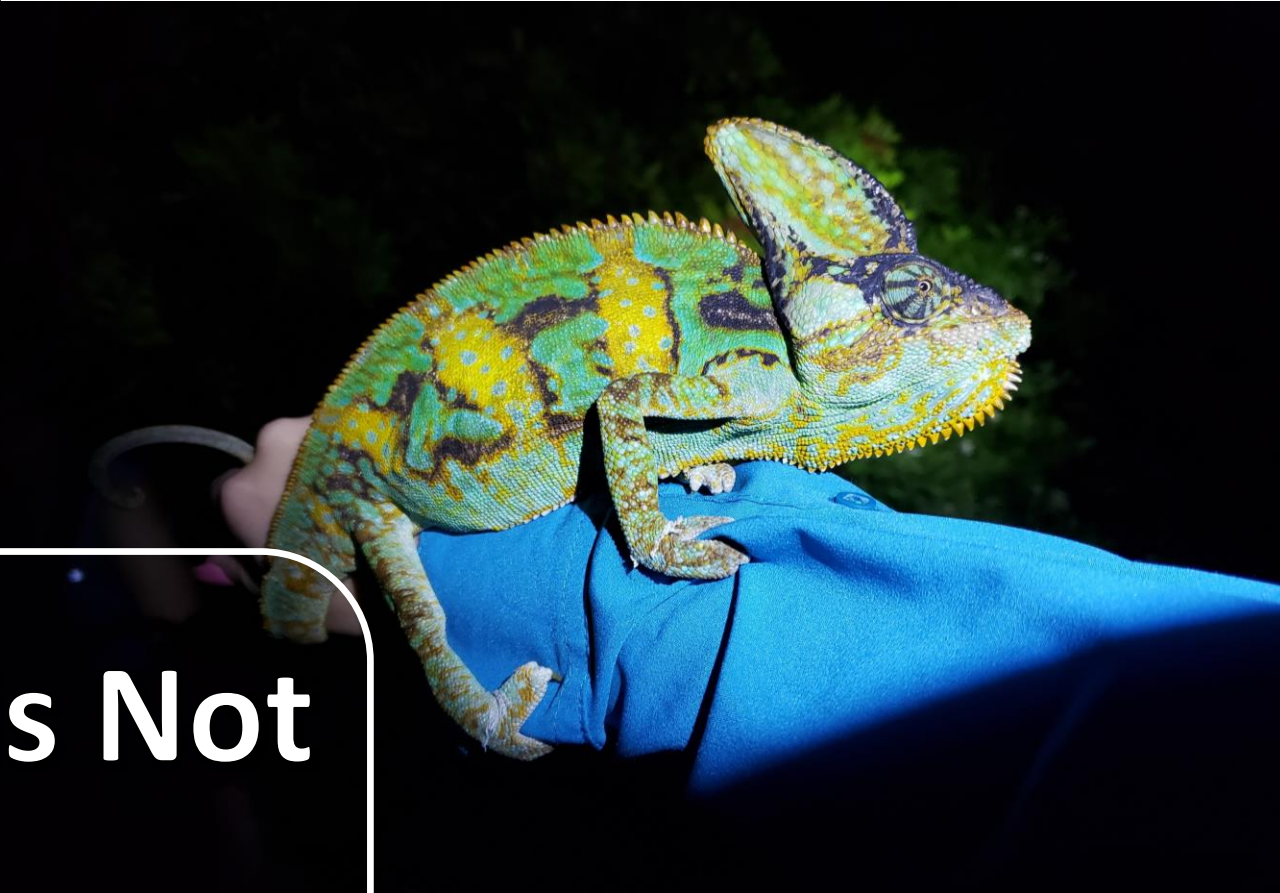


Check out the paper!

Relevance to WRDA 2020

- Selected reptiles for EDRR in CERP projects
- We are integrating invasive reptiles into the RECOVER CEMs for the GE and SCS – selected species
- Established regional EDRR network for CERP/CEPP projects
- Developing innovative strategies and tactics for detection, removal, and monitoring of invasive wildlife





This is Not

The End

