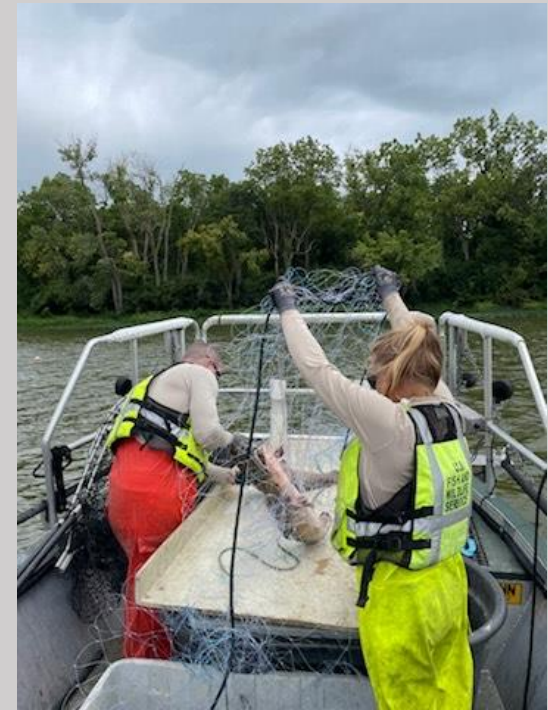


If at First You Don't Succeed: The Evolution of Capture Methods in Great Lakes Grass Carp (*Ctenopharyngodon idella*) Control



Robert L Mapes (UToledo), Rob Hunter (USGS), Ryan Young (USFWS), Ryan Brown (MDNR), Dillon Weik (UToledo), Christine Mayer (UToledo), Lucas Nathan (MDNR), Eric Weimer (ODNR), Song Qian (UToledo), Matt Acre (USGS), James Roberts (USGS), John Dettmers (GLFC)

What's the Problem with Grass Carp?

No Native Herbivores = No Competition



Eat Up To 100% of Body Weight Daily

35+ lbs

25+ years

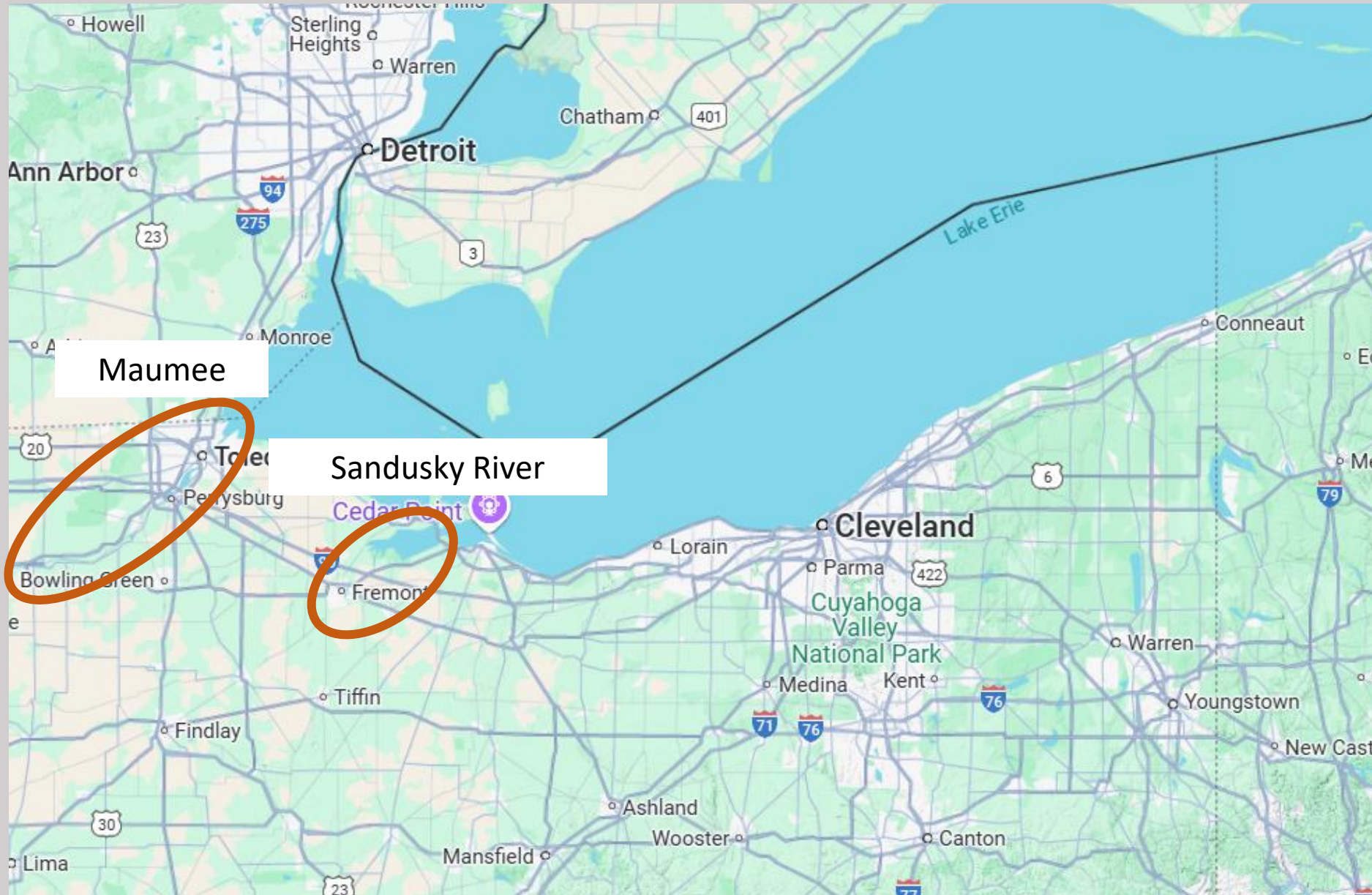


Degrade Wetlands

Only 5% of Wetlands Left in Lake Erie
Habitat and Ecosystem Services

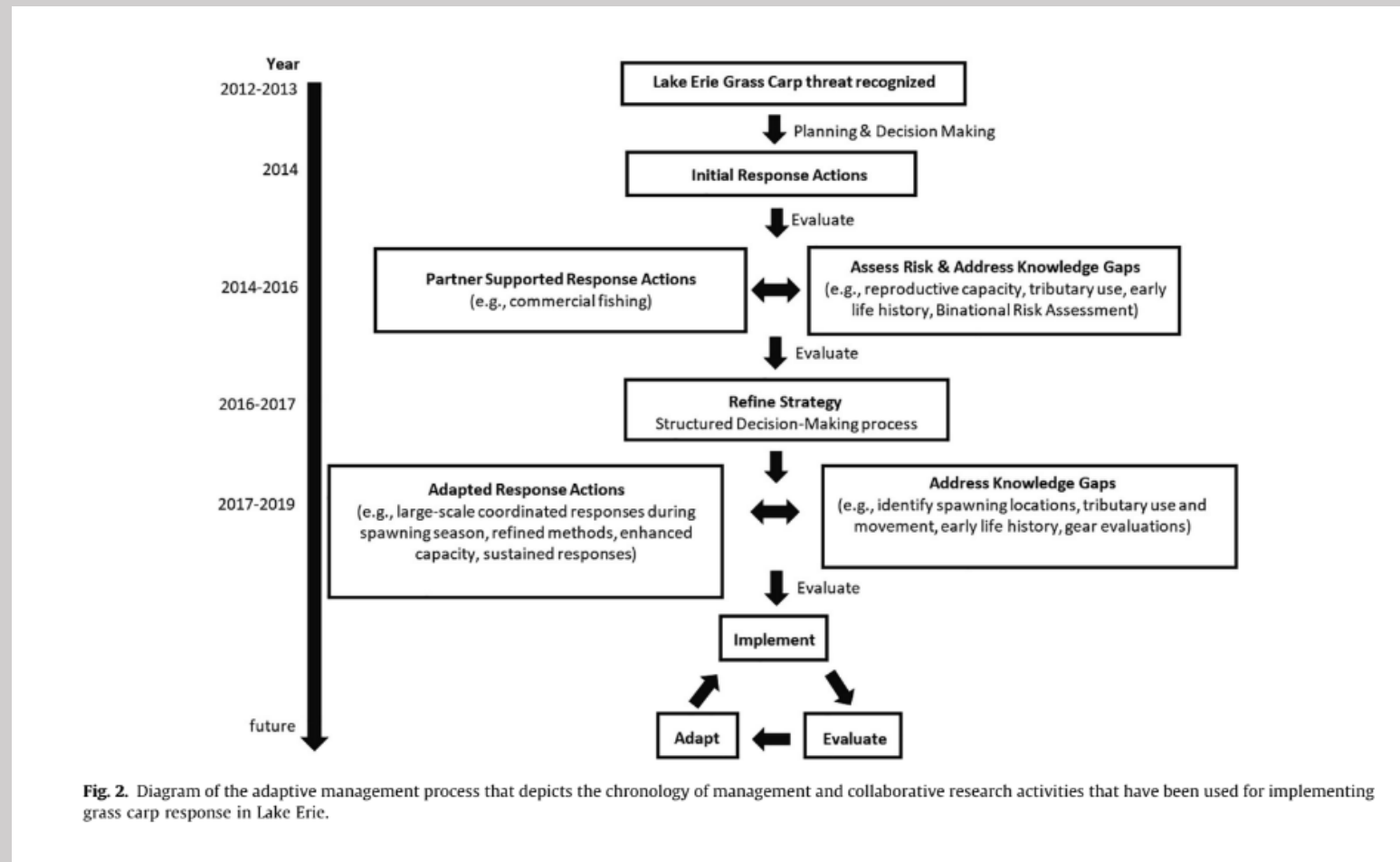


Grass Carp Control in Great Lakes



Grass Carp Control in Great Lakes

- 2012-2018 Confirmed Grass Carp Reproduction
- Management Agencies Coordinate Response
- Removal Strike Teams Deployed



How Do We Catch Grass Carp?

- Initial Methods Based on Work in Other Systems
 - Grass Carp More Abundant in Miss
 - Rare or difficult to find in GL
- Preliminary Trials Focused on Surrogate Species
 - Sparse Data
- SDM process came to consensus to use combo method

Combination Method

Short Trammel Net Sets
with Electrofishing

PRO:
Multiple Opportunities for
Detection (If Fish Present)

CON:
High Bycatch
Long Processing Time
Limited Spatial Coverage



Not All Good Ideas Catch Enough Fish

Bait/Attractants

Large Trap nets

Hoop nets

Passive Trammel Nets

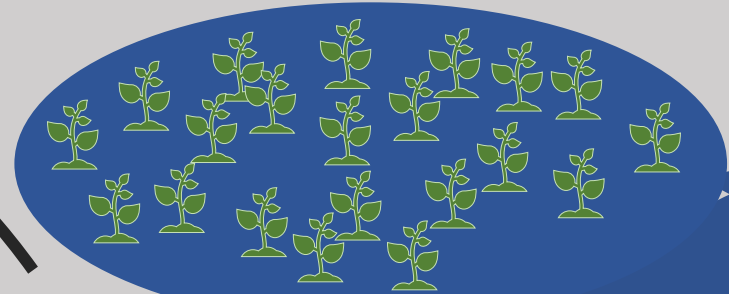
Night vs Day Electrofishing and Combination

Method

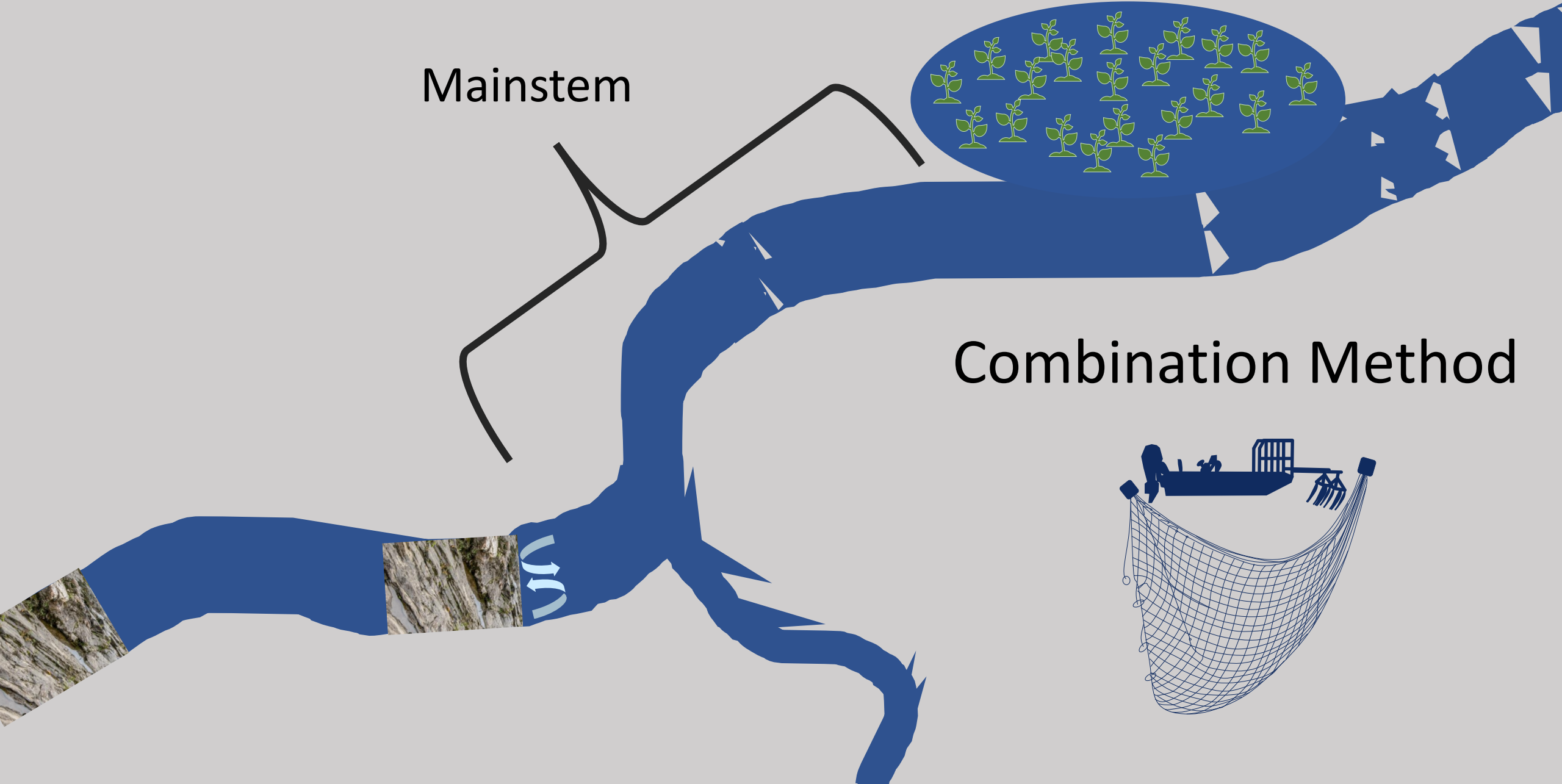
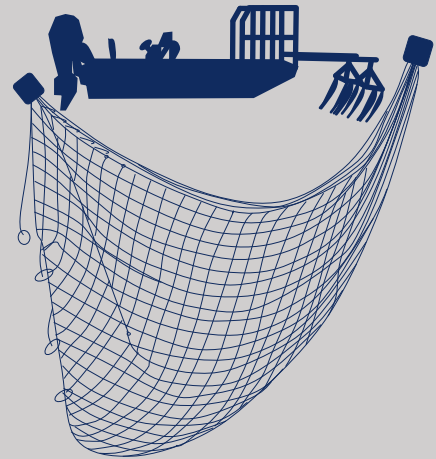
Hunting for Juveniles with a Variety of Gears

Herding with Sound

Mainstem

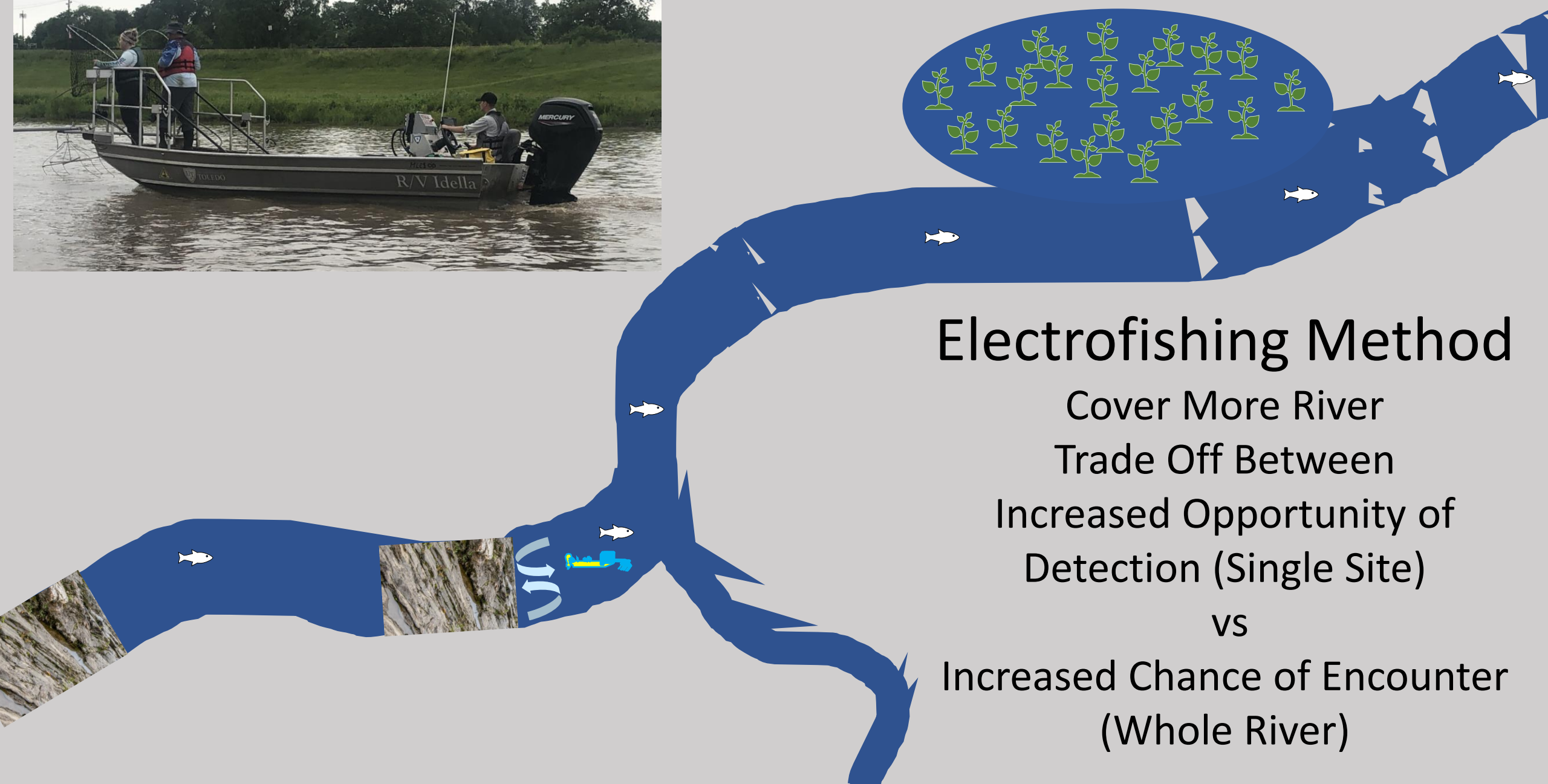


Combination Method





Combination Method
Limited Spatial Coverage
Lots of Bycatch



Electrofishing Method

Cover More River

Trade Off Between

Increased Opportunity of
Detection (Single Site)

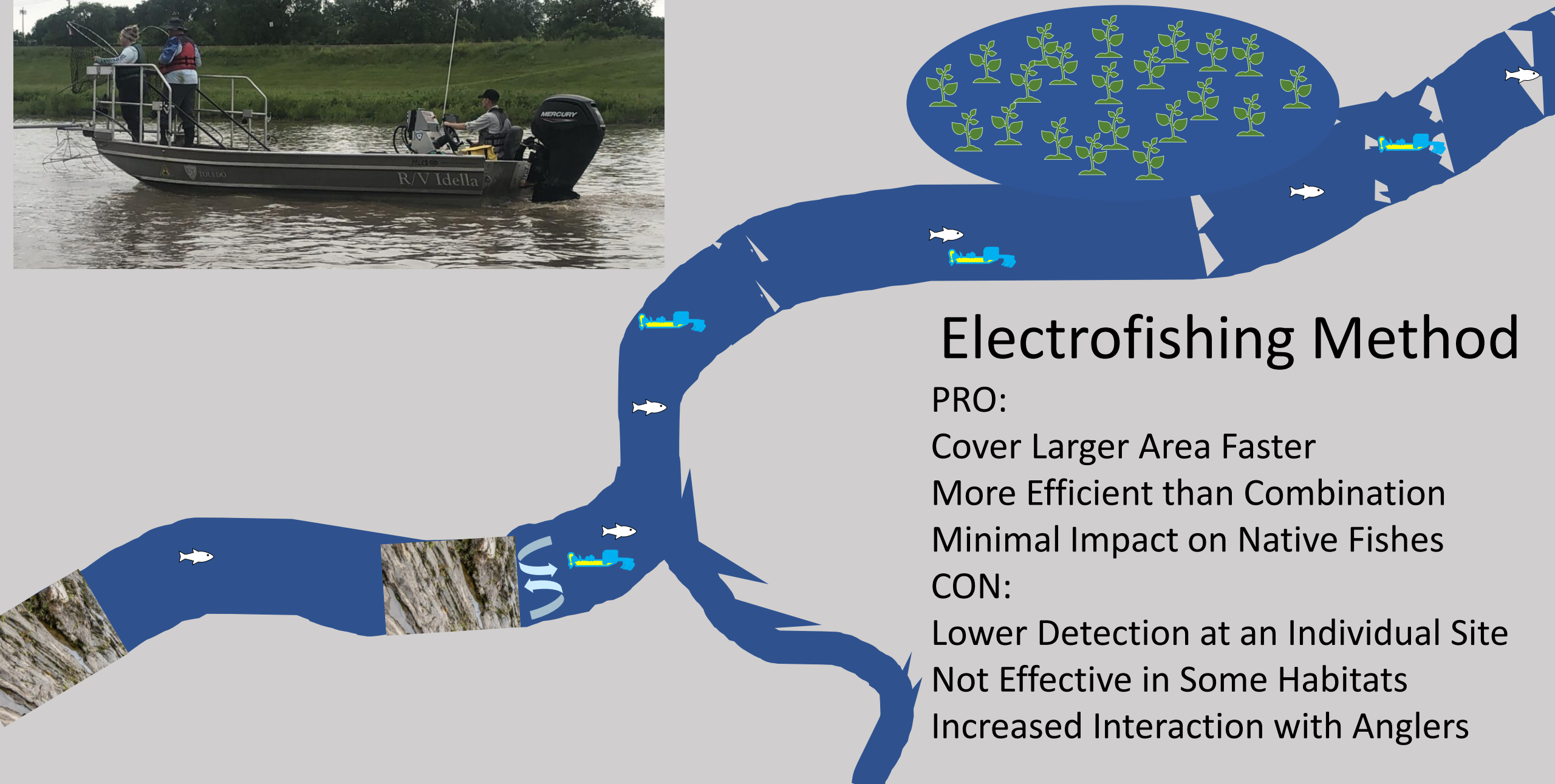
VS

Increased Chance of Encounter
(Whole River)

Electrofishing is More Efficient than Combo

- Bycatch Processing Slows Combination Method
- Electrofishing Without Nets 2.2X More Efficient
- Single Site Detection Not Significantly Different
- Hunter et al, *in review*





Electrofishing Method

PRO:

Cover Larger Area Faster

More Efficient than Combination

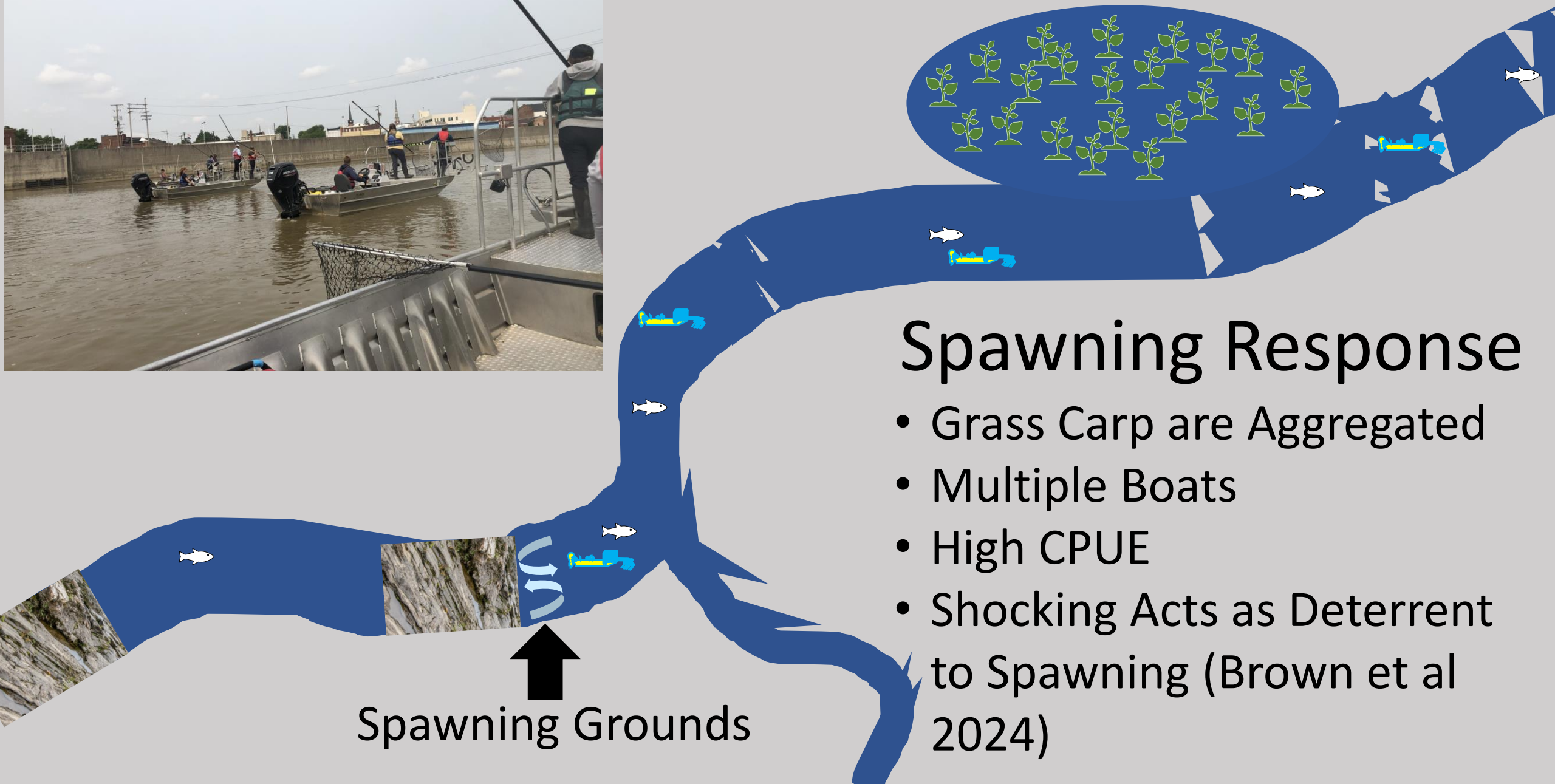
Minimal Impact on Native Fishes

CON:

Lower Detection at an Individual Site

Not Effective in Some Habitats

Increased Interaction with Anglers



Spawning Response

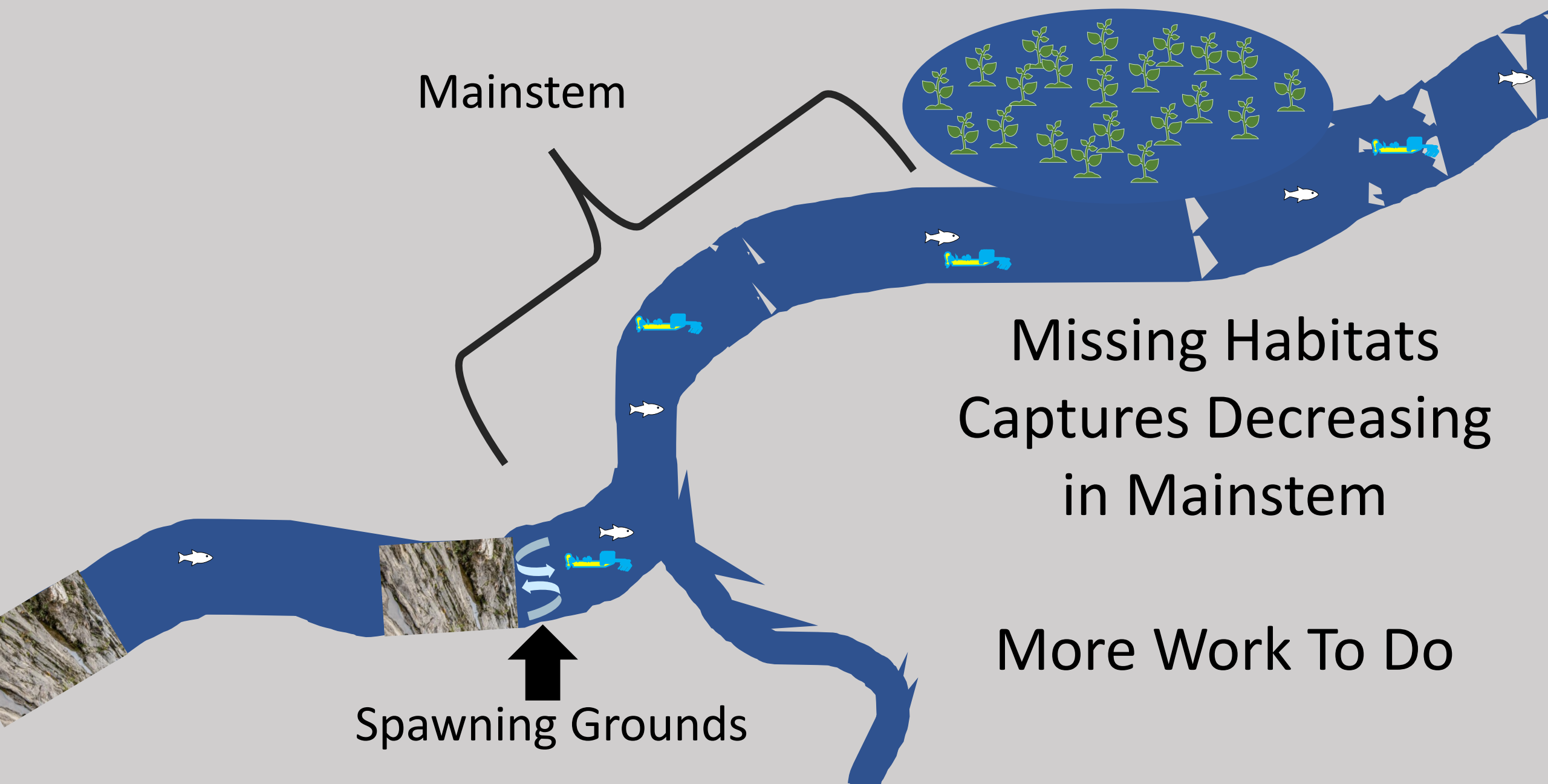
- Grass Carp are Aggregated
- Multiple Boats
- High CPUE
- Shocking Acts as Deterrent to Spawning (Brown et al 2024)



Spawning Response

- Short Duration
- Unpredictable
- Not Every Year

Spawning Grounds



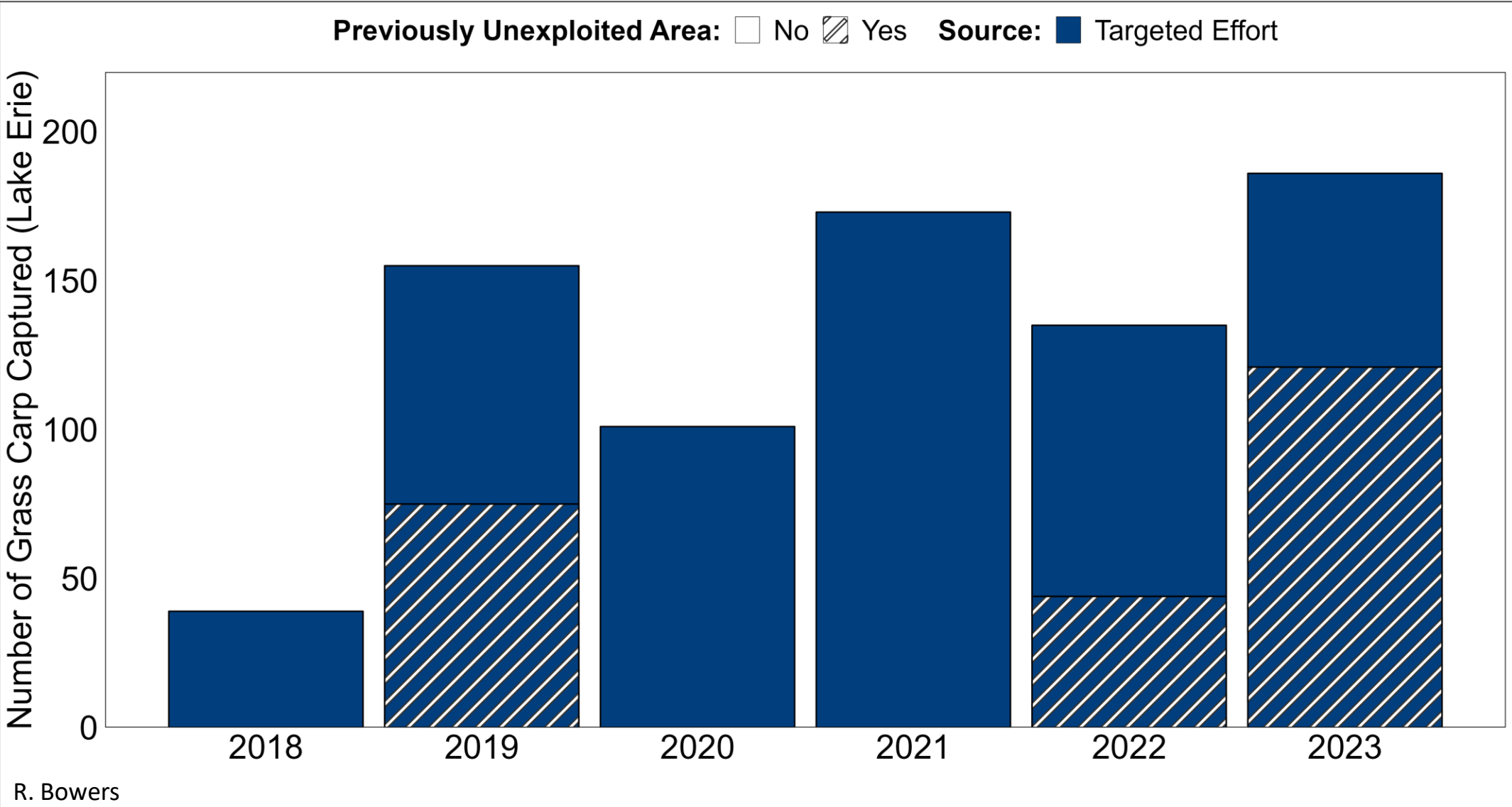
Mainstem

Missing Habitats
Captures Decreasing
in Mainstem

More Work To Do

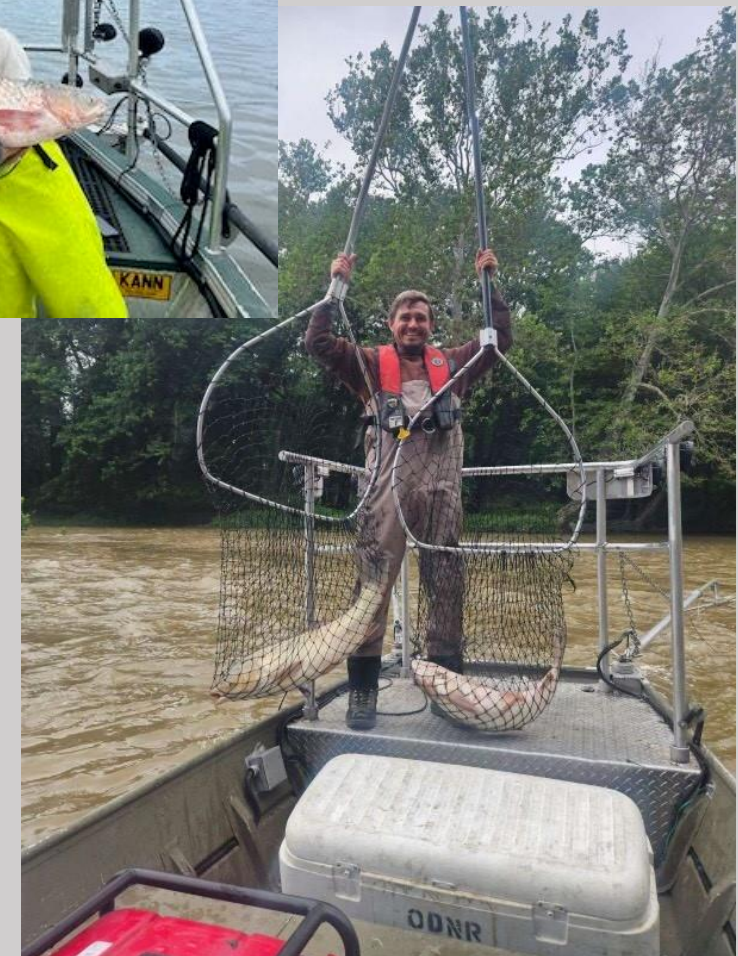
Spawning Grounds

Catch Numbers Maintained by New Areas



Dense Pockets of Fish in Pools Between Rapids

- Crews Found Dense Pockets of Grass Carp in Both Maumee and Sandusky
 - Staging Behavior?
 - Trapped at Certain Water Levels?
- Difficult Habitat to Sample
 - Shallow
 - Boulders
 - Access

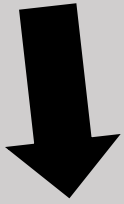


Inflatable Rafts Access More Habitats

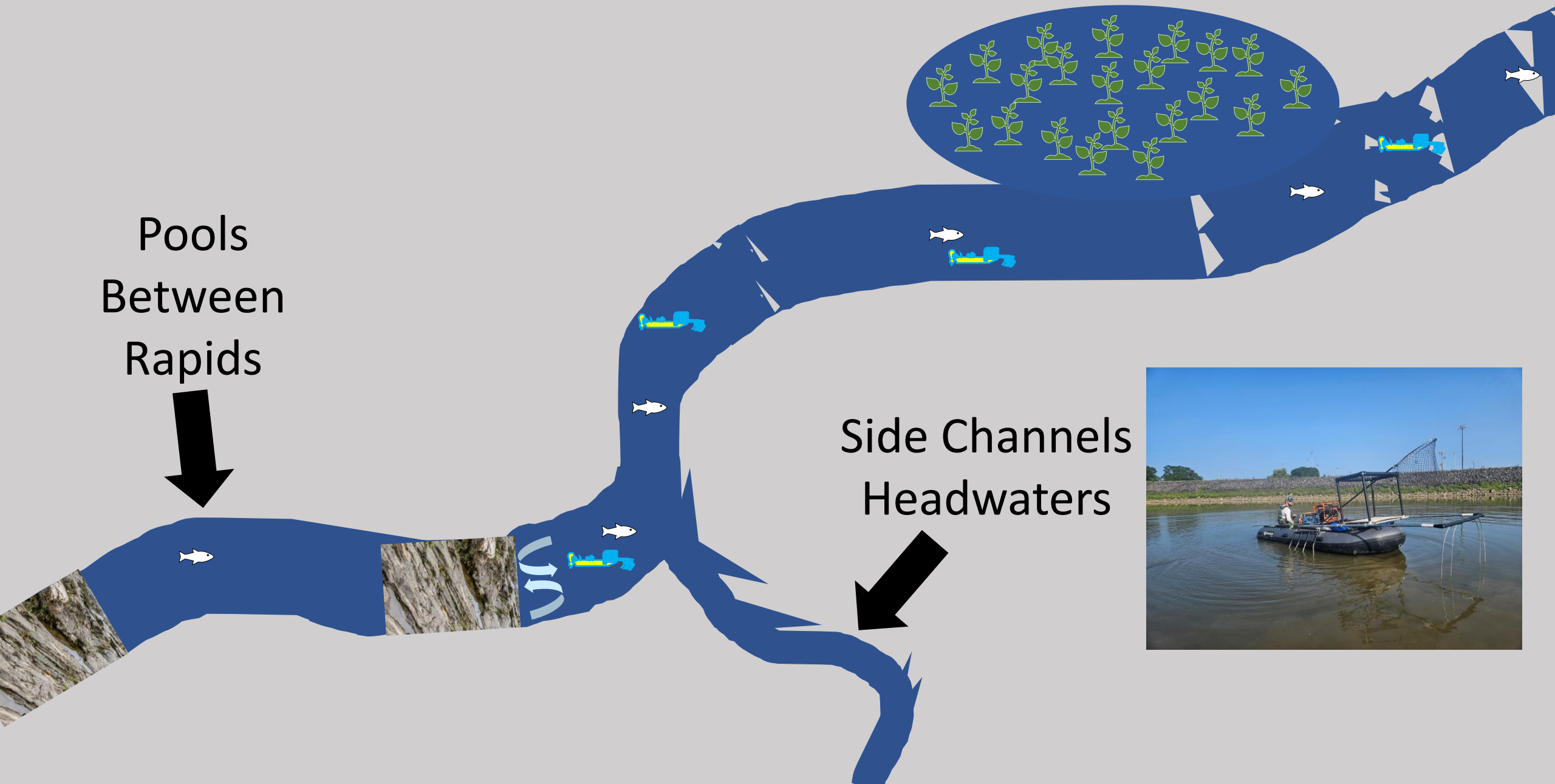
- More Maneuverable in Smaller Water
- Withstand Boulders and Other Hazards
- Cross Rapids, Increase Accessible Habitats
- Limited Deployment but Promising So Far

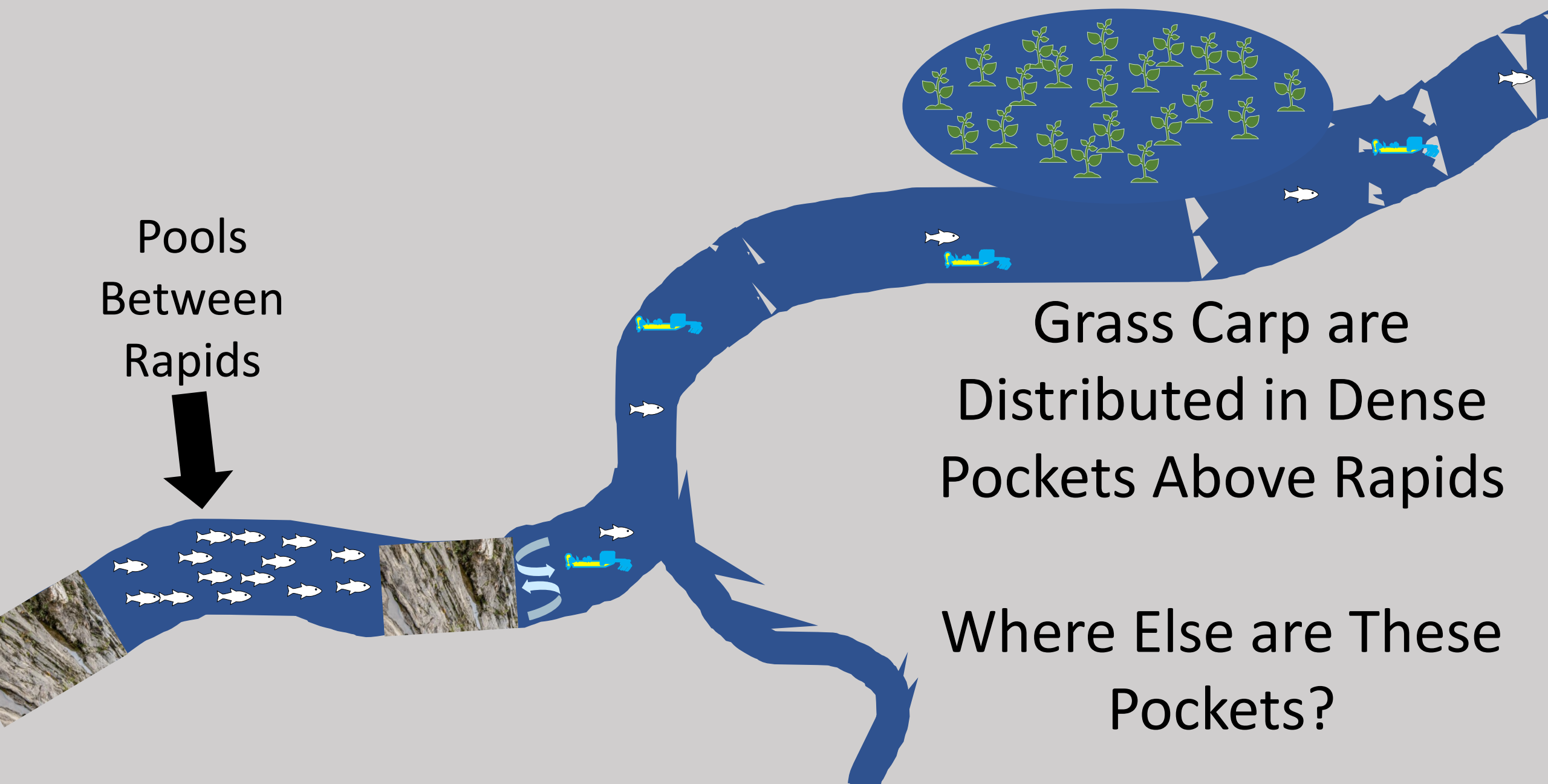


Pools
Between
Rapids

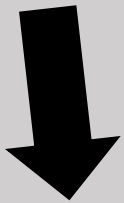


Side Channels
Headwaters



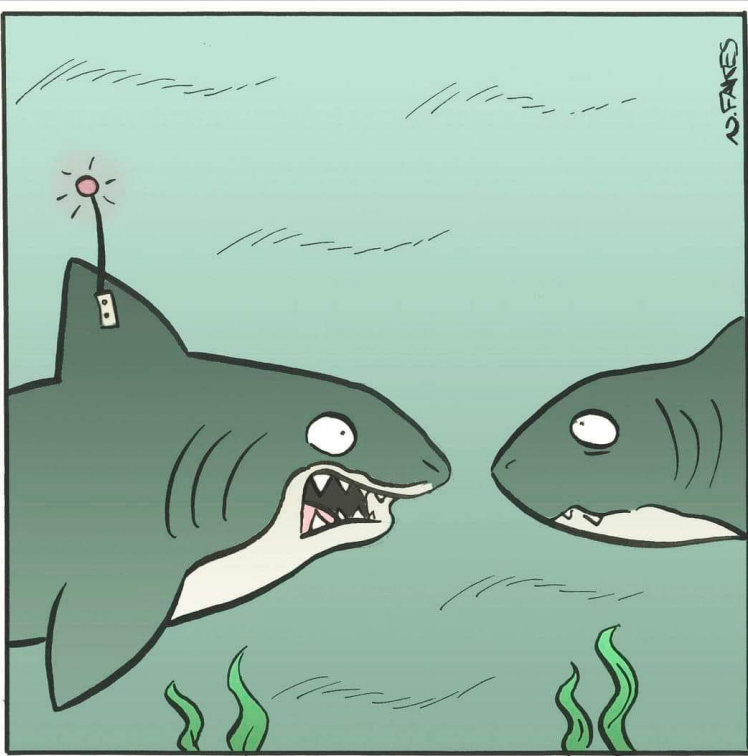


Pools
Between
Rapids

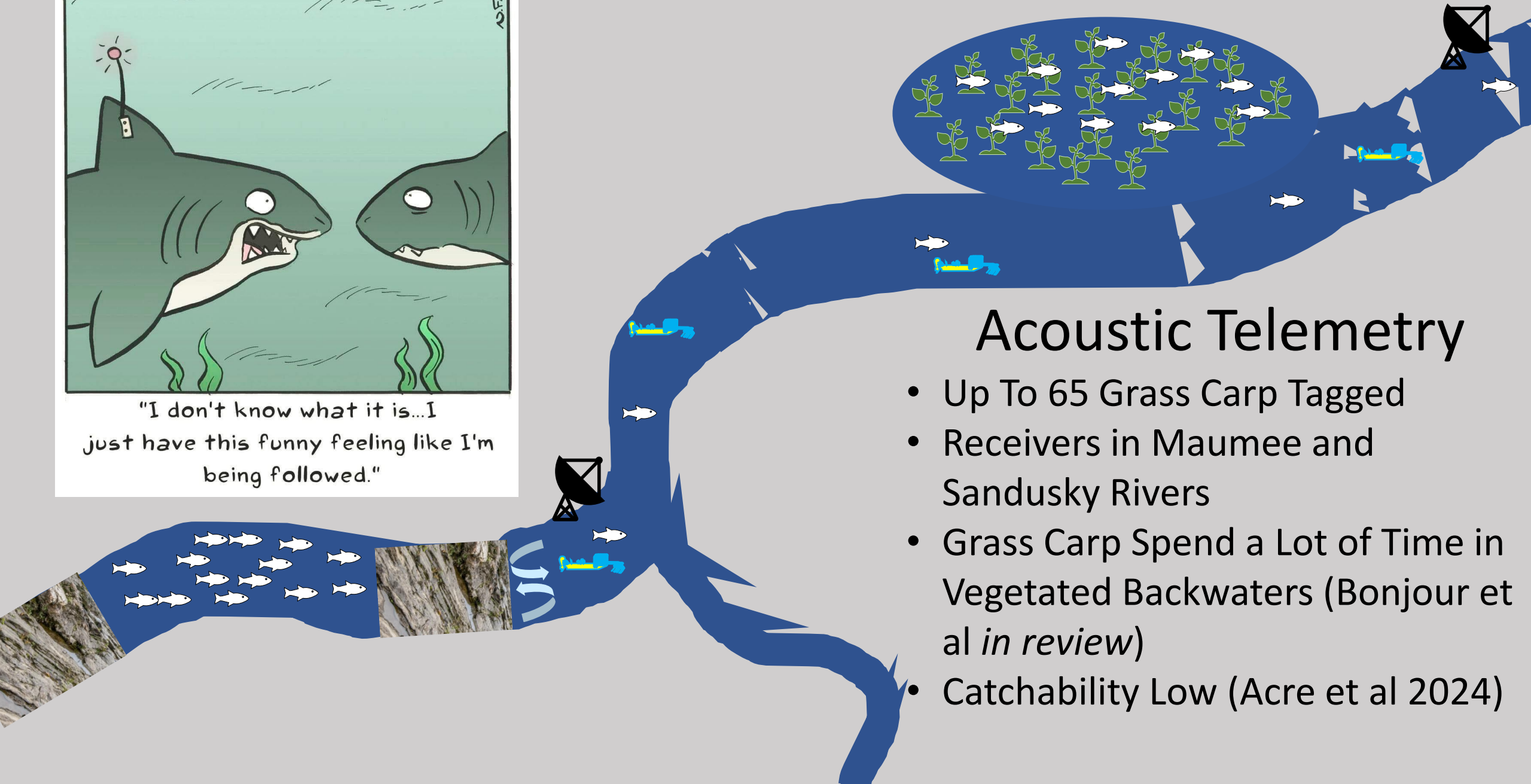


Grass Carp are
Distributed in Dense
Pockets Above Rapids

Where Else are These
Pockets?



"I don't know what it is...I just have this funny feeling like I'm being followed."

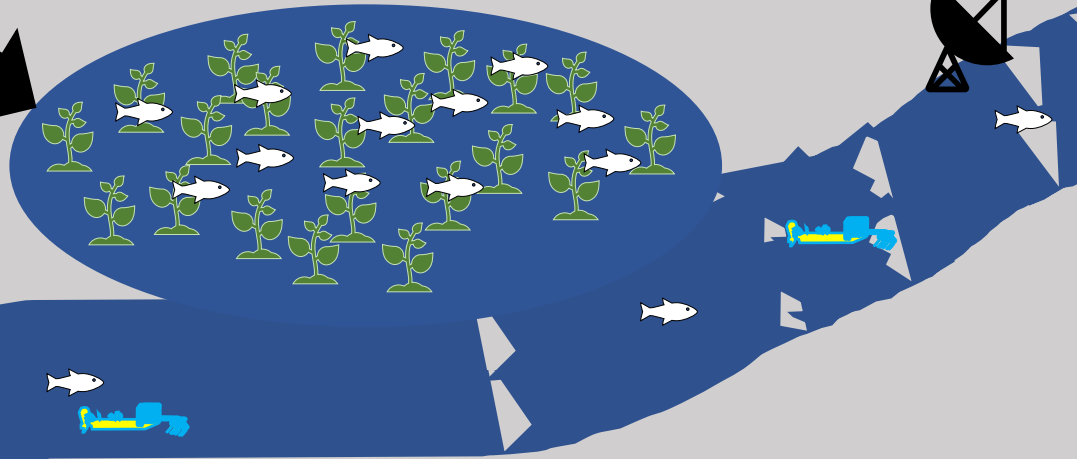


Acoustic Telemetry

- Up To 65 Grass Carp Tagged
- Receivers in Maumee and Sandusky Rivers
- Grass Carp Spend a Lot of Time in Vegetated Backwaters (Bonjour et al *in review*)
- Catchability Low (Acre et al 2024)



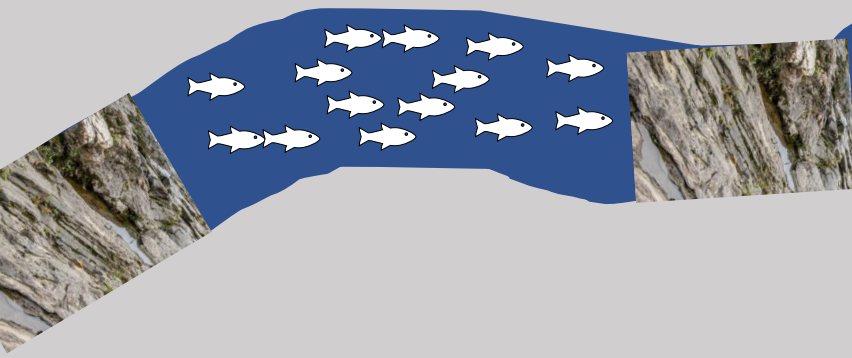
Vegetated
Backwaters



Grass Carp Spend a Lot of
Time in Vegetated
Backwaters

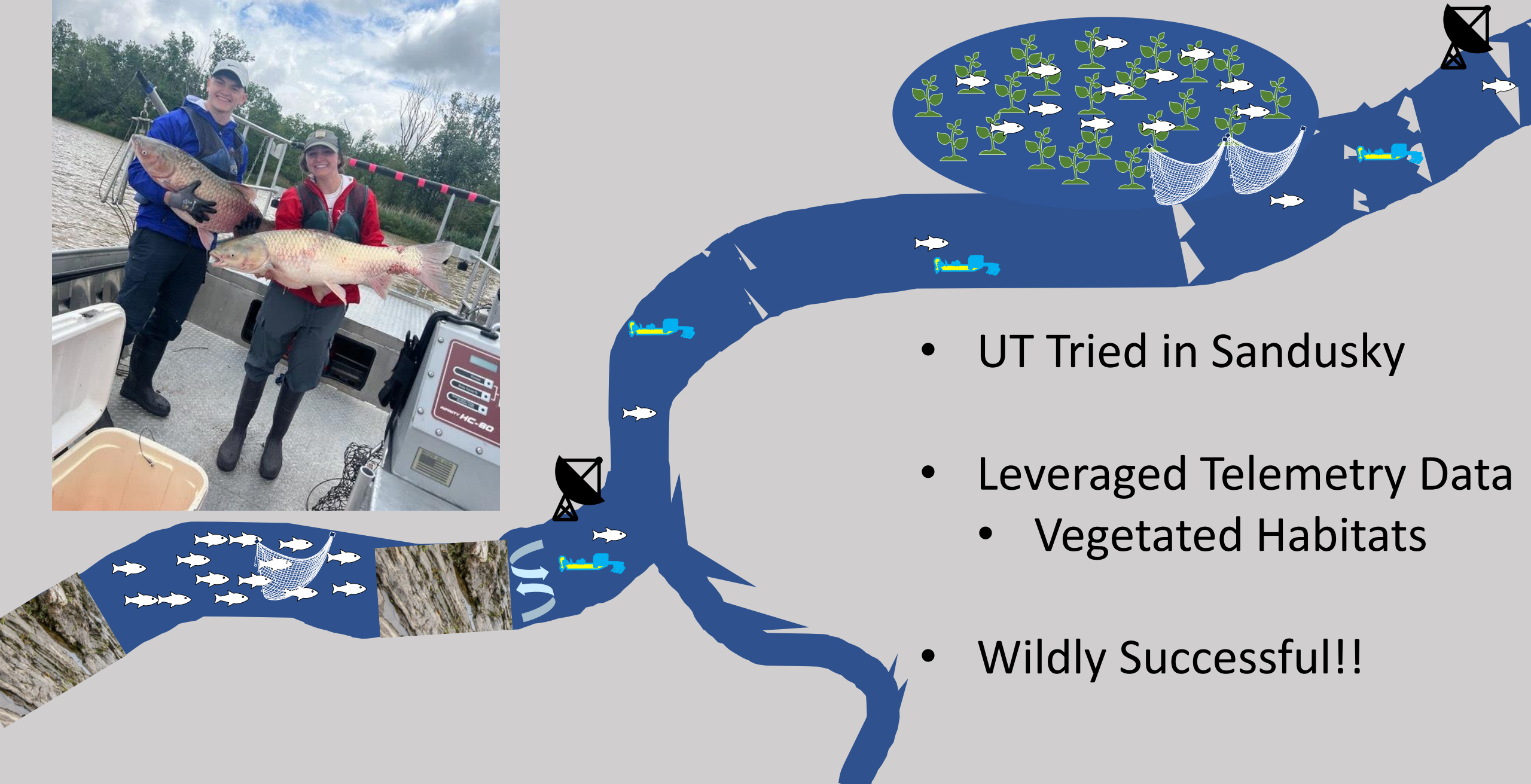
Diurnal Movements

Low Catchability

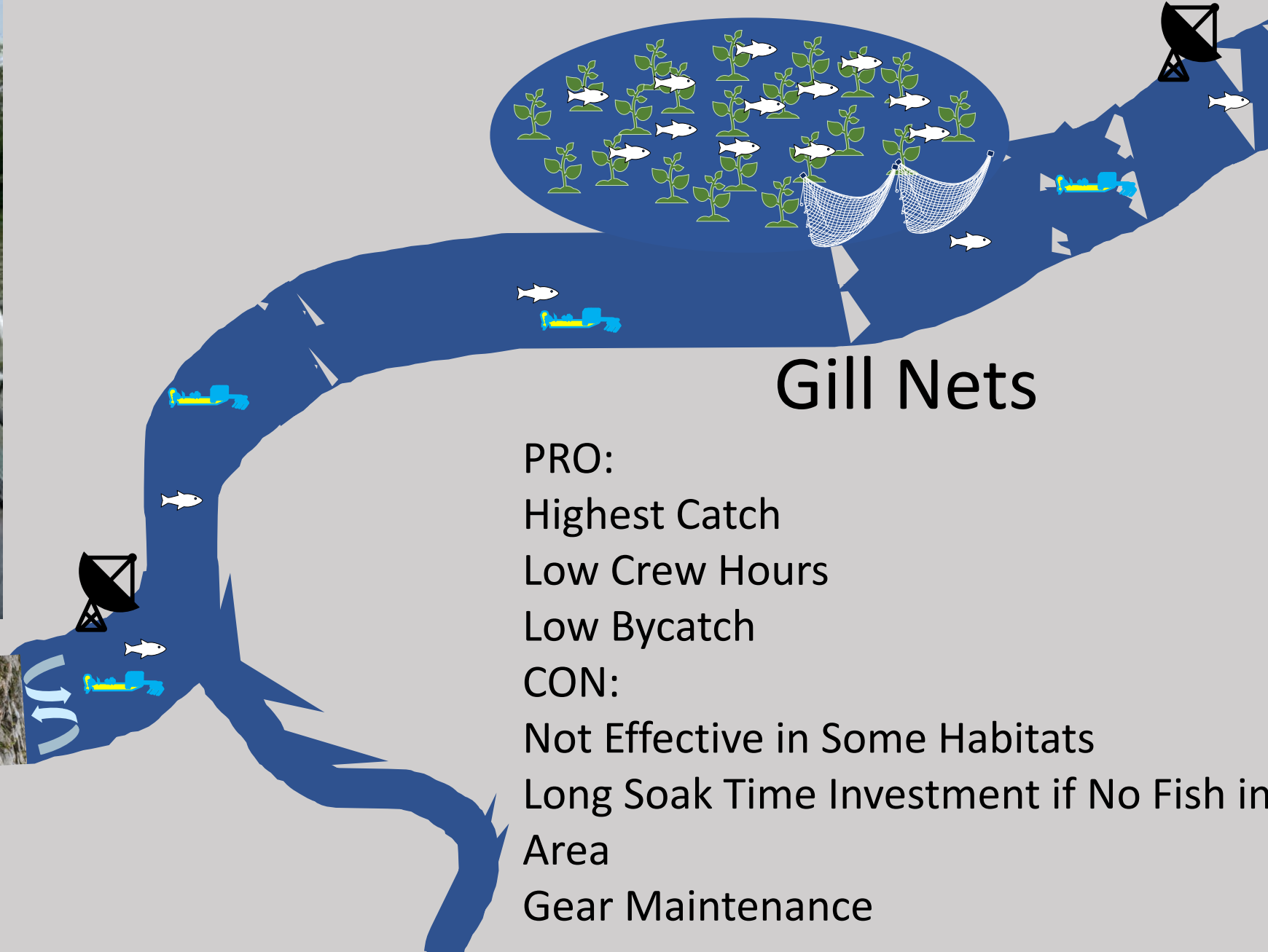
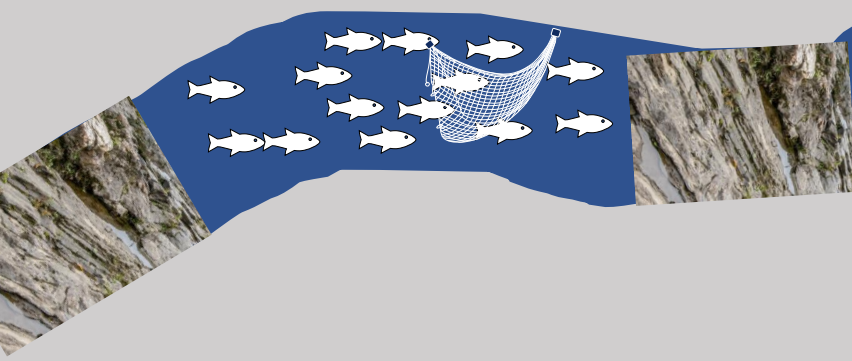




- USFWS Tried Passive Overnight Gill Net Sets
- Known Pocket in Maumee
- Wildly Successful!!



- UT Tried in Sandusky
- Leveraged Telemetry Data
 - Vegetated Habitats
- Wildly Successful!!



Gill Nets

PRO:

Highest Catch

Low Crew Hours

Low Bycatch

CON:

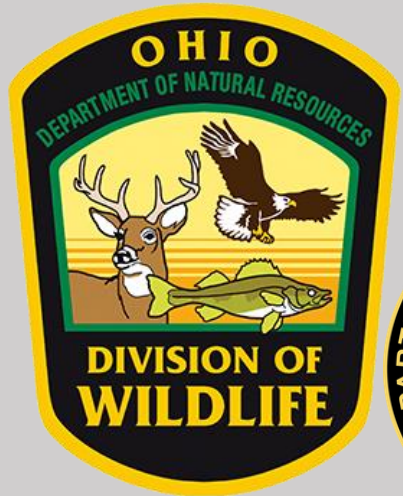
Not Effective in Some Habitats

Long Soak Time Investment if No Fish in Area

Gear Maintenance

How Do We Continue to Improve with Low Catches?

- Leverage Different Data Streams
 - Telemetry
 - Early Life History
 - Habitat Maps
 - Diet
- Explore Different Habitats and Capture Methods
 - Accessibility
 - Creativity



Questions?