ACTIVE EDNA MONITORING OF THE INVASIVE ASIAN SWAMP EEL IN SOUTH FLORIDA: ASSAY DEVELOPMENT AND APPLICATION

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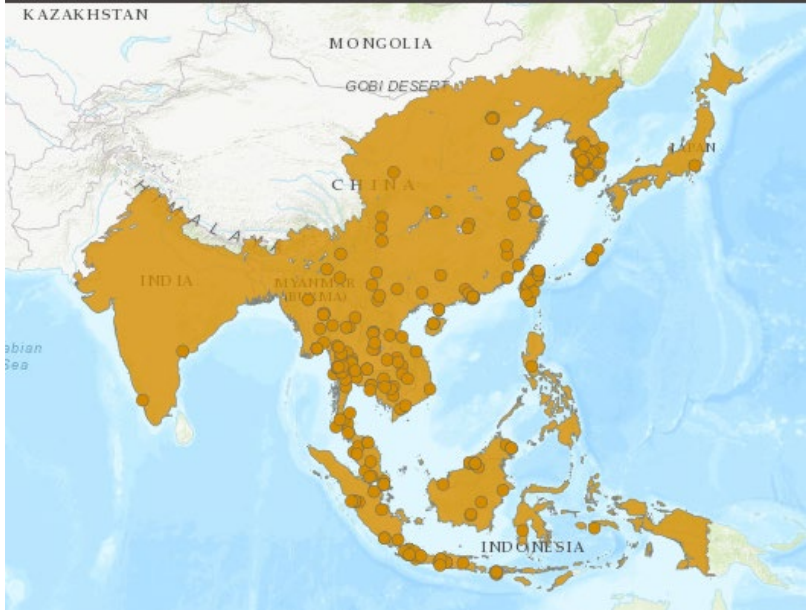


Introduction

- ~ 200 freshwater fish introduced in Florida.
- 22 species stablished.

Monopterus albus (Zuiew, 1793)

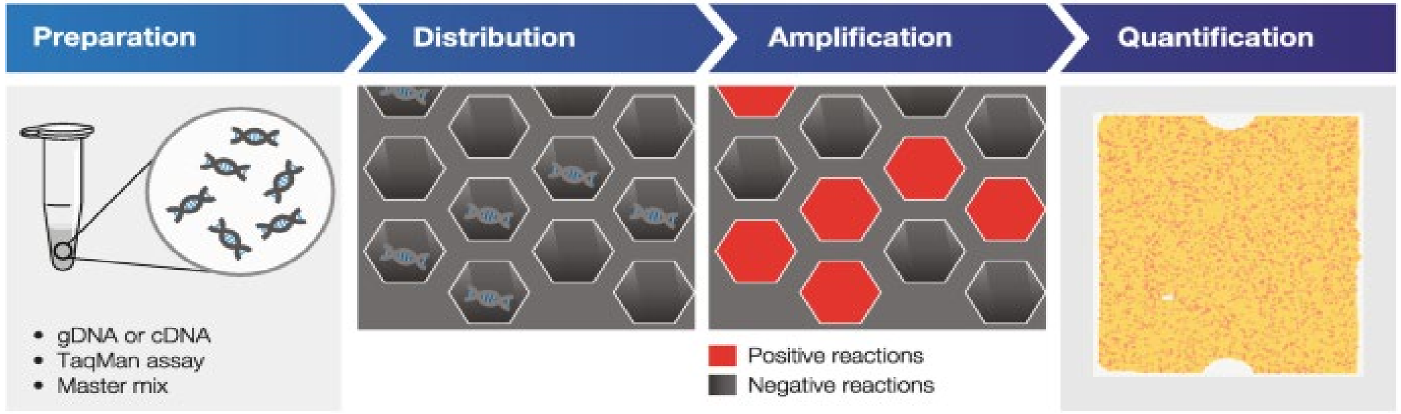
EDDMapS (2025)

Objectives

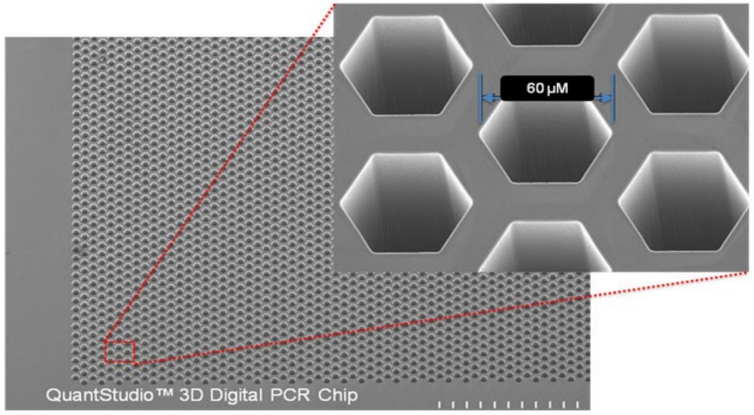
- Development of a tool to detect lower amounts/concentrations of Asian swamp eel DNA.
- Development of a protocol to define uncertainty.
- Test and tunning under semi-controlled environments.
- Use in the field as EDRR tool.

Methods

Digital PCR



Cytochrome Oxidase I

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ASE_FL                              GGGACGACCAAATCTATAATGTTATCGTAACCGCTCACGCCTTC ATTATAATCTTCTTTATAGTAATGCCTATTATAATCGGGGGCTTCGGAAATTGATTAGTCCCCTTAATAATCGGAGCCCCGGACATGGCCTTCCCCCGA[198]
BS_FL                               .......T.......C.....A..T..G..A..A..T.....TG.A.....T.....C..G..C..A..A..A..G..T..A.....T.........C....T..AC.......T..C.....T.....A..A.........C[198]
Monopterus_javanensis_(MW591100)    .......................................................................C..........A...........C.......................T........A........T..T......[198]
Anguilla_rostrata_(KX459333)        .A..T........T..C.....C.....C..A..G..T.....TG.A..G..T................AG.A........A..A..T..C..C...C.T..G..A..........C..T..A.....A..G.........[198]
Ophichthys_cuchia_(MK572331)        .A..T........T...............T..A..C..T..T...G.A...................A..A..C.....T..T..A..T..C..C........T..TC.......T.....T..A..T..A..A.....T..T[198]
Cichla_ocellaris_(PP999311)         .A.....T.....T..C..C.....T..T.....A..T.....TG.A.....T...........T..A..A..C..G..T..A.....T.....C...C..A.T..AC....G..T..C.....C.....A.....T......[198]
Mayaheros_urophthalmus_(MT169481)   .A...........T.....C..A........T..A........TG.A.....T...........T..A..C.....G..T............C..C...C.GA....AC.C..G..T..C..T..C.....A.....T..A...[198]
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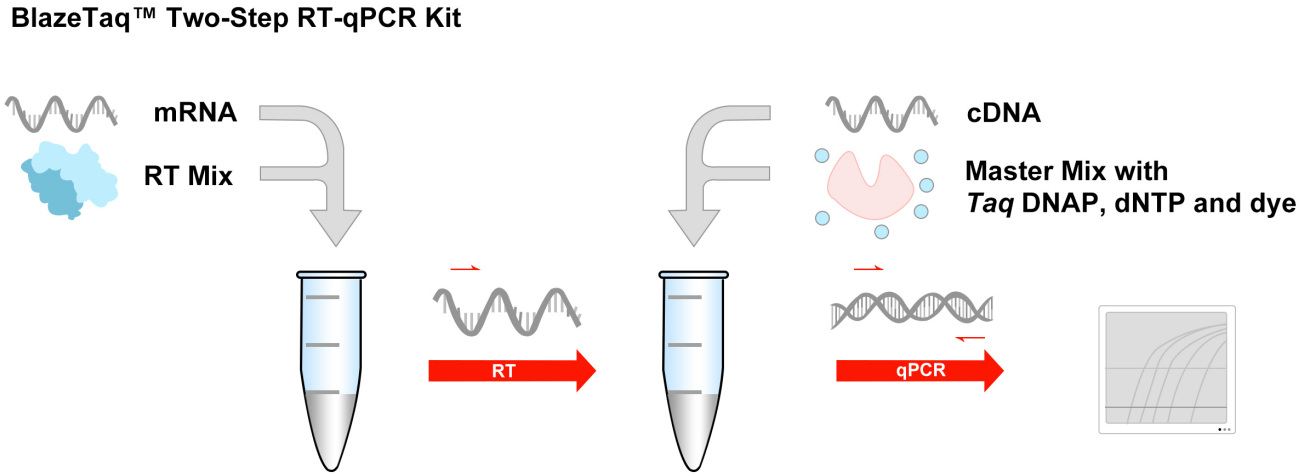
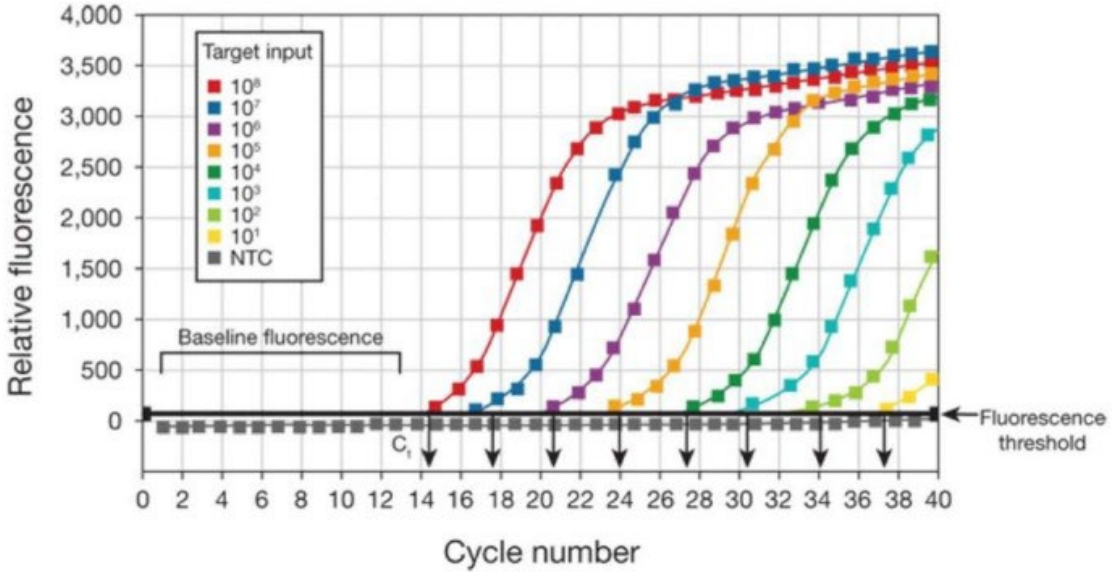
Methods

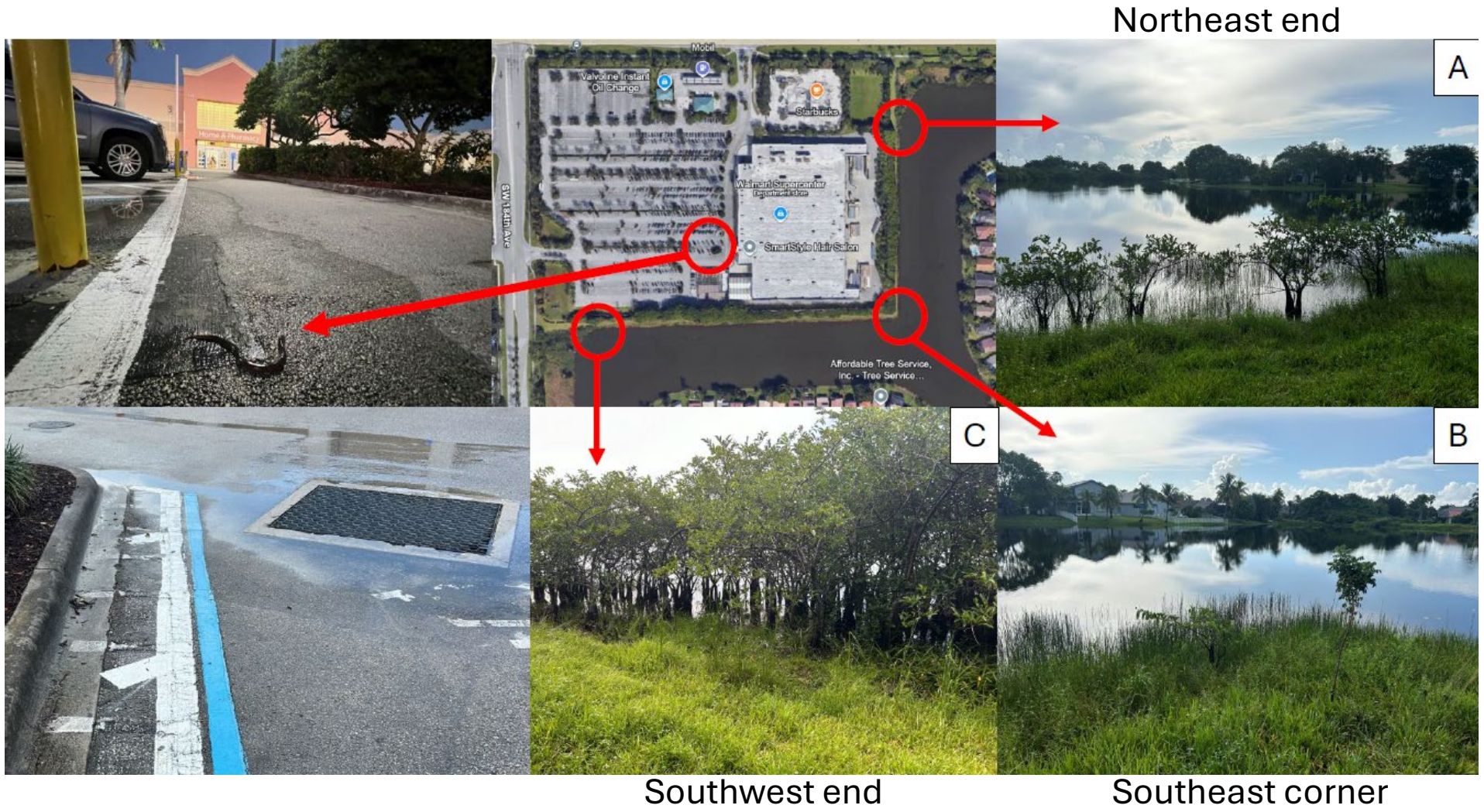
Quantitative PCR



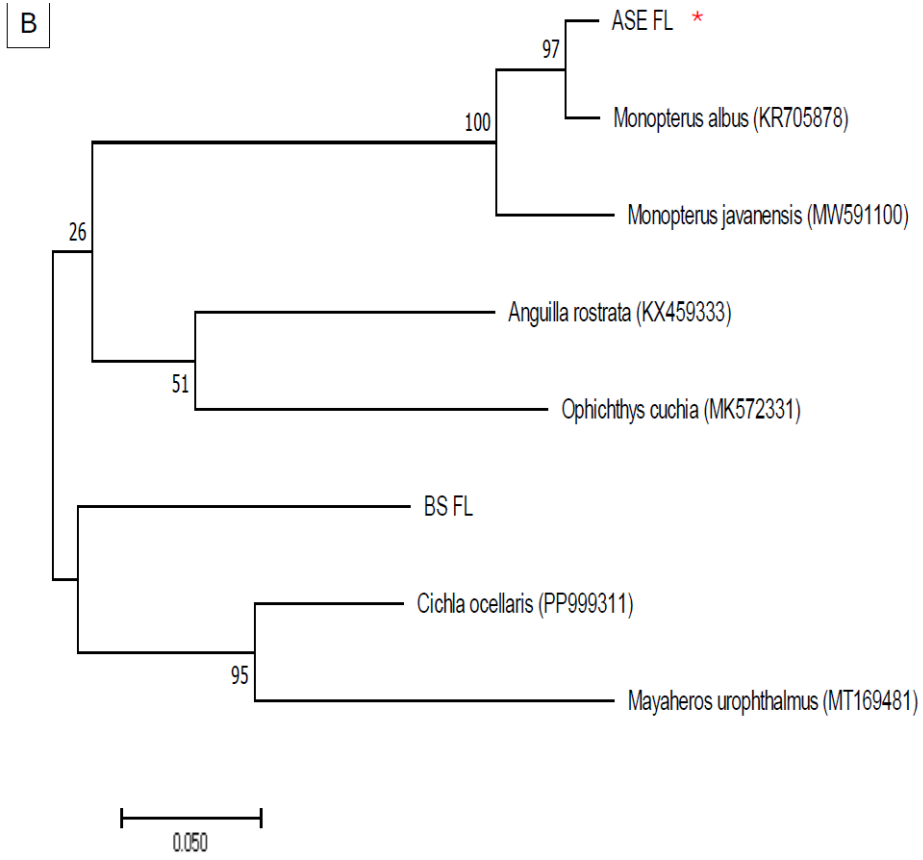
Cytochrome Oxidase I

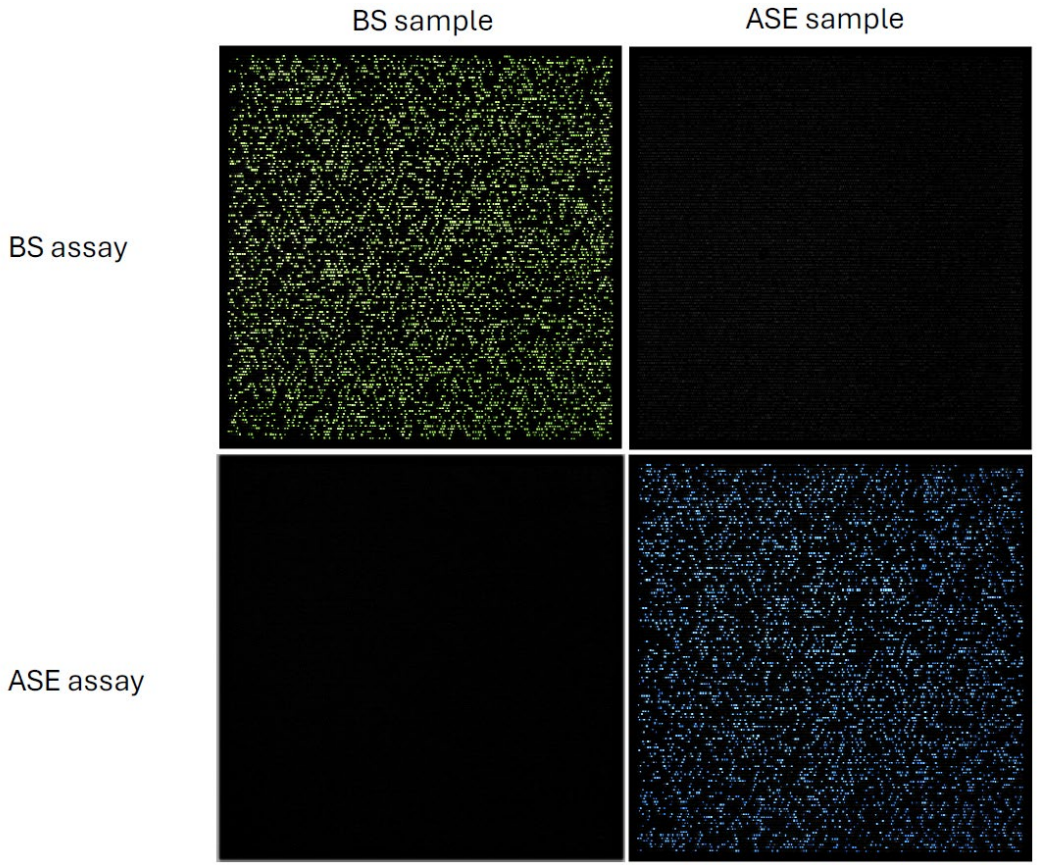


Methods


Northeast end
A
Mobil
Valvoline Instant Oil Change
Starbucks
Walmart Supercenter
SmartStyle Hair Salon
SW 184th Ave
Affordable Tree Service, Inc. - Tree Service...
C
B
Southwest end
Southeast corner

Results



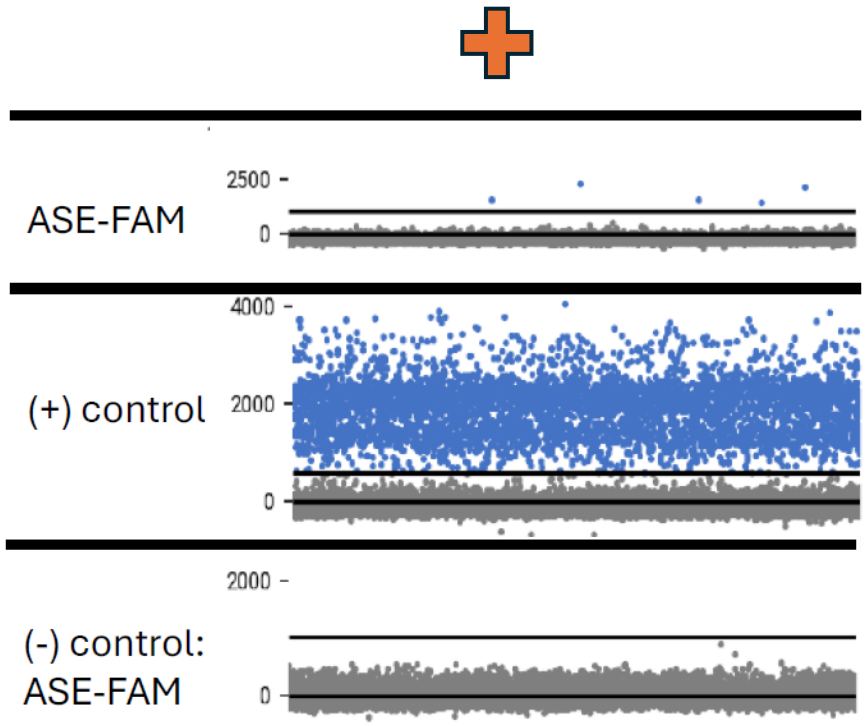


Amplified
10^3 copies/µl ~27.0%
10^2 copies/µl ~5.7%
10^1 copies/µl ~1.1%

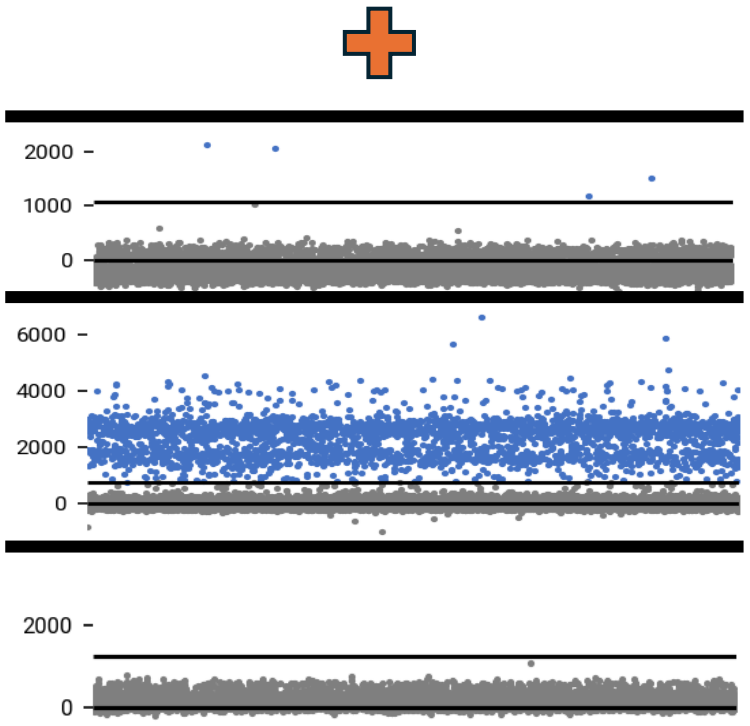
tDNA
0.25 ng/µl ~26%
0.025 ng/µl ~2%

10^7 copies/µl to 10^4 copies/µl – tDNA 25 ng/µl and 2.5 ng/µl

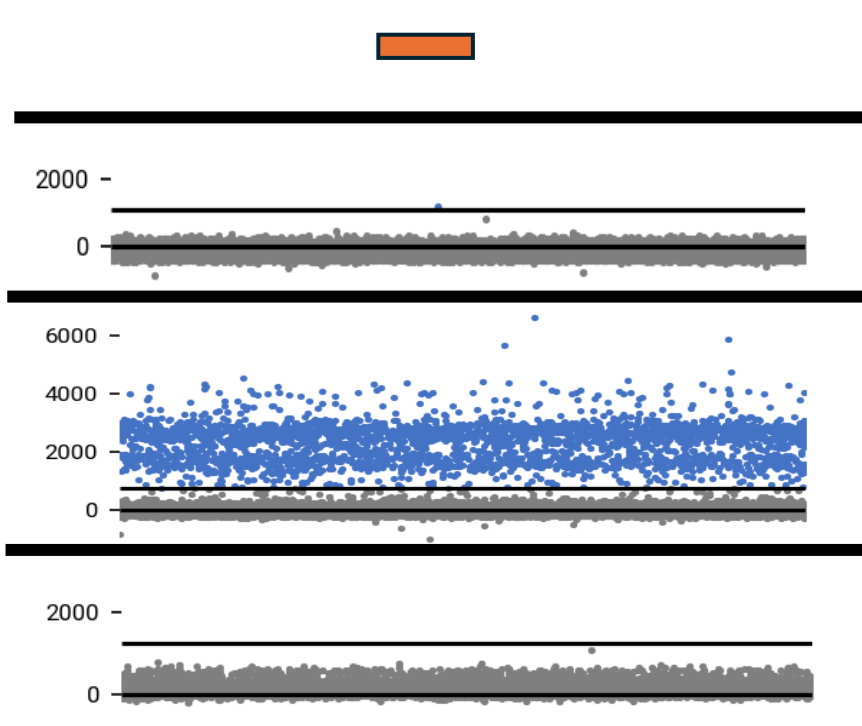
Results



Southeast corner

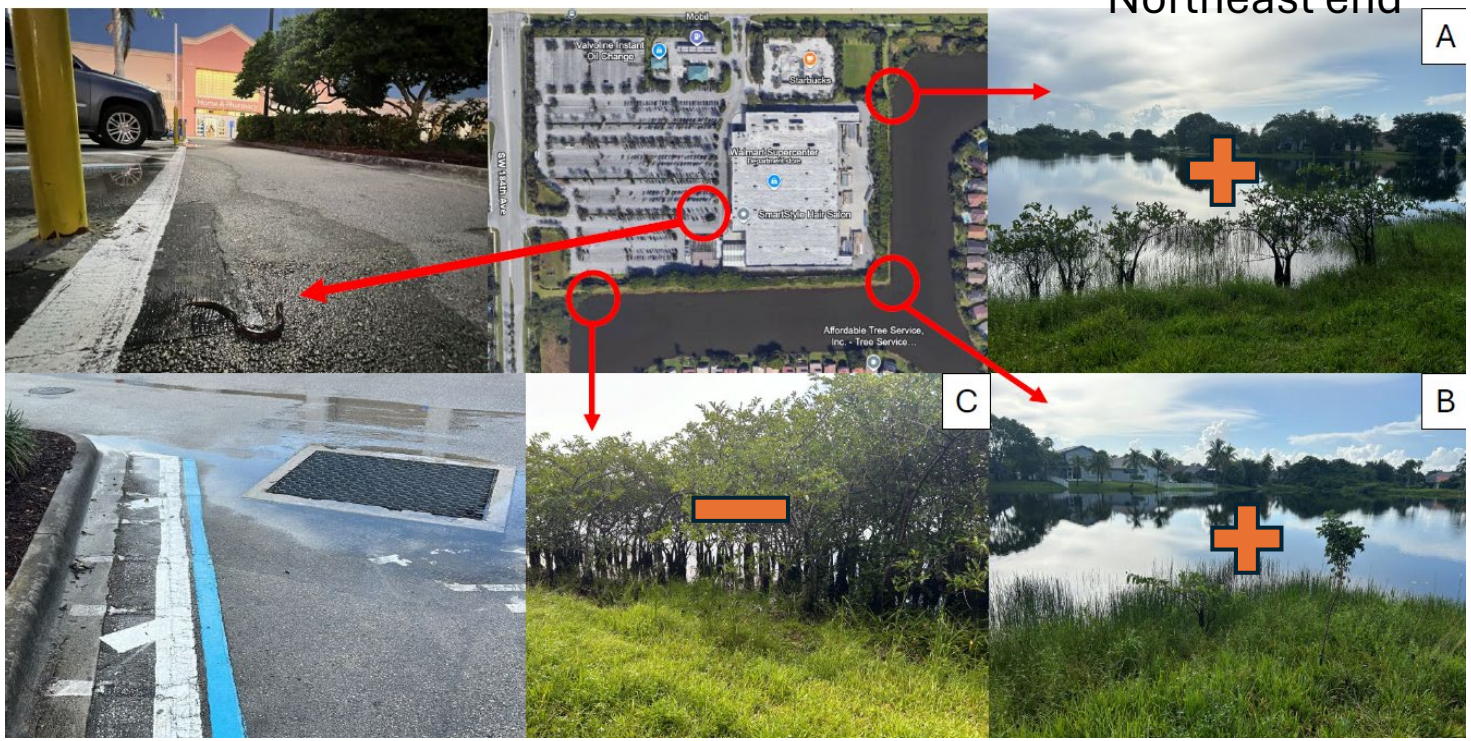


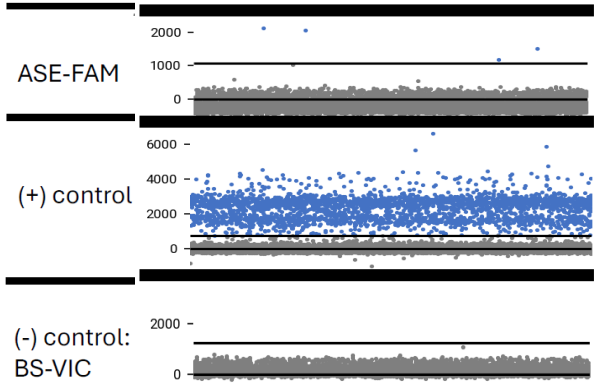
Northeast end



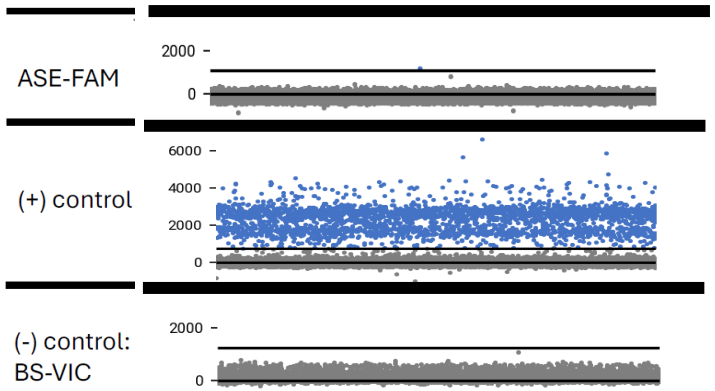
Southwest end

Northeast end

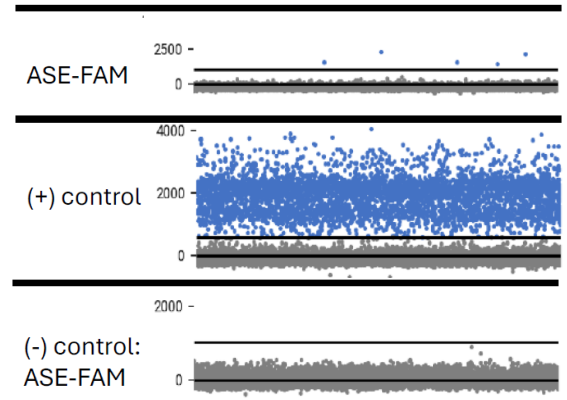




Southwest end

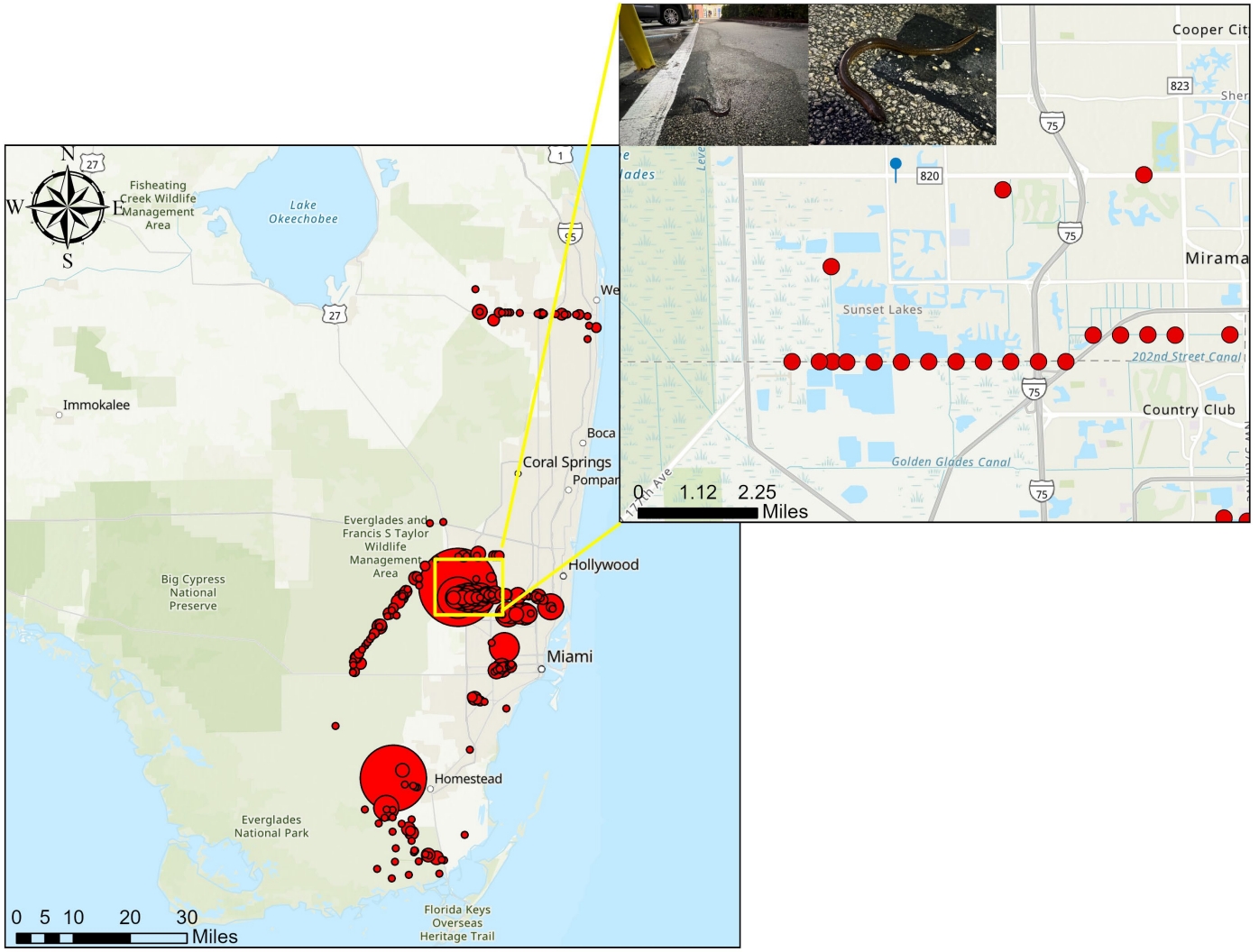


Southeast corner



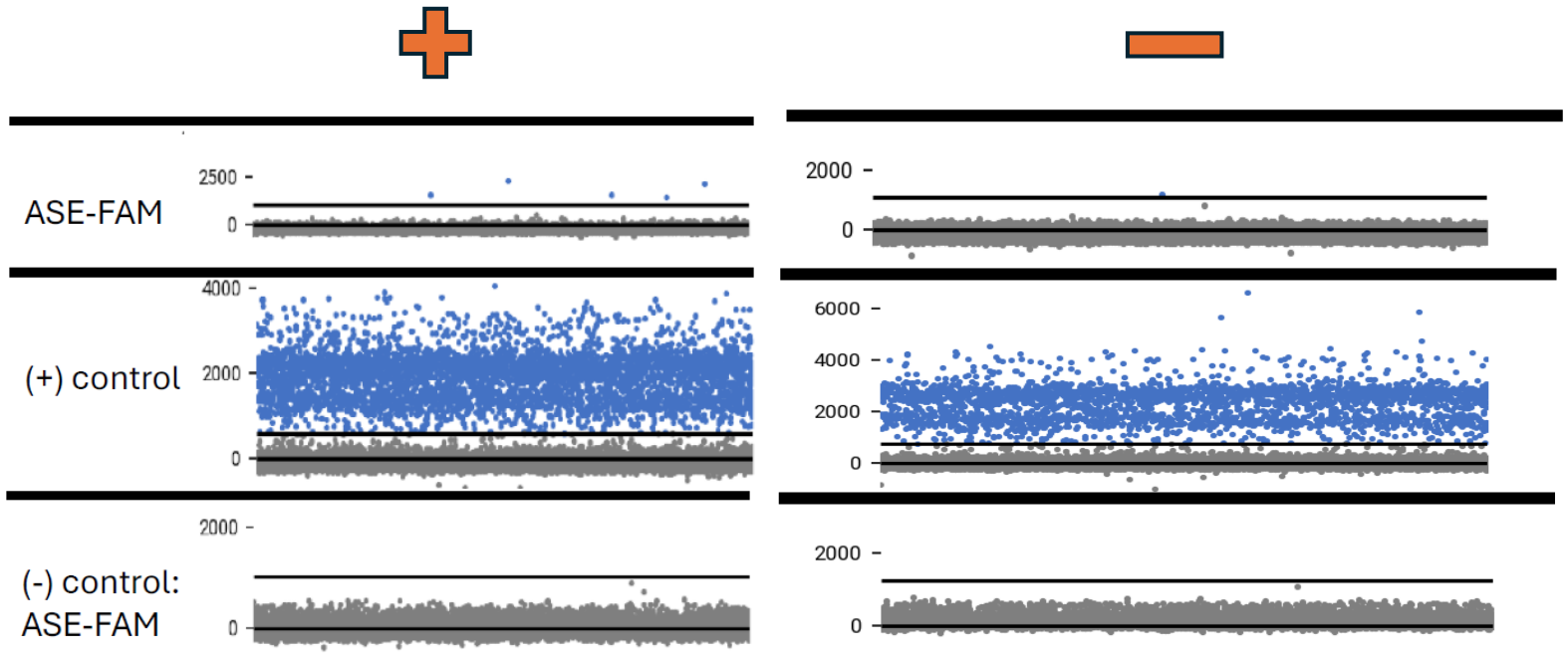
Discussion

- We successfully developed a tool to detect lower concentrations of Asian swamp eel DNA.
  - Up to 0.025 ng/µl ~2% from tDNA
  - Up to 0.11 copies/µL from the field



Discussion

- Development of a protocol to define uncertainty.
  - Threshold defined
- Test and tunning under semi-controlled environments.



Southeast corner

Southwest end

Future directions

- **Sampling**
  - Canal with high and low Asian swamp eel density.
  - 3 unknown locations.
  - Marsh areas + / - / unk.

Detectability

Semi-controlled experiments to determine detectability.

Acknowledgements

- University of Florida
  - Vector entomology lab
  - Croc Docs lab

Funding institutions

- South Florida Water Management District
- US Army Corps of Engineers
- University of Florida – IFAS Invasive Science Institute

Hi Hello

CARD
Work

RESEARCH ASSISTANT SCIENTIST

Sergio Balaguera-Reina

COMPANY

University of Florida - IFAS - FLREC