



ASSESSING TIDAL ROAD CROSSINGS IN THE SOUTH ATLANTIC

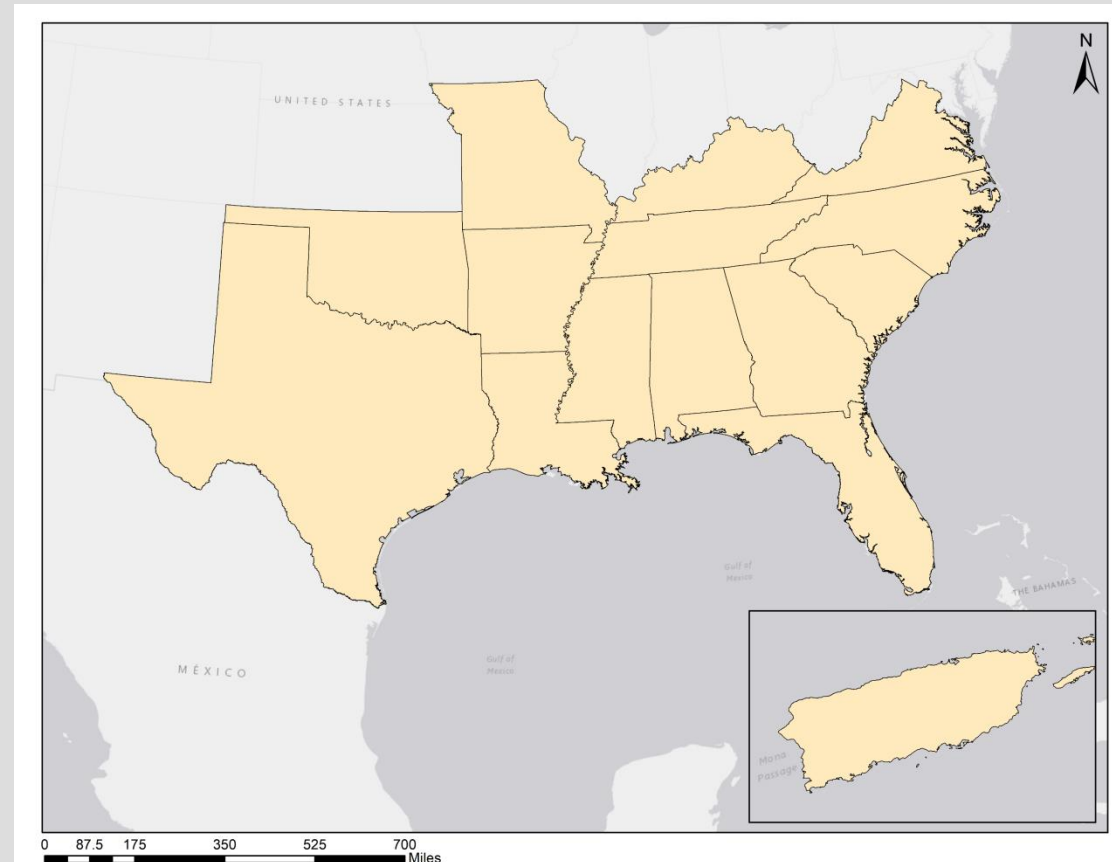
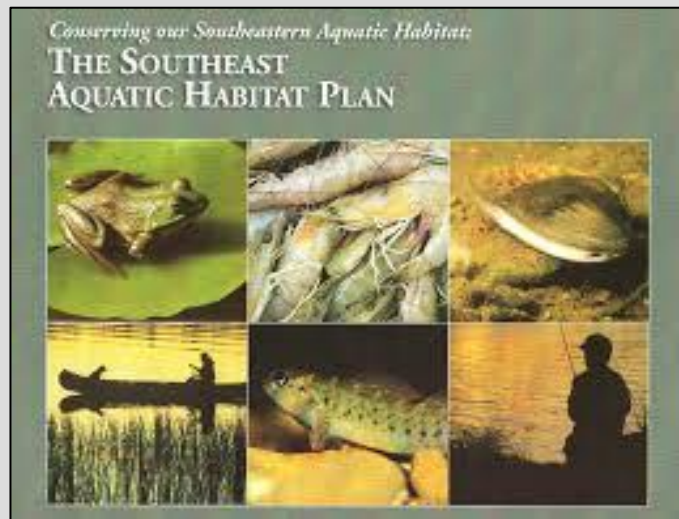


Kat Hoenke, GIS
Coordinator

SOUTHEAST AQUATIC RESOURCES PARTNERSHIP

Mission

SARP will, with partners, protect, conserve and restore aquatic resources including habitats throughout the Southeast for the continuing benefit, use and enjoyment of the American people.



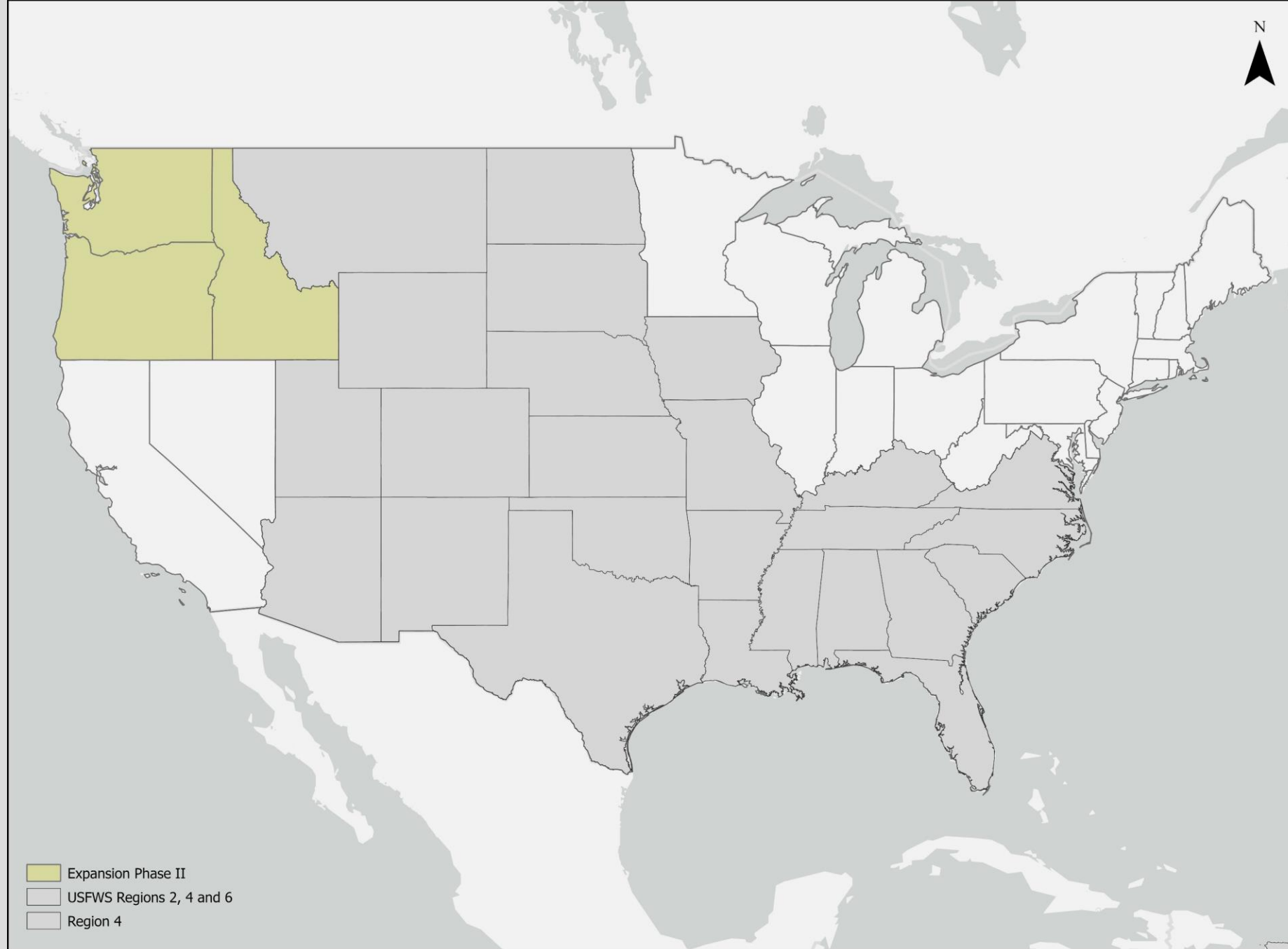
SARP CONNECTIVITY PROGRAM



Inventory

Prioritization

Connectivity
Teams



0 180 360 720 1,080 1,440 Miles

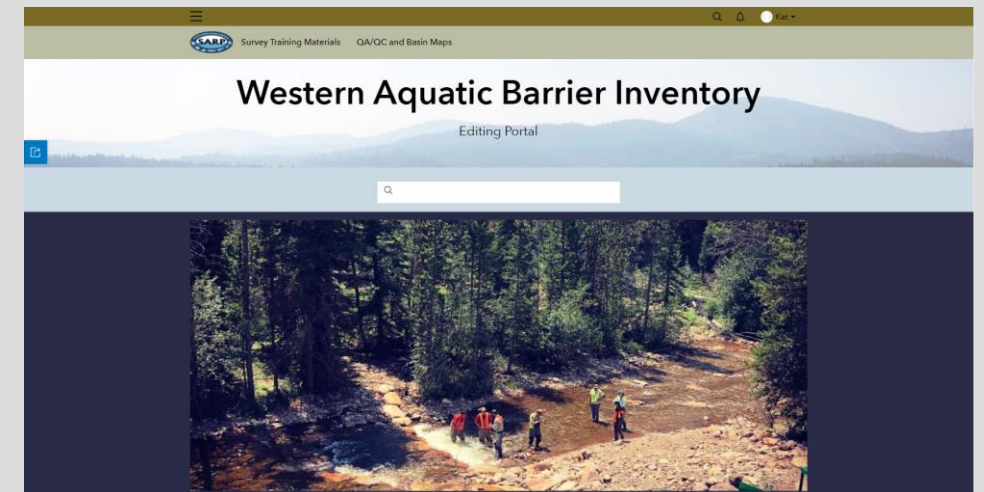
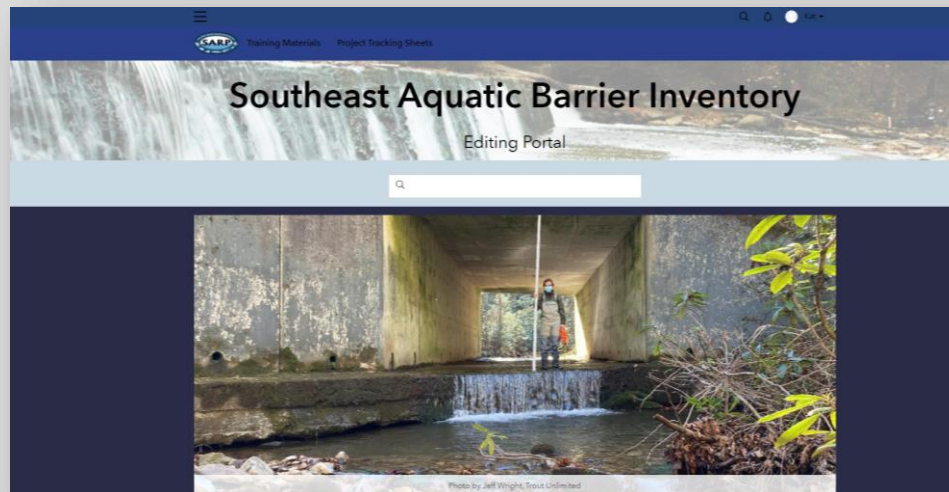
SARP CONNECTIVITY PROGRAM

Inventory

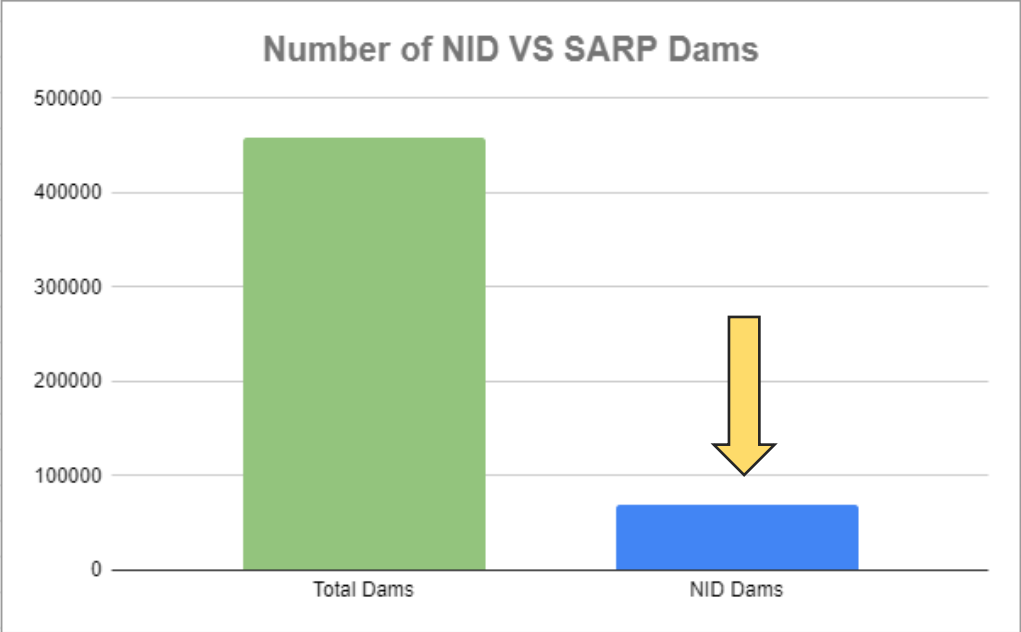
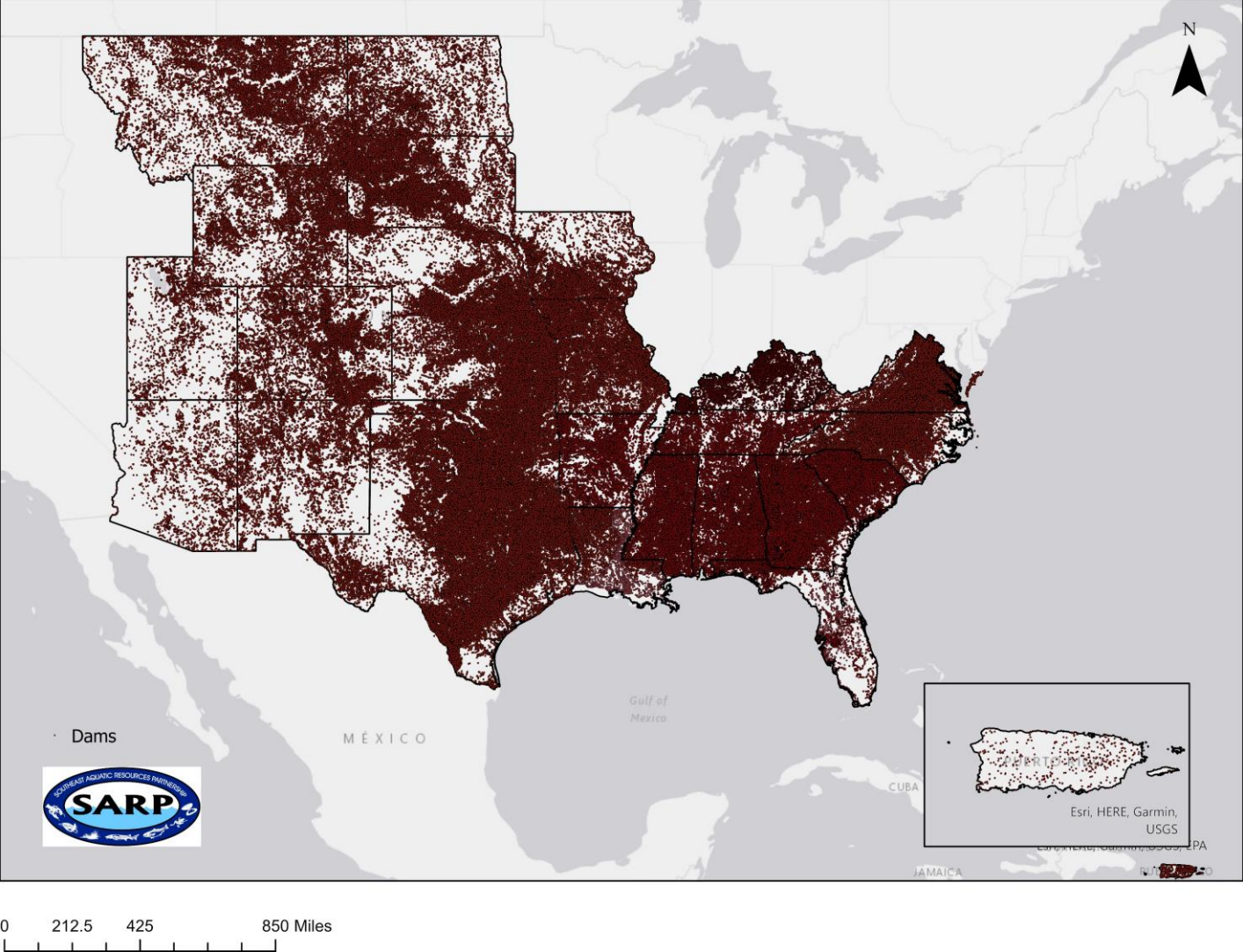
Dams

Road Crossings

Waterfalls



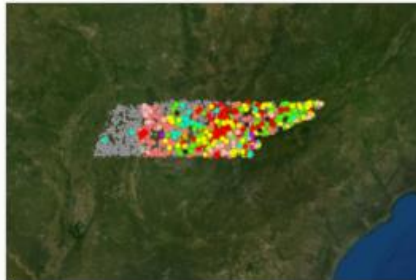
Dams





Aquatic Barrier Prioritization Tool

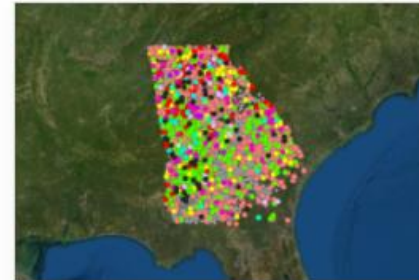
Instructions to Edit Barriers in Each Webmap: 1) Click on the appropriate box below. 2) When the map opens, select "I want to use this." 3) Then, click "Open in ArcGIS online." 4) Now, you will be able to edit individual points. If performing social feasibility reconnaissance, click below to read instructions.

[Read Dam Recon Instruction Manual](#)

01 Tennessee Aquatic
Connectivity Team Map



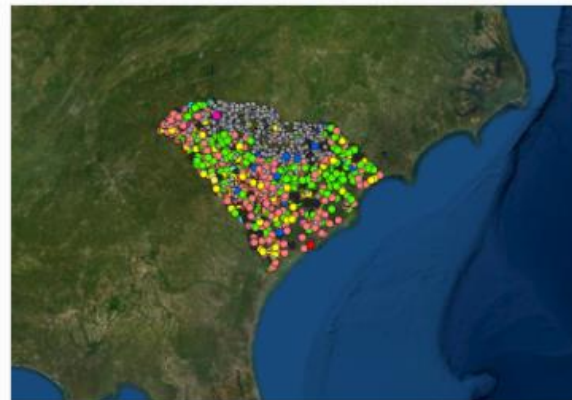
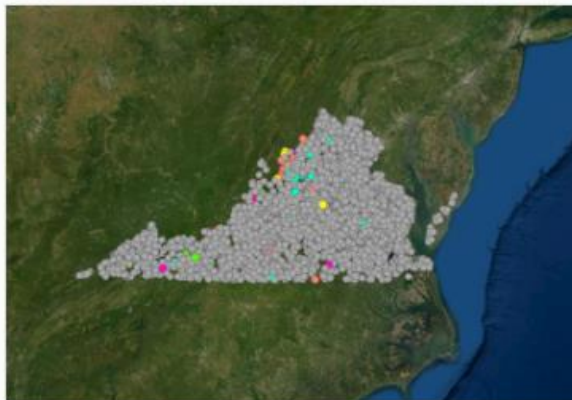
02 North Carolina Aquatic
Connectivity Team Map



03 Georgia Aquatic
Connectivity Team Map



04 Arkansas Stream
Heritage Partnership...



 modify area of interest

Filter dams

7,998 selected

[OPTIONAL] Use the filters below to select the dams that meet your needs. Click on a bar to select dams with that value. [Show more ...](#)

 The following filters do not have sufficient unique values to support using them in this area: Trout presence / absence, SARP conservation opportunity areas.

► Feasibility & Conservation Benefit

► Miles Gained

► Dam Height

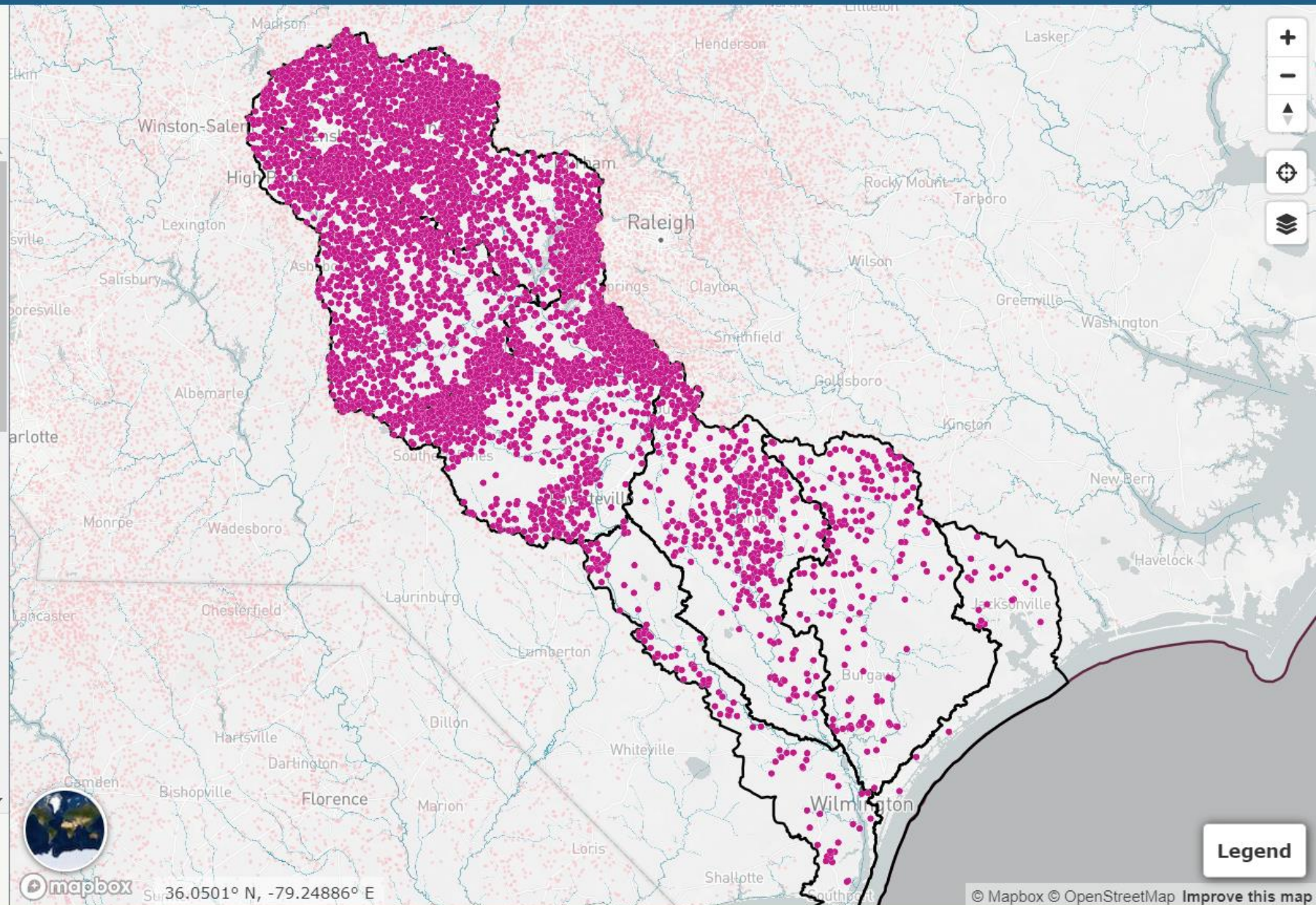
► Number of Federally-Listed Threatened & Endangered Species

► Number of State-listed Species of Greatest Conservation Need

► Stream Order (NHD modified)



 Prioritize dams

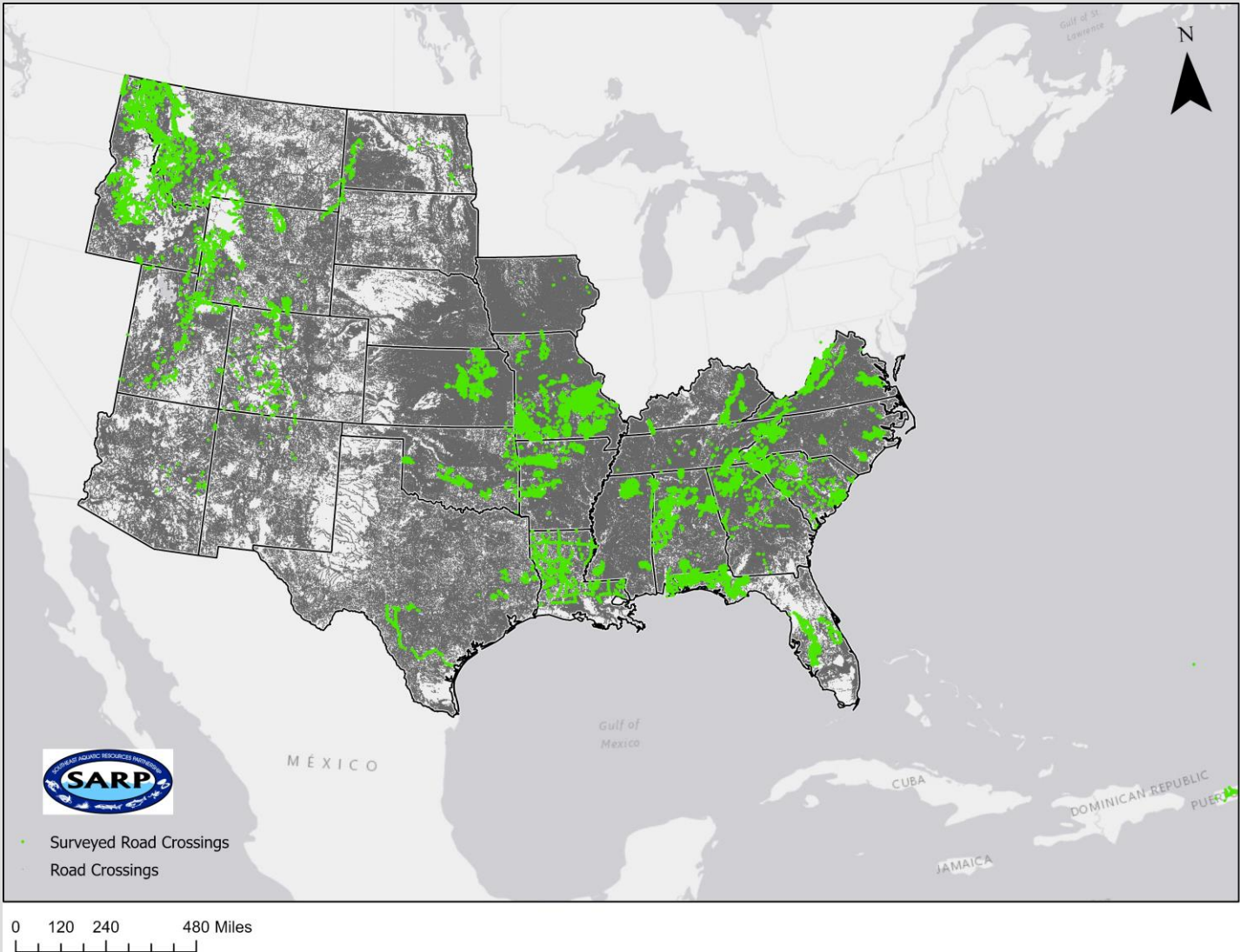


Legend

© Mapbox © OpenStreetMap [Improve this map](#)

Road Crossings

- 37,801 assessed
- 46% are barriers



Severity	Number	Percent
No Barrier	20222	53%
Moderate Barrier	1536	4%
Barrier Non-Specific	11784	31%
Major Barrier	4259	11%

[Details](#) [Add ▾](#) | [Edit](#) [Basemap](#) | [Analysis](#)

[Save ▾](#) [Share](#) [Print ▾](#) | [Directions](#) [Measure](#) [Bookmarks](#)

[About](#) [Content](#) [Legend](#)

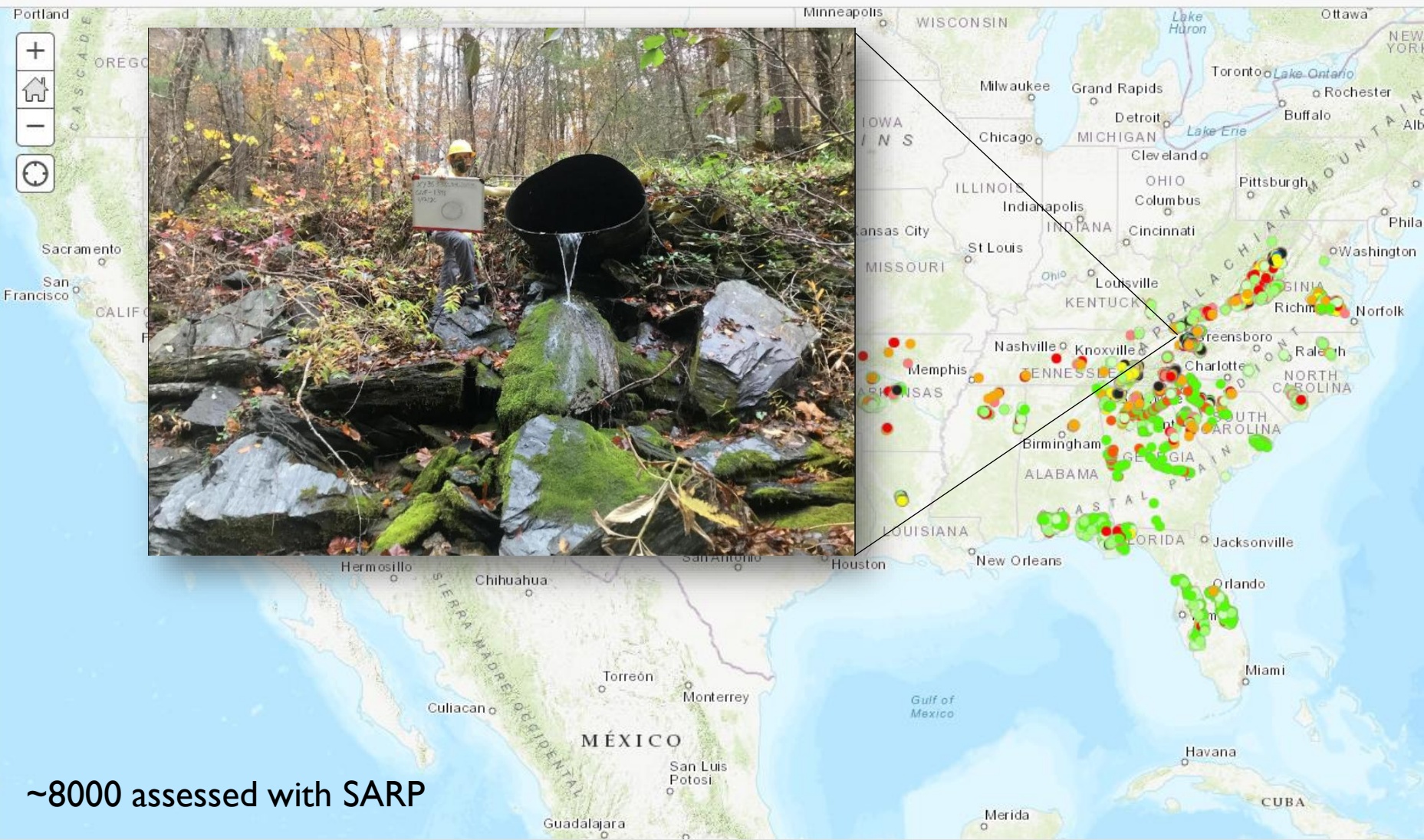
Legend

05012019 SARP AOP Stream Crossing Survey Protocol

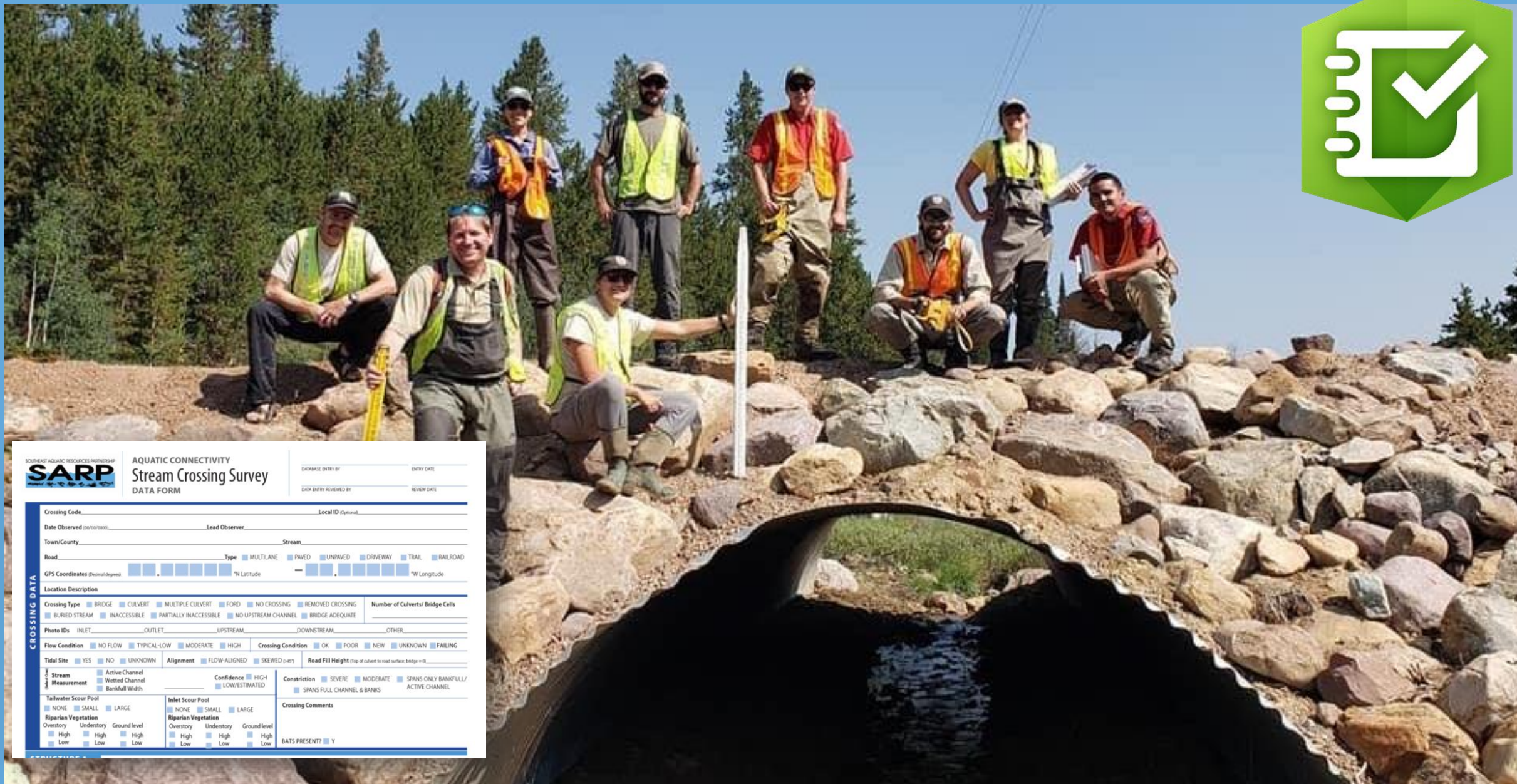
- Severe Barrier
- Minor Barrier
- No Upstream Channel
- Insignificant Barrier
- No Barrier
- Moderate Barrier
- Significant Barrier
- No Crossing
- Inaccessible
- Not Scored
- Buried Stream

SARP AOP Coarse Survey Form

- No Drop
- Severe Drop
- Significant Drop
- Minor Drop
- Insignificant Drop
- Moderate Drop



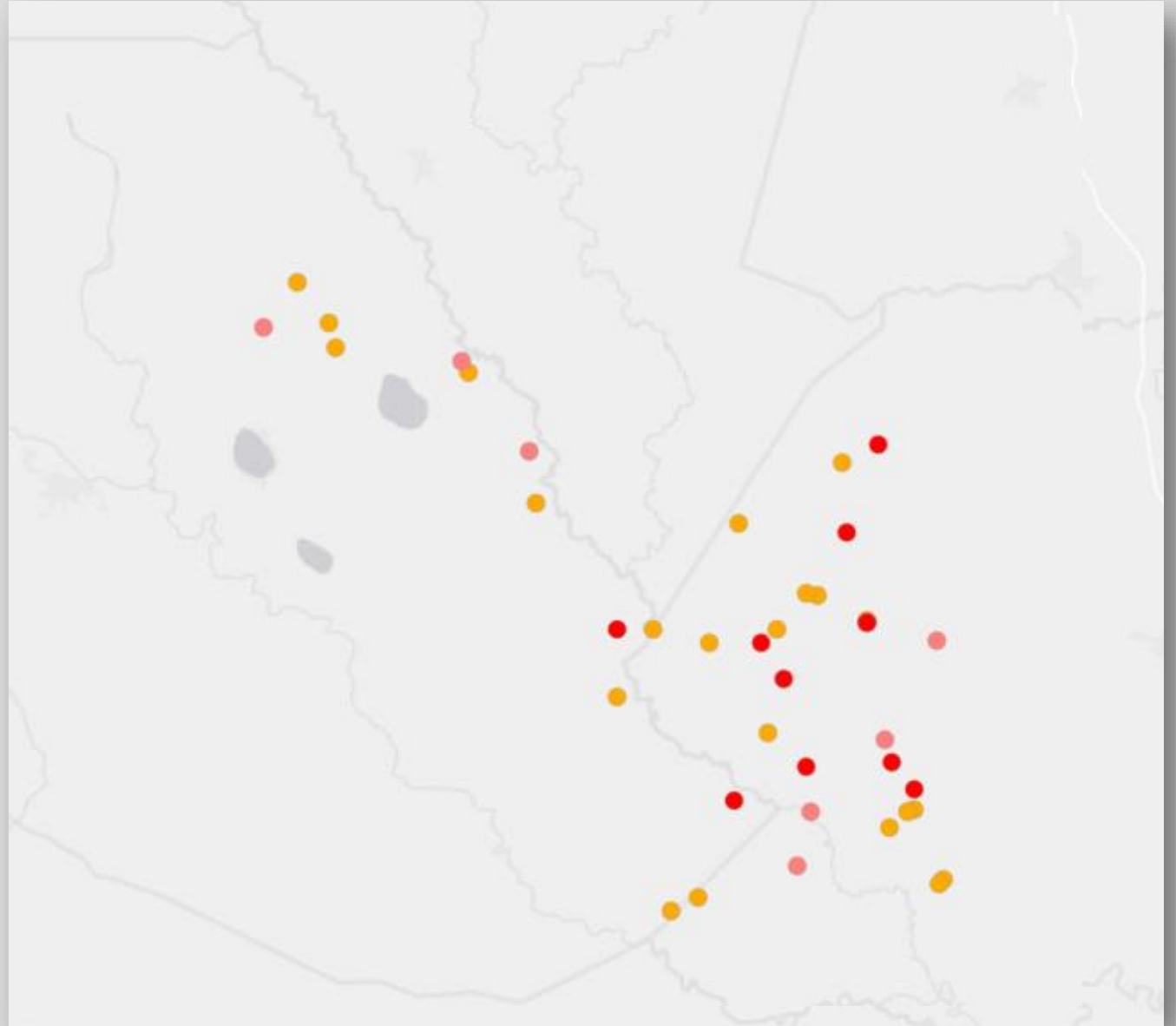
~8000 assessed with SARP



Bear River training

NON-TIDAL AOP IN BLACK RIVER

- Over 200 culverts assessed with non-tidal protocol
- >30 are moderate – severe barriers



NAACC TIDAL

Focuses on:

- Constriction
- Tidal Constriction
- Perch
- Tide Gates
- Physical Barriers

Metric	Flow Condition	Crossing Classification			
		Good AOP <i>If all are true</i>	Moderate AOP <i>If not RED or Orange and any are true</i>	Poor AOP <i>If not RED and any are true</i>	No AOP <i>If any are true</i>
Constriction ratio		≥ 1.5	≤ 1.5		
Tidal constriction		≥ 1.0	≤ 1.0		
Water depth	High tide	≥ 1.0	0.4 – 0.99	< 0.4	
Inlet perch	Low tide	0 ft.	≤ 1.0 ft.		
Inlet perch	High tide	0 ft.	0 ft.	$0 < x < 2.5$ ft.	> 2.5 ft.
Outlet perch	Low tide	0 ft.	< 0.25 ft.		
Outlet perch	High tide	0 ft.	0 ft.	$0 < x < 2.5$ ft.	> 2.5 ft.
Tide gate barrier severity		No tide gate	Minor or moderate	Severe	No aquatic passage
Other physical barrier severity		No barrier	Minor or moderate	Severe	No aquatic passage

DETAILED SCORING

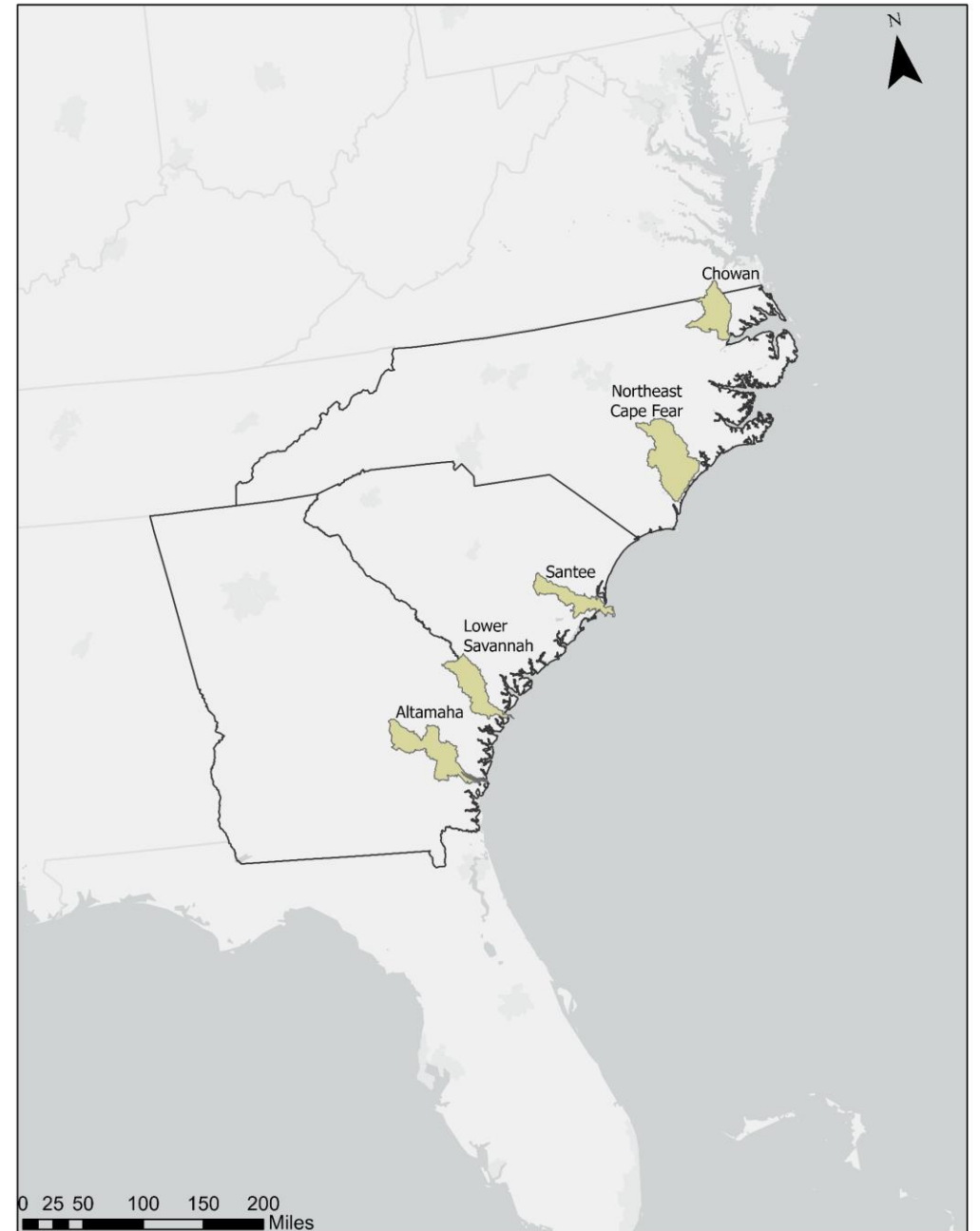
- Limiting Factors:
 - Perch
 - Physical Barriers
 - Tide Gates

Variable	Salt marsh creek	Salt/brackish flow-through river/stream	Freshwater tidal river/stream
Constriction ratio	11.84	14.93	18.18
Tidal constriction	19.58	20.04	10.49
Vegetation change: upstream vs. downstream	14.32	8.07	4.90
Water depth at high tide	2.41	2.55	2.45
Downstream scour	5.84	6.22	6.64
Upstream scour	5.84	6.22	4.90
Inlet perch at low tide	3.51	5.45	5.94
Outlet perch at low tide	9.81	10.95	11.19
Inlet armoring	4.01	1.47	3.15
Outlet armoring	3.53	1.11	4.20
Crossing openness	9.97	9.51	16.08
Substrate comparability	4.88	7.31	5.94
Substrate coverage	4.47	6.18	5.94
Total	100	100	100

Step 4: Limiting Variables. A limiting variable is one that is so important that its score should take precedence if it is lower than the composite score (weighted average). Limiting variable were identified by consensus of the Technical Advisory Committee. All three tidal crossing types have the same four limiting variables.

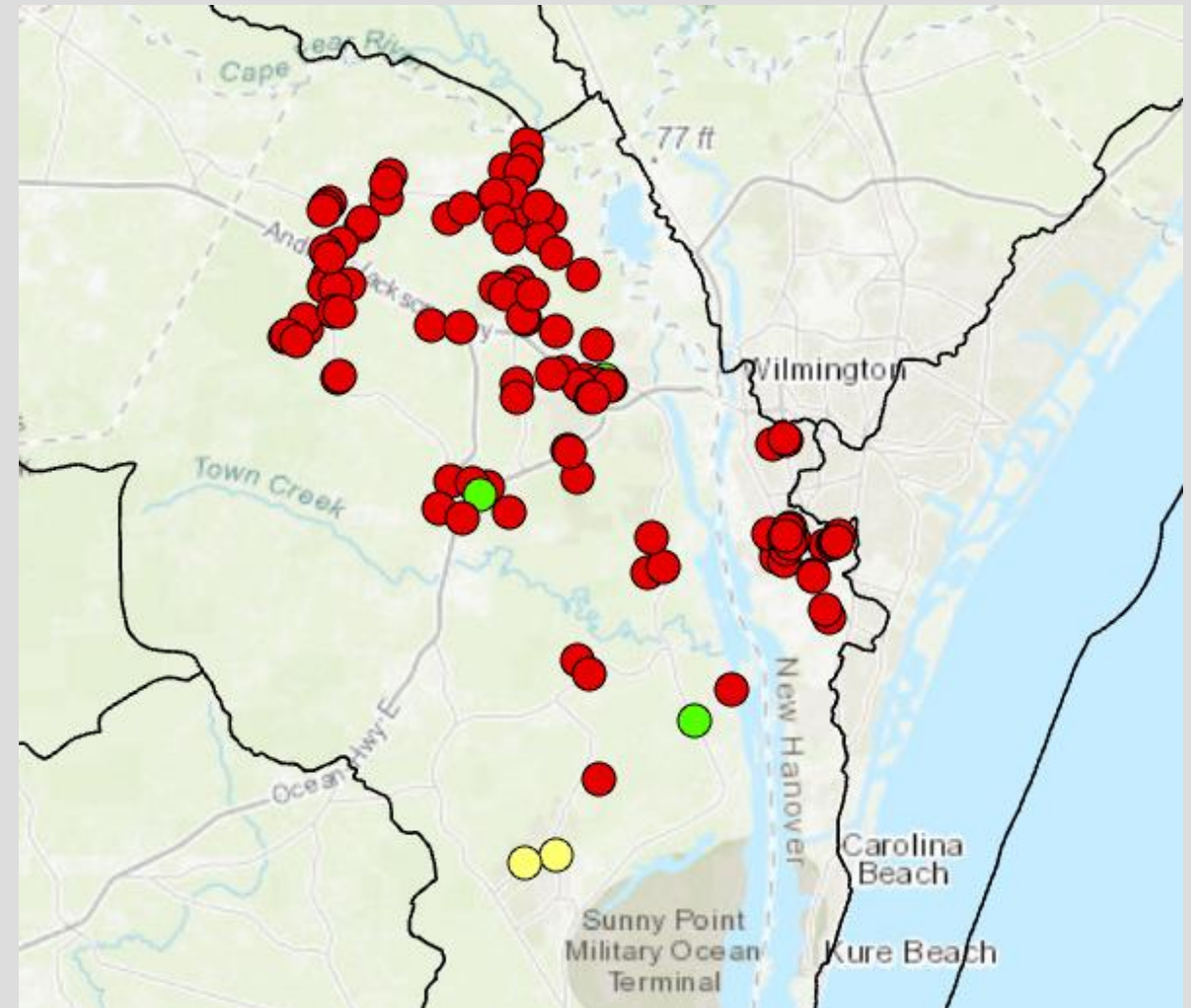


- Funded to collect data using tidal protocol at ~200 sites in 5 basins.
 - Lower Cape Fear
 - Chowan
 - Santee
 - Lower Savannah
 - Altamaha
- Use flood model data from TNC to predict constriction at crossing sites to plan surveys
- Prioritize top barrier sites for remediation



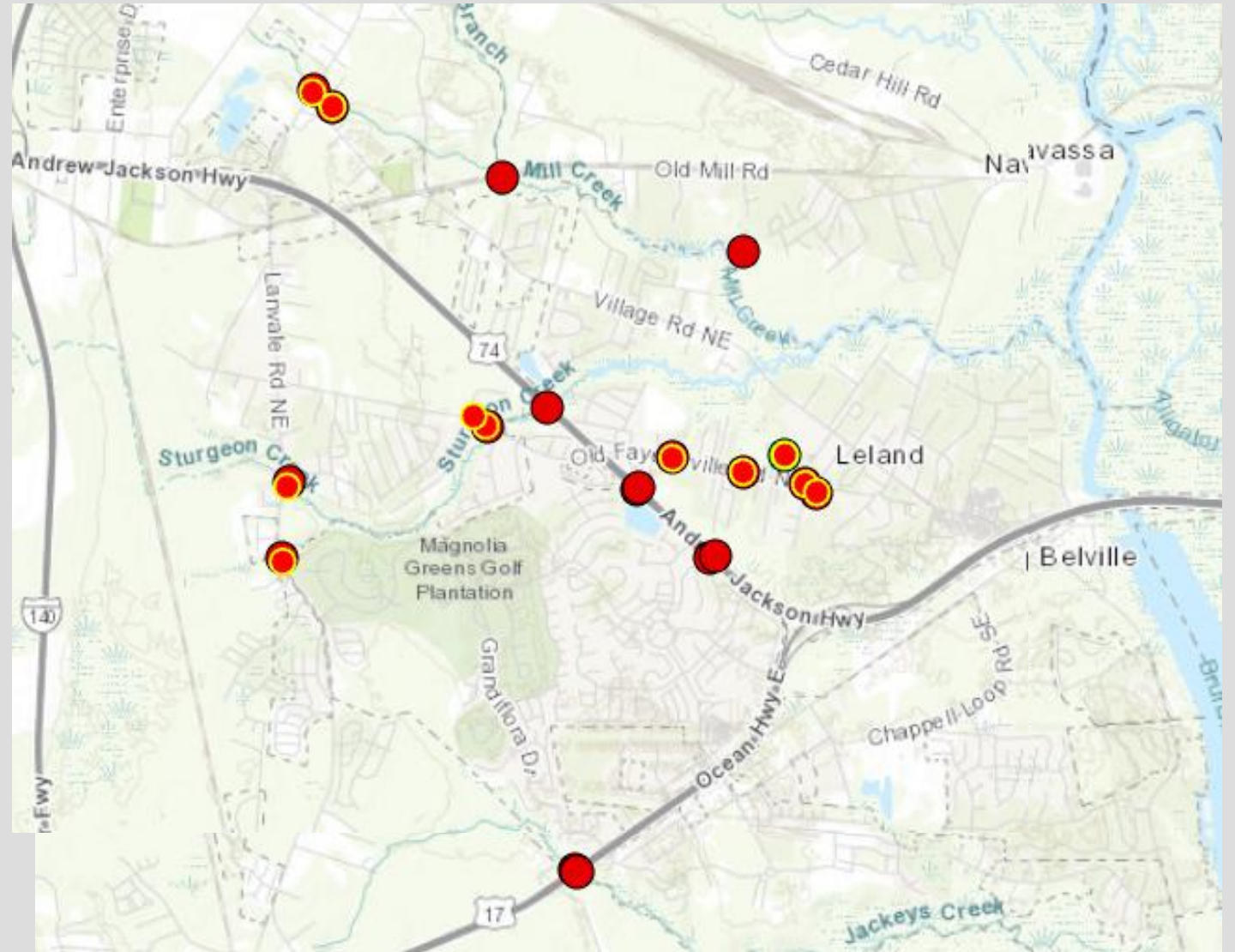
APPLICATION TO CAPE FEAR

- Met with towns of Leland and Nevassa
- Asked for possible problem sites
- Identified ~100 crossings for survey
- Used TNC flood model data to determine which might be problems
- Kris Bass Engineering is performing assessments
- Estimated completion: August 2022



SO FAR.....

- 11 sites surveyed
- QAQCing survey scores



SARP CONNECTIVITY PROGRAM



Inventory

Prioritization

Aquatic Barrier Prioritization Tool

Improve aquatic connectivity by prioritizing aquatic barriers for removal using the best available data.

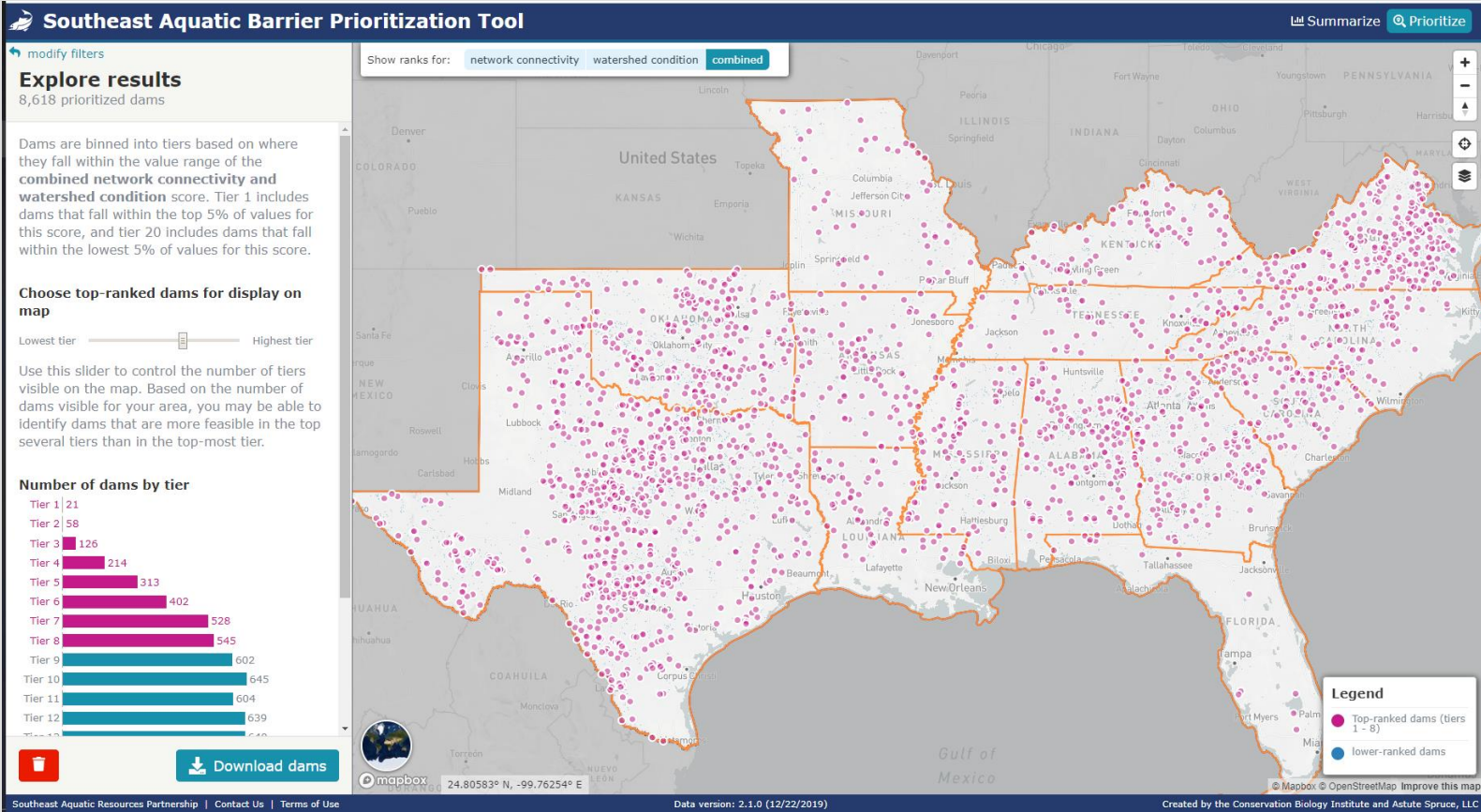
Aquatic connectivity is essential. Fish and other aquatic organisms depend on high quality, connected river networks. A legacy of human use of river networks have left them fragmented by barriers such as dams and culverts. Fragmentation prevents species from dispersing and accessing habitats required for their persistence through changing conditions.

Recently improved inventories of aquatic barriers enable us to describe, understand, and prioritize them for removal, restoration, and mitigation. Through this tool and others, we empower you by providing information on documented barriers and standardized methods by which to prioritize barriers of interest for restoration efforts.

connectivity.sarpdata.com

PRIORITIZATION

- Improve or maintain watershed connectivity
- Move from opportunistic to a strategic approach to barrier removal fish passage improvement
- Support management decisions



INDICATORS



Network Length

Network length measures the amount of connected aquatic network length that would be added to the network by removing the barrier. Longer connected networks may provide more overall aquatic habitat for a wider variety of organisms and better support dispersal and migration.

[Read more...](#)



Network Complexity

Network complexity measures the number of unique upstream size classes that would be added to the network by removing the barrier. A barrier that has upstream tributaries of different size classes, such as small streams, small rivers, and large rivers, would contribute a more complex connected aquatic network if it was removed.

[Read more...](#)



Channel Alteration

Altered river and stream reaches are those that are specifically identified as canals or ditches. These represent areas where the hydrography, flow, and water quality may be highly altered compared to natural conditions.

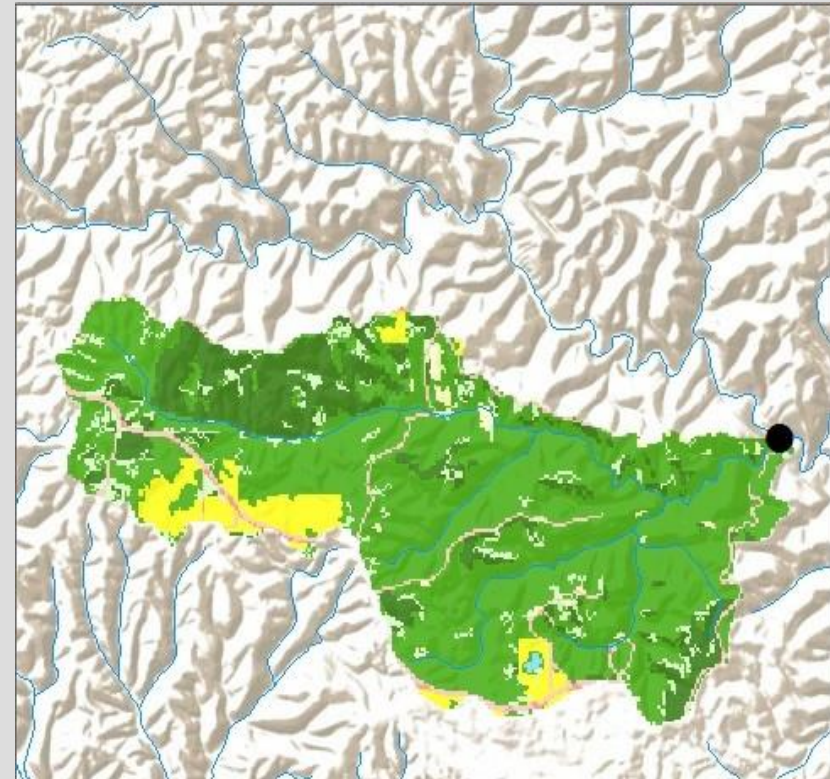
[Read more...](#)




Natural Landcover

Natural landcover measures the amount of area within the floodplain of the upstream aquatic network that is in natural landcover. Rivers and streams that have a greater amount of natural landcover in their floodplain are more likely to have higher quality aquatic habitat.


[Read more...](#)



The landcover types present in a contributing watershed of a dam on the Ozark National Forest.

 Southeast Aquatic Barrier Prioritization Tool

SummarizePrioritize



Southeast Aquatic Barrier Prioritization Tool

Improve aquatic connectivity by prioritizing aquatic barriers for removal using the best available data.

Aquatic connectivity is essential. Fish and other aquatic organisms depend on high quality, connected river networks. A legacy of human use of river networks have left them fragmented by barriers such as dams and culverts. Fragmentation prevents species from dispersing and accessing habitats required for their persistence through changing conditions.

Recently improved inventories of aquatic barriers enable us to describe, understand, and prioritize them for removal, restoration, and mitigation. Through this tool and others, we empower you by providing information on documented barriers and standardized methods by which to prioritize barriers of interest for restoration efforts.

Southeast Aquatic Resources Partnership | Contact Us

Created by the Conservation Biology Institute

connectivity.sarpdata.com

 modify area of interest

Filter road-related barriers

7 selected

 reset filters

▼ Barrier Severity

Major barrier 4

Moderate barrier 3

► Road Type

▼ Miles Gained

< 1 miles 24

1 - 5 miles 6

5 - 10 miles 1

10 - 25 miles 0

25 - 100 miles 0

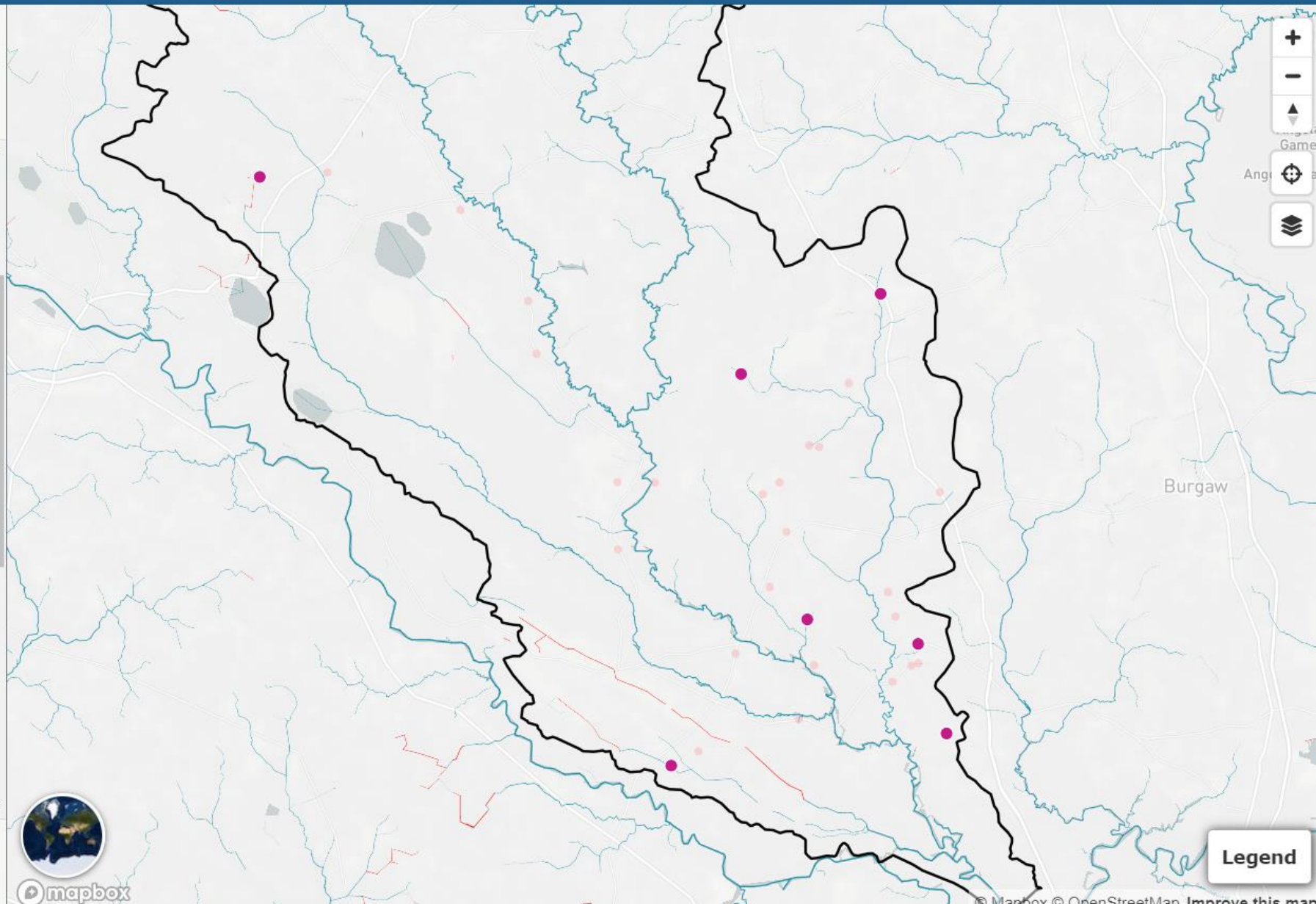
> 100 miles 0



 Prioritize road-related barriers



mapbox



Legend

ROAD BARRIER PRIORITIZATION

Aquatic Barrier Prioritization Tool

[Summarize](#) [Prioritize](#) [Download](#)

[modify filters](#)

Show ranks for: [network connectivity](#) [watershed condition](#) **[combined](#)** for [full networks](#) [perennial reaches only](#)

Explore results

113 prioritized road-related barriers

Road-related barriers are binned into tiers based on where they fall within the value range of the **combined network connectivity and watershed condition** score. Tier 1 includes road-related barriers that fall within the top 5% of values for this score, and tier 20 includes road-related barriers that fall within the lowest 5% of values for this score.

Choose top-ranked road-related barriers for display on map

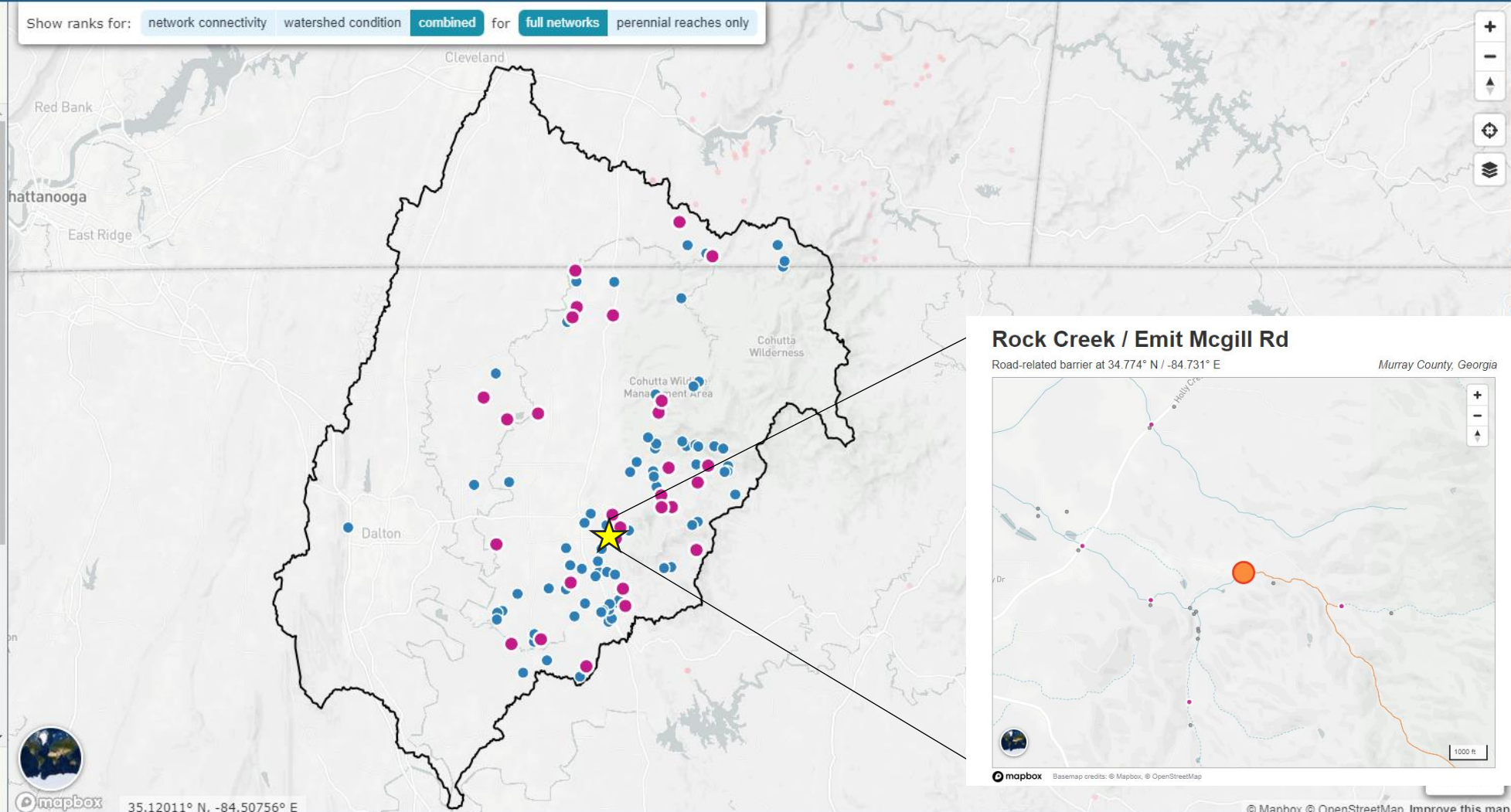
Lowest tier Highest tier

Use this slider to control the number of tiers visible on the map. Based on the number of road-related barriers visible for your area, you may be able to identify road-related barriers that are more feasible in the top several tiers than in the top-most tier.

Number of road-related barriers by tier



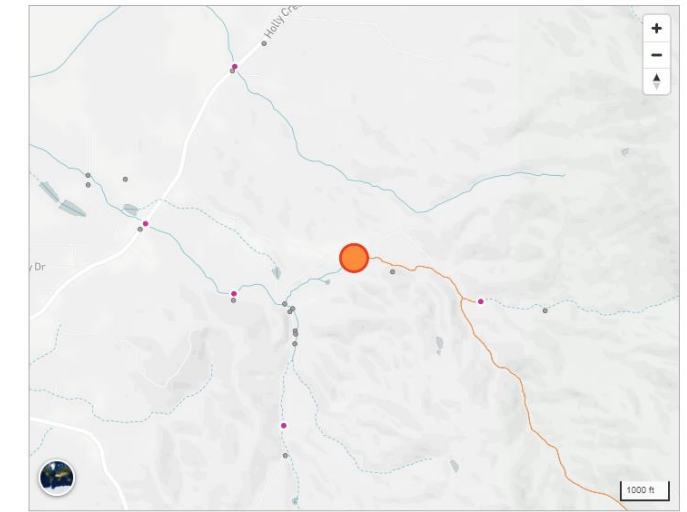
35.12011° N, -84.50756° E



Rock Creek / Emit McGill Rd

Road-related barrier at 34.774° N / -84.731° E

Murray County, Georgia



mapbox Basemap credits: © Mapbox, © OpenStreetMap

© Mapbox © OpenStreetMap Improve this map

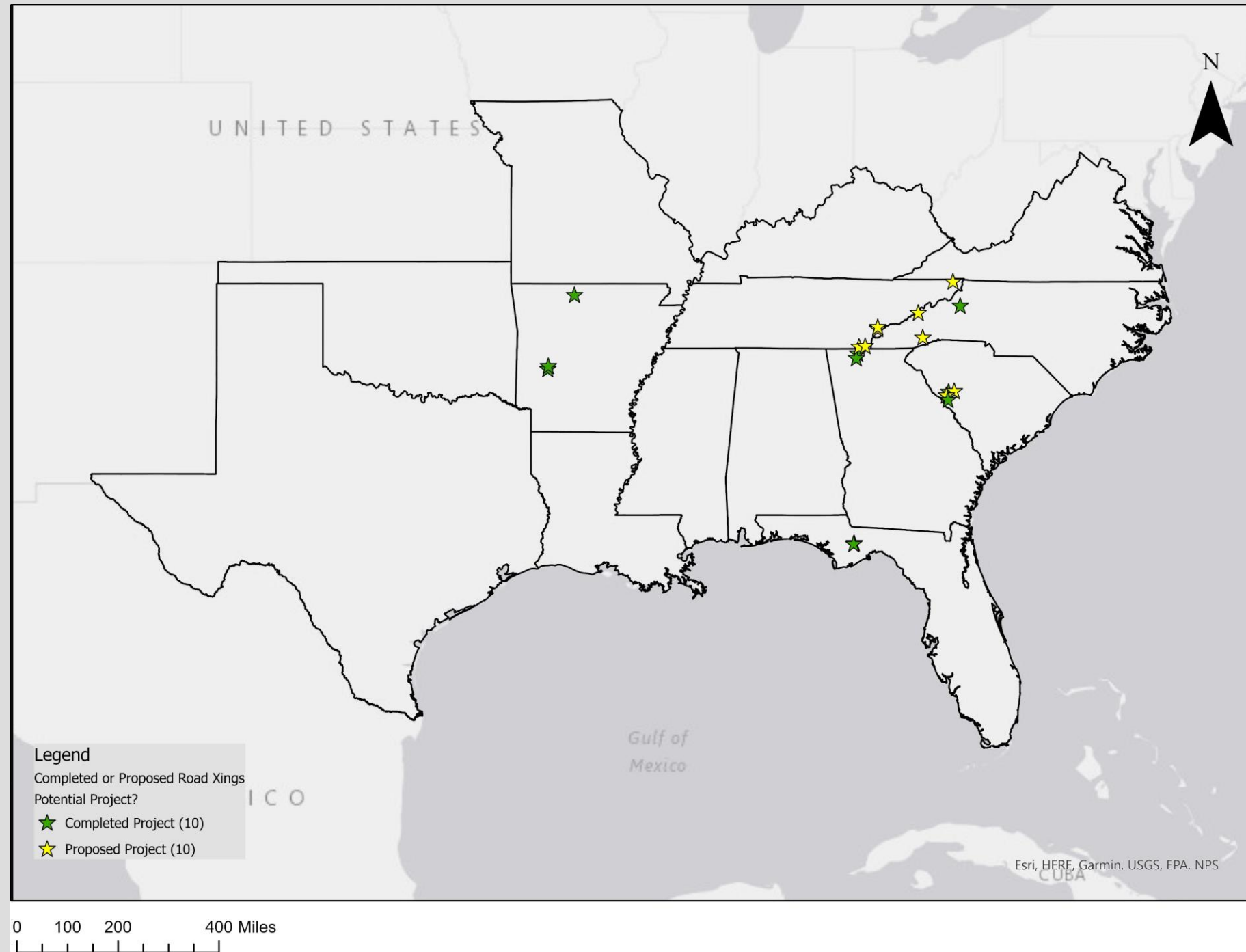
Created by Astute Spruce, LLC

HOLLY CREEK, GA EARTH DAY 2021



ROAD XING REPLACEMENTS

- **275** completed or proposed
- **20** of these influenced by inventory and tool



A large school of fish, likely salmon, swimming in the water. The fish are densely packed and moving in a coordinated manner, creating a sense of movement and direction. The water is a deep blue-grey color, and the fish have a silvery, iridescent sheen. The perspective is from directly above, looking down at the school.

QUESTIONS?