Georgia Weather Loach Update: Tools for Rapid Response to ANS Issues

Wesley Gerrin | Jay Shelton | Martin Hamel | Peter Hazelton | Brian Shamblin

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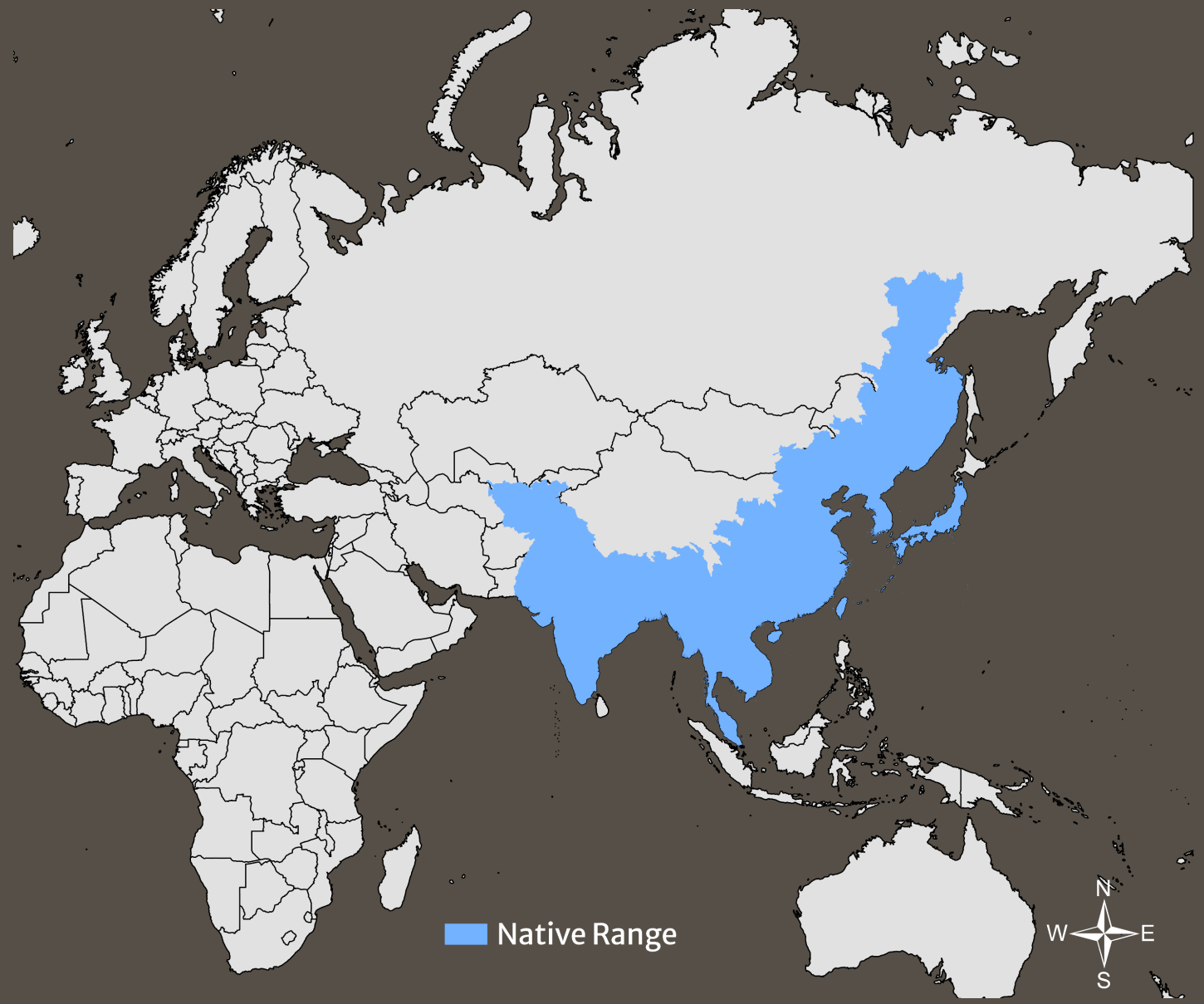
Weather Loach Background

- *Misgurnus anguillicaudatus*
- Native to eastern Asia
  - Siberia to southeast Asia
  - Includes Japan



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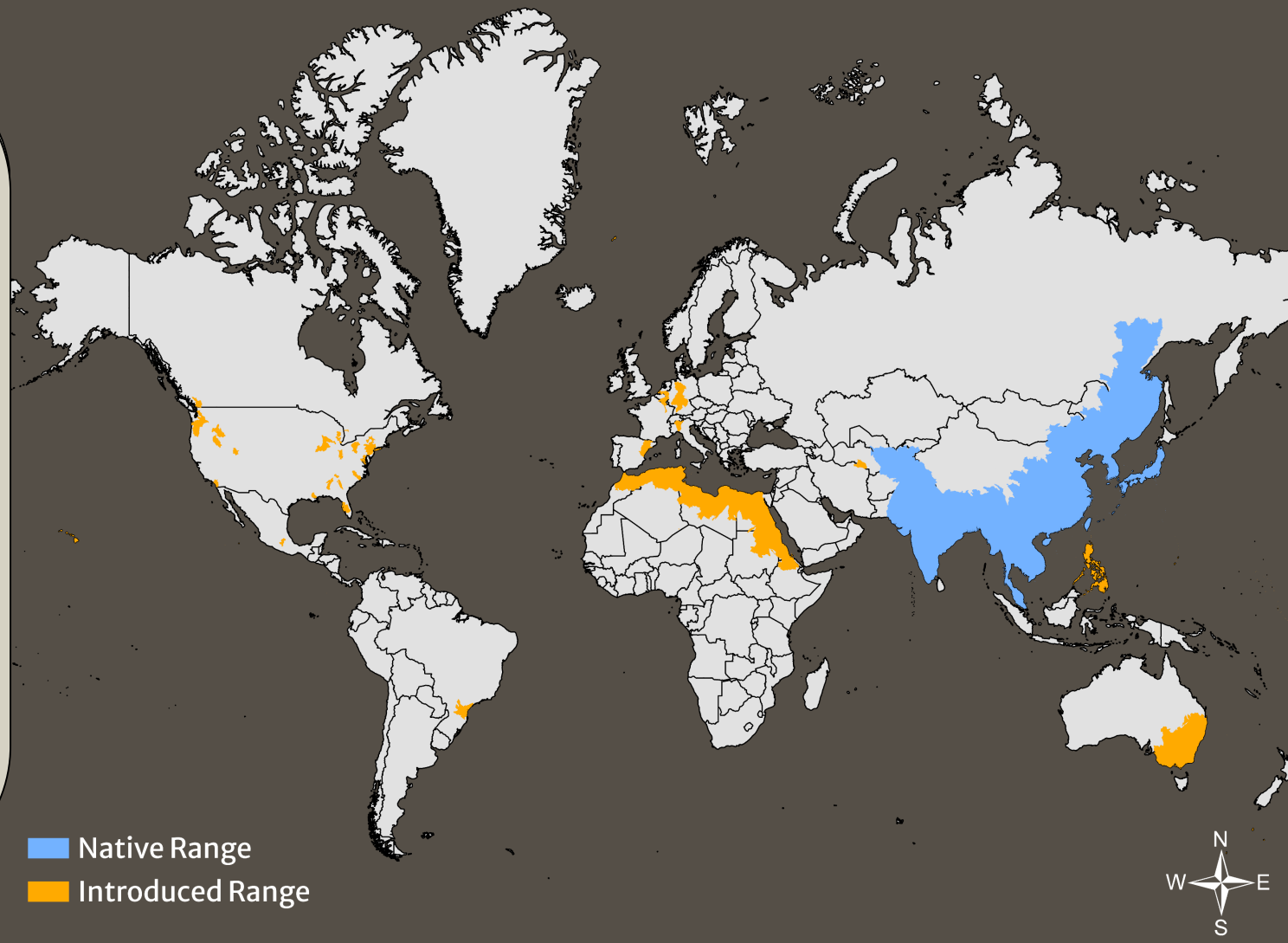

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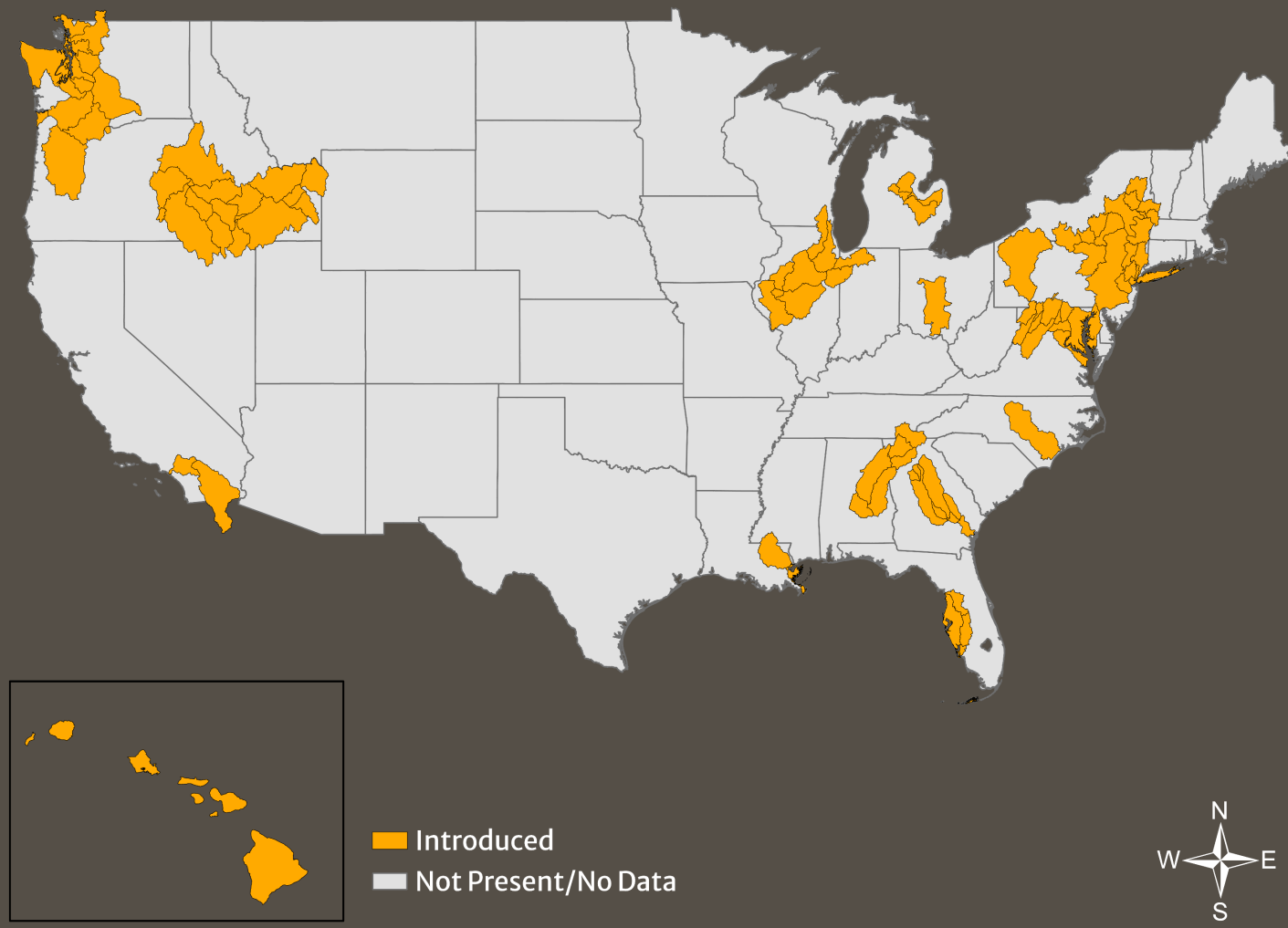
Weather Loach Background

- *Misgurnus anguillicaudatus*
- Native to eastern Asia
  - Siberia to southeast Asia
  - Includes Japan
- Current Distribution Worldwide
- Multiple U.S. introduction pathways
  - Food
  - Aquarium
  - Bait



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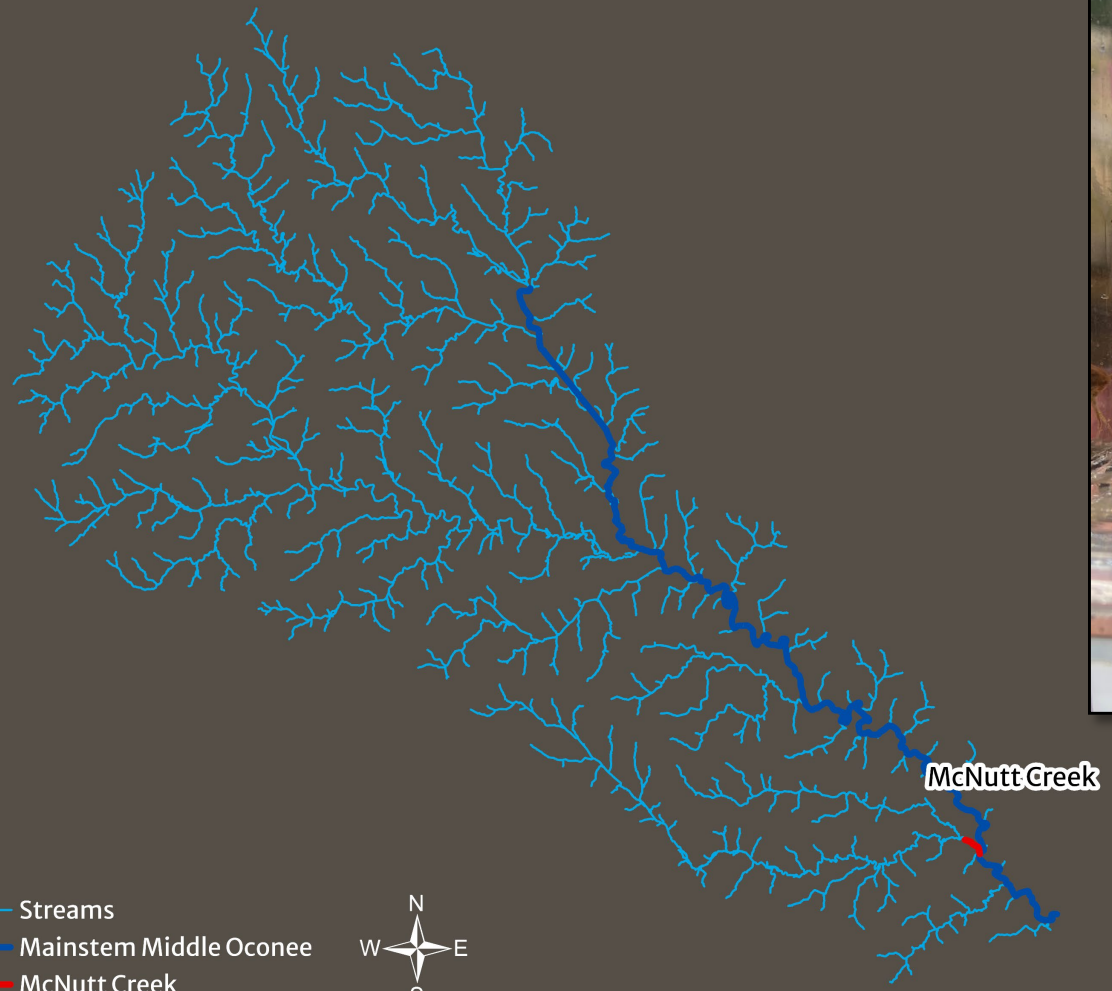
Georgia Discovery Timeline

McNutt Creek
Athens, GA
11/5/2020



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Georgia Discovery Timeline

McNutt Creek
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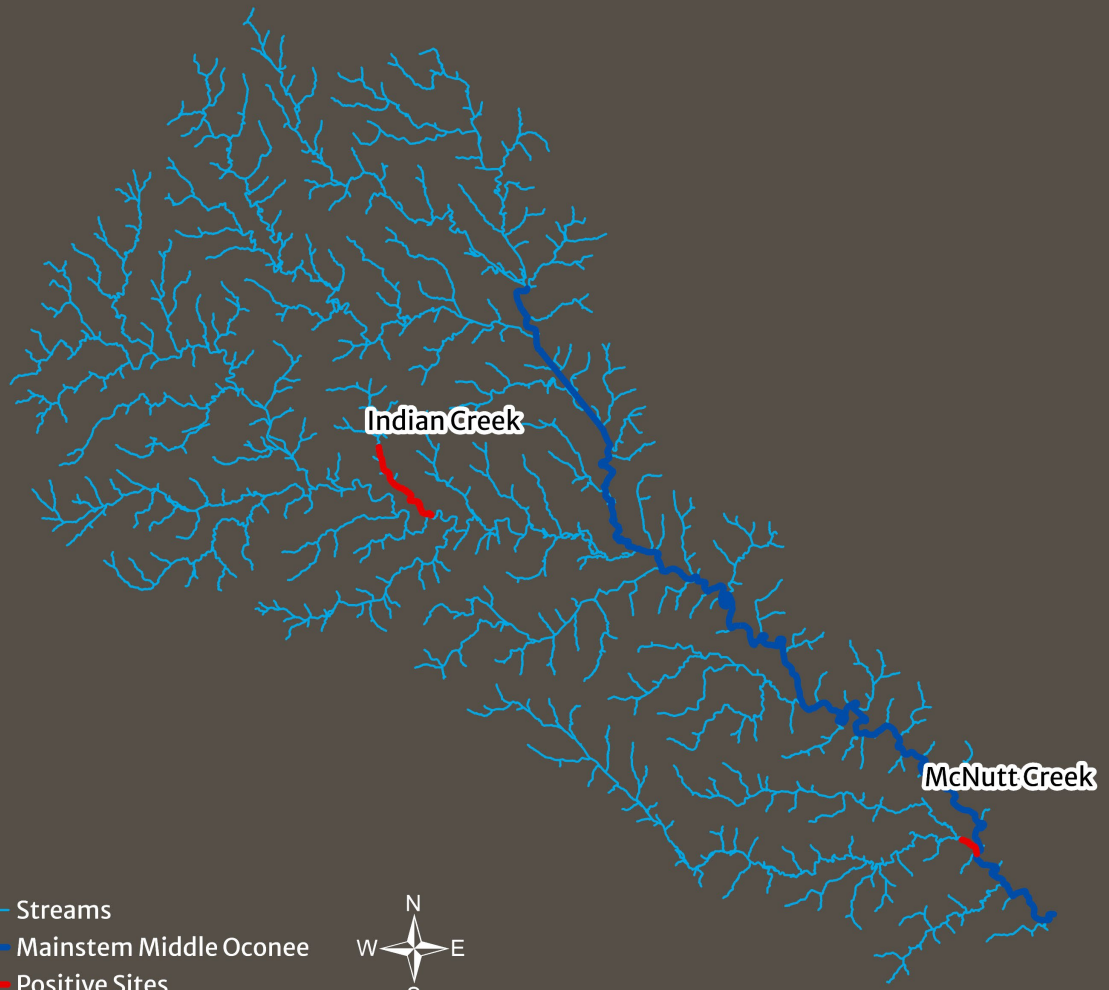
11/5/2020

Indian Creek
Sells Mill, GA
8/4/2021



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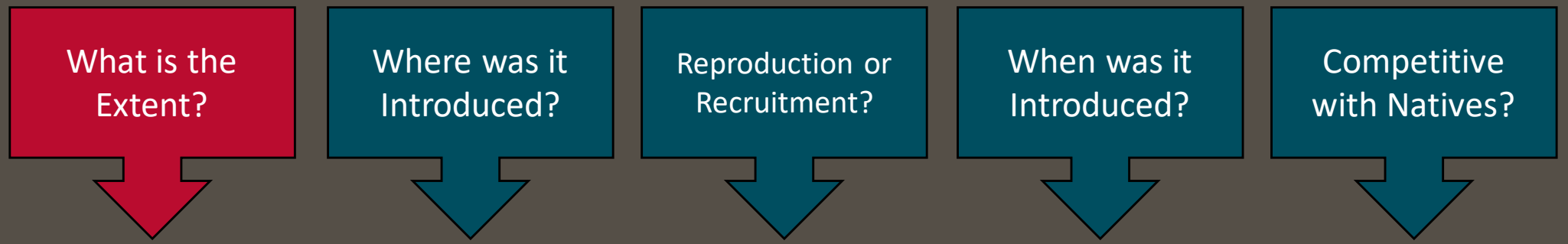
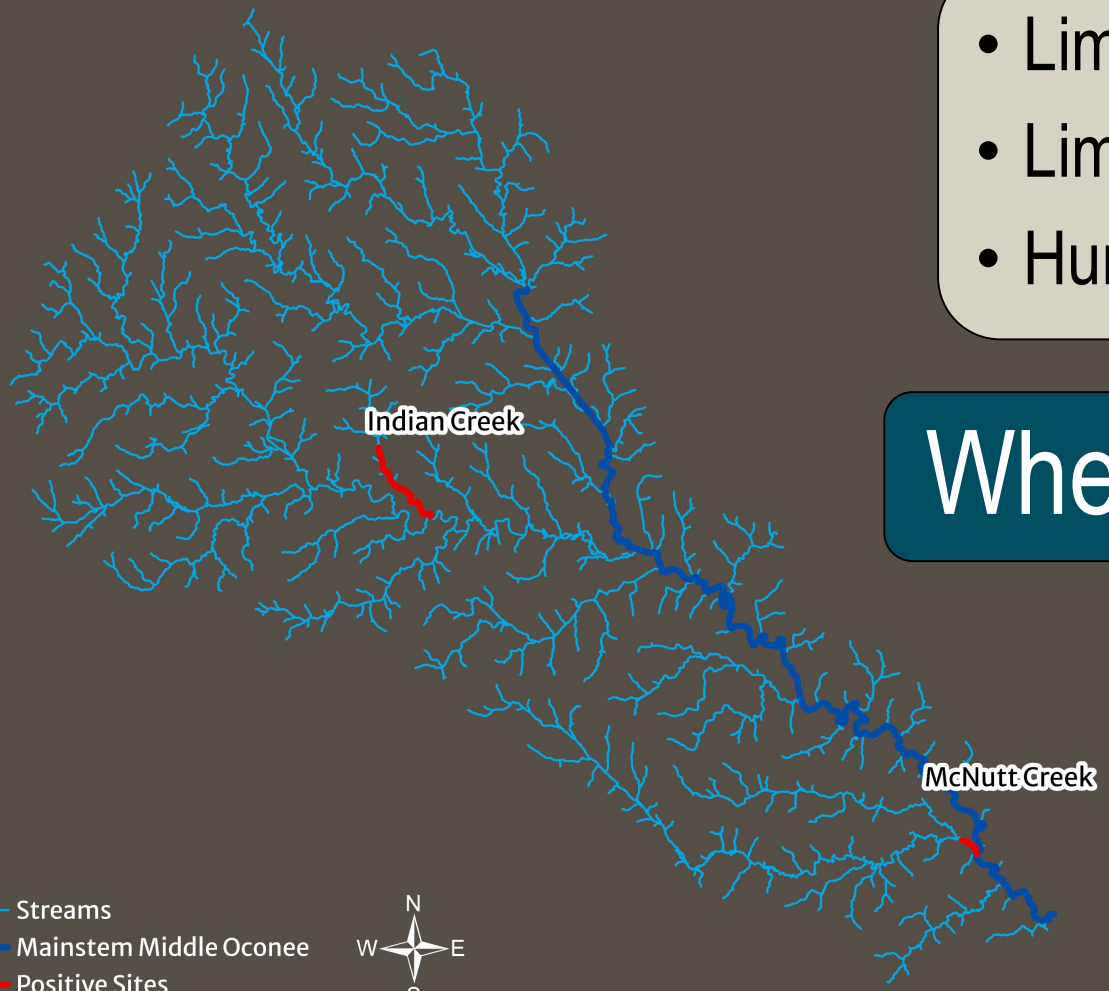
Questions to Answer About ANS Invasions



- Prioritizing Sampling Locations
- Electrofishing Surveys
- eDNA?

Prioritizing for Rapid Response



- Limited Time
- Limited Resources
- Hundreds of Miles of Stream

Where do we look next?

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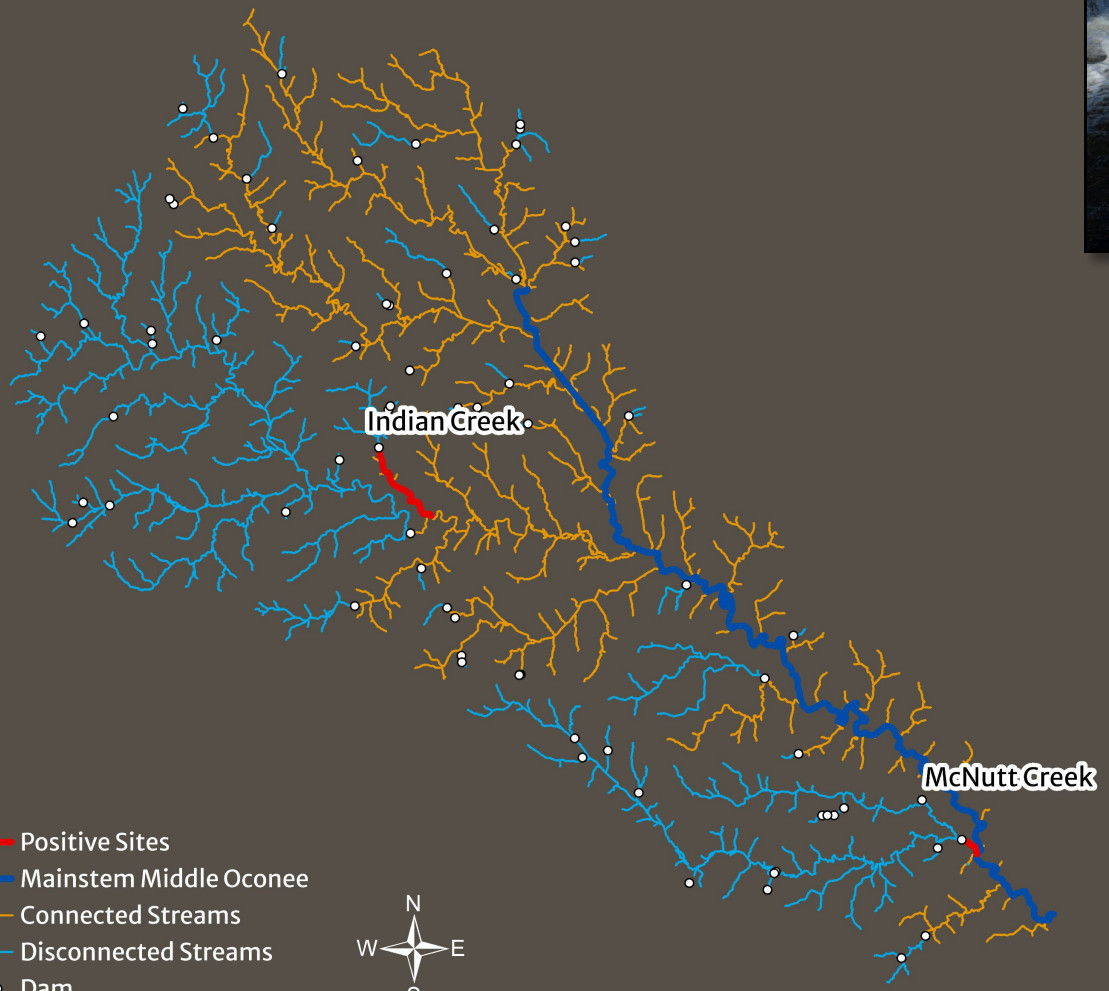
Prioritizing for Rapid Response

Dams



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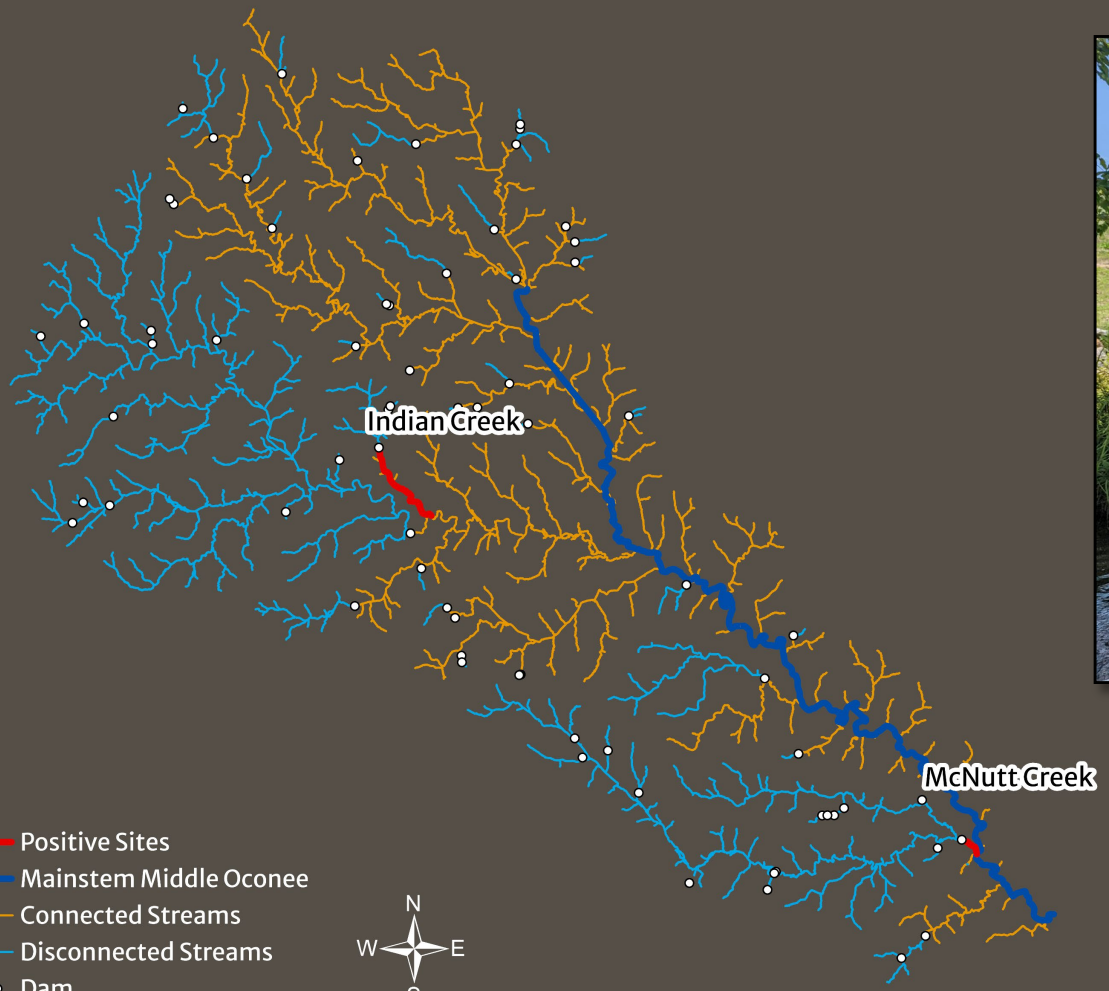
Prioritizing for Rapid Response

Dams

Road Crossings



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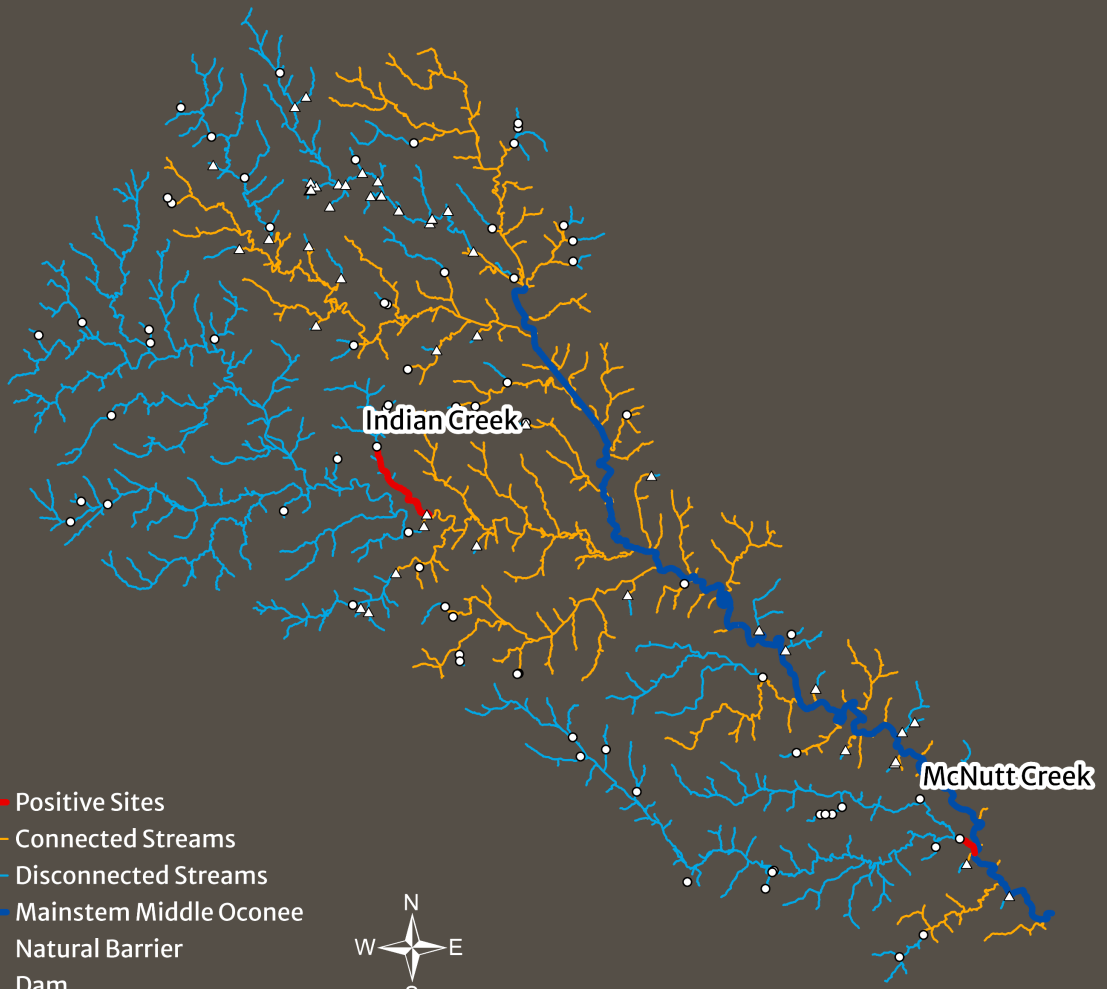
Prioritizing for Rapid Response

Dams | Road Crossings | Natural Barriers | Public Lands



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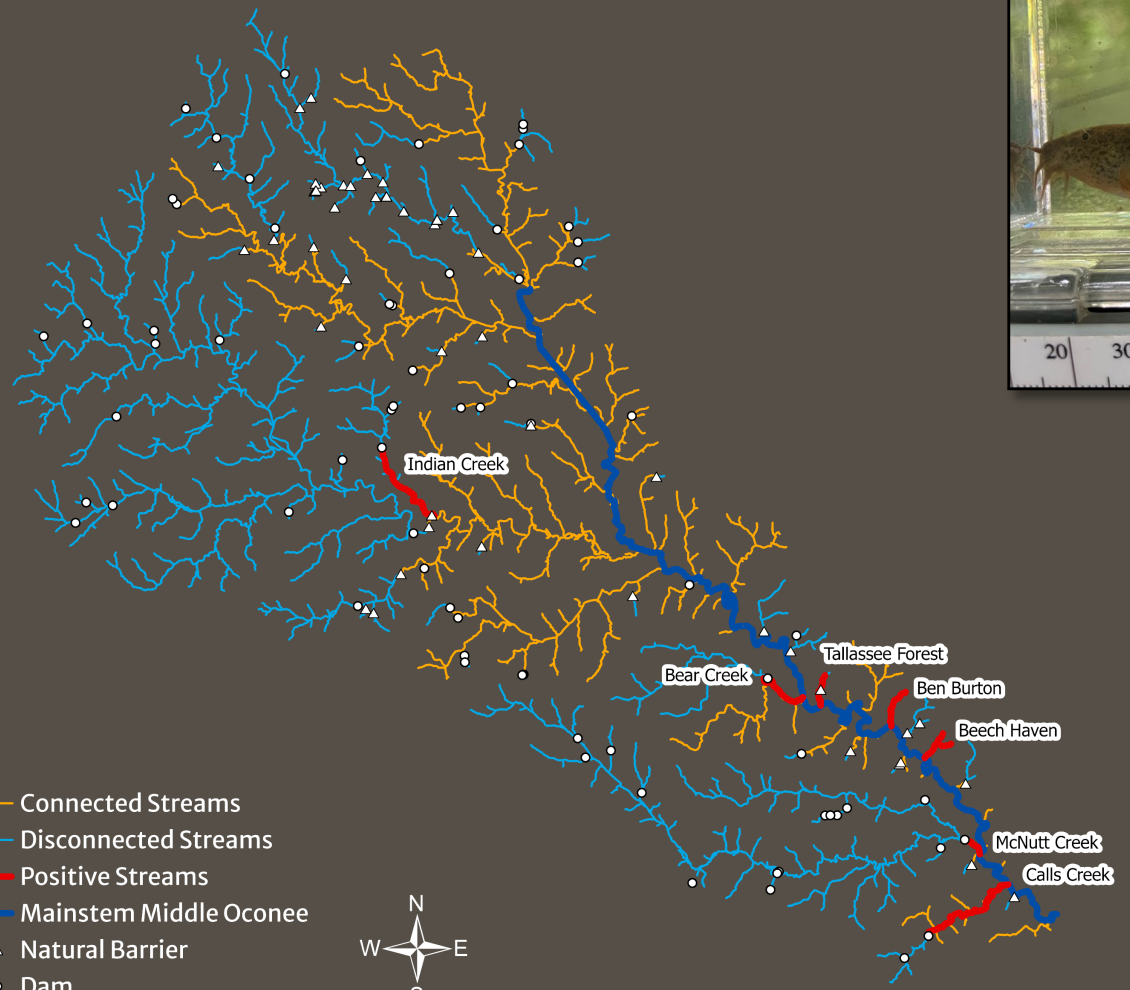
Georgia Discovery Timeline

McNutt Creek
Athens, GA
11/5/2020

Indian Creek
Sells Mill, GA
8/4/2021

5 Middle Oconee Sites Added
Summer 2022



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Georgia Discovery Timeline

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5 Middle Oconee
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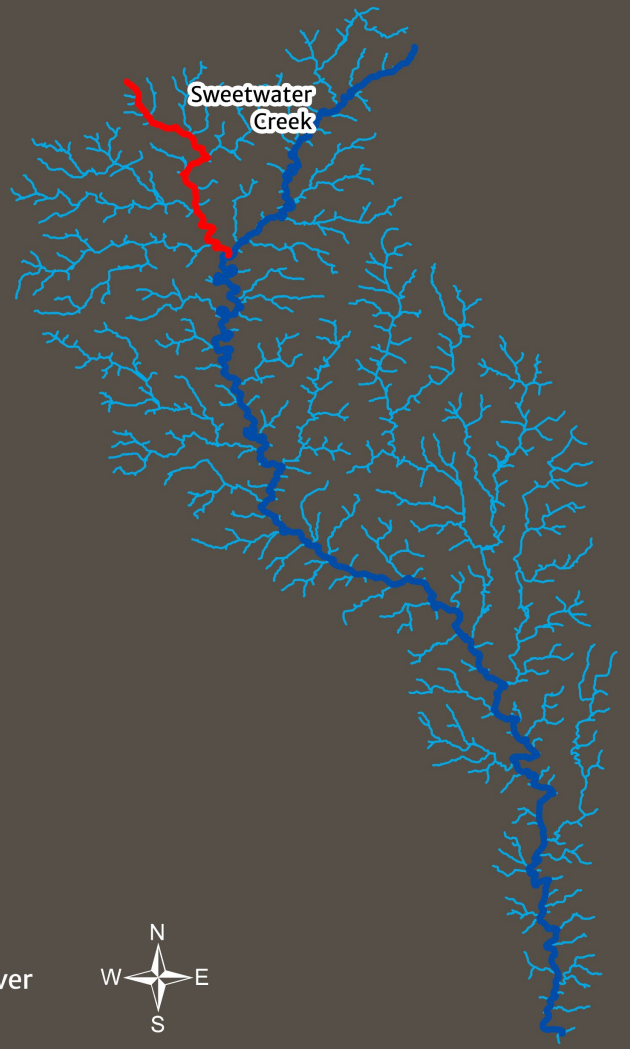
Summer 2022

Sweetwater Creek
Duluth, GA
8/1/2022



Club Drive Tributary:
25 loaches in 2 days

No More in mainstem
Sweetwater Creek

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Positive Streams
Mainstem Yellow River
Streams

N
W E
S

Georgia Discovery Timeline

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Athens, GA
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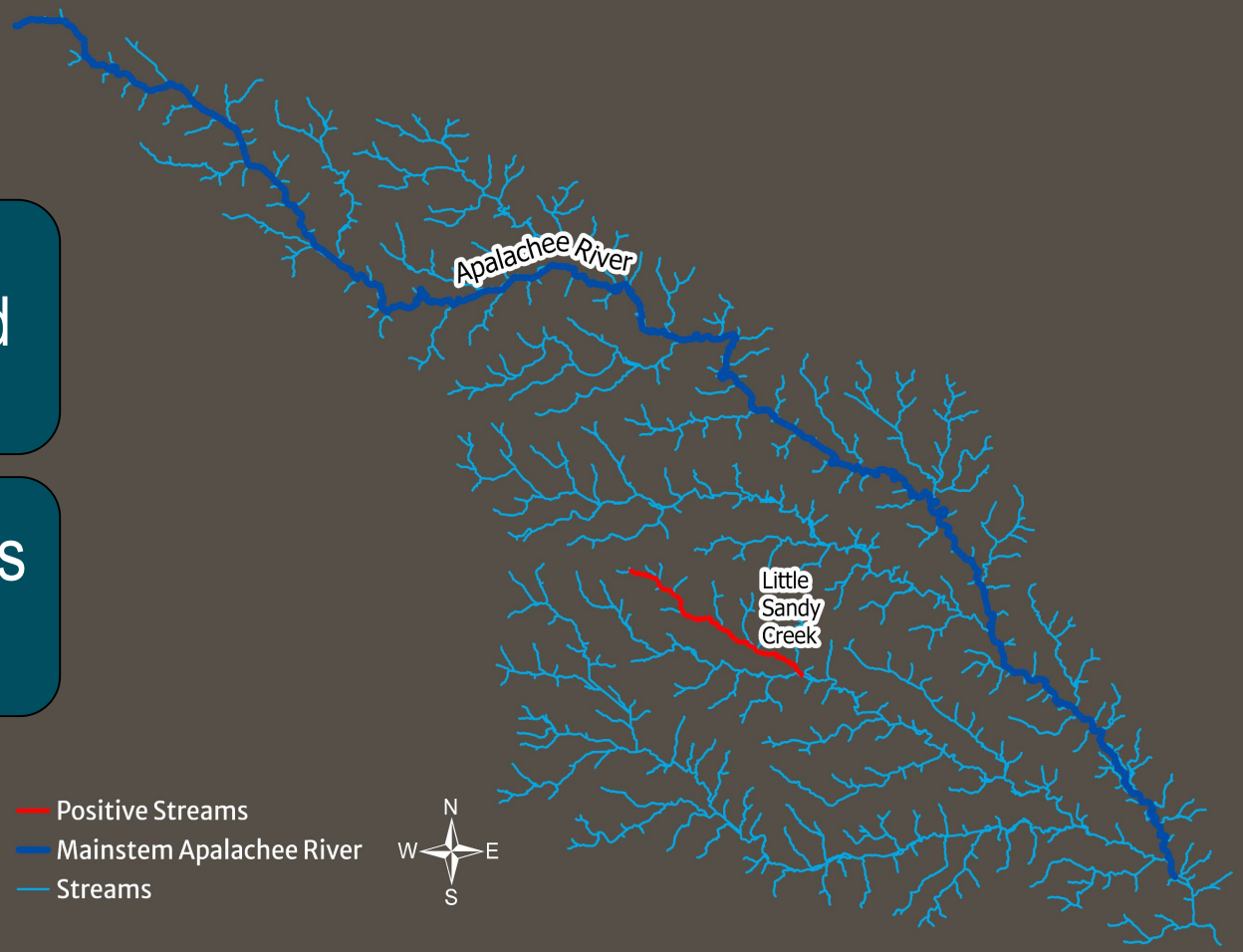
5 Middle Oconee
Sites Added
Summer 2022

Sweetwater Creek
Duluth, GA
8/1/2022

Apalachee River
Social Circle, GA
4/3/2023

Unsuccessful at recapturing pictured individual

Captured 2 loaches downstream



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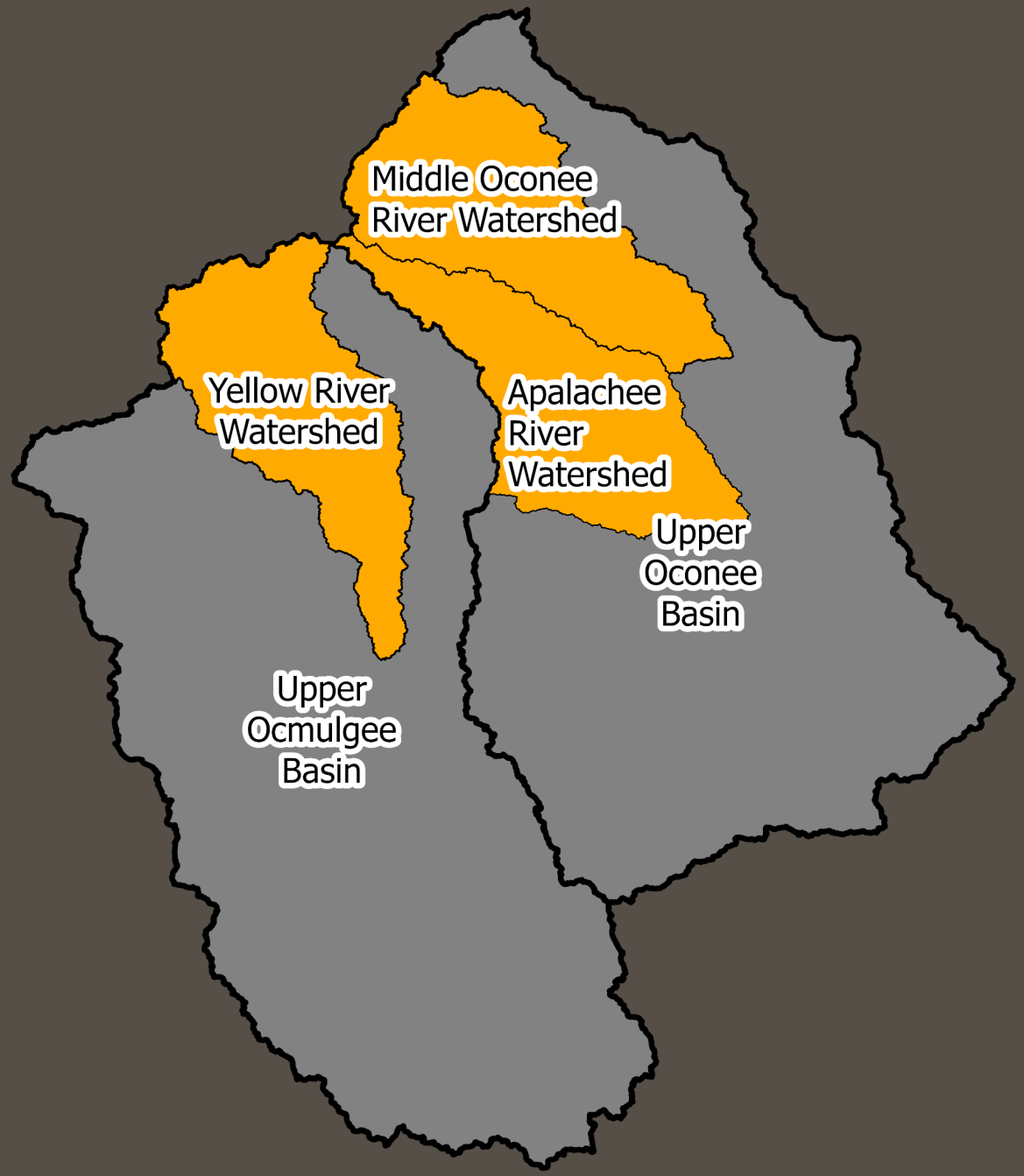

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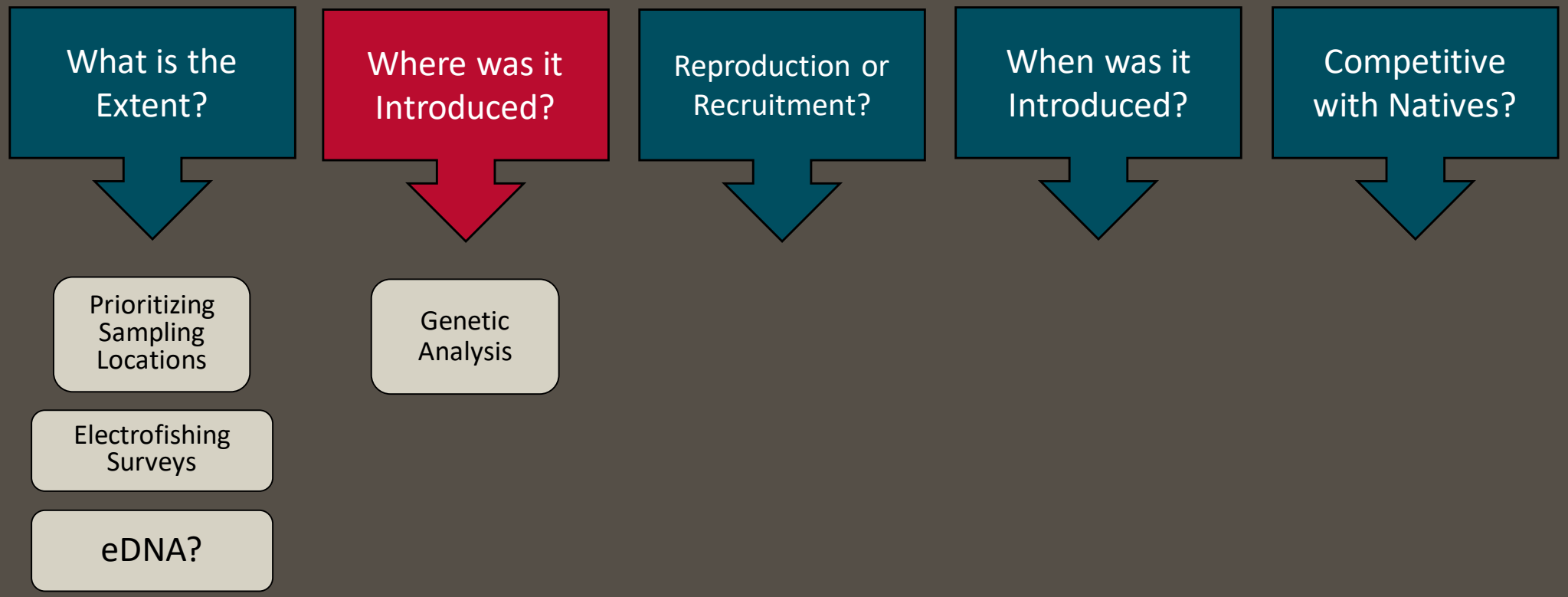
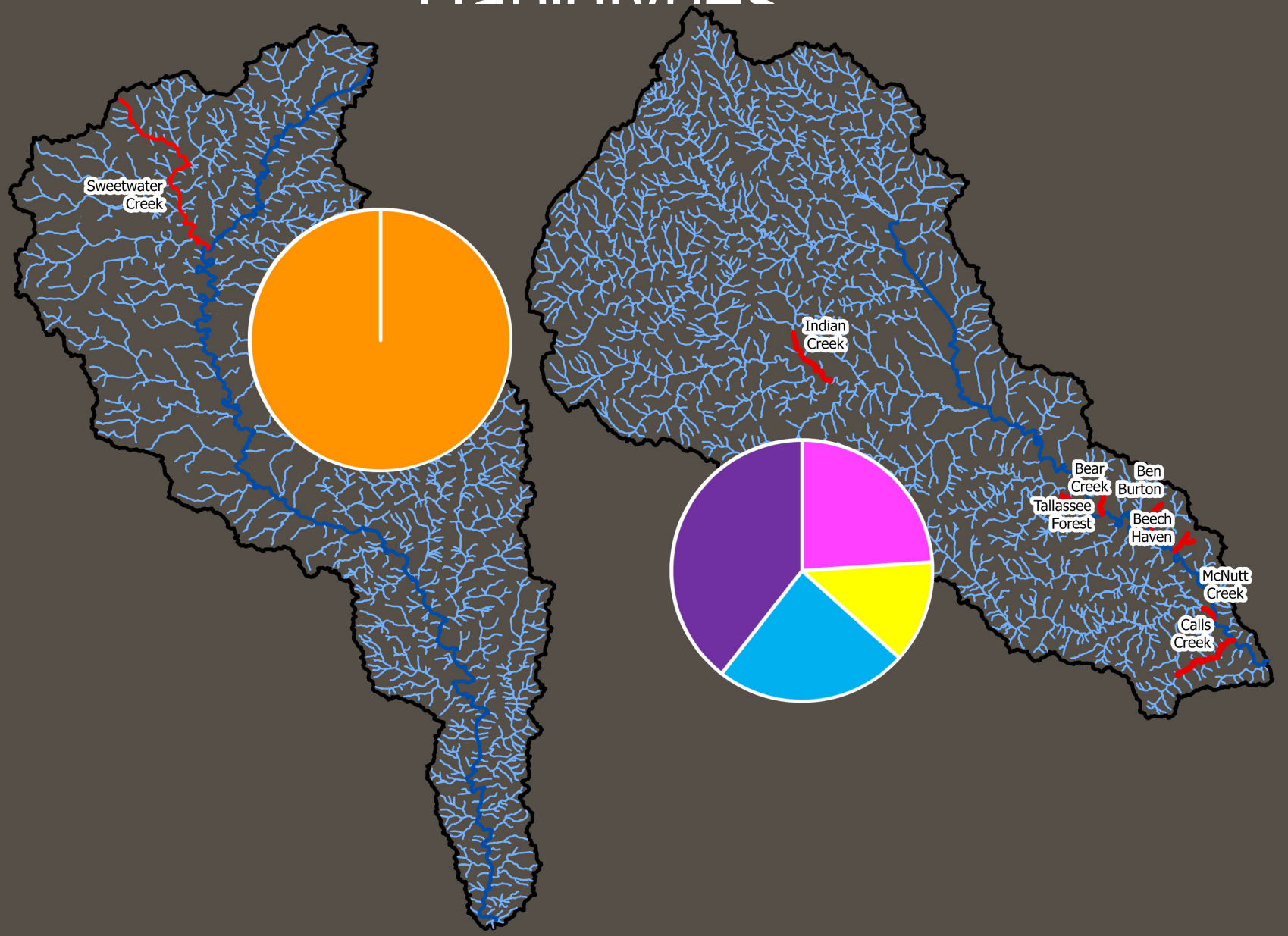
Questions to Answer About ANS Invasions



Oconee vs. Ocmulgee Control Region Haplotypes



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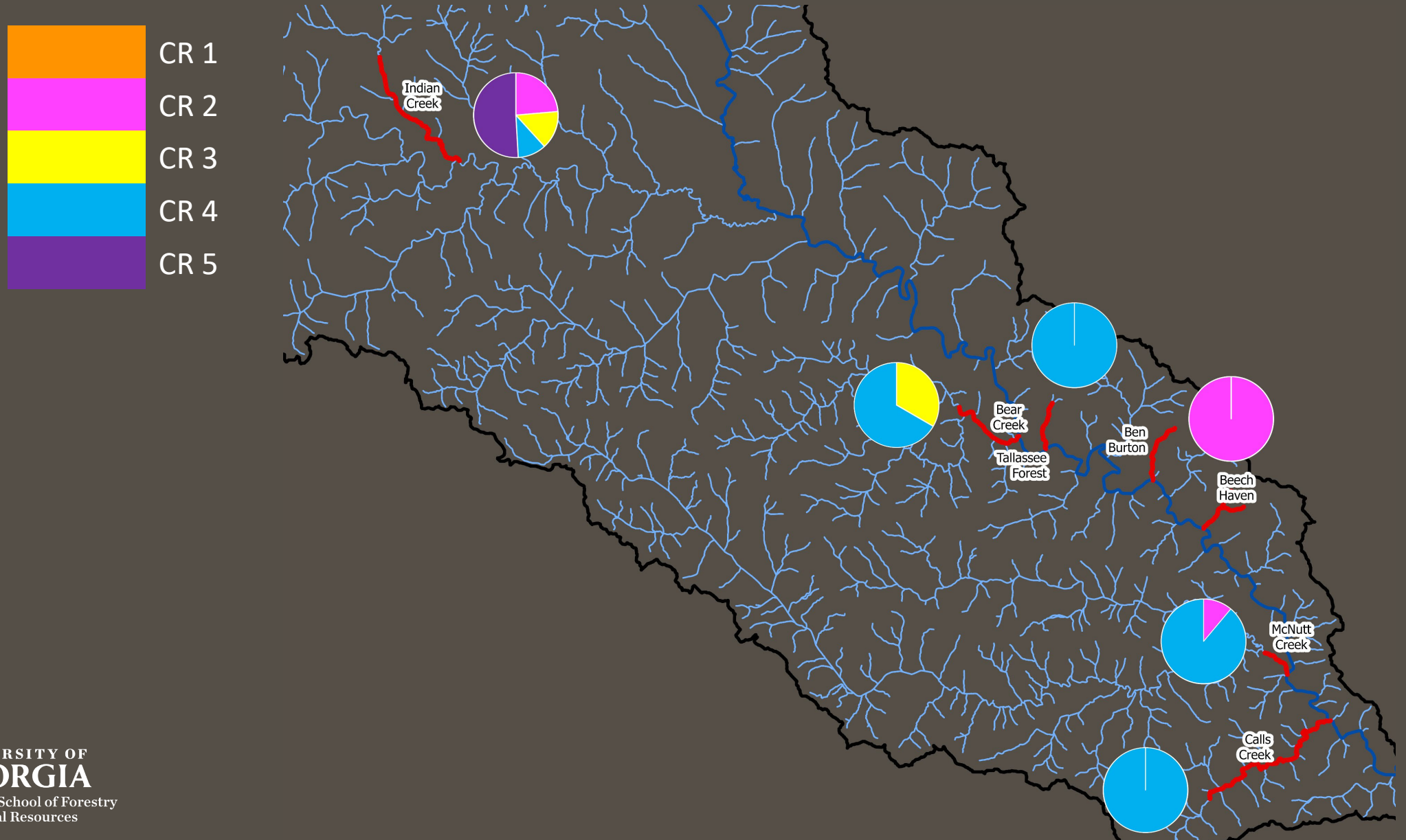
Middle Oconee Control Region Haplotypes



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Aquarium Store Loaches

- Purchased loaches sold as *Misgurnus anguillicaudatus* from two Athens, GA aquarium stores
- Genetic sequencing reveals these fish are *Paramisgurnus dabryanus*
- No source of loaches available to the public have matched wild Georgia loaches

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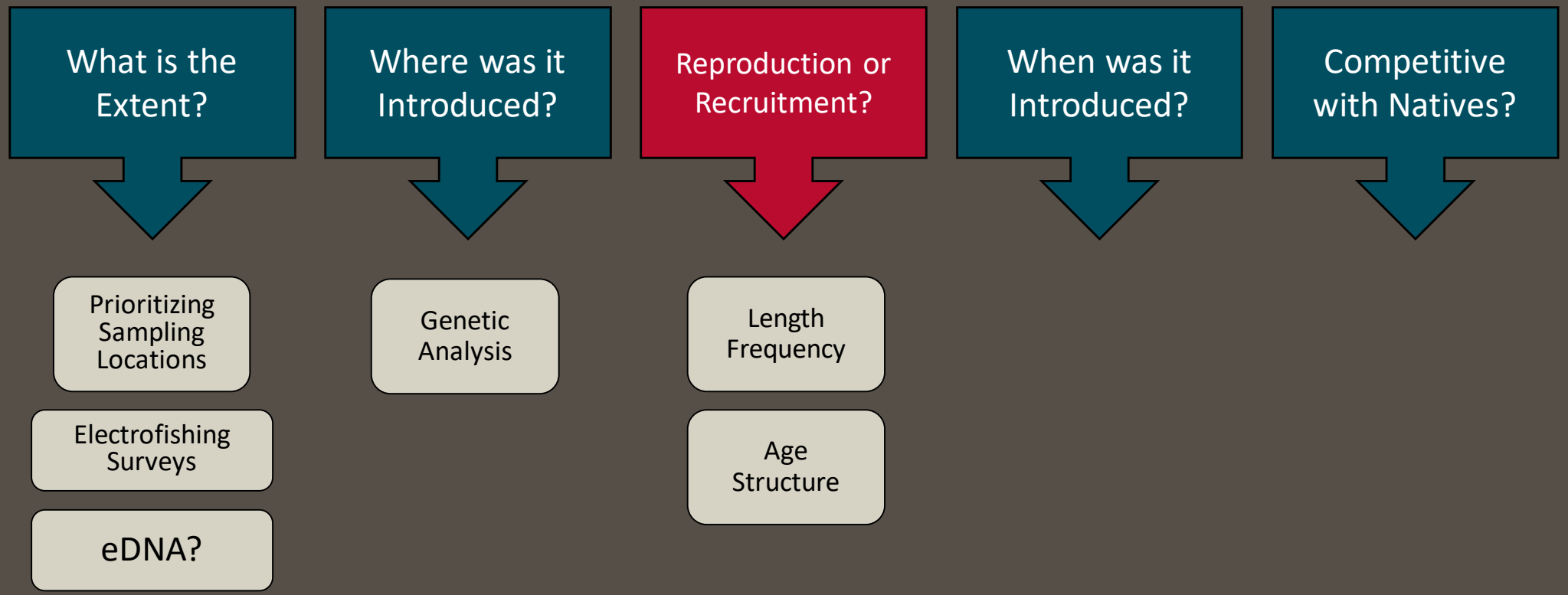
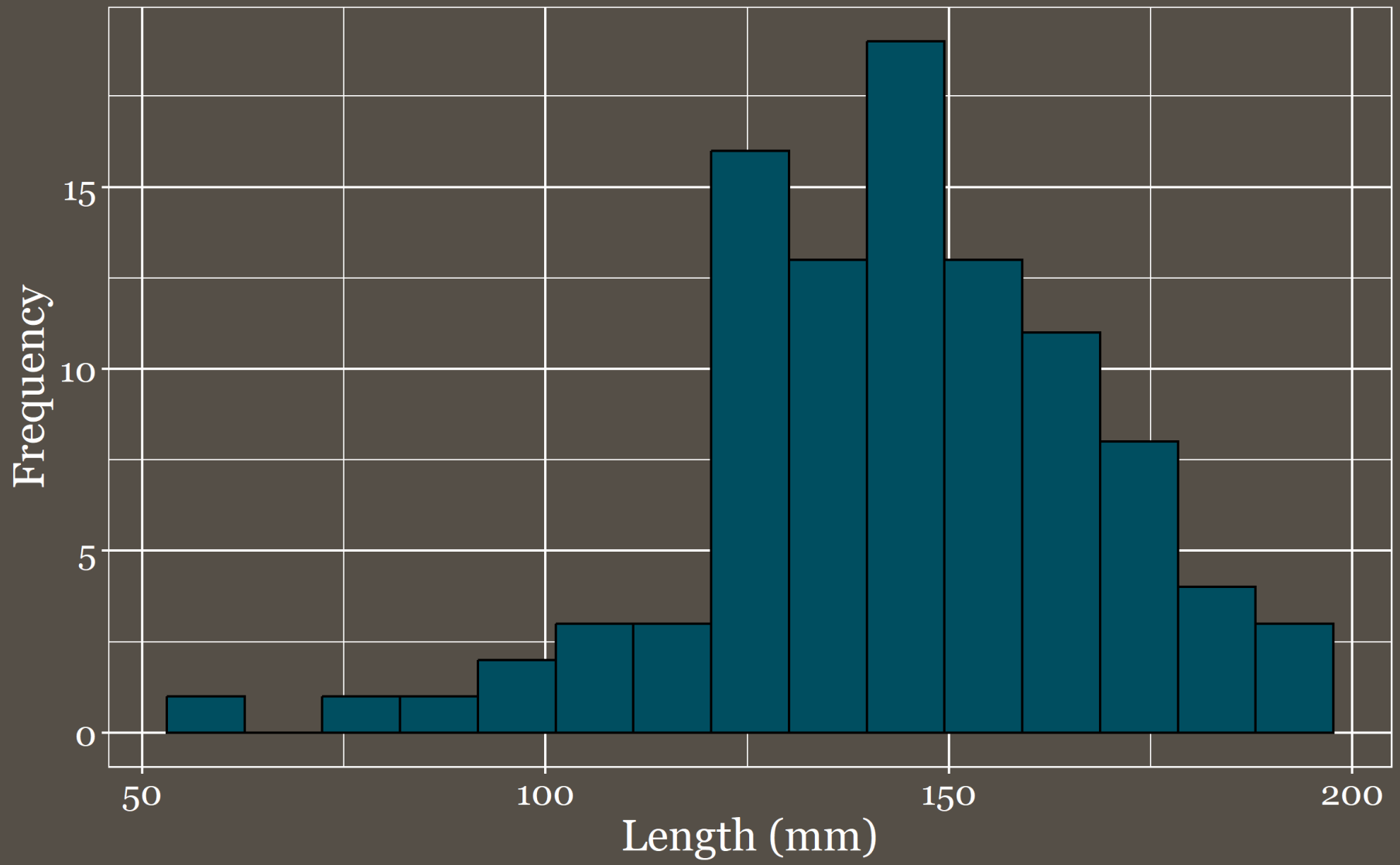
Questions to Answer About ANS Invasions



Length Frequency

Length Range: 43-190 mm



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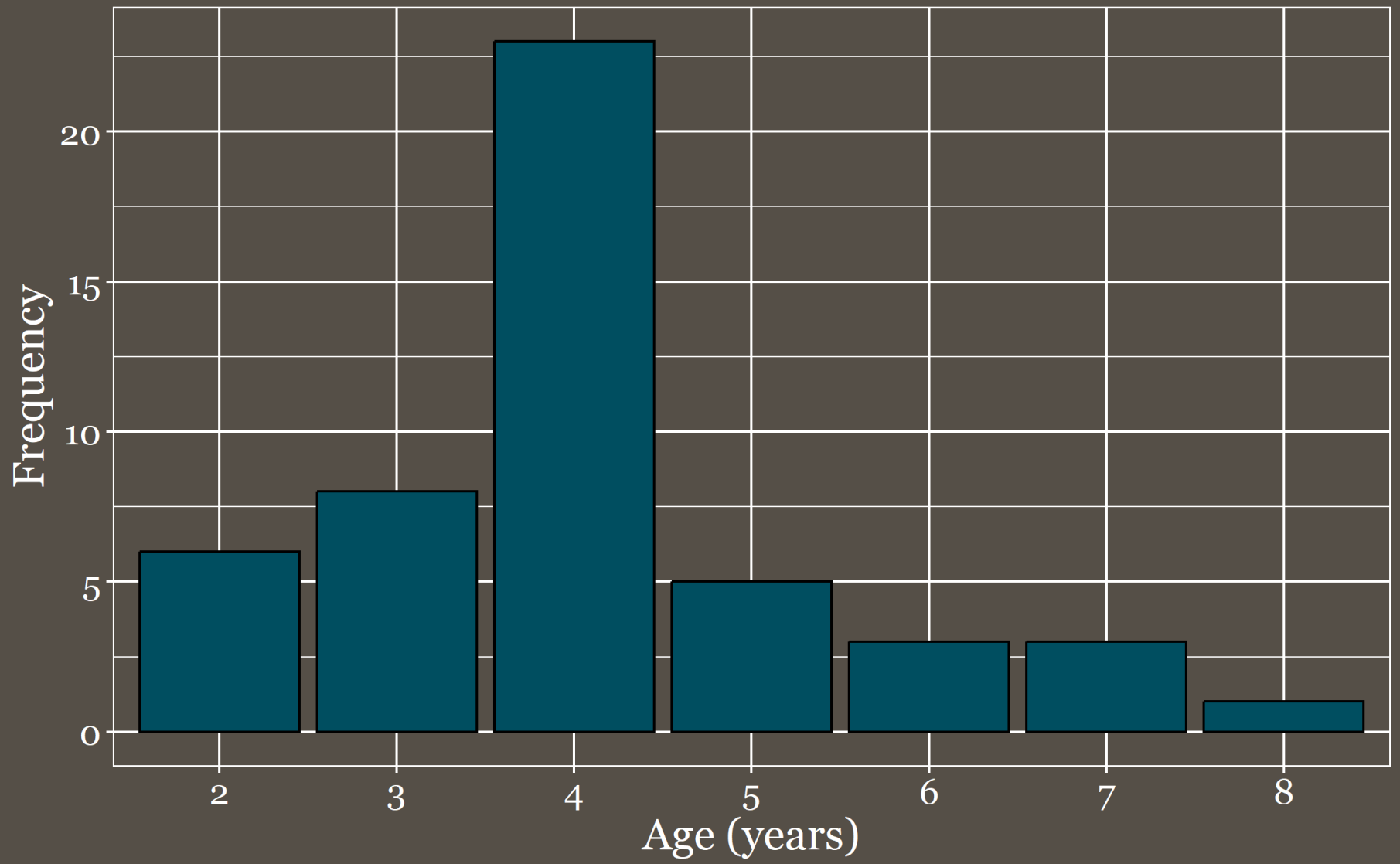
Age Frequency

Age Range: 2-8 years



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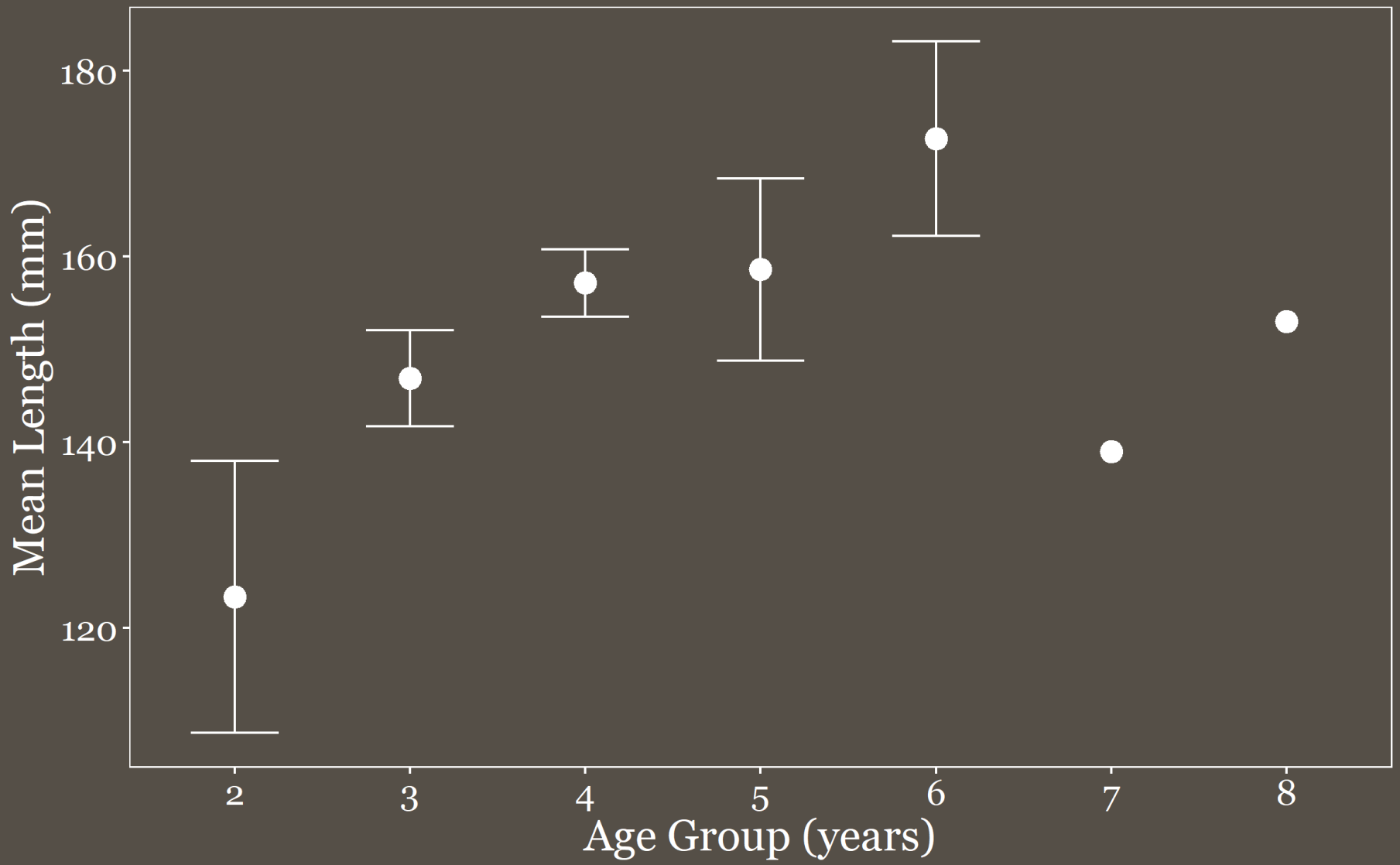
Mean Length at Age

Age 2 Mean: 123.3 mm



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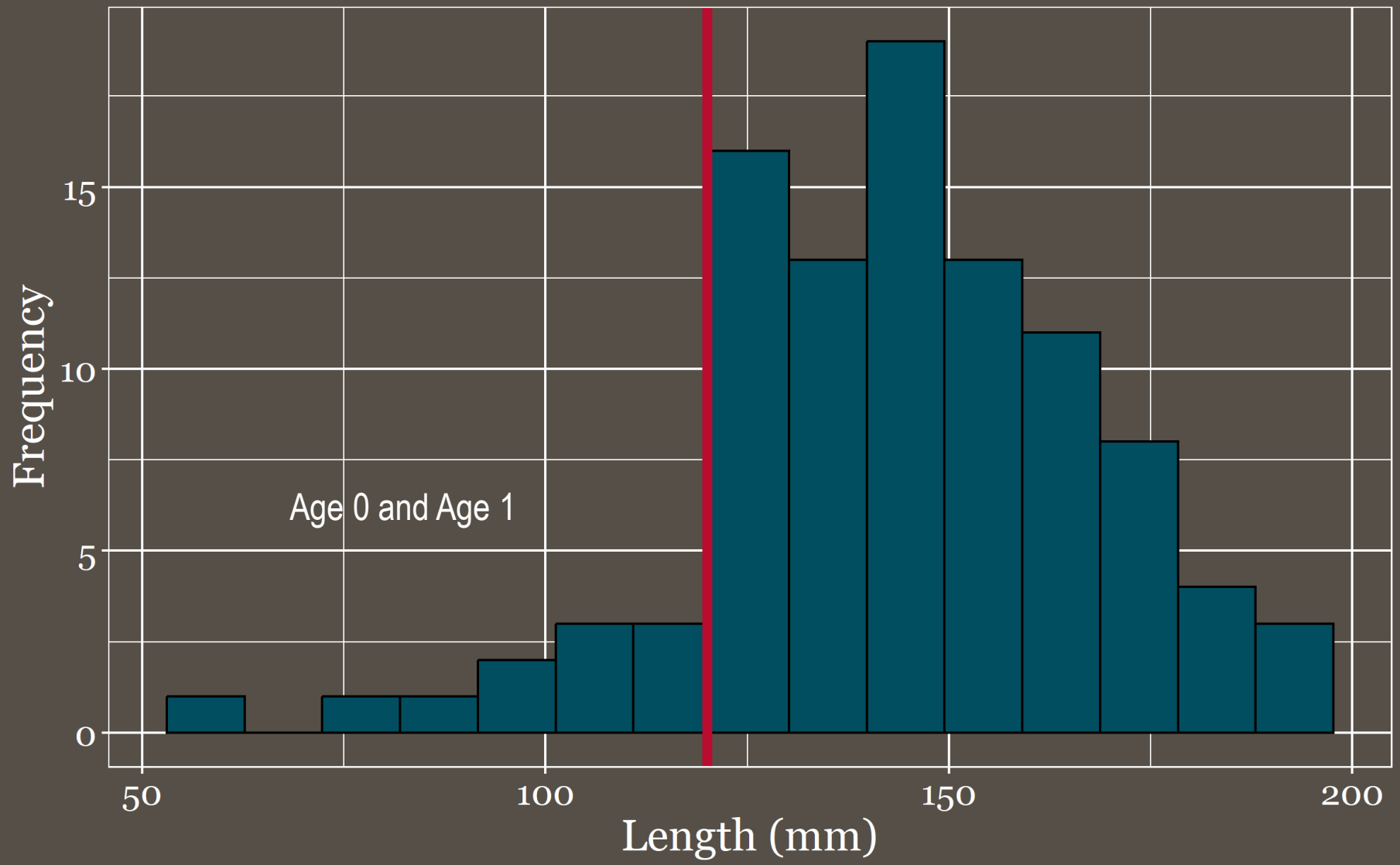
Length Frequency

Age 0-1 below 120 mm



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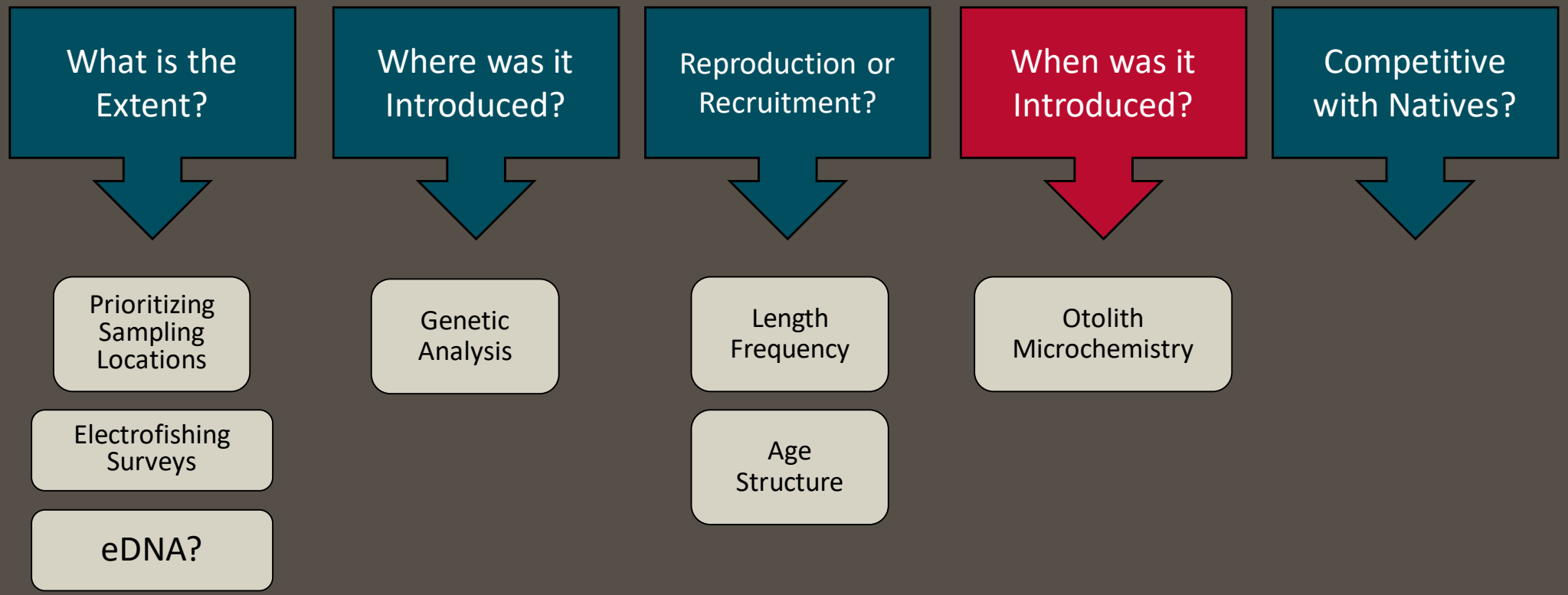
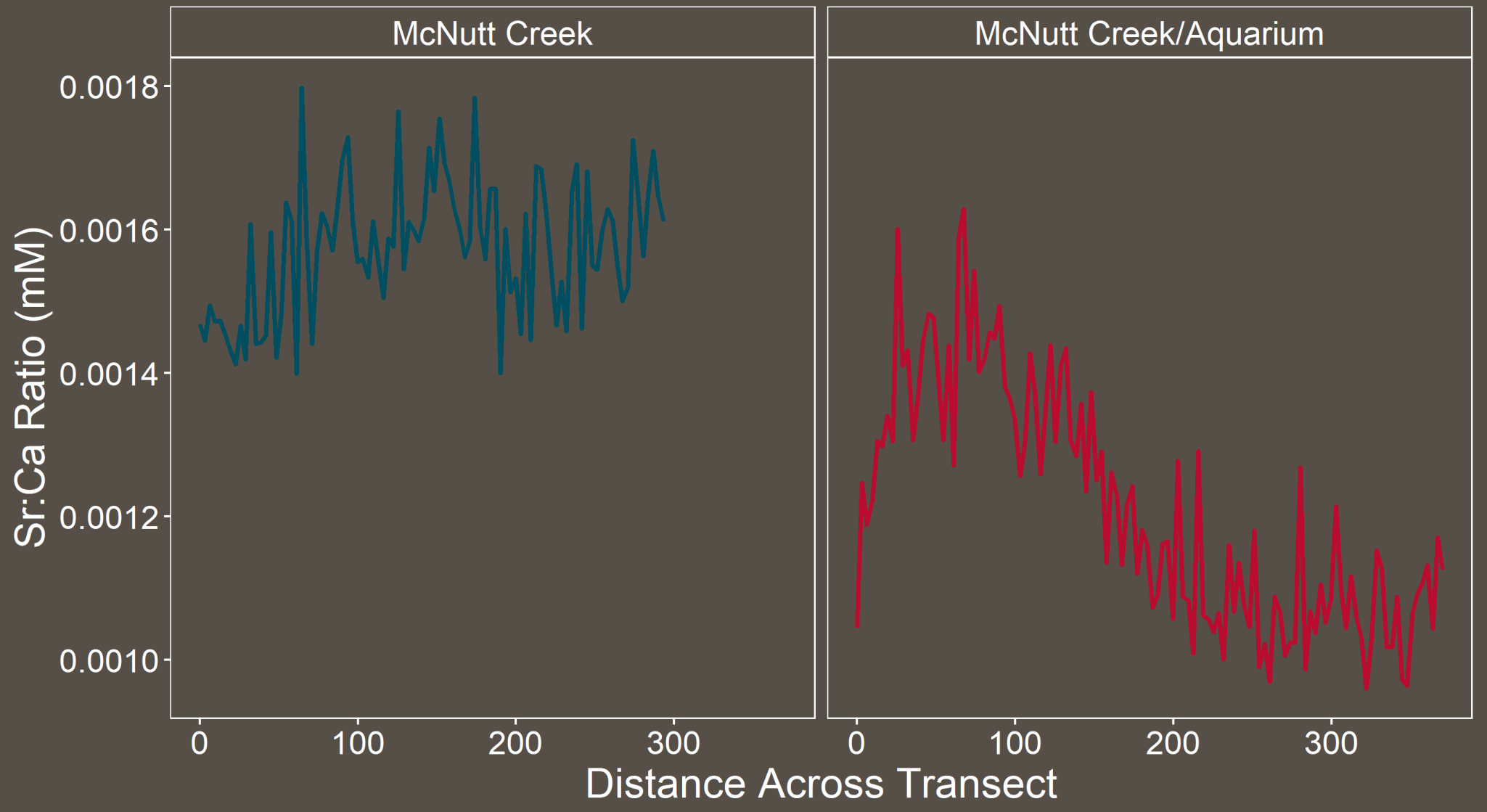


Otolith Microchemistry

Mismatch between fully wild and aquarium captive



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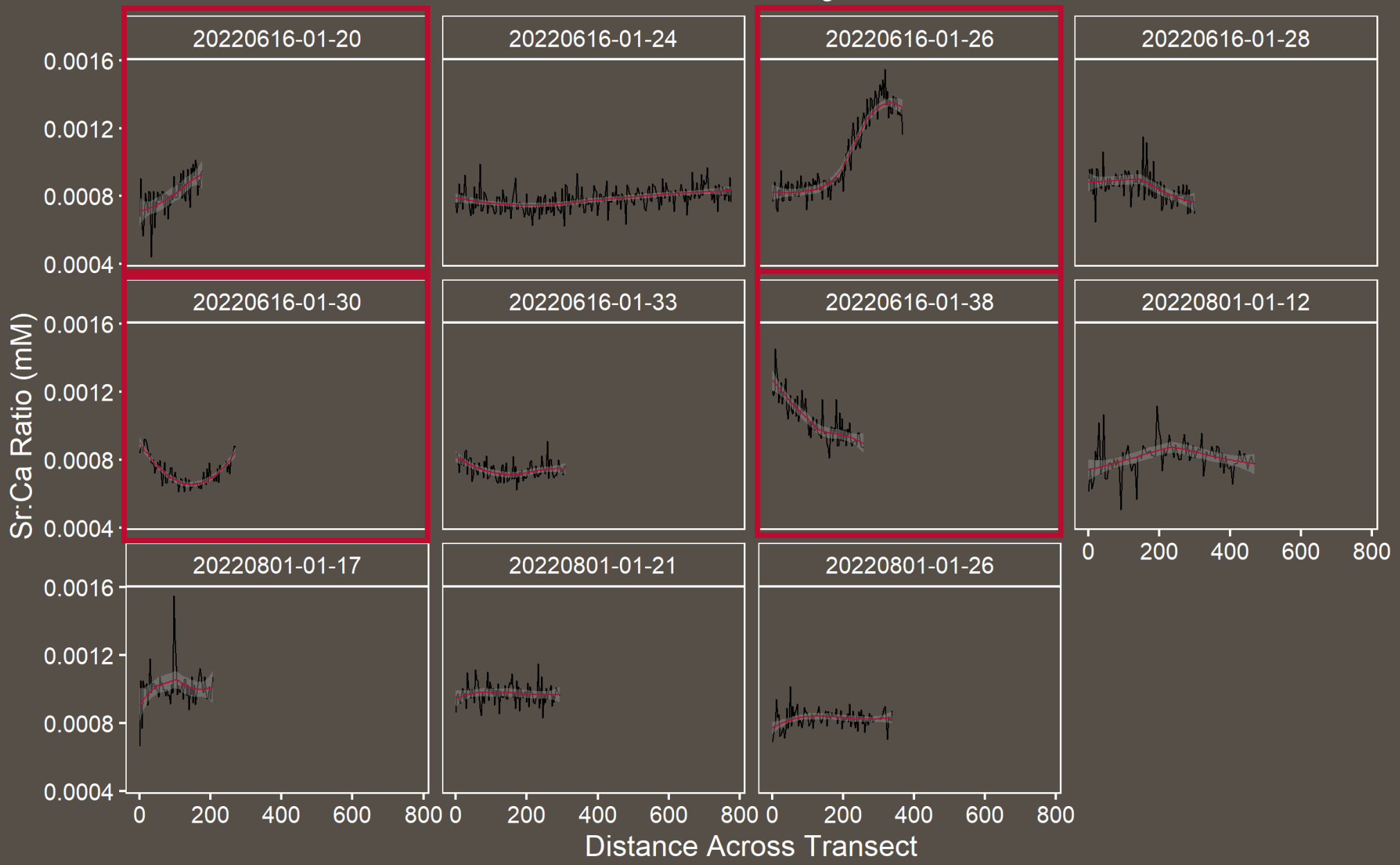
Indian Creek Otolith Microchemistry



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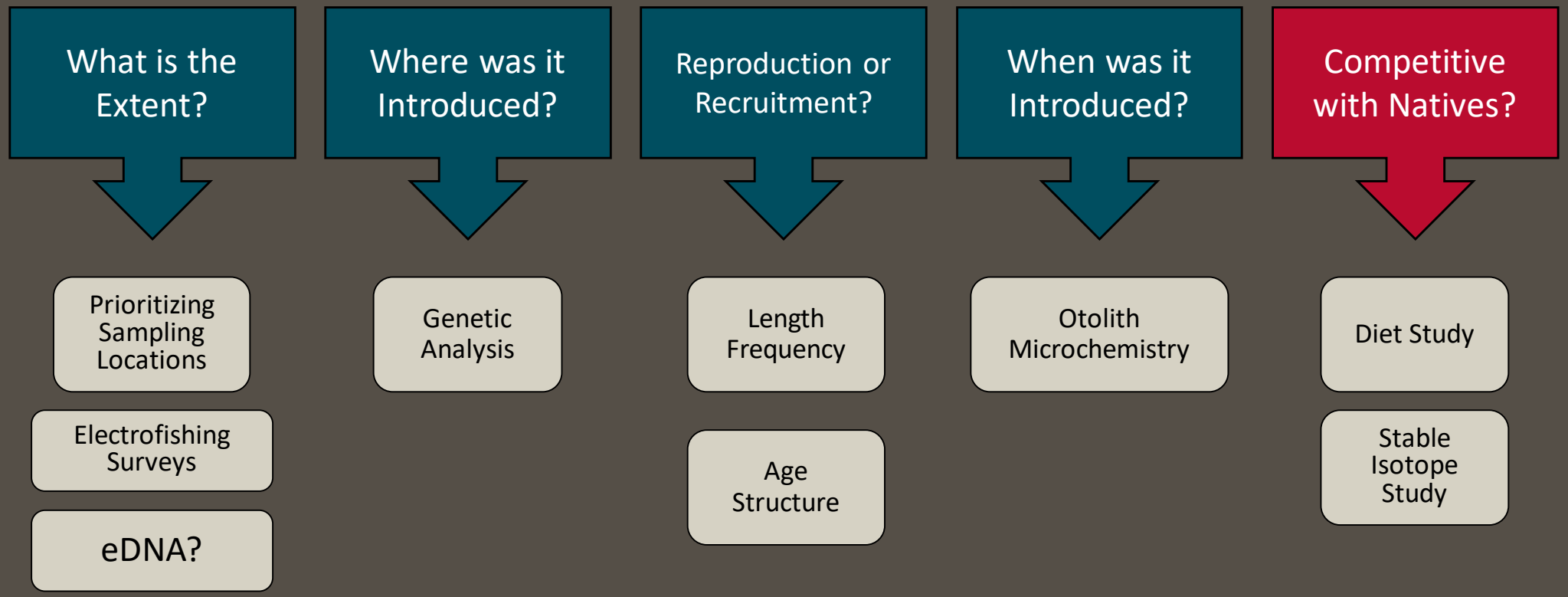
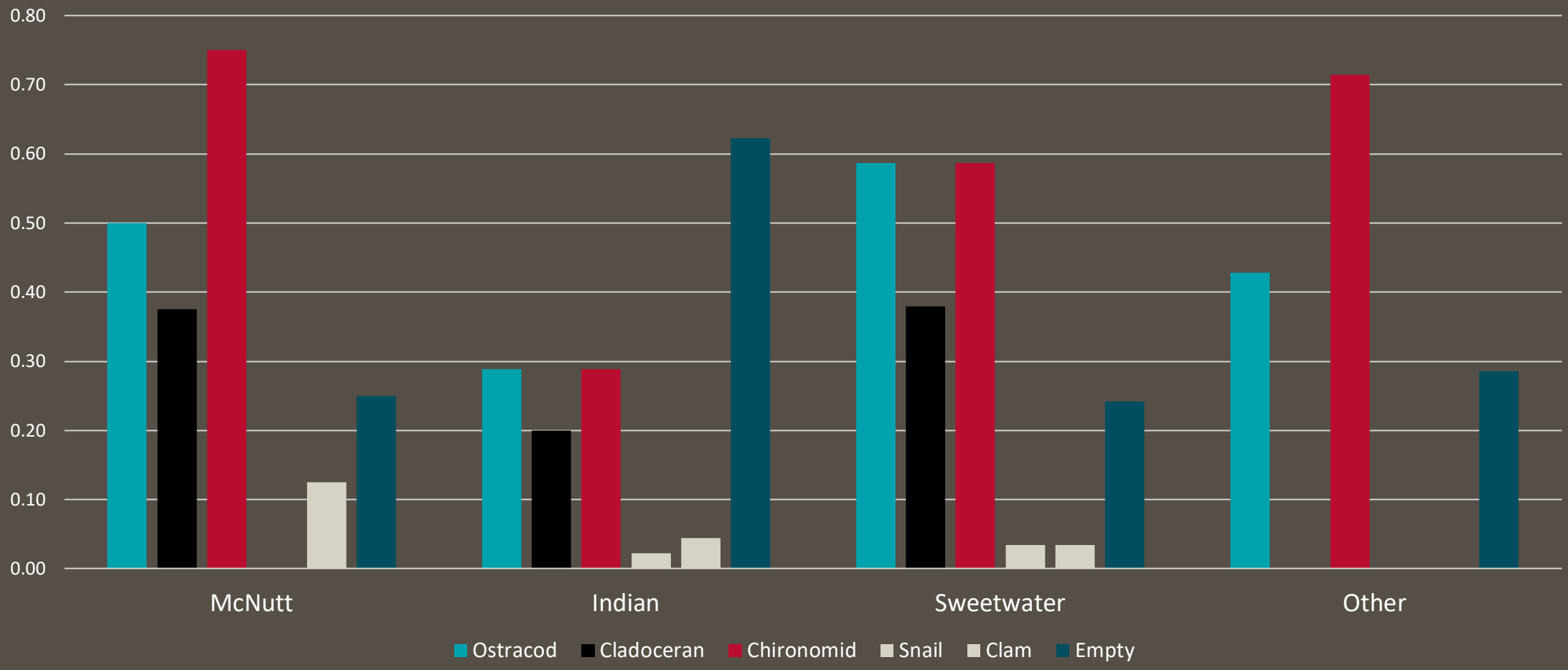


Prey Frequency by Site



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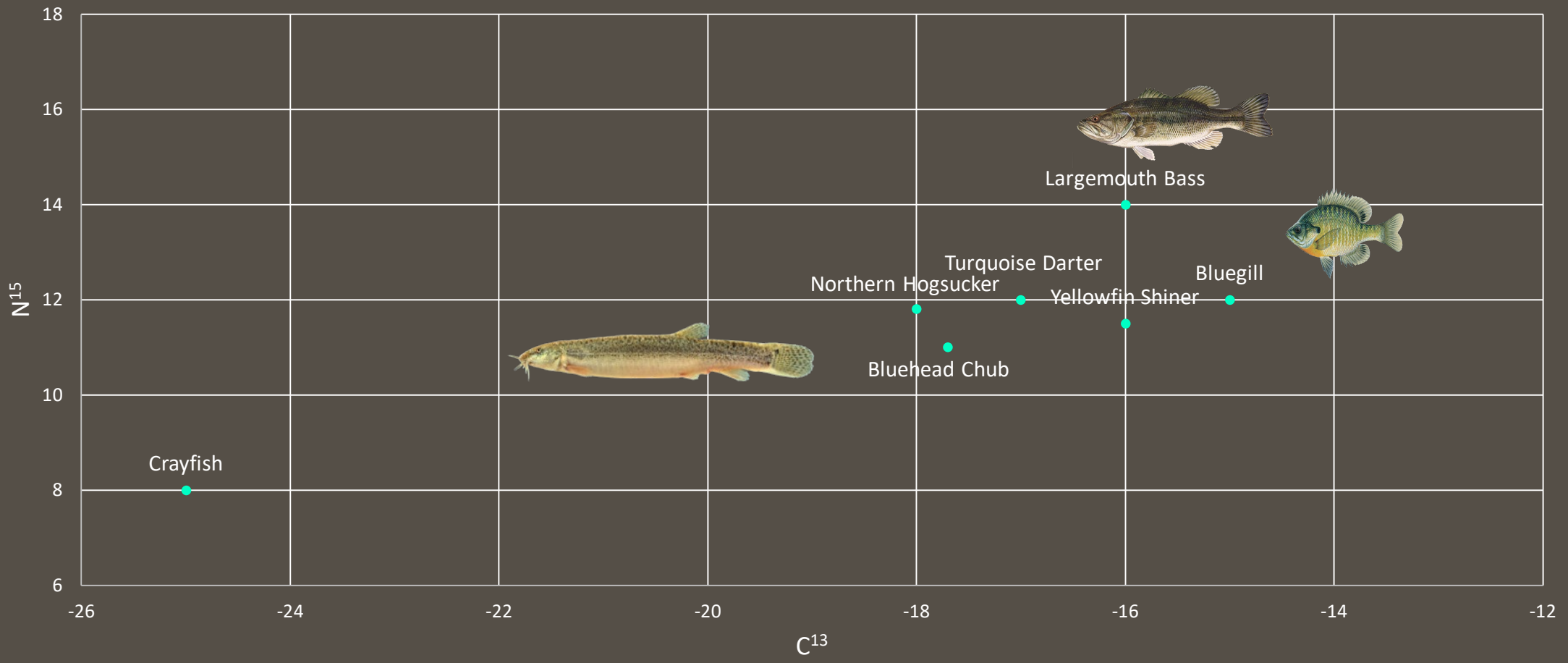
Stable Isotope Conceptual Graph



Population Sources

- Middle Oconee Population – Single Introduction, outward dispersal
  - Data support Indian Creek as ground zero
  - No habitat limitations, stopped only be substantial barriers
- Awaiting genetics results for Apalachee fish
- Not enough data for Yellow River fish

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Questions Answered

- Reproduction and recruitment occurring in Georgia
- Dispersal occurring long distances from source populations
- Individuals are consuming large amounts of micro and macroinvertebrates, some eggs, and appear to be scavenging dead fishes

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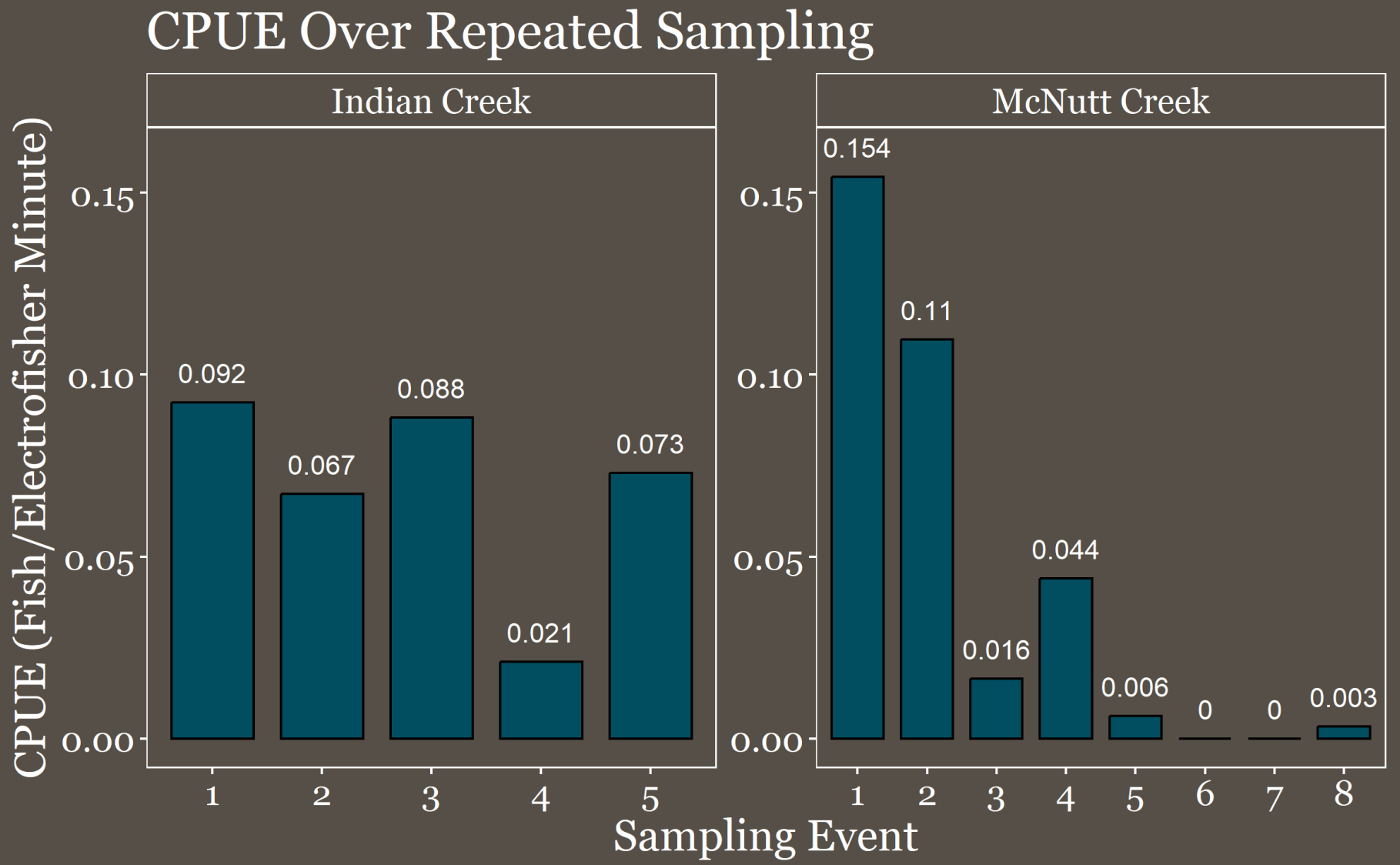
What Now?

- Continue collecting information
  - eDNA
  - Stable Isotopes
  - Genetics
  - Otolith Microchemistry
- Continue population reduction effort
- Outreach

What Effect Can We Have?



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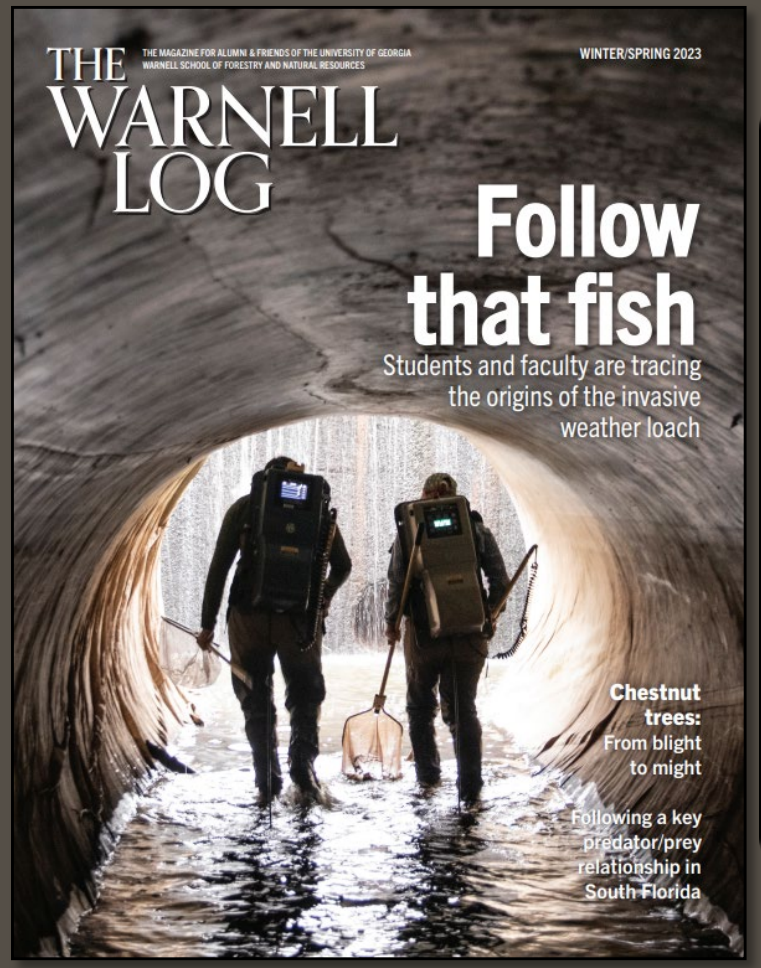
Public Outreach

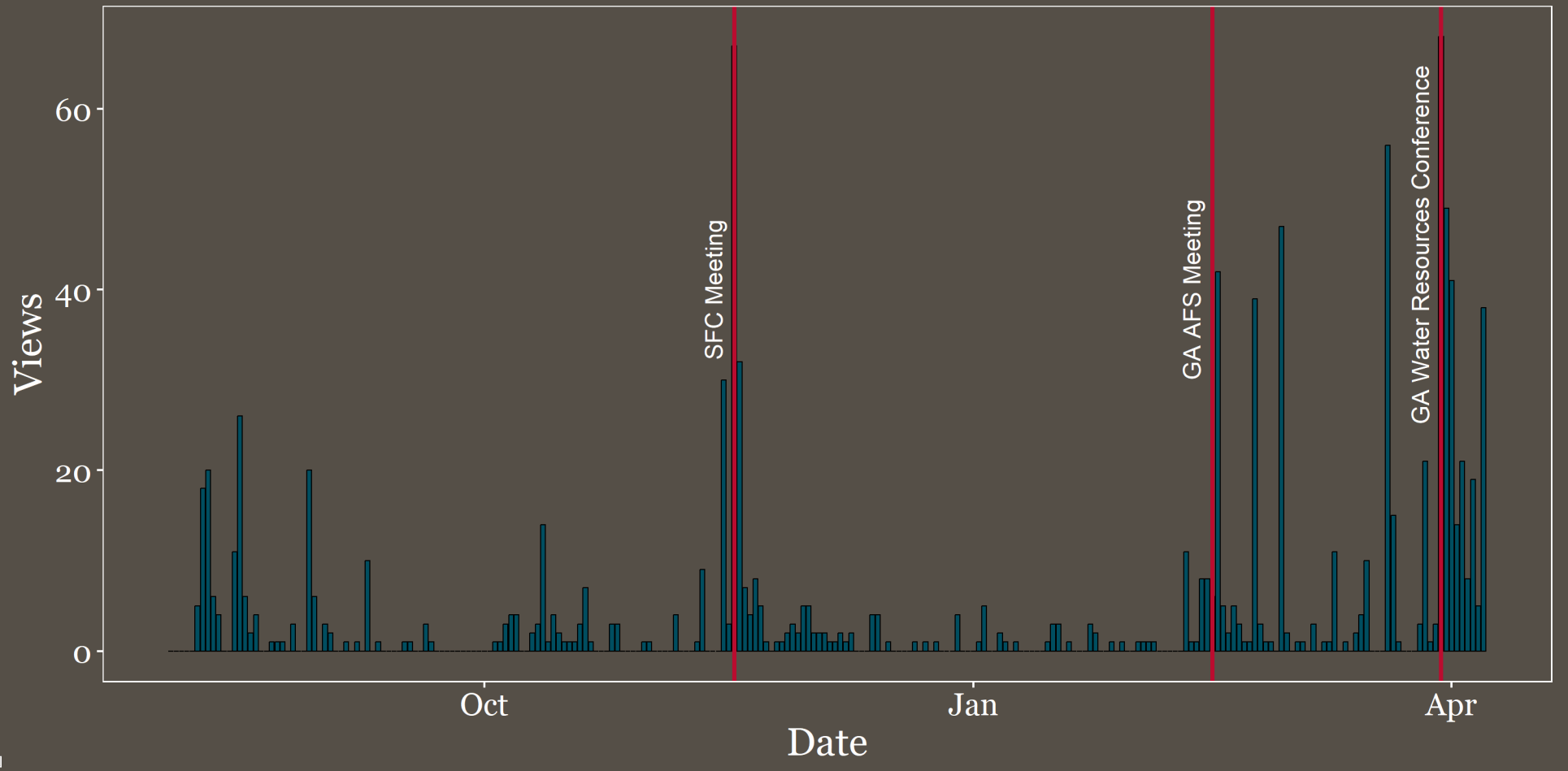
- ArcGIS Story Map
- Warnell Log alumni magazine
- Warnell social media
- Gwinnett County Department of Water Resources



SCAN ME

Outreach – ArcGIS Story Map

Total Views: 1,072



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Acknowledgements

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Questions?

- Wesley Gerrin (overall): wgerrin@uga.edu
- Jay Shelton (overall): jshelton@uga.edu
- Brian Shamblin (genetics & eDNA): brianshm@warnell.uga.edu
- Peter Hazelton (stable isotopes & diet): phaze@uga.edu
- Martin Hamel (otolith microchemistry): hamel@uga.edu

SCAN ME

ArcGIS Story Map

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