

# Red Swamp and Rusty Crayfish in Illinois Waterways



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*Presentation to Great Lakes Panel; June 1, 2022*



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# Invasive crayfishes in Illinois

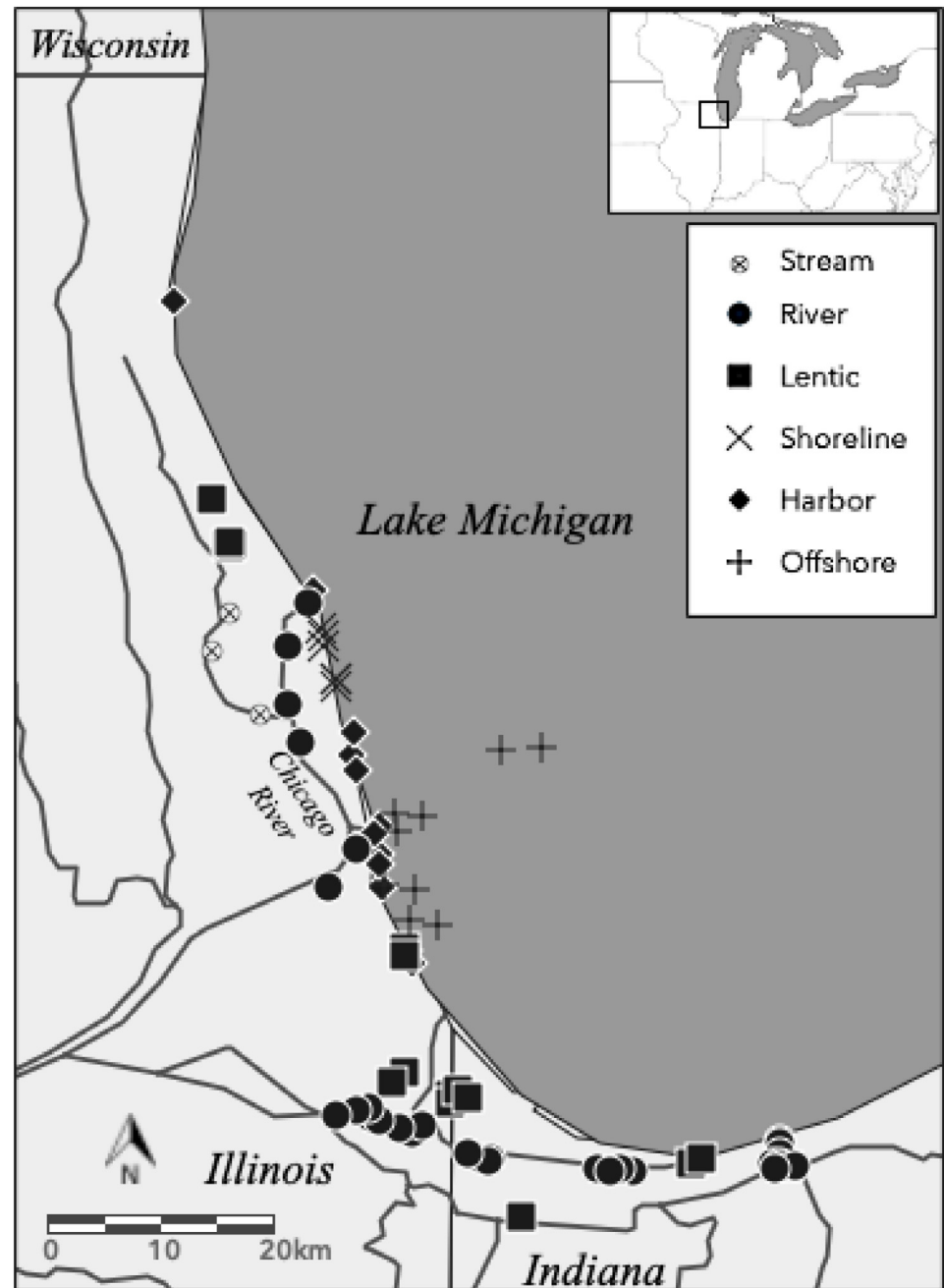
## Overview:

- Distribution of invasive and native crayfishes in Northeast Illinois
- Impacts of invasive crayfishes
- Control of red swamp crayfish in the North Shore Channel

# Part 1: Distribution

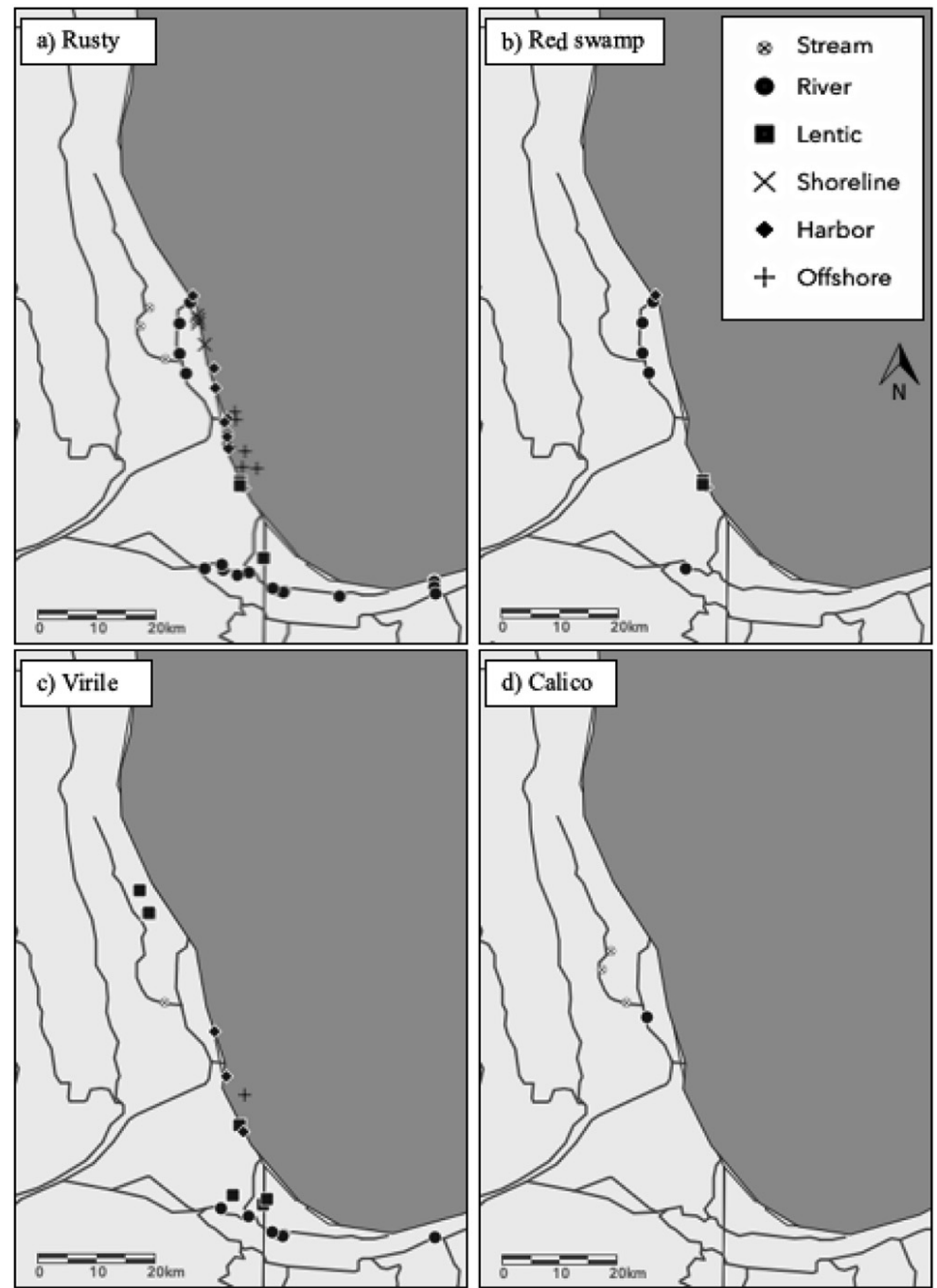
## Overview:

- 2015 – present, sampling in lakes, ponds, rivers and streams
- Sampling with traps, dipnets, and SCUBA as appropriate for system



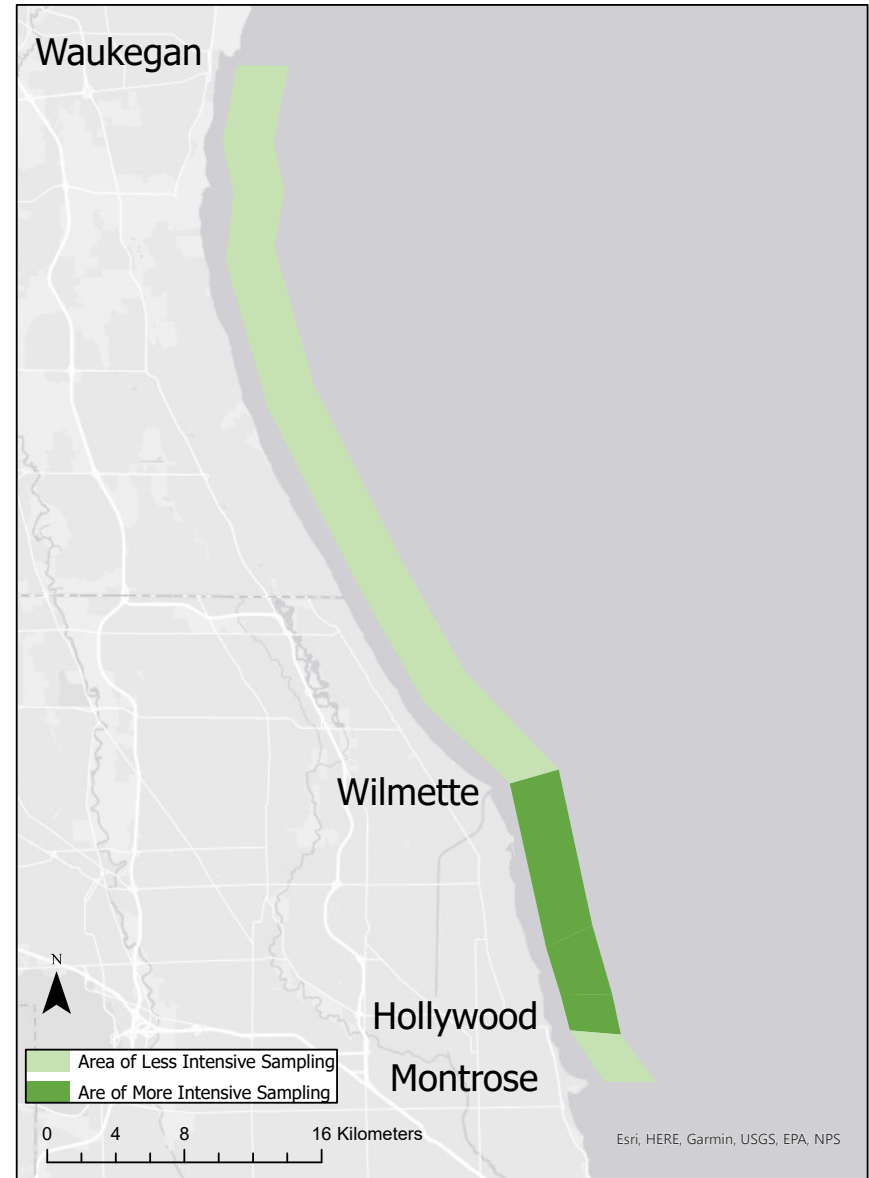
# Distribution

- Where rusty crayfish are found they are almost always dominant
- White river and Northern clearwater crayfish (not shown here) were each found at single sites



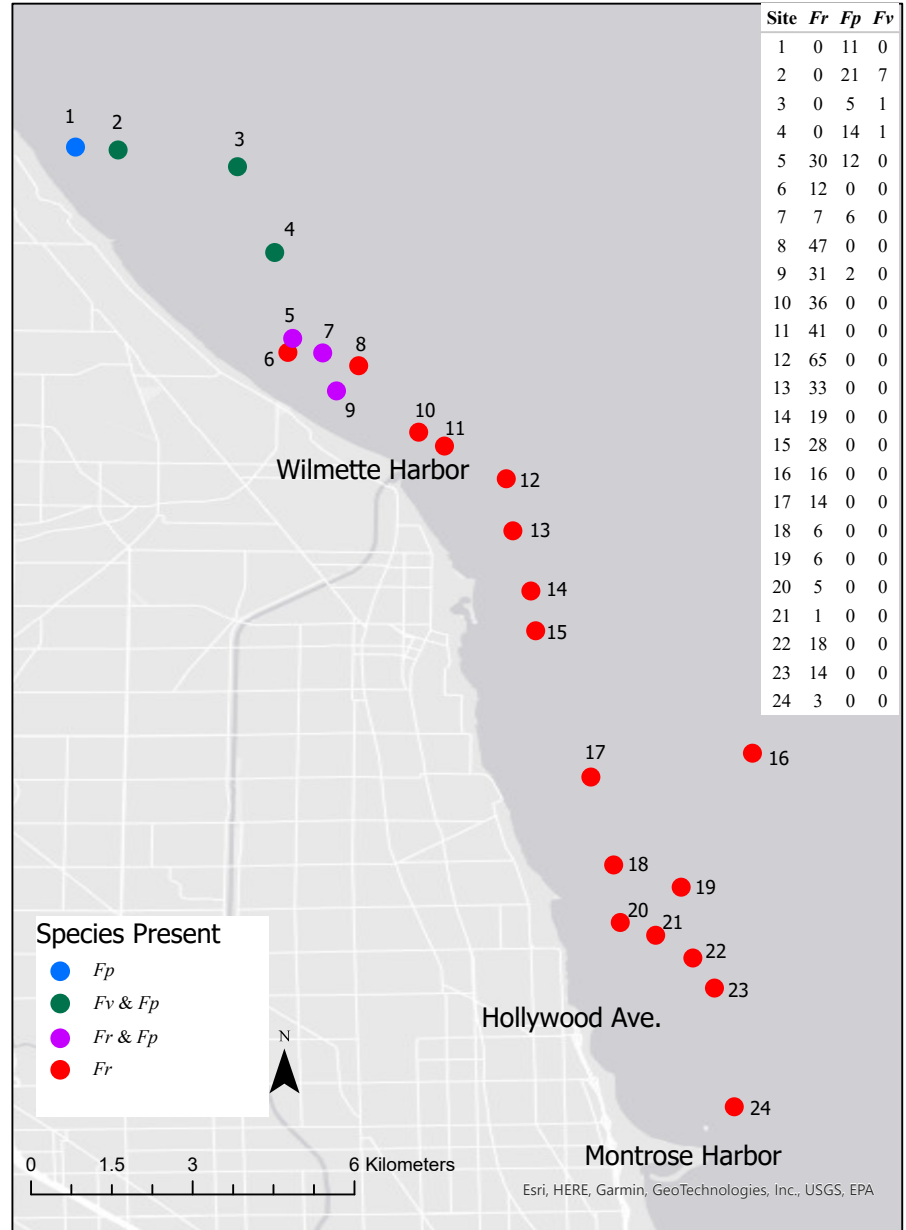
# Lake Michigan Distribution

- From 1979-1983 John Quinn and John Janssen sampled 38 sites from Montrose Harbor to Waukegan
- Found only native virile and northern clearwater crayfish



# Lake Michigan Distribution

- From 2020-present we are sampling the same region
- Rusty crayfish dominant in the south with transition to natives north of Wilmette



Unpublished data

# Lake Michigan Distribution

## Summary of Crayfish Distributions

- Rusty crayfish first found in the region in the 1980s, is now dominant across many habitats
- Red swamp crayfish are a relatively new arrival, only in high densities at one site in North Shore Channel
- Native crayfish still widespread, but found at relatively few sites and usually at low densities



## Part 2: Impacts

- Replacement of native species by rusty and red swamp crayfish
- Other impacts have not been studied in this region

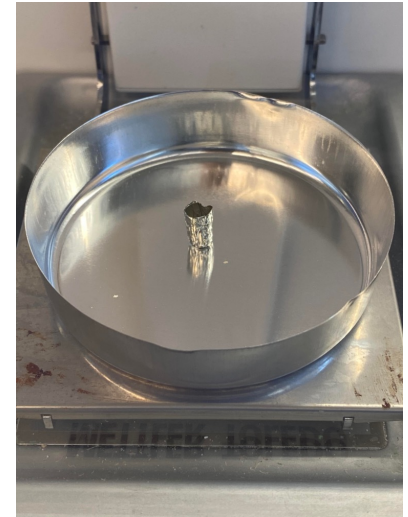
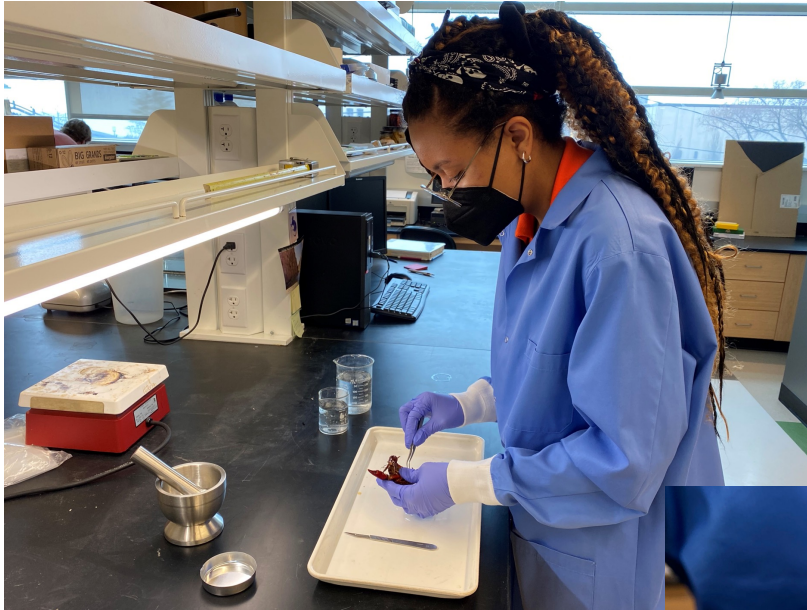


## Part 2: Impacts

- Replacement of native species by rusty and red swamp crayfish
- Other impacts have not been studied in this region
- Red swamp and rusty crayfish likely compete for resources
- Based on invasions elsewhere, we might expect reduced macrophyte, invertebrate, and sportfish populations, and increased turbidity from red swamp burrowing

# Food-web impacts of red swamp and rusty crayfish

- We are investigating red swamp and rusty diets with stable isotope analysis



# Food-web impacts of red swamp and rusty crayfish

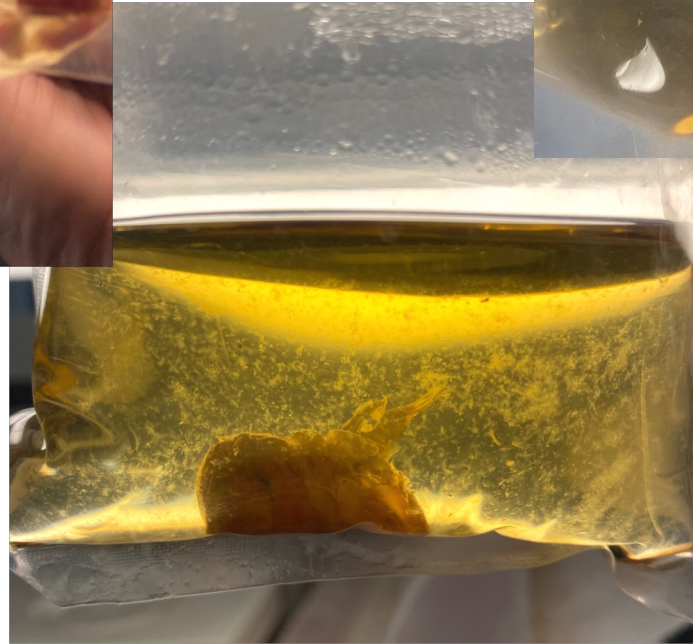
- Fish consumption of crayfish



# Food-web impacts of red swamp and rusty crayfish



# Food-web impacts of red swamp and rusty crayfish



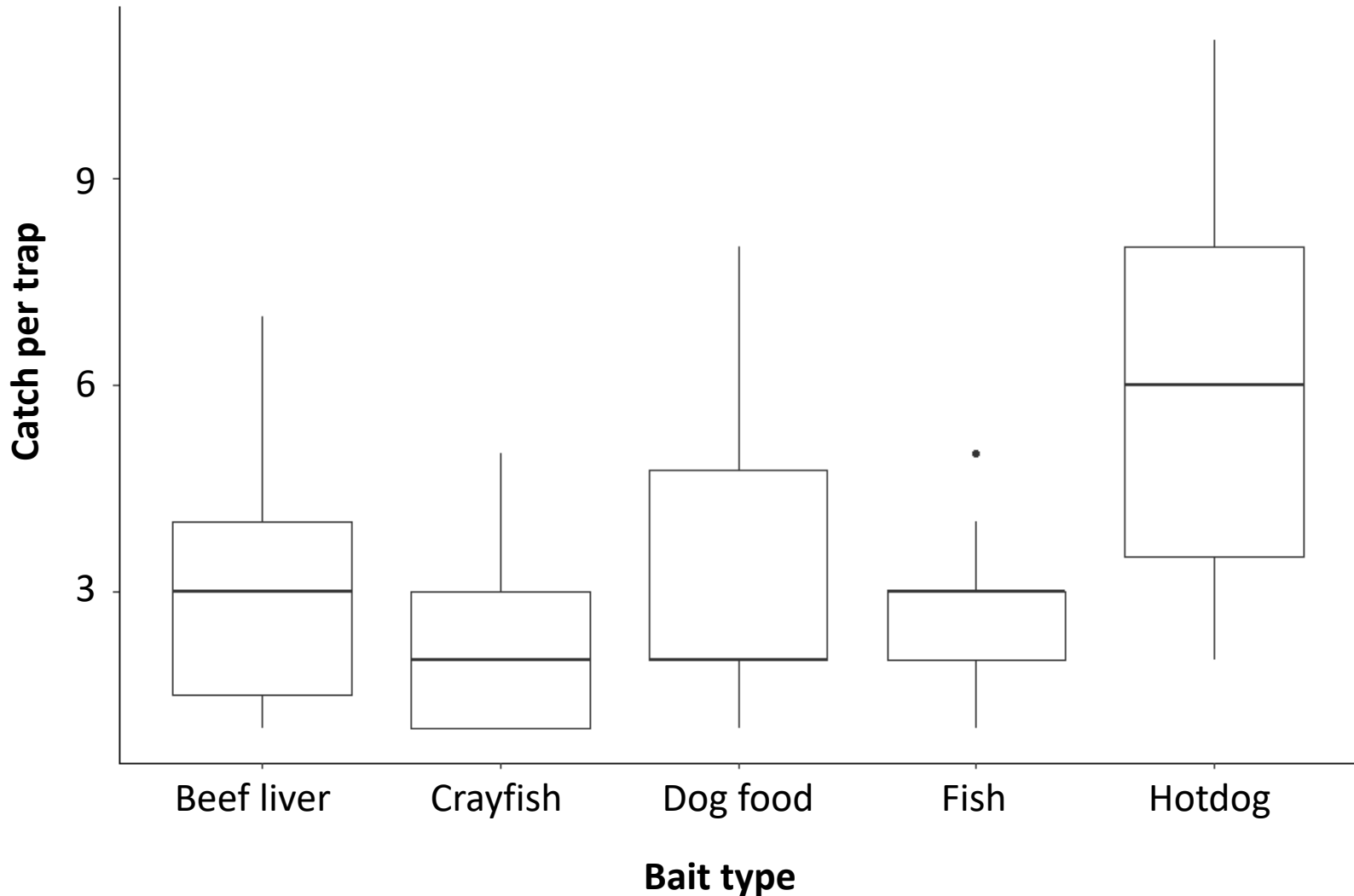
## Part 3: Control

- Reproducing population of red swamp crayfish confirmed in North Shore Channel in 2015
- Experimental removal from 2018 – 2021, continuing this summer
- Goals:
  - Improve trapping efficiency
  - Reduce population size to reduce chance of spread



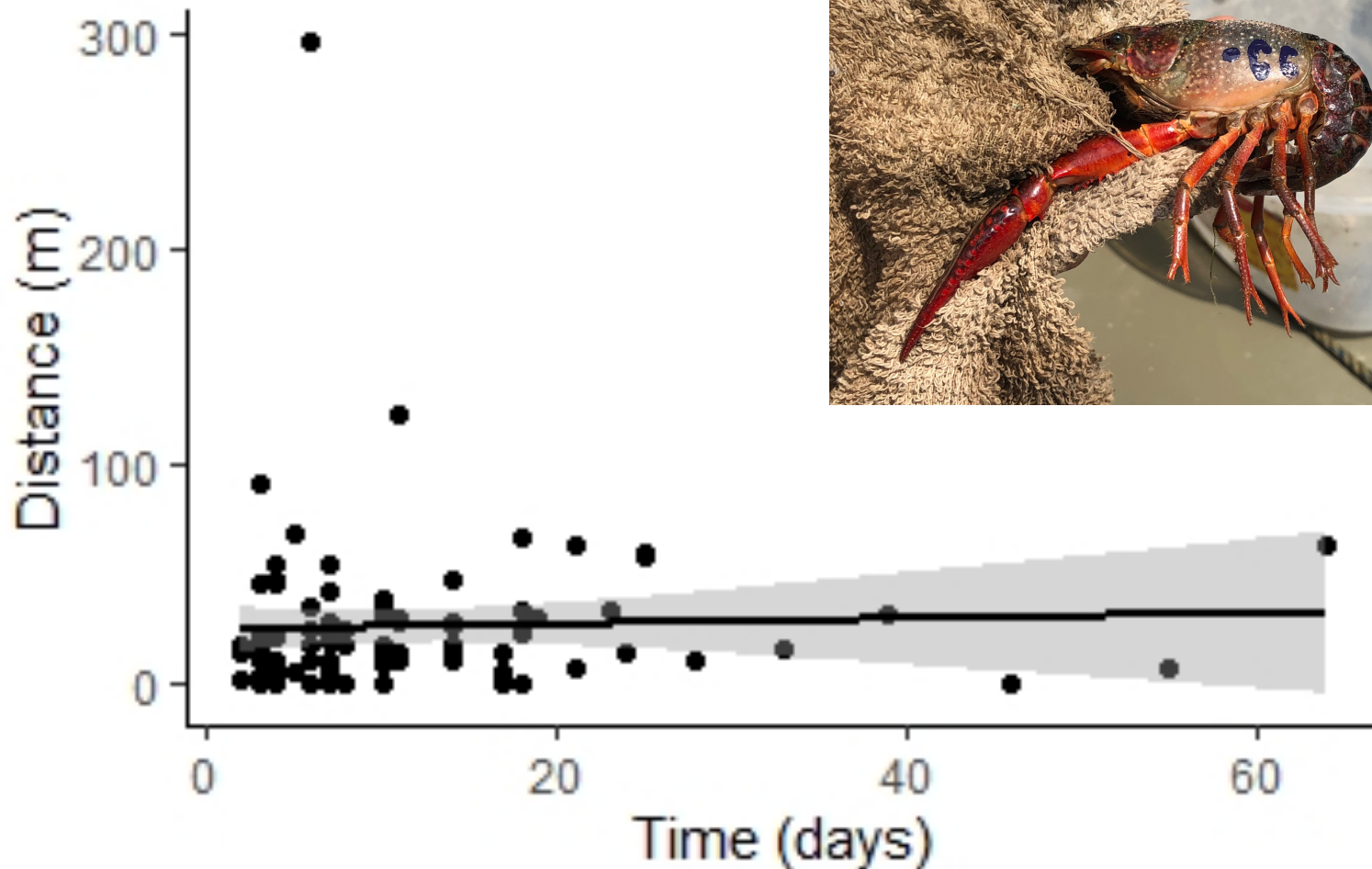
# Improve Trapping Efficiency - Bait

- Hotdog bait leads to capture rates  $\sim 2x$  higher than other baits



# Improve Trapping Efficiency – Distance b/w traps

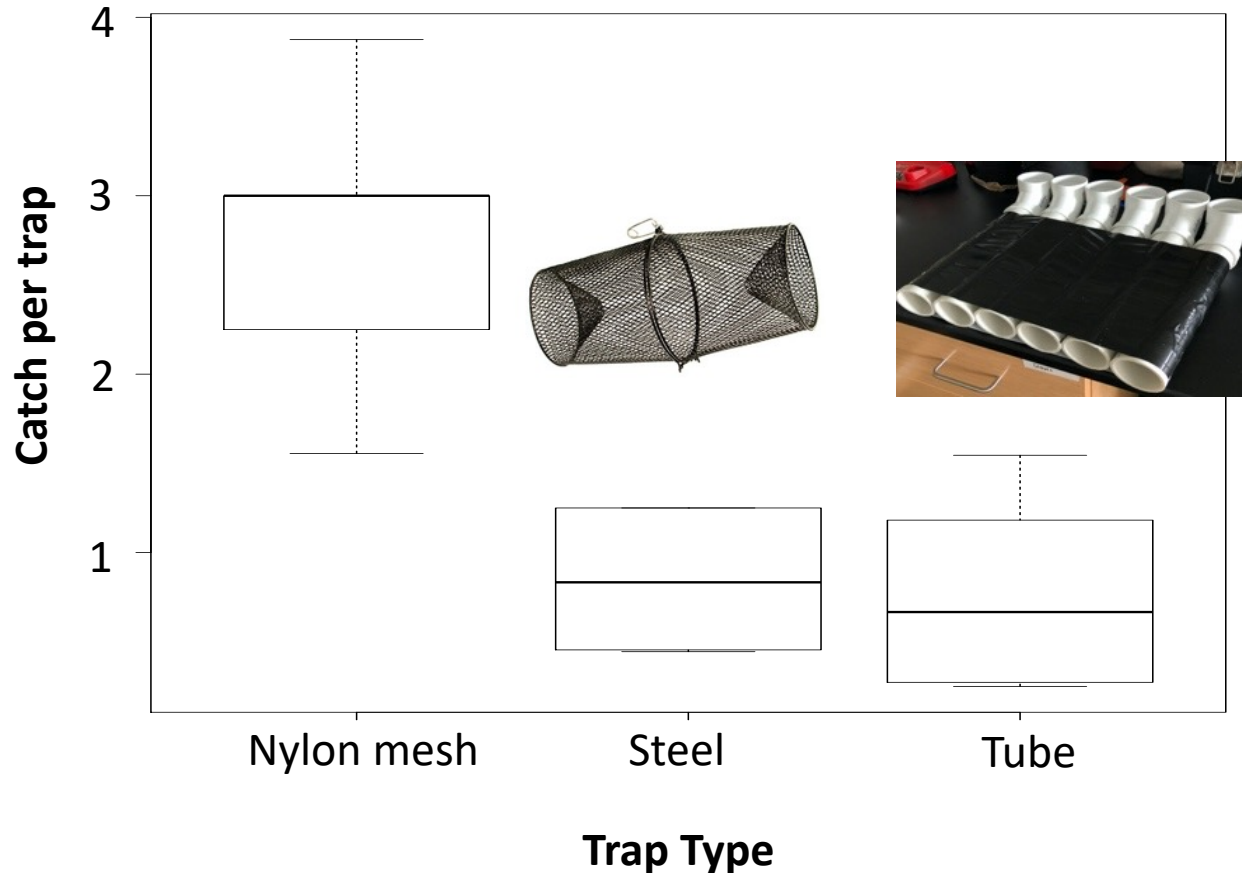
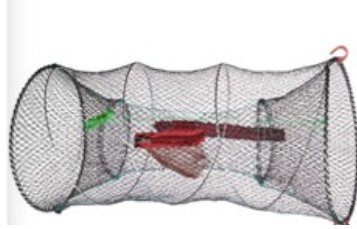
- Red swamp crayfish don't move far – need to keep traps close to each other (5m)





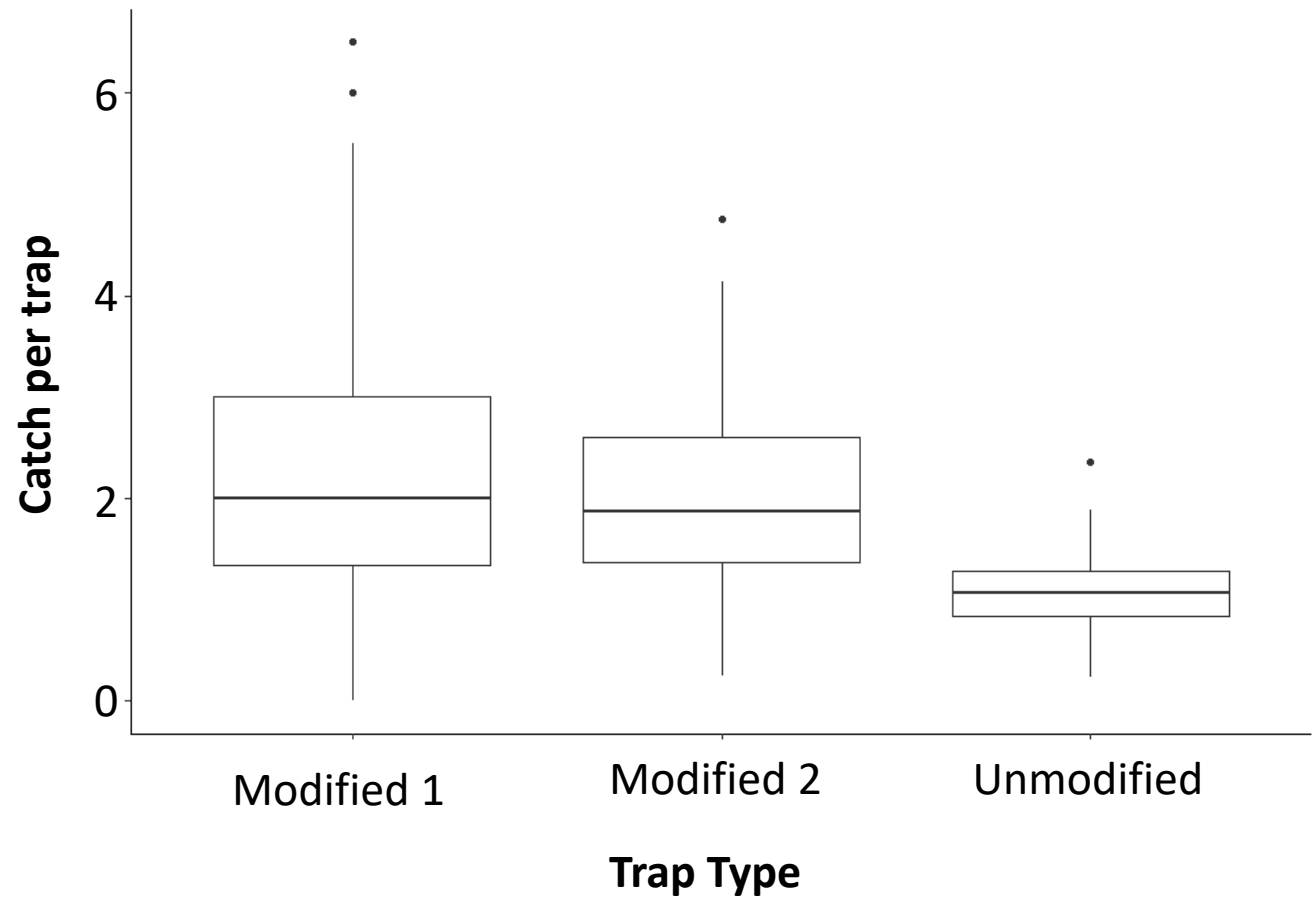
# Improve Trapping Efficiency – Trap Type

- Soft mesh traps capture more crayfish, but are lost at higher rates and much more difficult to work with



# Improve Trapping Efficiency – Modified Traps

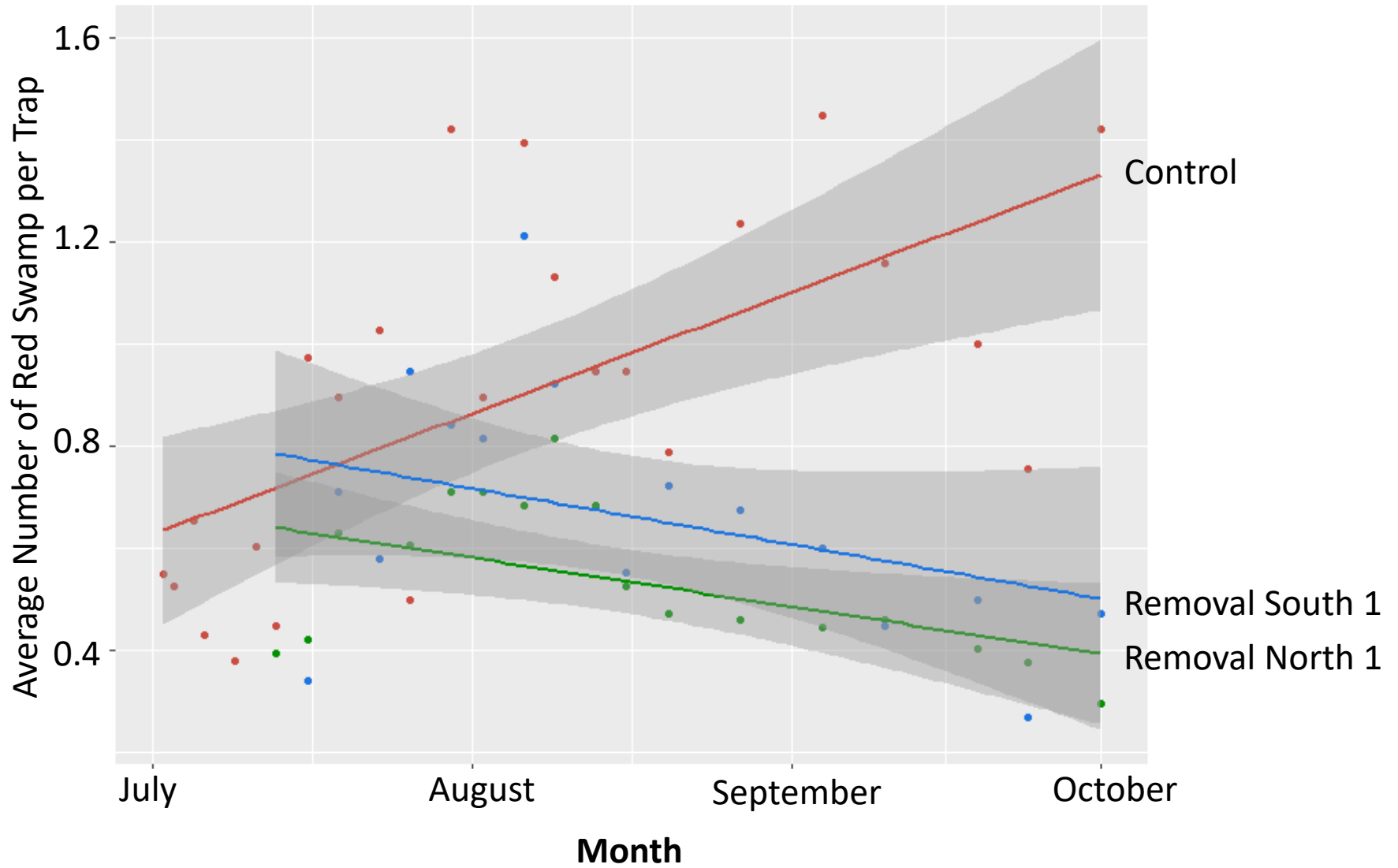
- Modifications to minnow traps can greatly increase number of crayfish captured



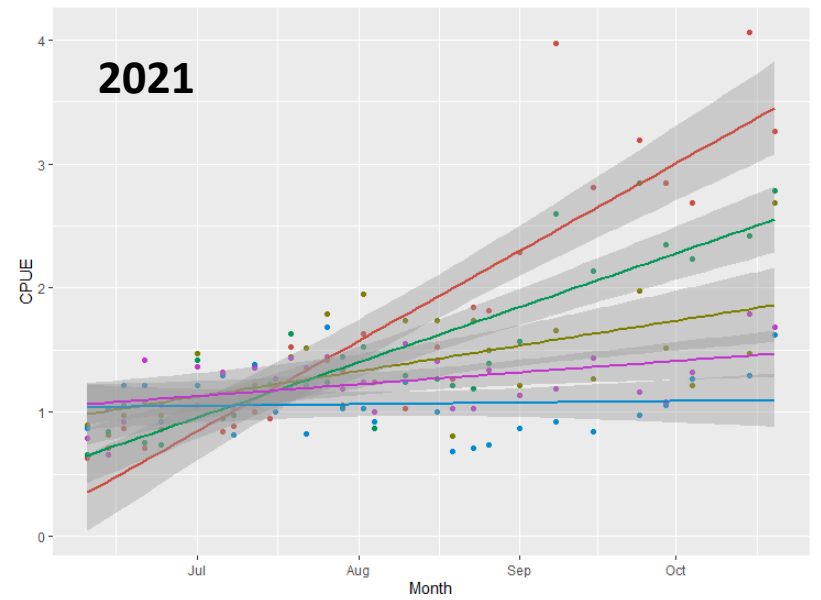
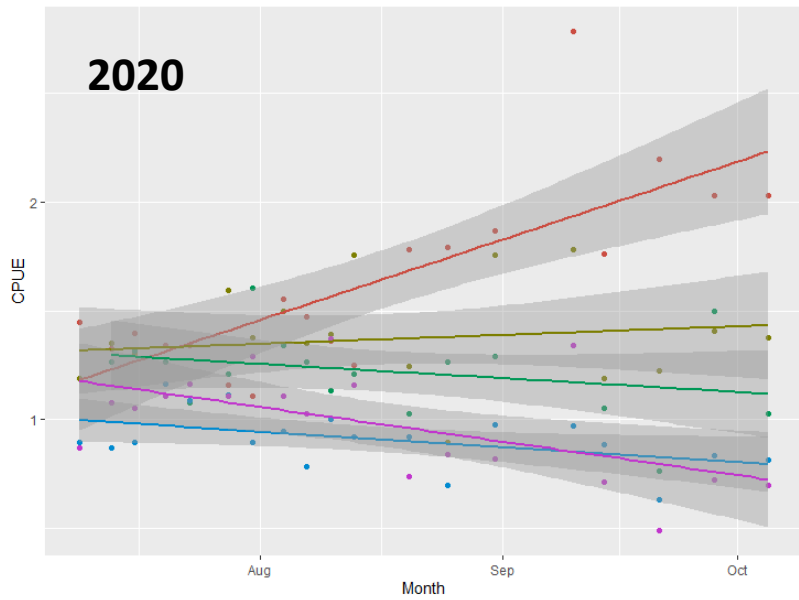
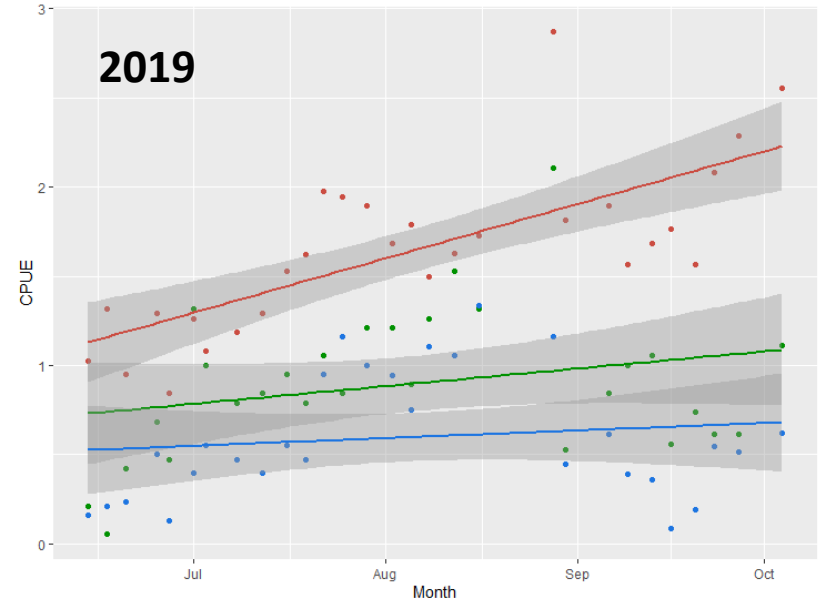
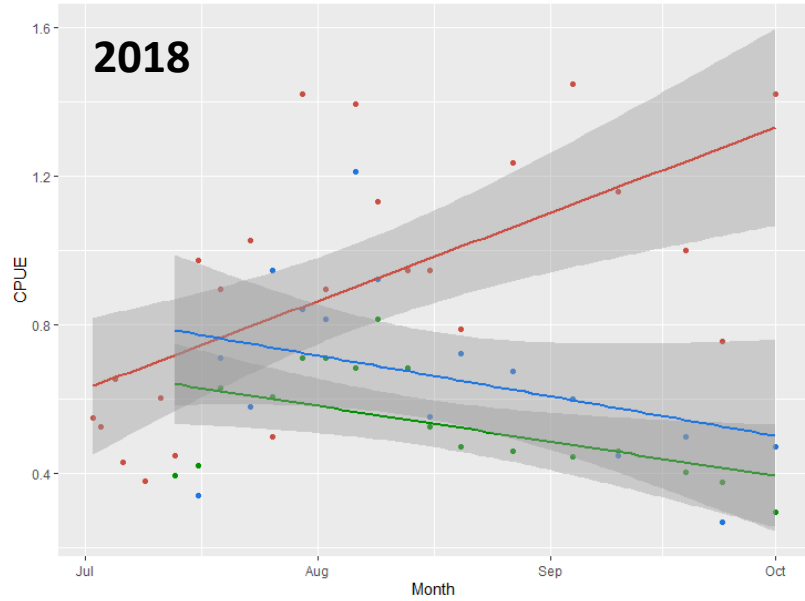
# Reducing Red Swamp Population

- 2018 – present
- Control and removal sections in North Shore Channel
- Traps 5m apart, cleared 2x/week from ~June – October
- Steel minnow traps, initially baited with dog food, now hotdogs
- For 2018 and 2019 100m control, 200m removal.
- For 2020 and 2021 100m control, 400m removal.

# Results - 2018



# Results – All years



# Red Swamp Crayfish Control

- Advances in trapping methods are assisting our goals of lowering populations – may be useful in other systems
- Four years of control in an open flowing waterbody
- Densities can be reduced, but eradication is likely impossible
- Risk of a low-density population spreading is lower
- Other approaches (e.g., manipulating fish populations) may be helpful