Tracking Large-scale Movement of Invasive Carp in Louisiana

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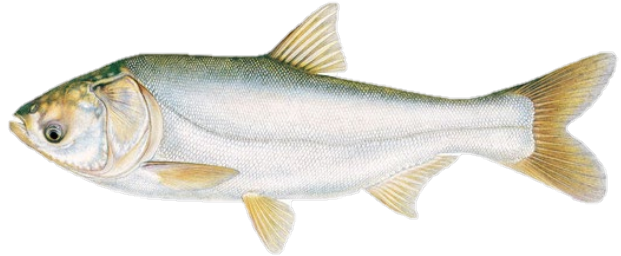
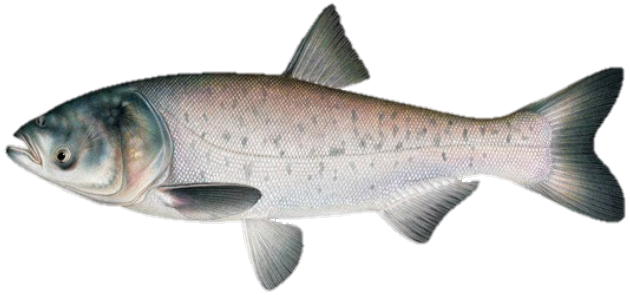
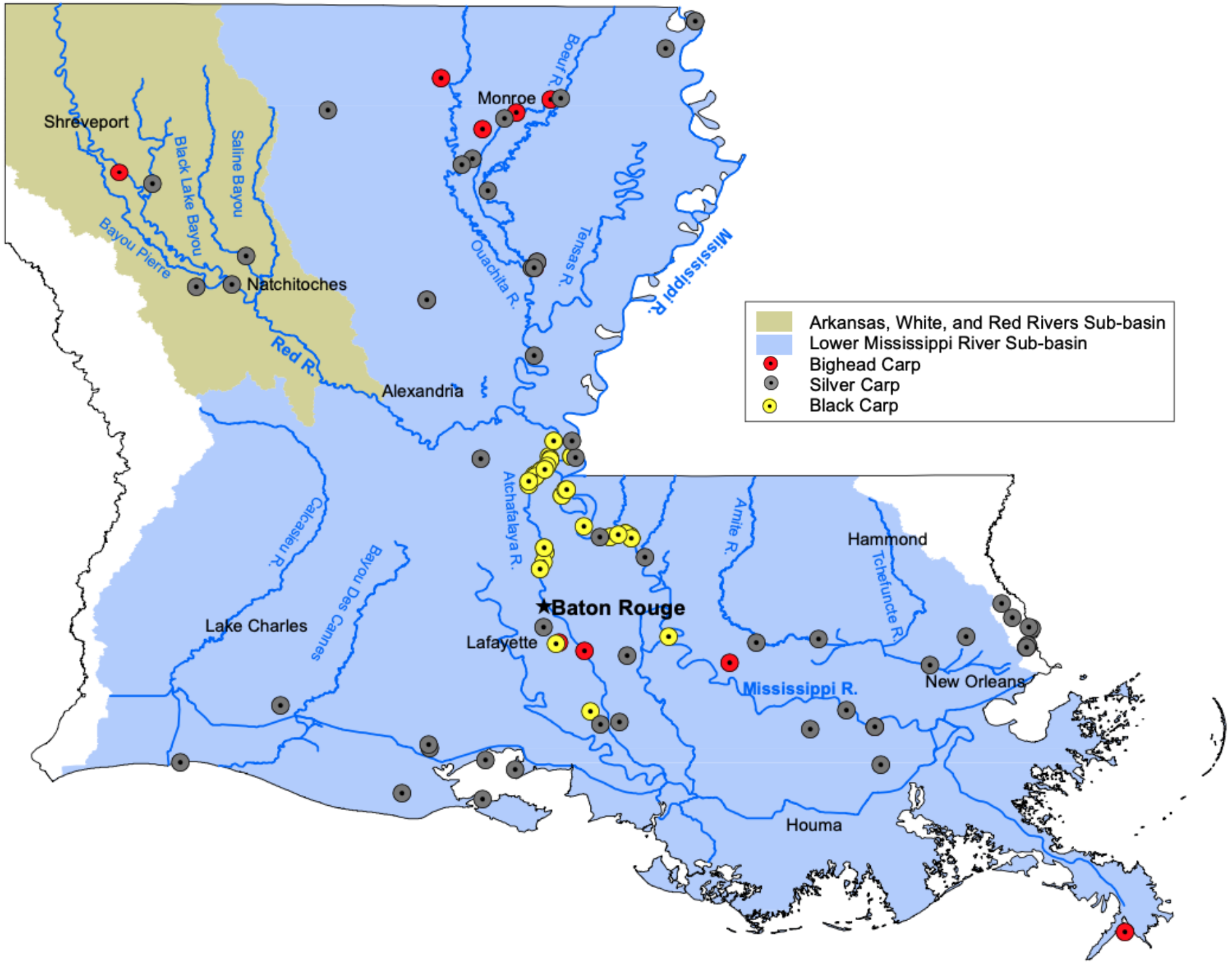
Invasive Carp in the United States

- Four Species
- Introduced for aquaculture
- Escape through flooding
- Can outcompete native fishes for basal resources





Invasive Carp in Louisiana



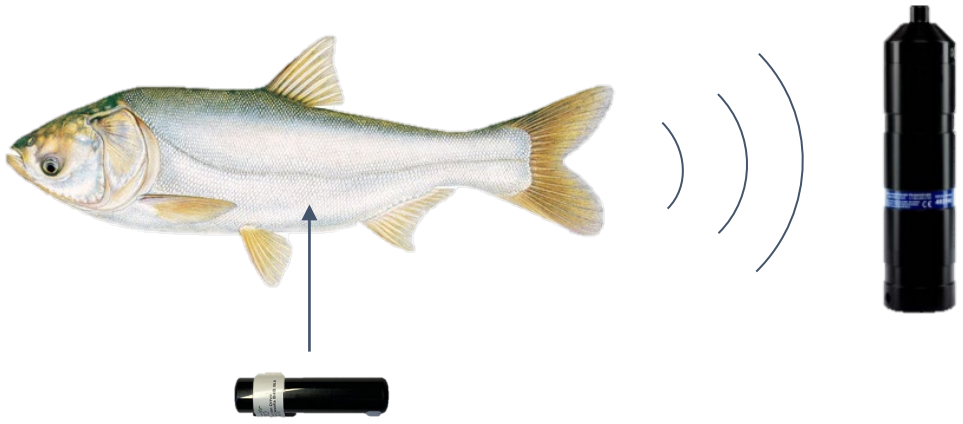
Objectives

1) Identify key corridors and waterways that facilitate carp movement

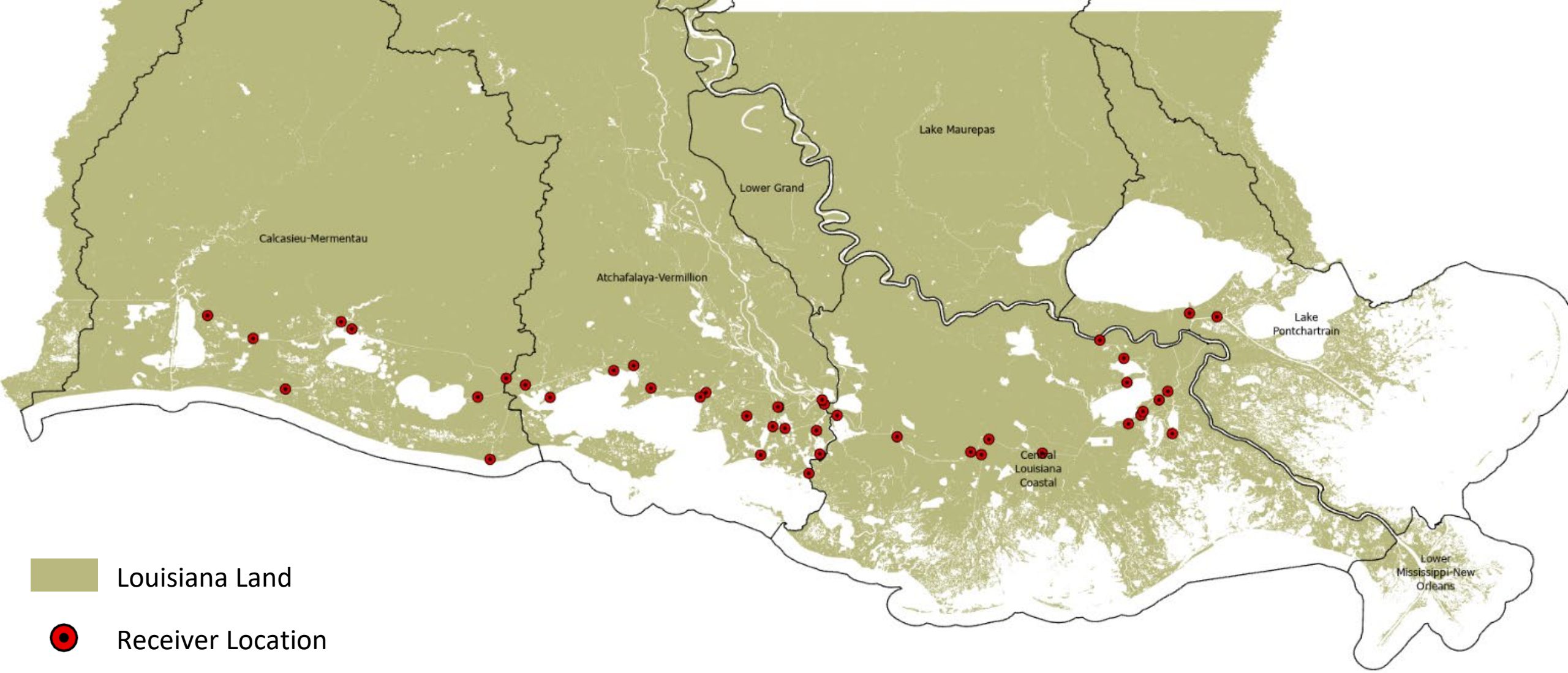
2) Examine potential of coastal estuaries as habitat for invasive carp

3) Characterize seasonal patterns of distribution and movement

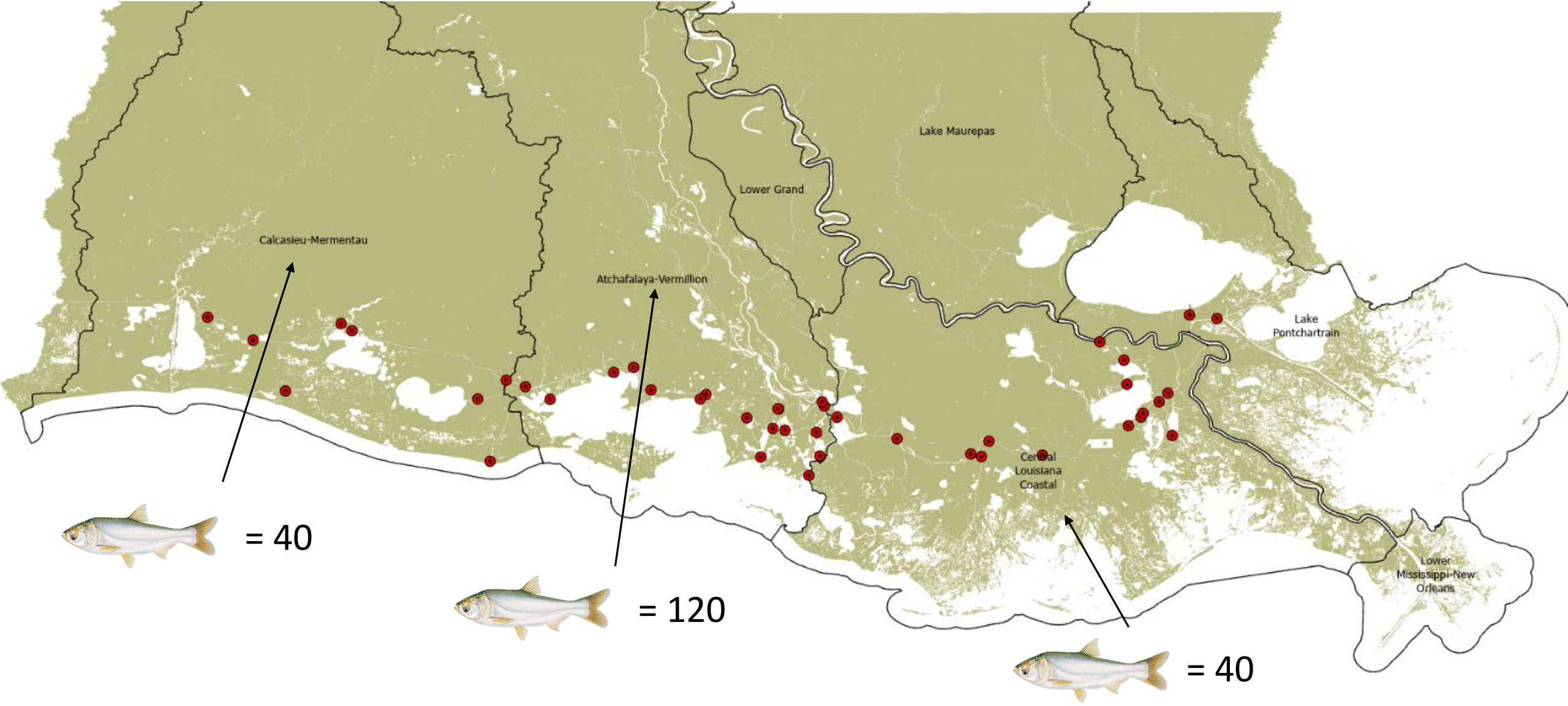
Tracking Aquatic (Invasive) Species



Designing an Array

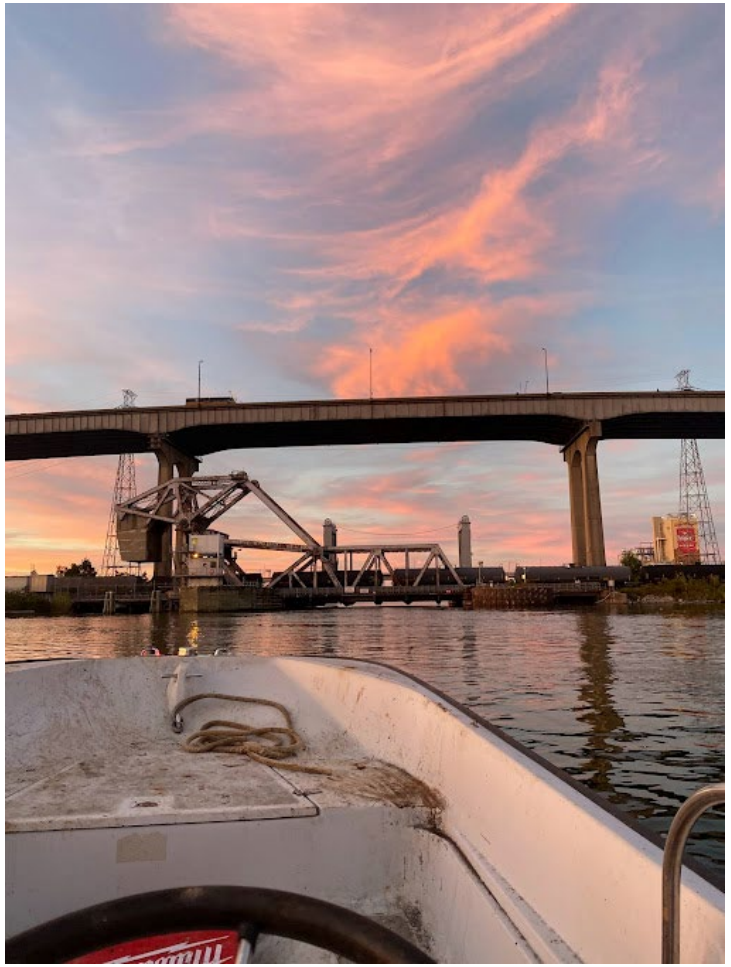


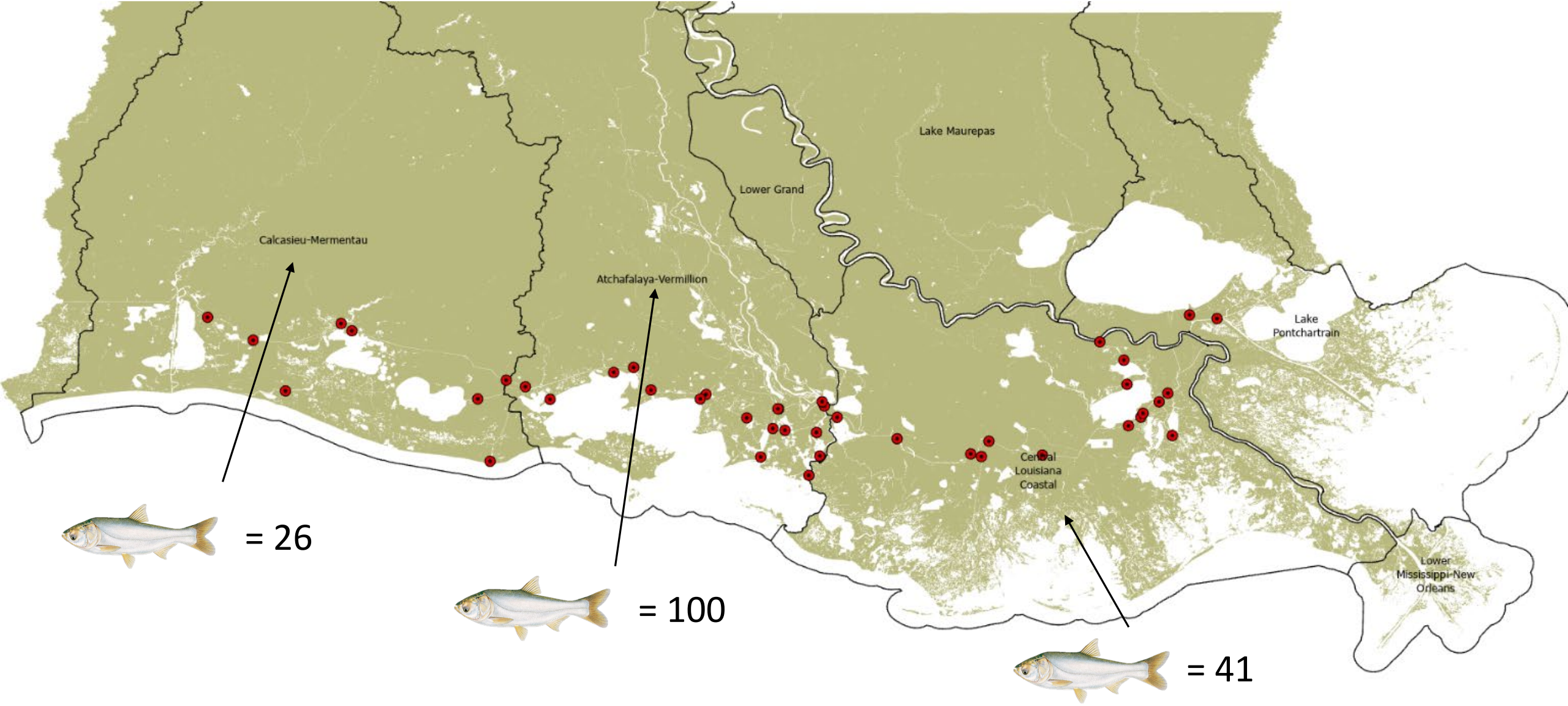
Tagging Zones



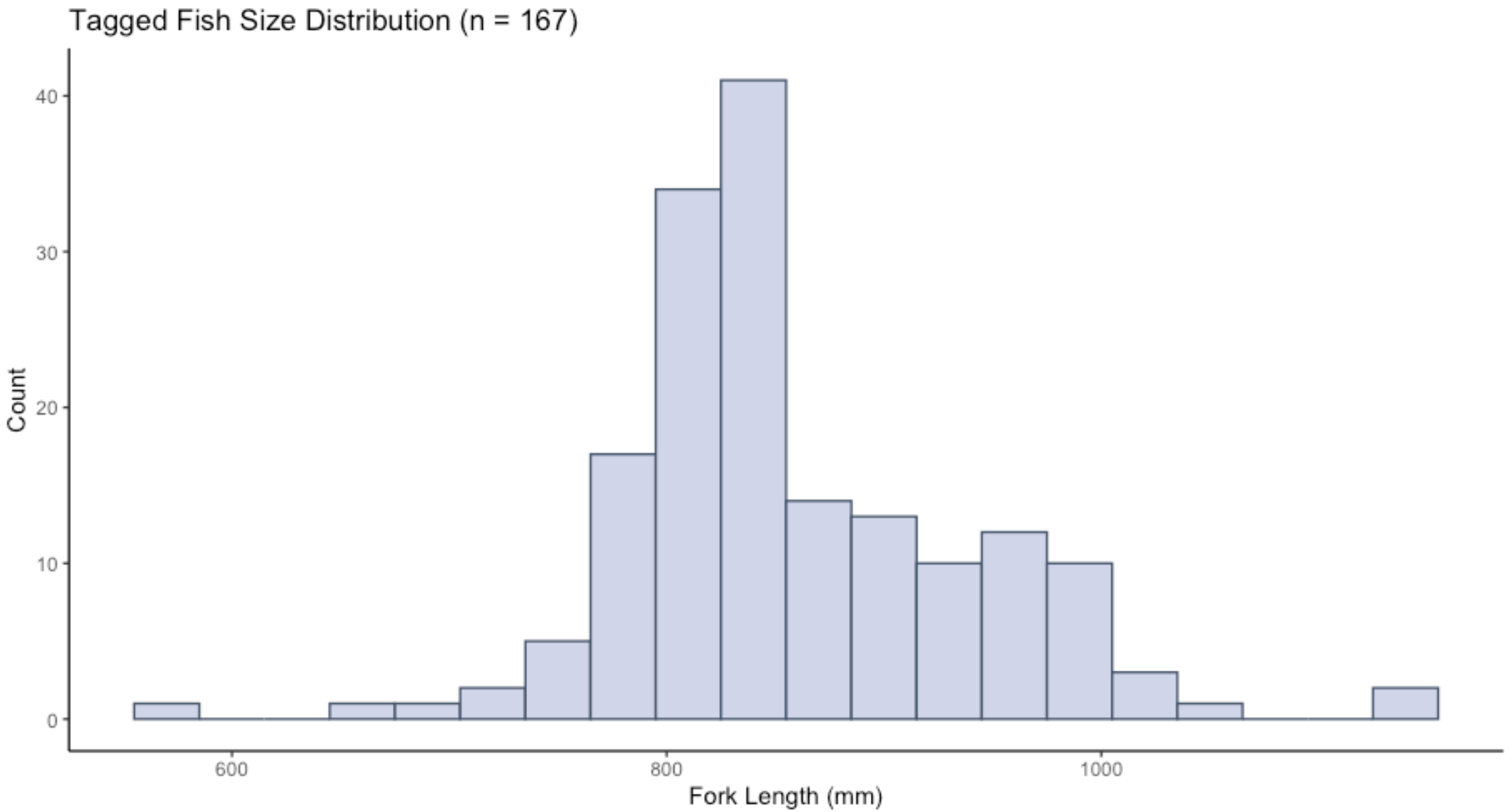
Tagging Goals

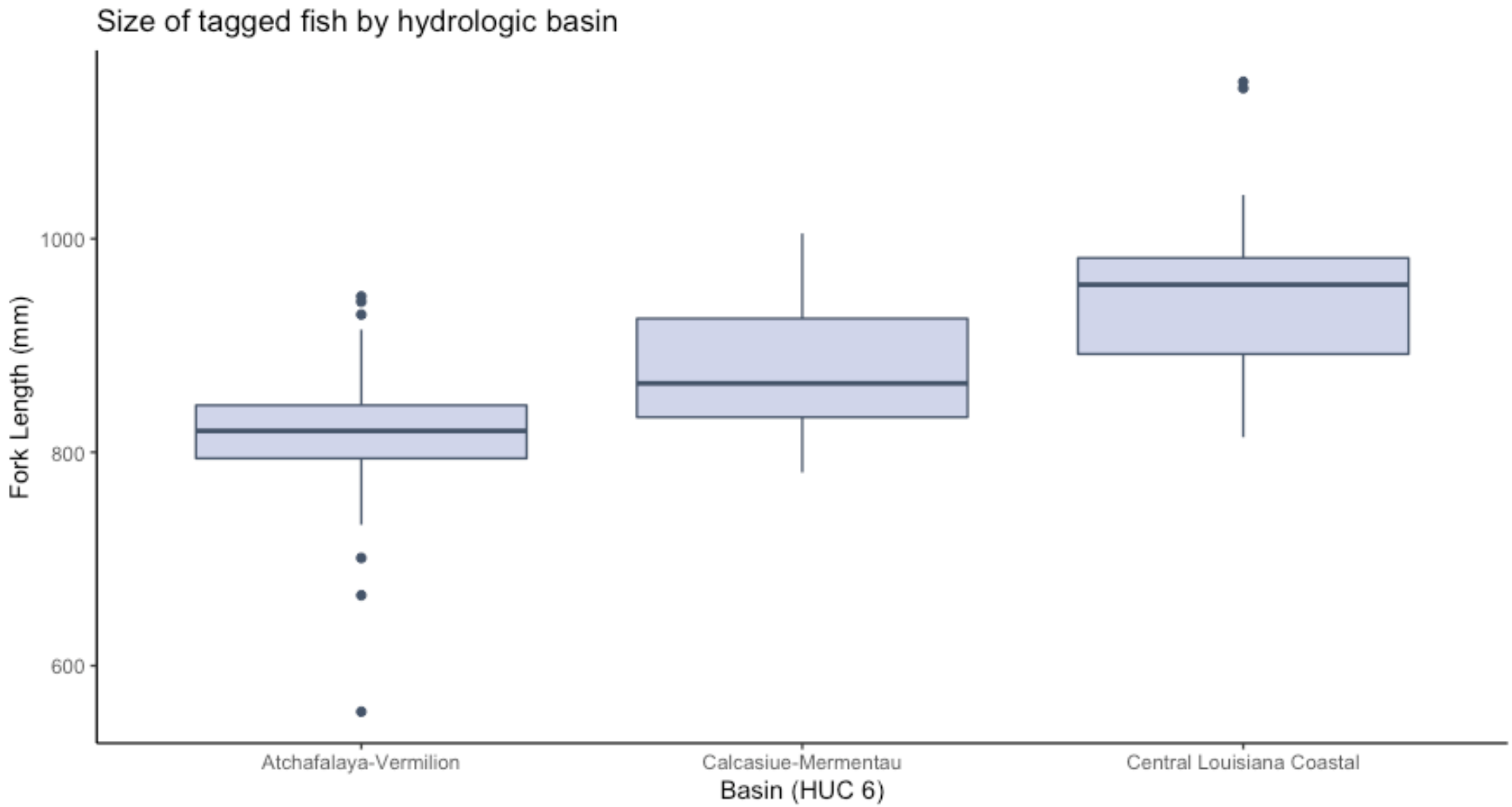
Deployments | Downloads | Tagging

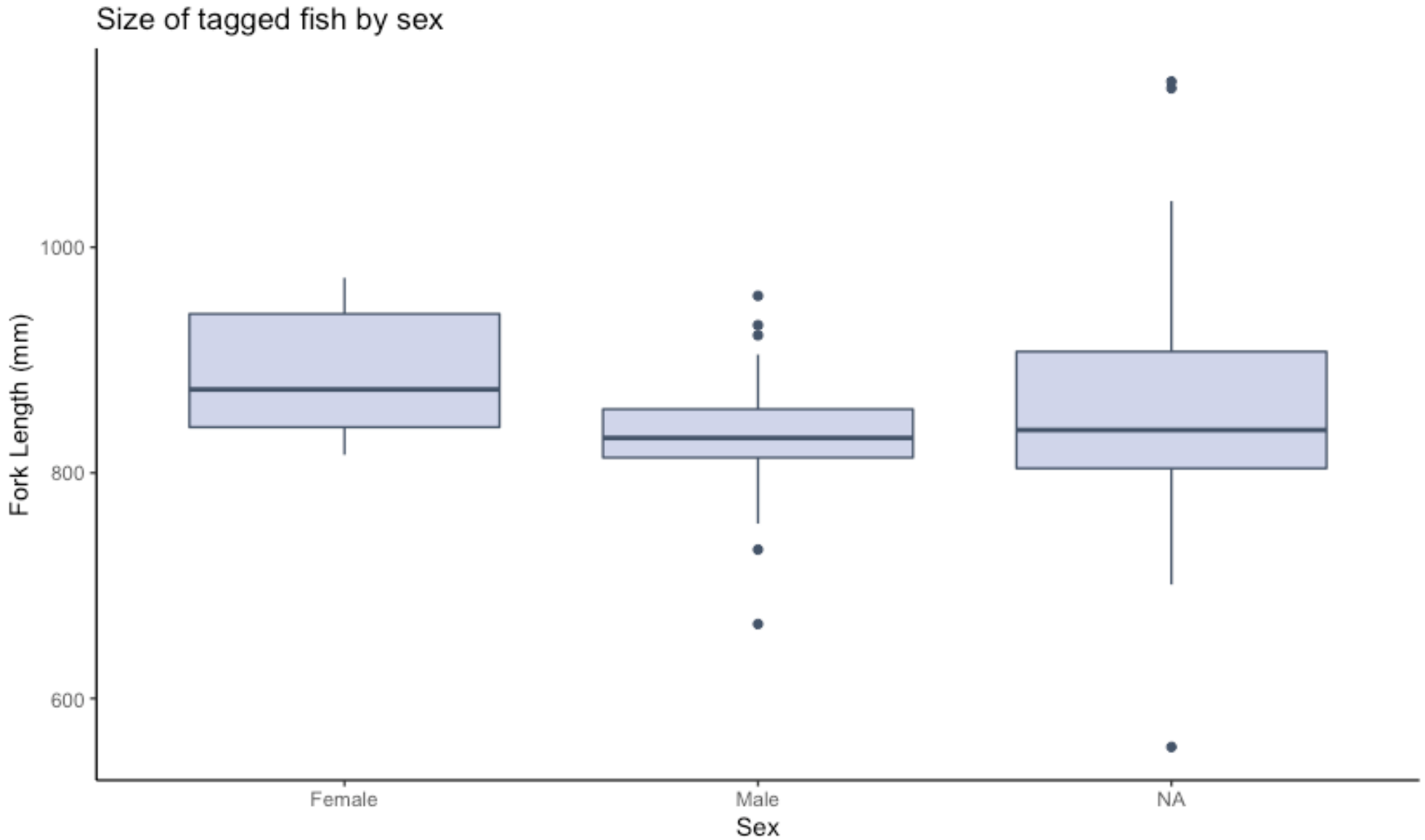




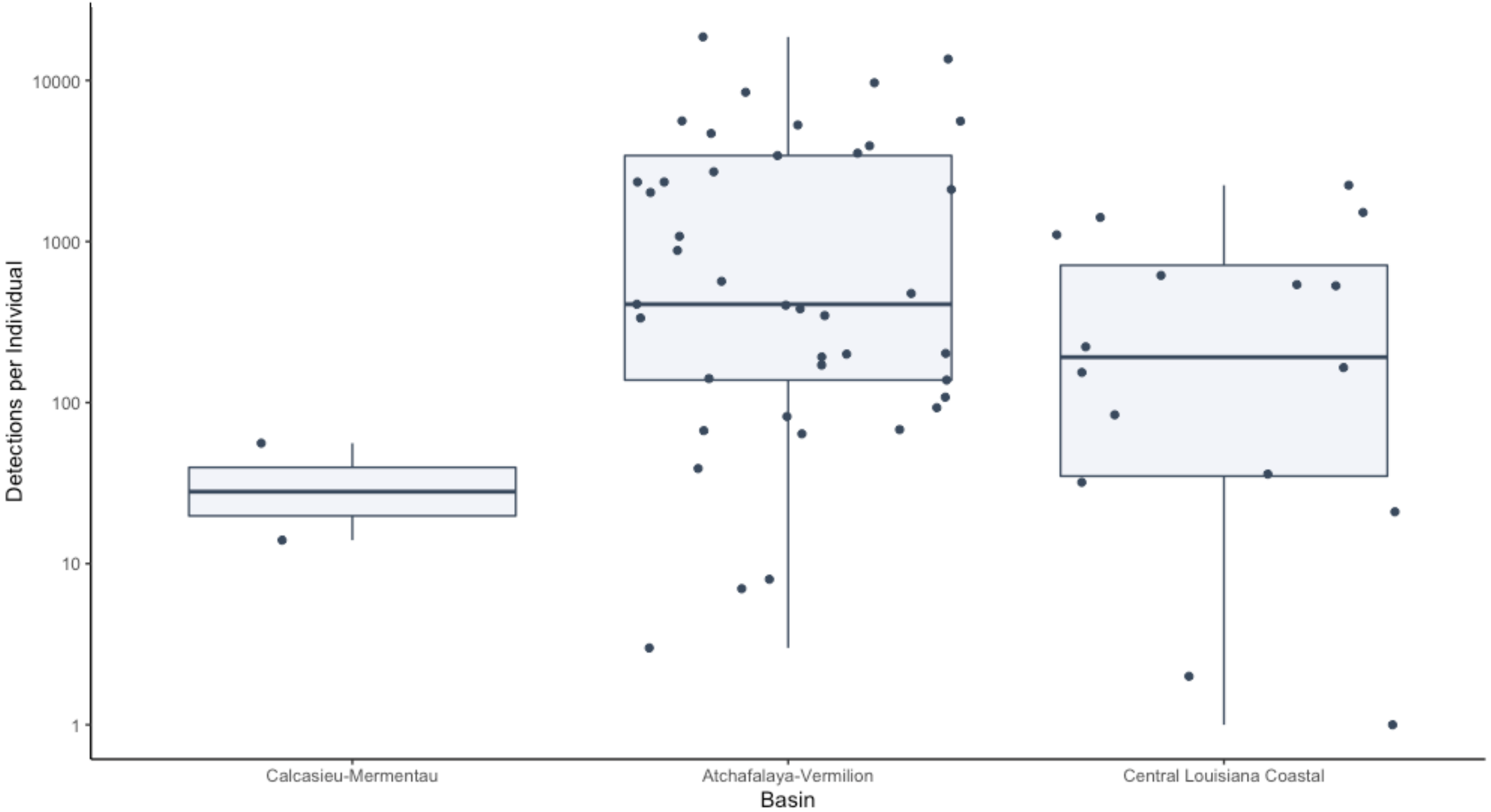
Current Tagging Results


Tagged Fish Size Distribution (n = 167)
Count
40
30
20
10
0
600
800
1000
Fork Length (mm)


Size of tagged fish by hydrologic basin
Fork Length (mm)
1000
800
600
Atchafalaya-Vermilion
Calcasiue-Mermentau
Central Louisiana Coastal
Basin (HUC 6)


Size of tagged fish by sex
Fork Length (mm)
1000
800
600
Female
Male
NA
Sex

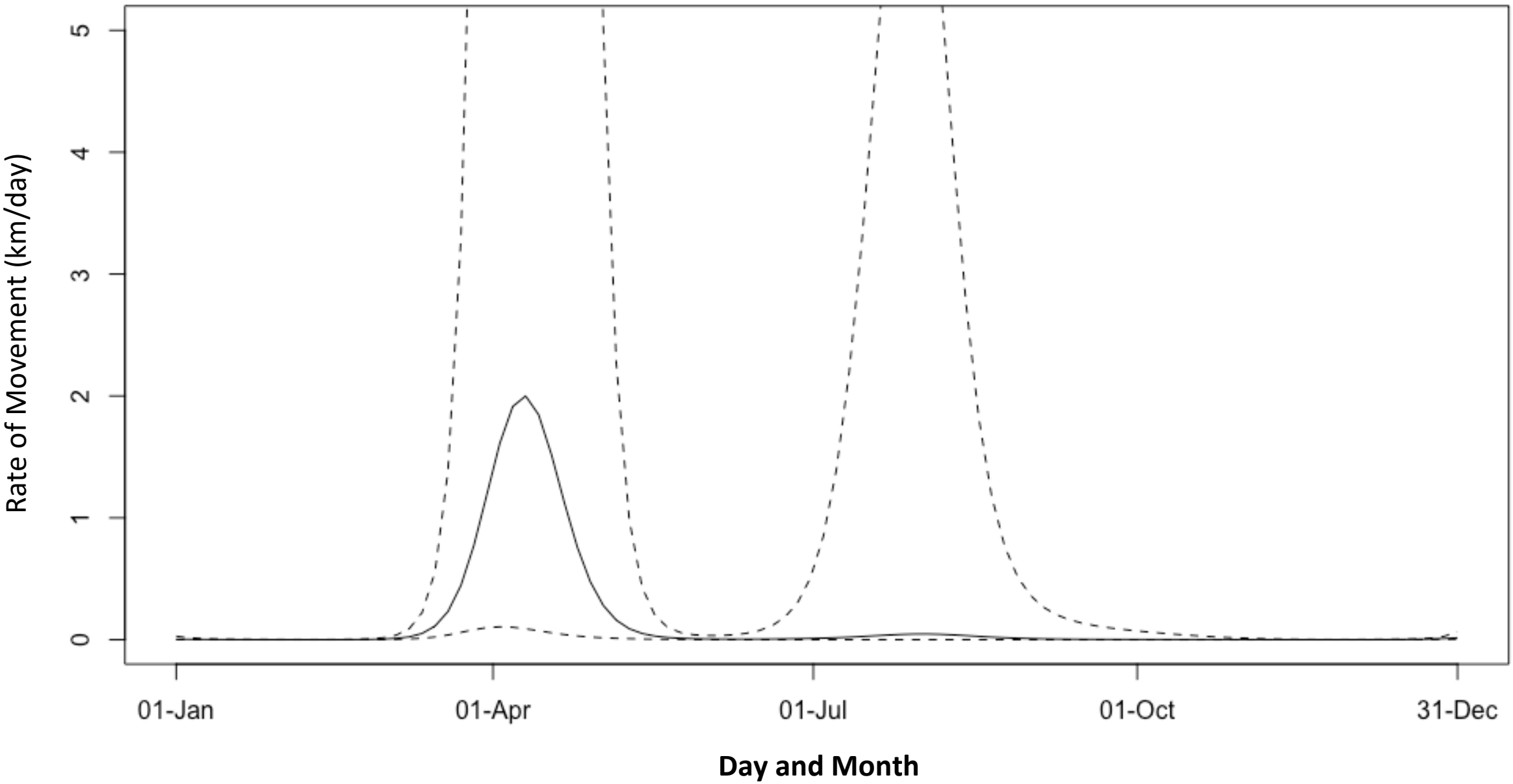
Detections per Individual by Basin



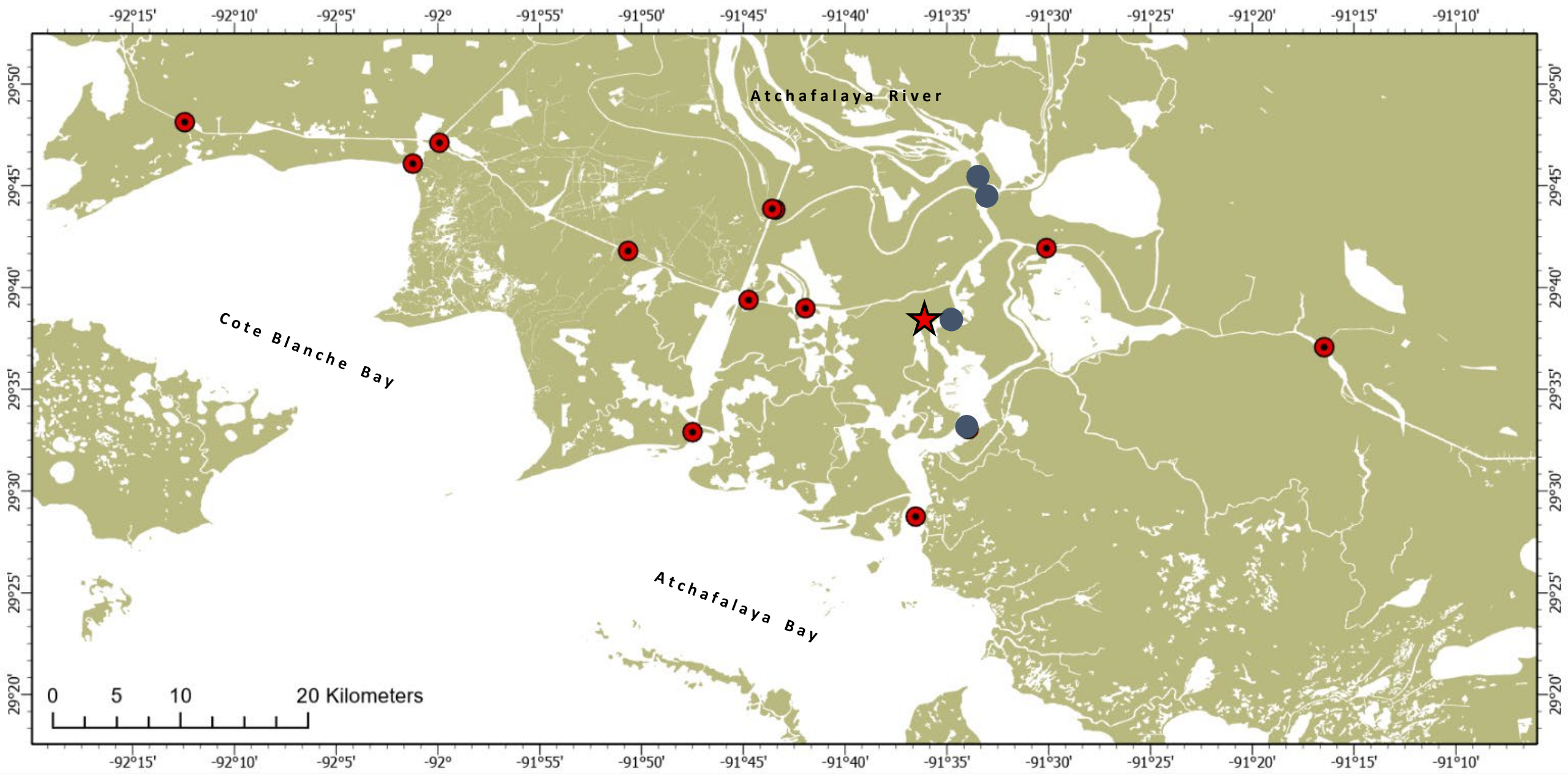
Exploratory Analysis: GAM

- Characterize Seasonal Movement
  > Effect of Julian Day on daily rate of movement (km/day)
- Generalized Additive Model or “GAM”
- Semi-parametric extension of GLM
- Effective for dealing with non-linear data (typical in ecology)
- Negative Binomial GAM – Overdispersion

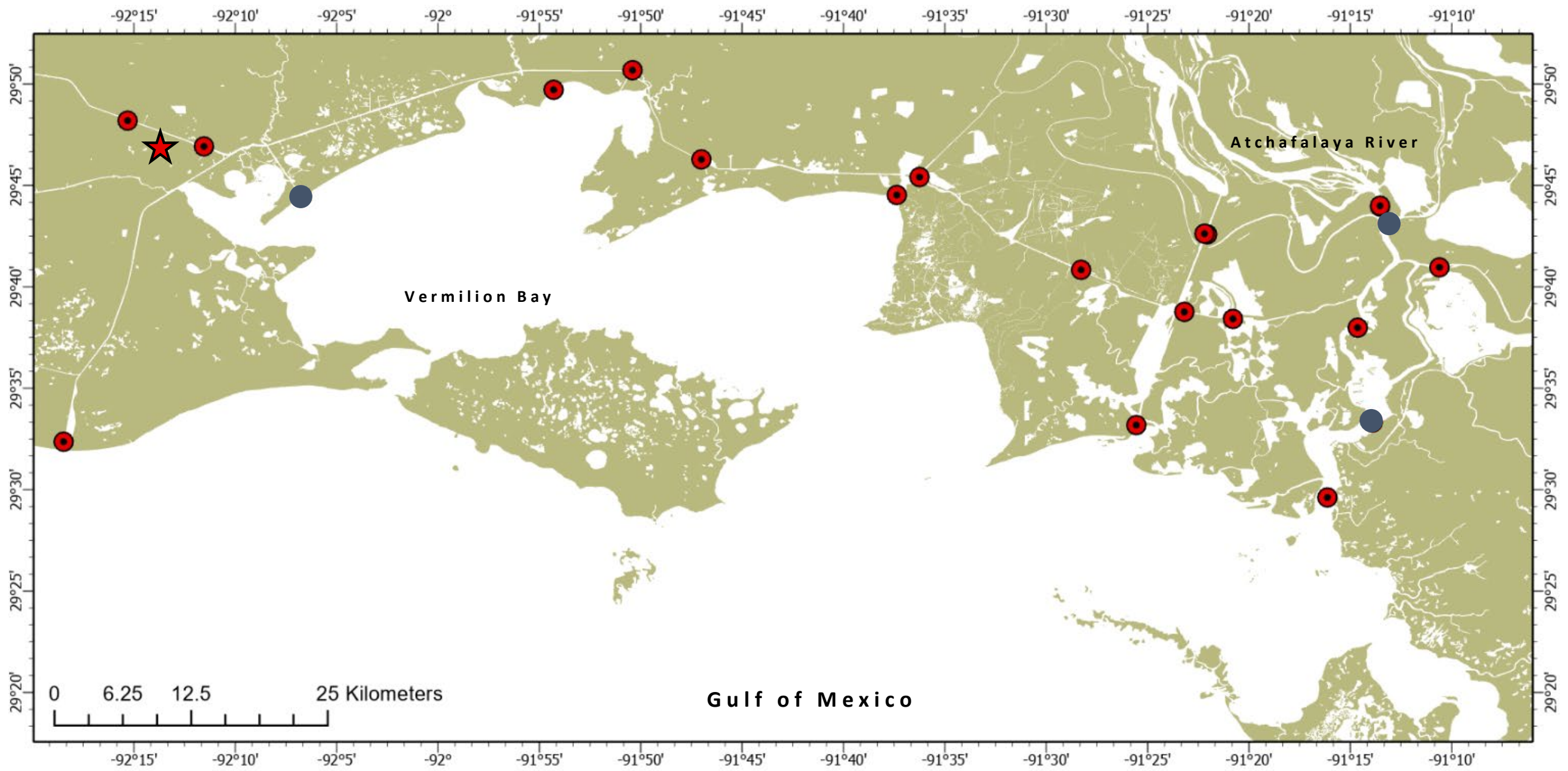
Negative Binomial GAM: Significant relationship between Julian Day and rate of movement



Example: Seasonal Movement



Example: Estuarine Use



Conclusions

1. Seasonal movement varied with rates peaking in spring

   - Spawning movements up the Atchafalaya River coinciding with rising water levels

2. Evidence that silver carp can enter low salinity estuaries

   - Movement through estuaries may facilitate spread of invasive carp into previously uninhabited water bodies

Future Work

1. An additional 63 carp will be tagged in 2022 and 2023

2. Expand telemetry array to cover areas up stream on the Atchafalaya River to better capture extent of seasonal migrations

3. Examine movement data in relation to environmental predictors (e.g., temperature, water level, etc.)

Over 50 people have contributed to some facet of this project.
I would like to thank the following people specifically: