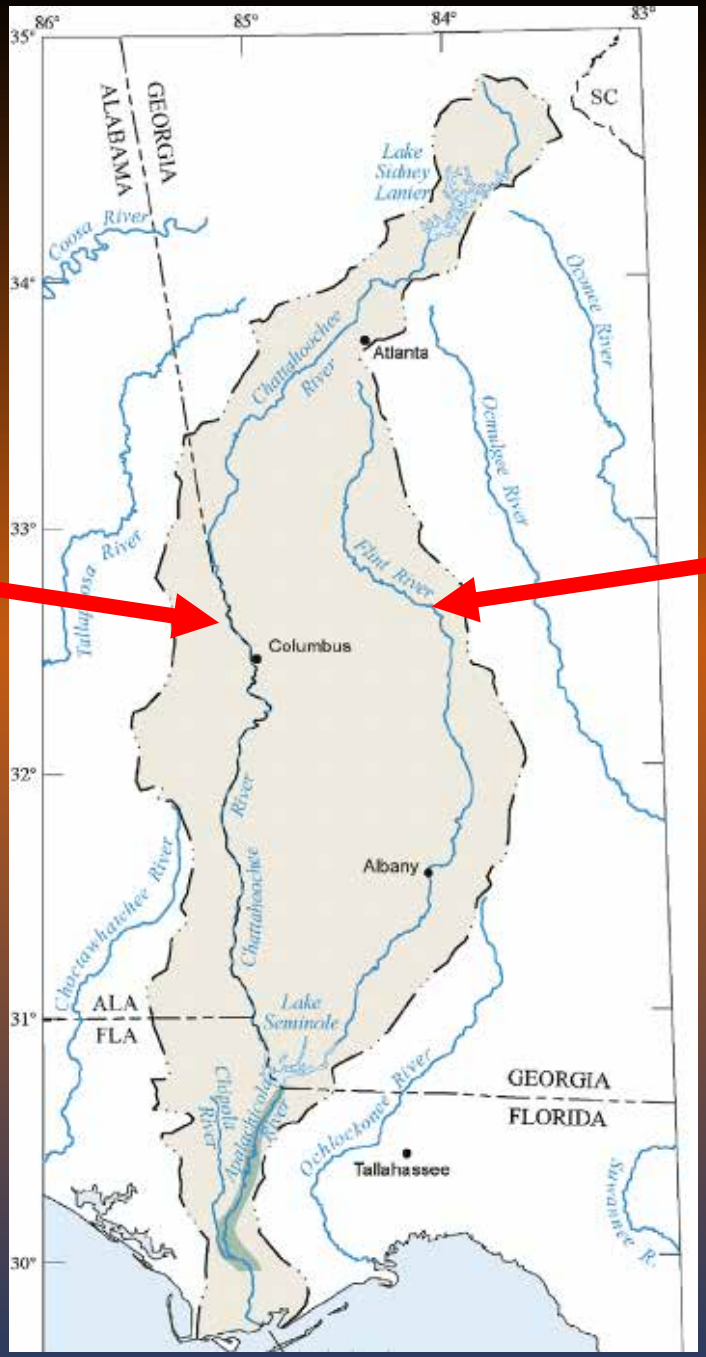
Rivers of the Dammed – Anthropogenic Legacy Shapes Conservation and Management of Shoal Bass, an Endemic Black Bass in the ACF Basin

Meet the Shoal Bass

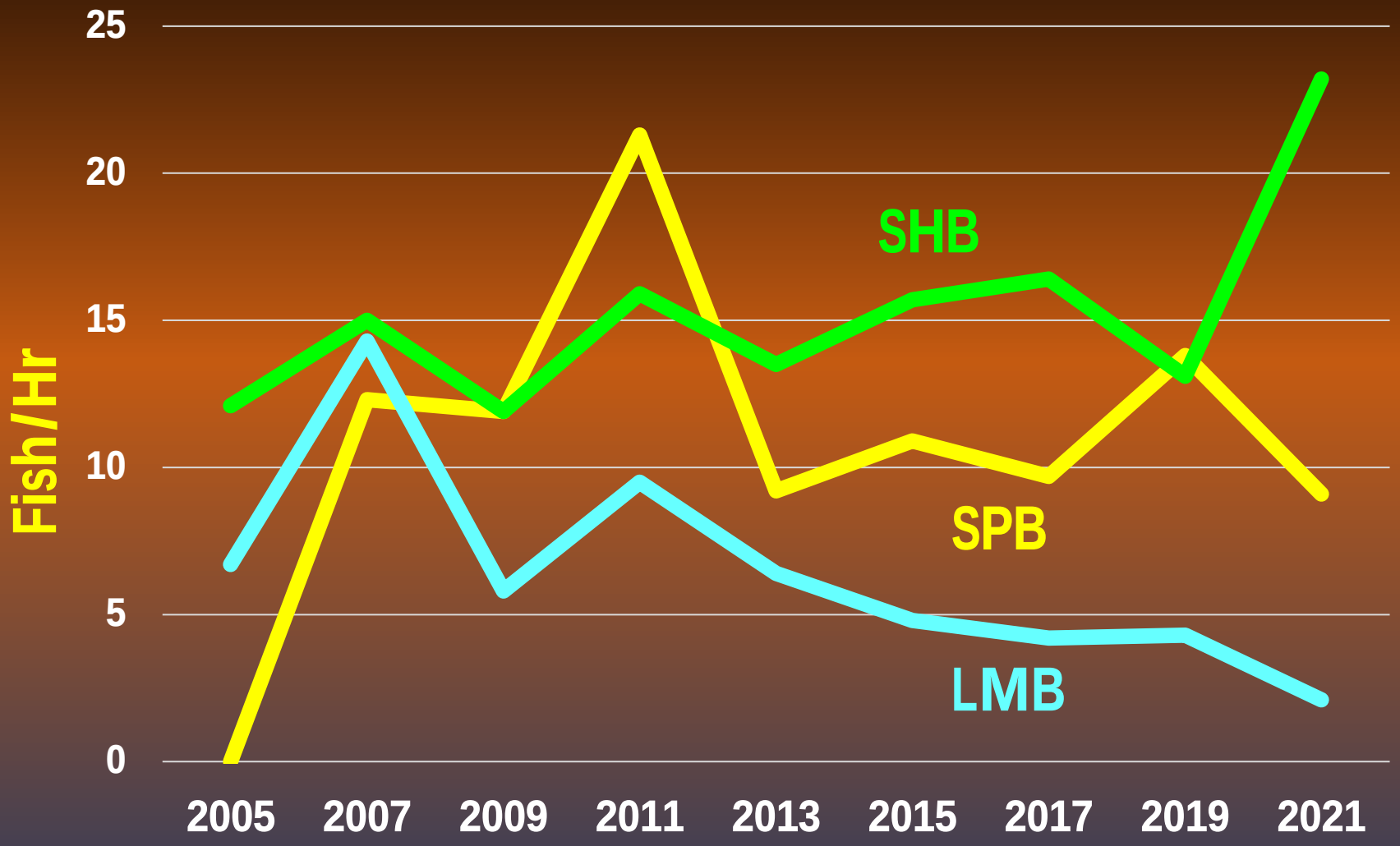
- Endemic to Apalachicola Watershed
- Obligate Lotic Species
- Do Not Withstand Impoundment
- Prefer Rocky Habitat with Strong Flow
- Most Common Around Fall Line

CHATTAHOOCHEE
702 km
22,714 sq km
13 dams
3.55 million people



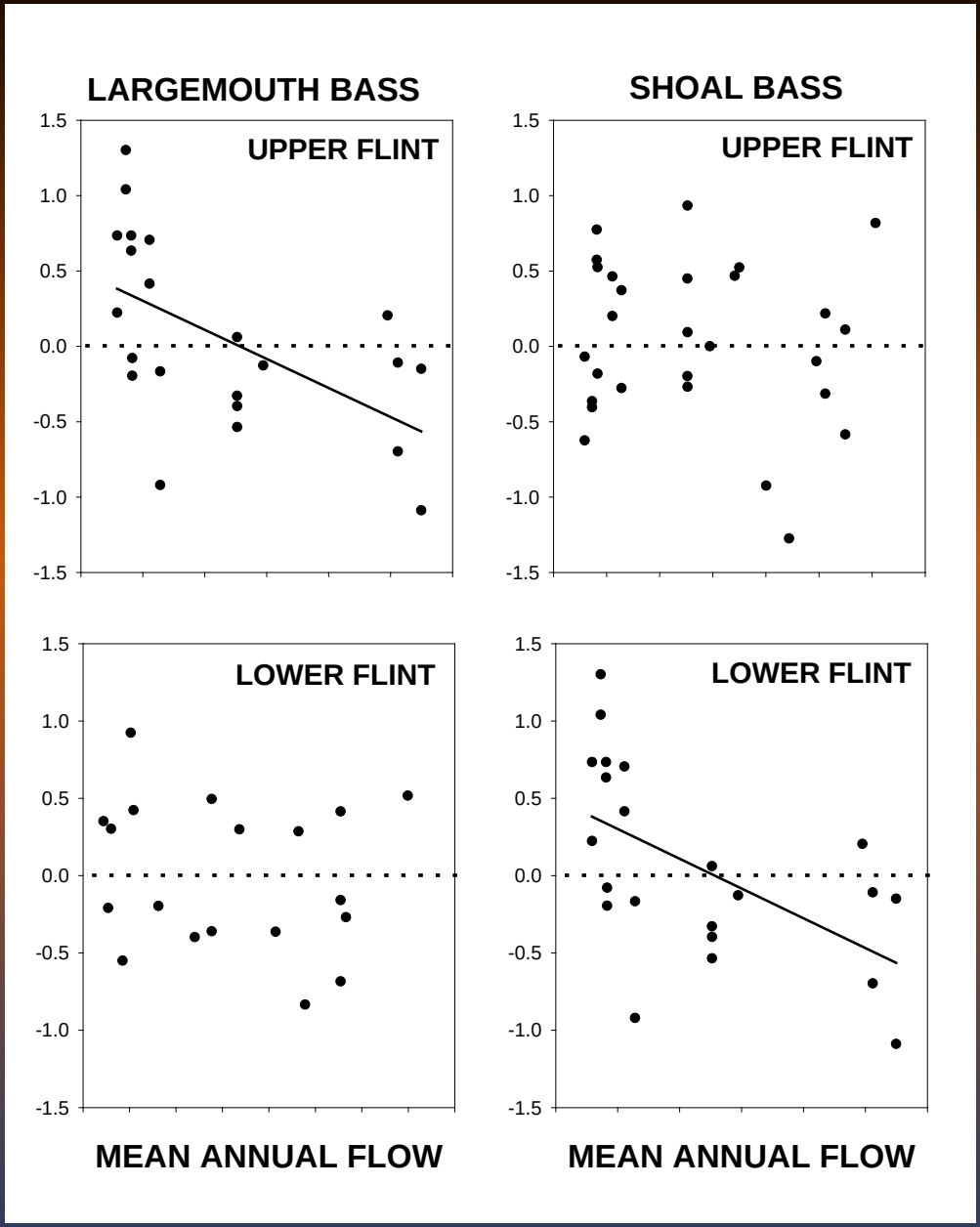
FLINT
565 km
21,911 sq km
2 dams
866,000 people

Catch Rates of Black Bass in Upper Flint River

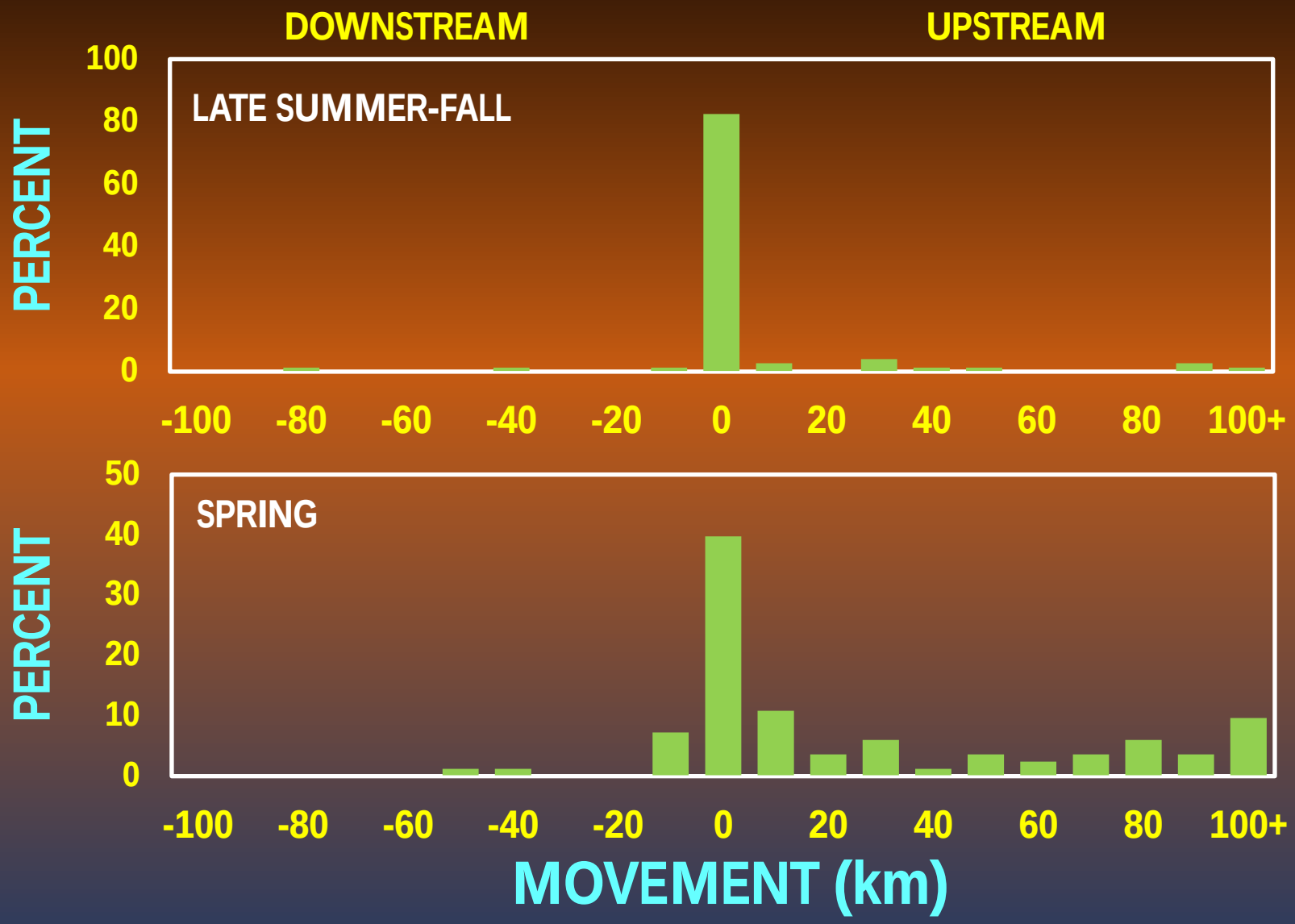


RECRUITMENT

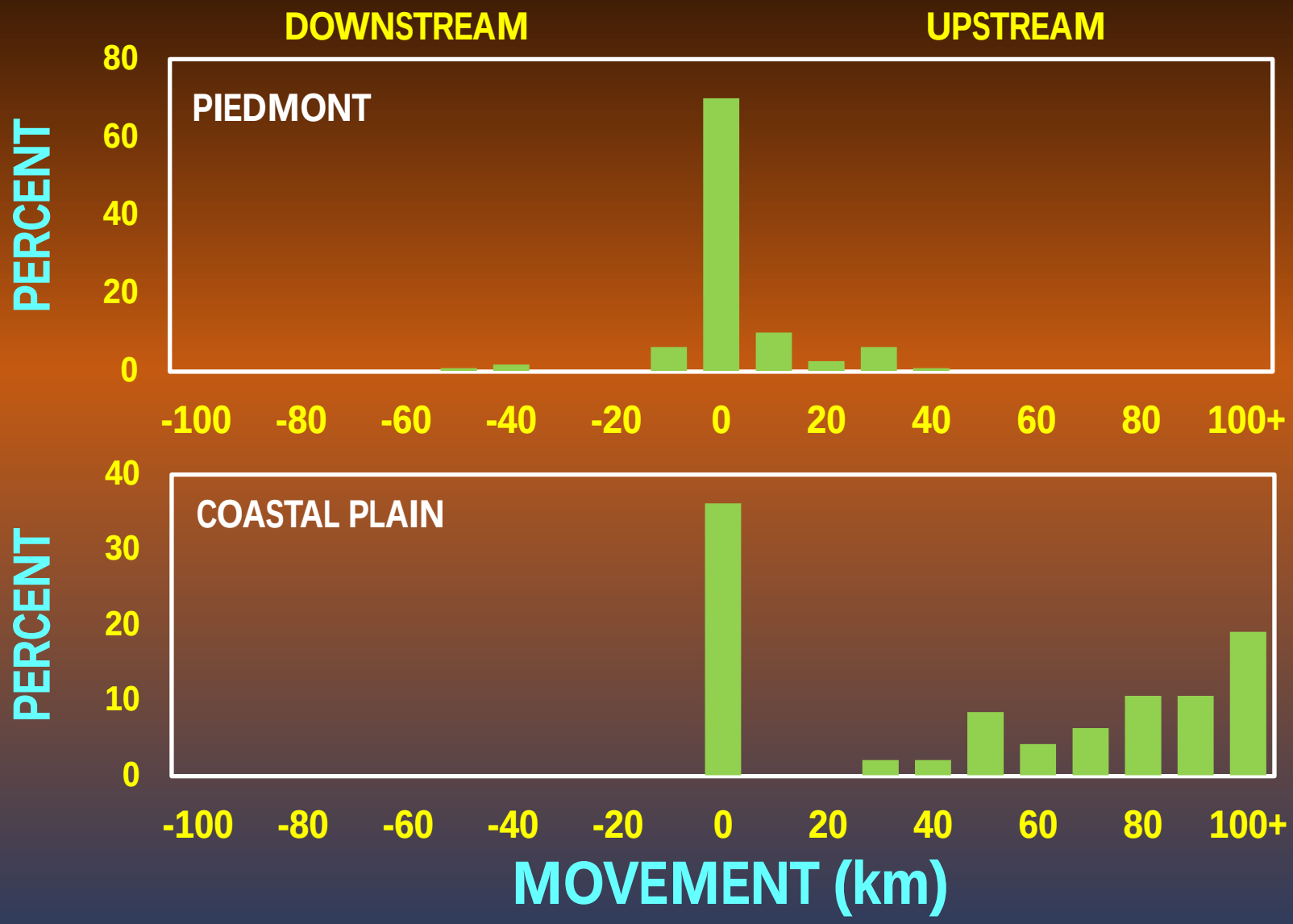
- LMB Recruitment Above Blackshear Dam Impacted by High Flows
- SHB Recruitment in UFR Not Affected By Discharge 1994-2010
- Opposite in LFR
  - Shoal Destruction
  - Hydropeaking
  - SHB Stocking



MOVEMENT IS IN THE SPRING…AND UPSTREAM



TWO SUB-POPULATIONS EXIST IN UPPER FLINT




Tributaries

What Does All This Mean?

- Recruitment of Shoal Bass Stable in Upper Flint
  - Robust to Large Flow Fluctuations
- Opposite Seen in Lower Flint
  - Shoal Destruction/Hydropeaking
- Highly Mobile Species in Connected Habitats
  - Form Large Spawning Aggregations in “Mega-Shoal” Complexes
- Two Sub-Populations in Upper Flint
- Mega-Shoal Complexes Likely Important Nursery Habitat
- Tributary Populations ARE Connected to Mainstem
  - Some Fish Likely Spawn in Tribs Every Year

Chattahoochee River

“River of the Dammed”

13 Dams

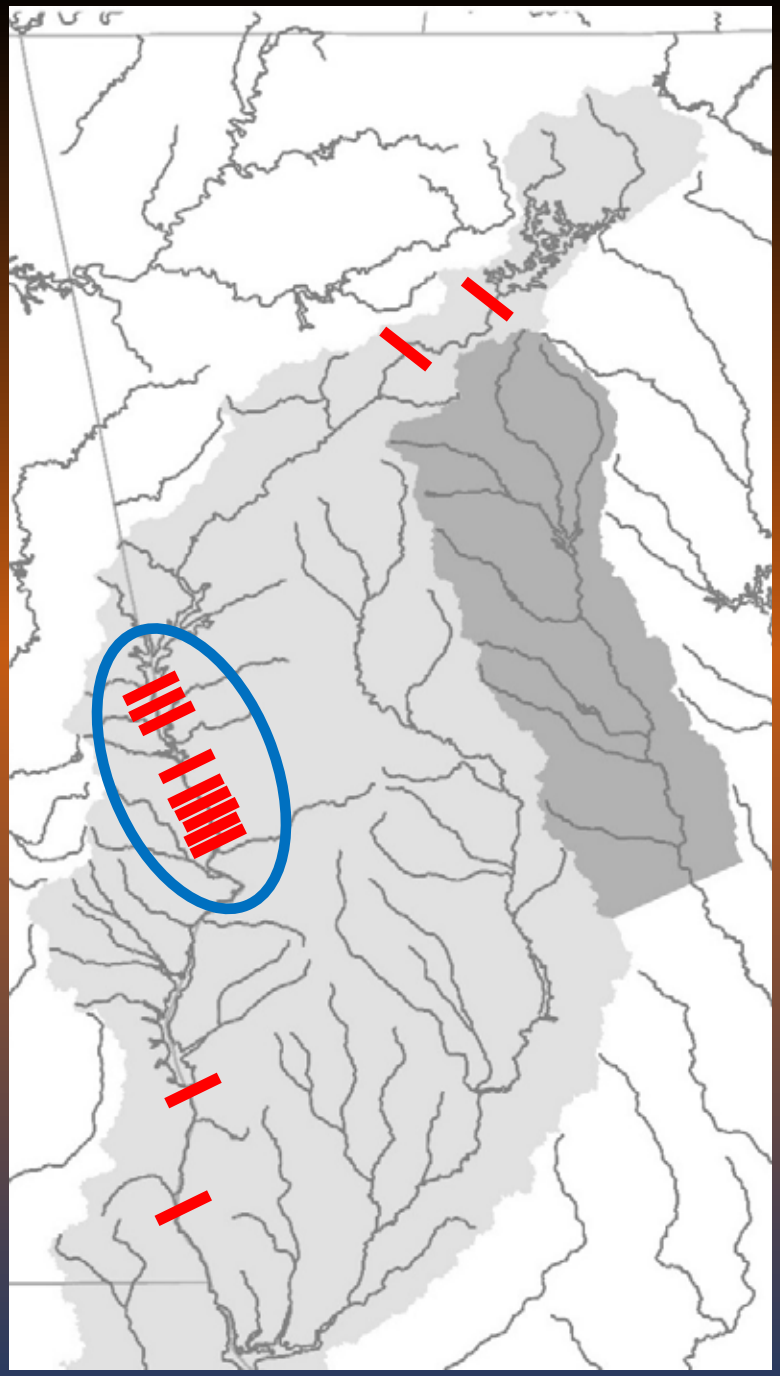
9 Dams in The Fall Line

Many There Since 1800s

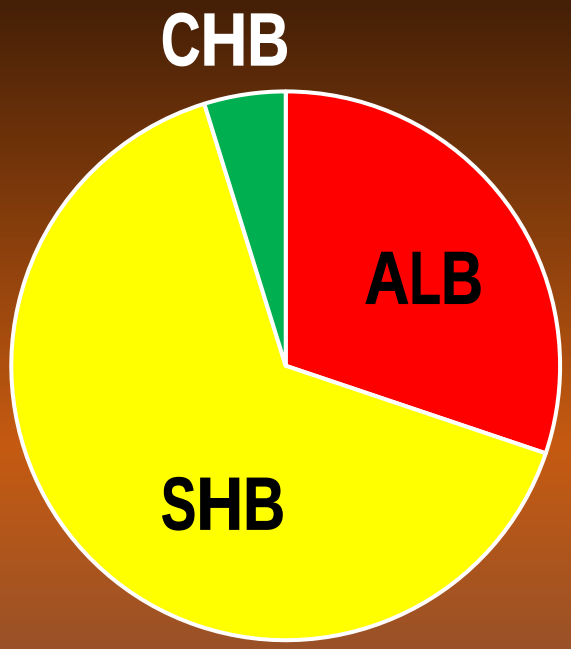
2 Removed in 2013-14

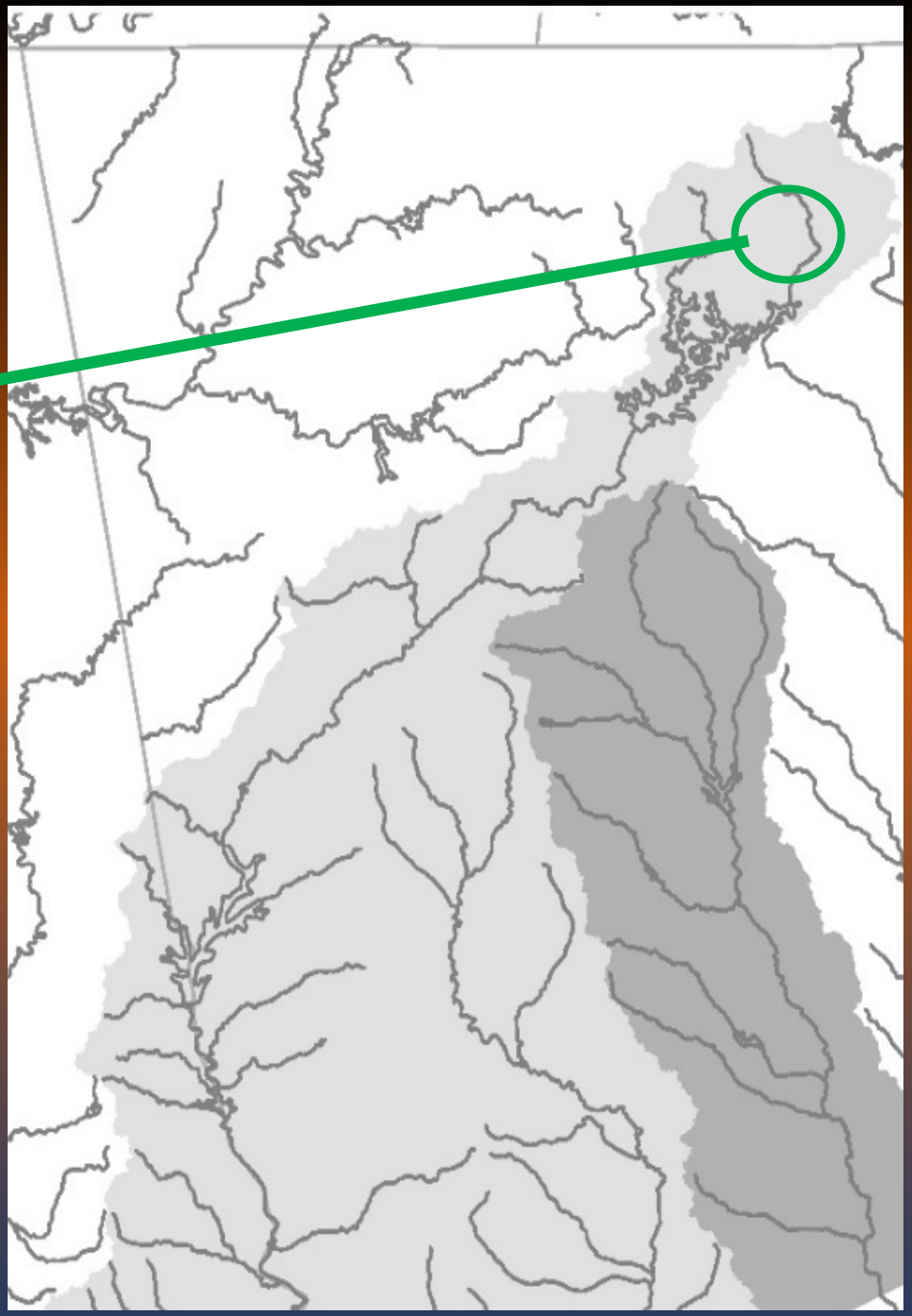
2 More Maybe This Fall

Many Tribs Also Have Dams, Some Dating Back to 1800s

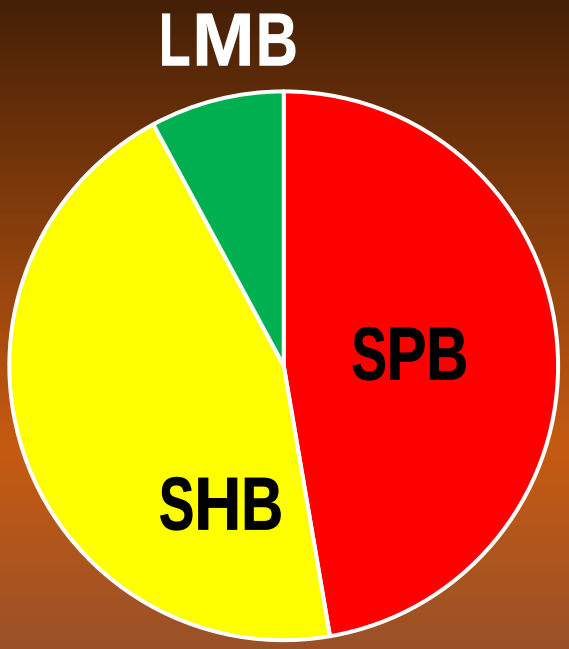


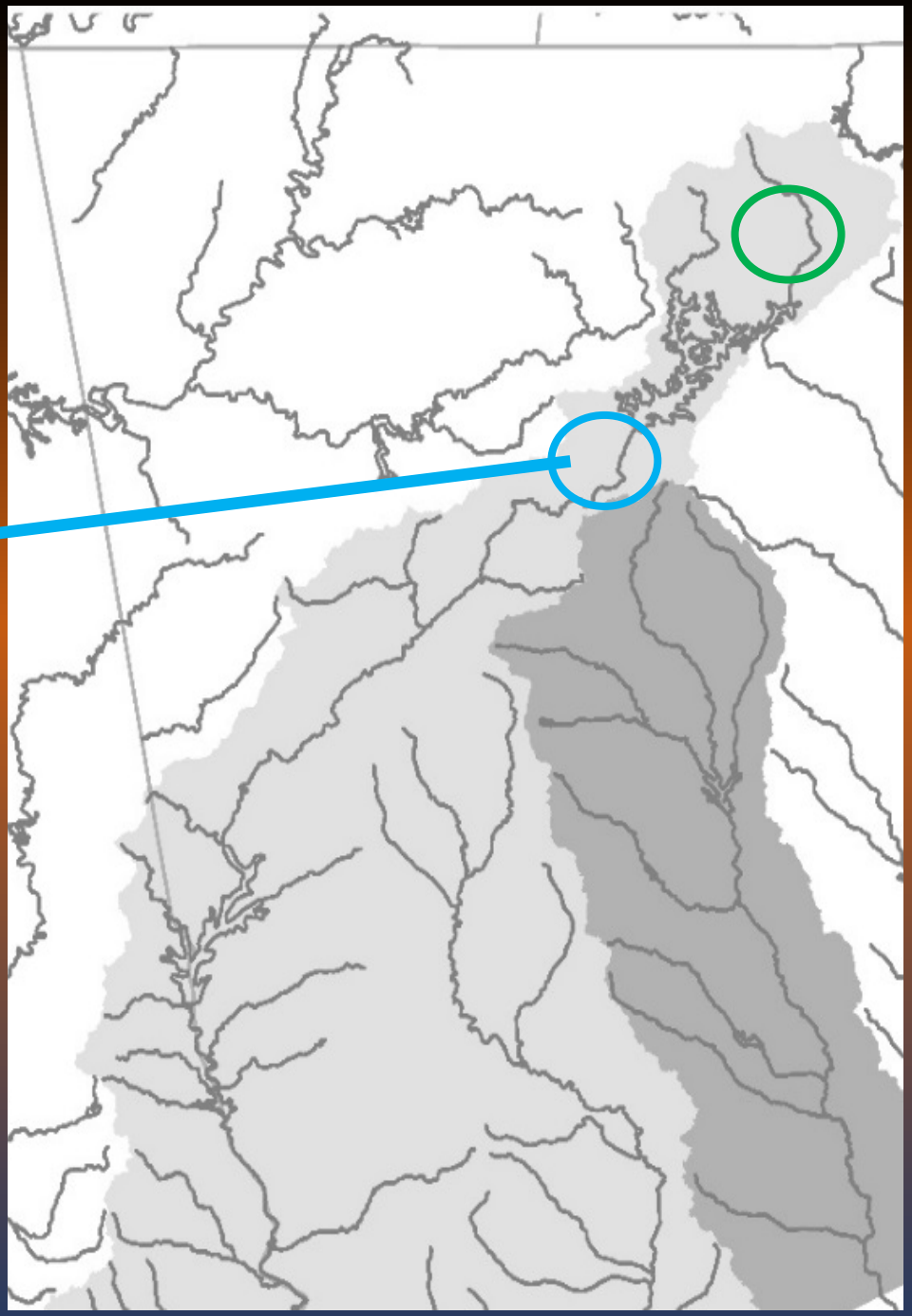
River of the Dammed



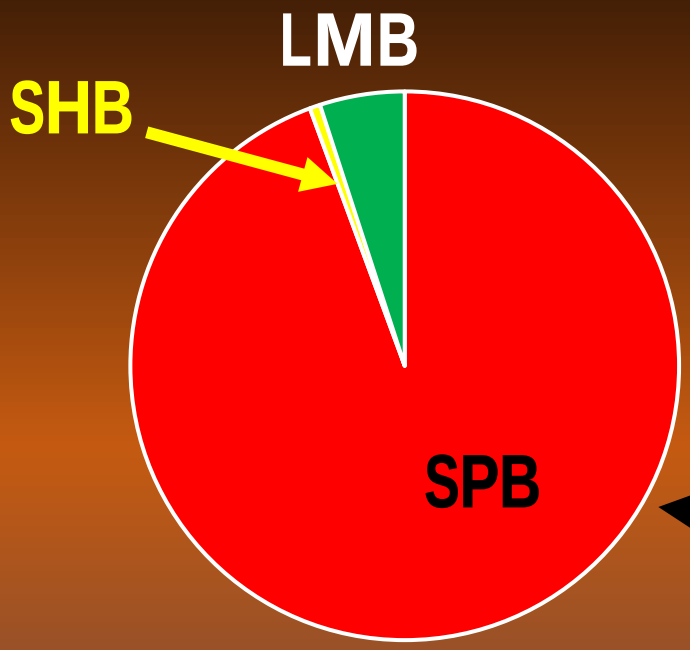


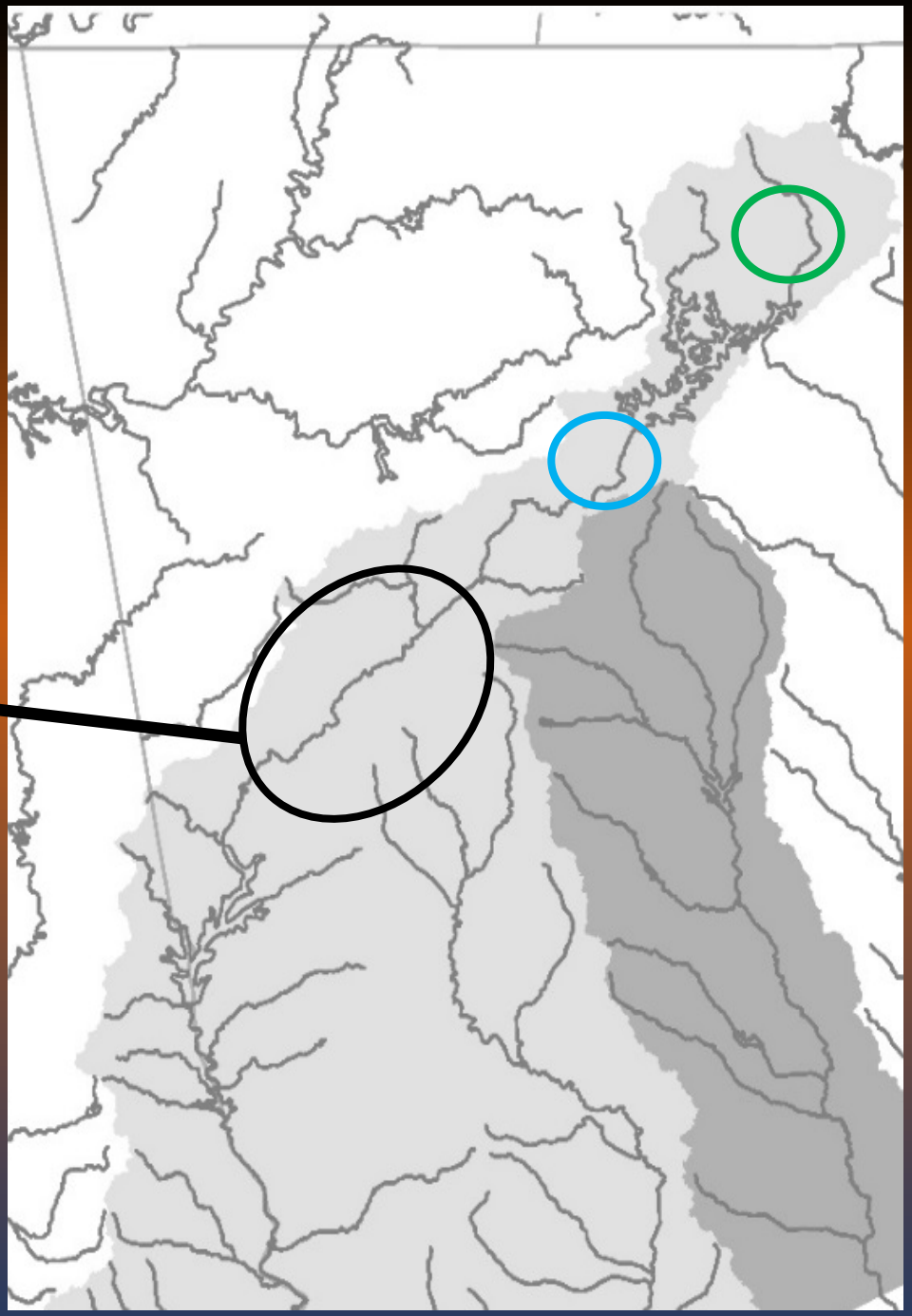
River of the Dammed



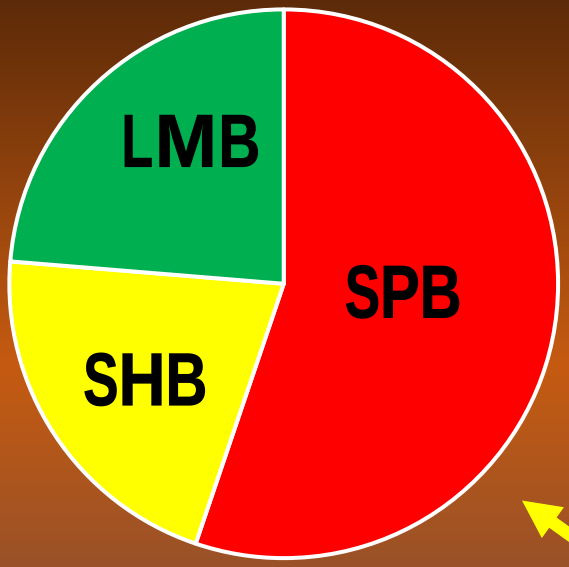


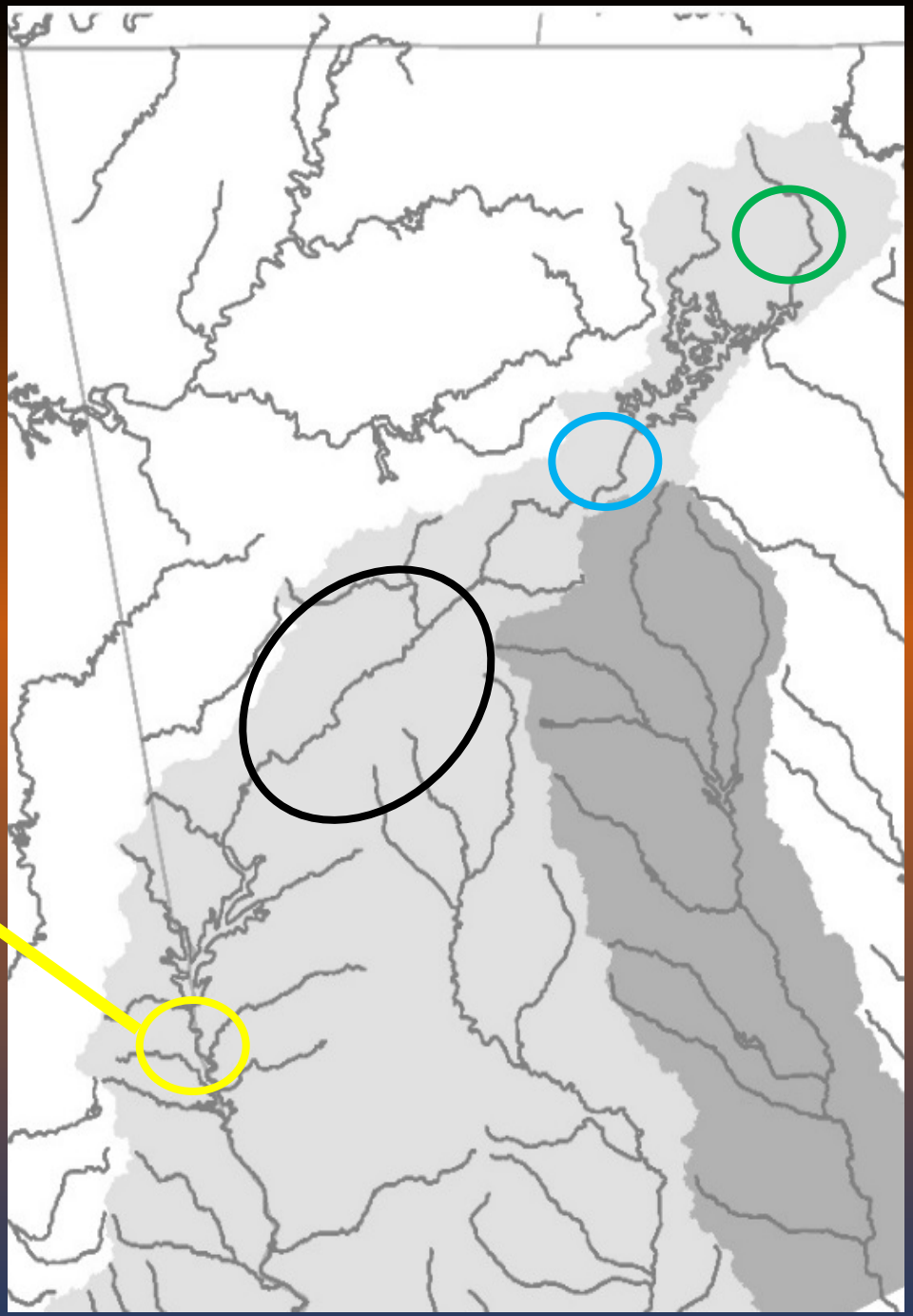
River of the Dammed



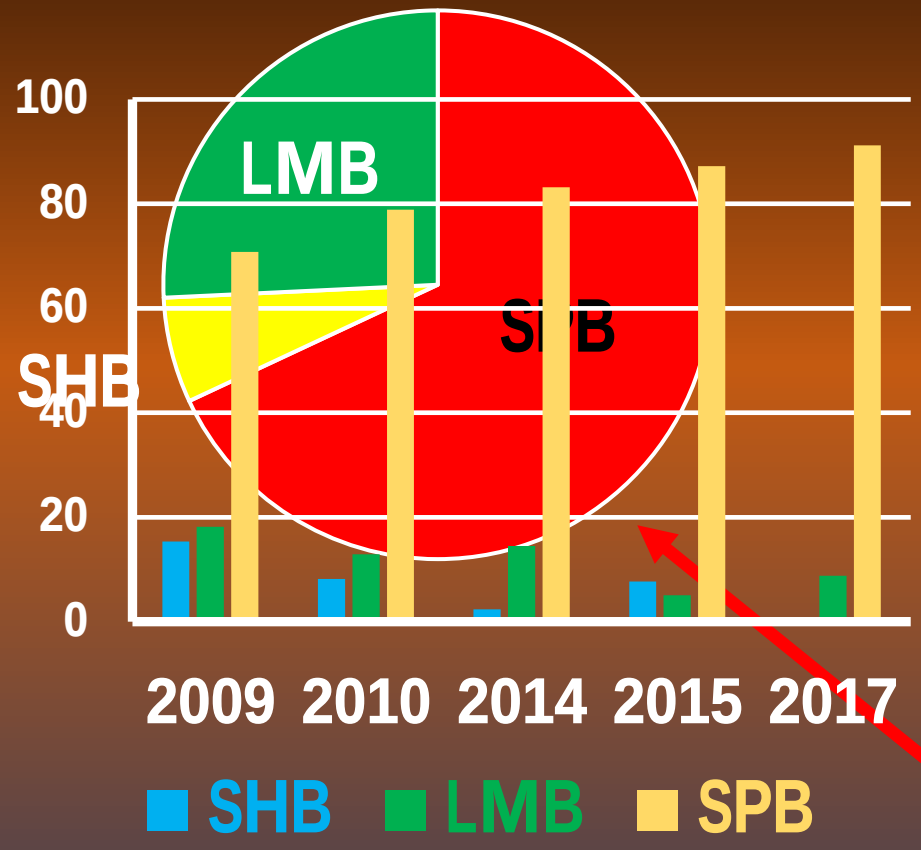


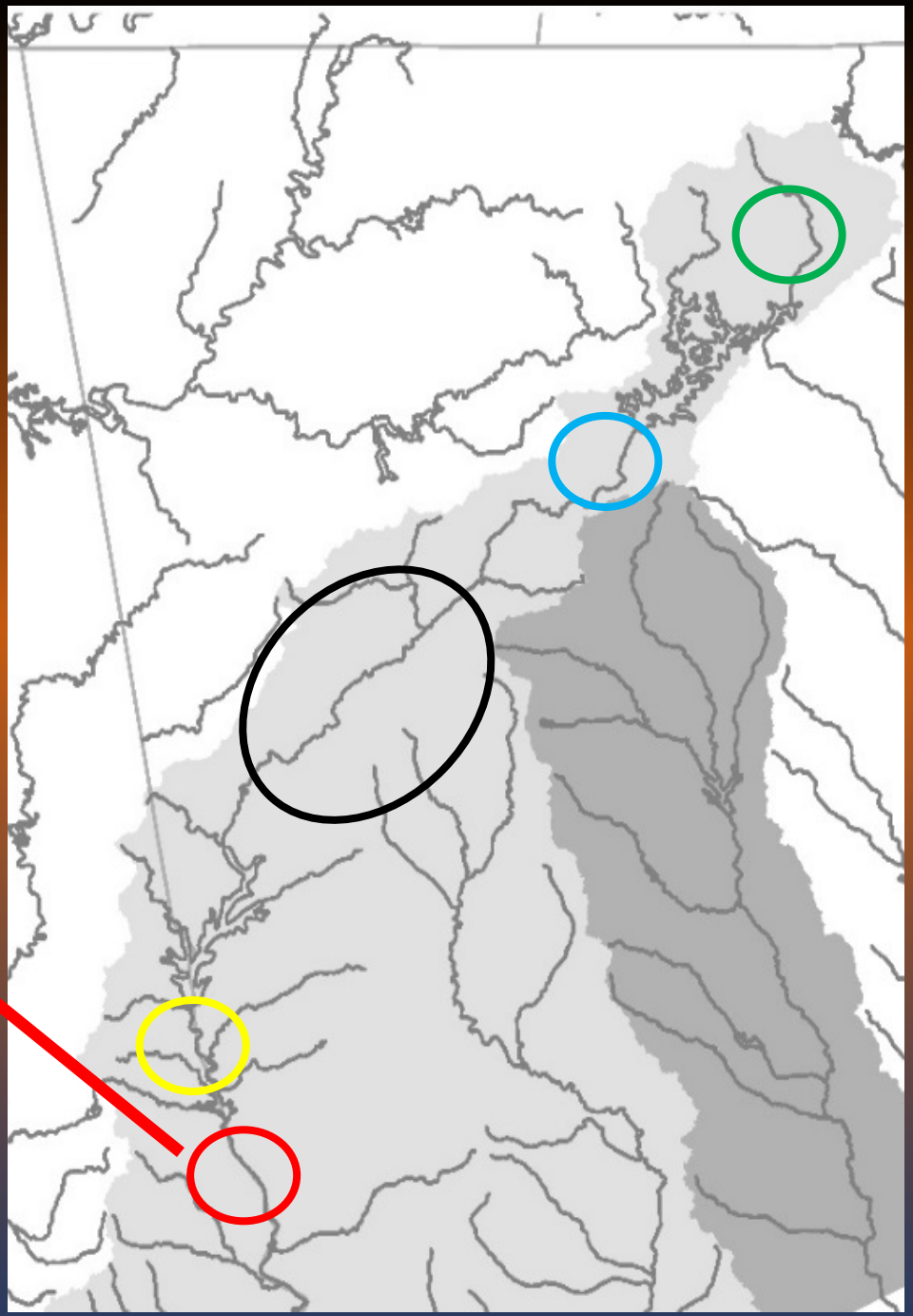
River of the Dammed





River of the Dammed





How Do Dams Affect Shoal Bass?

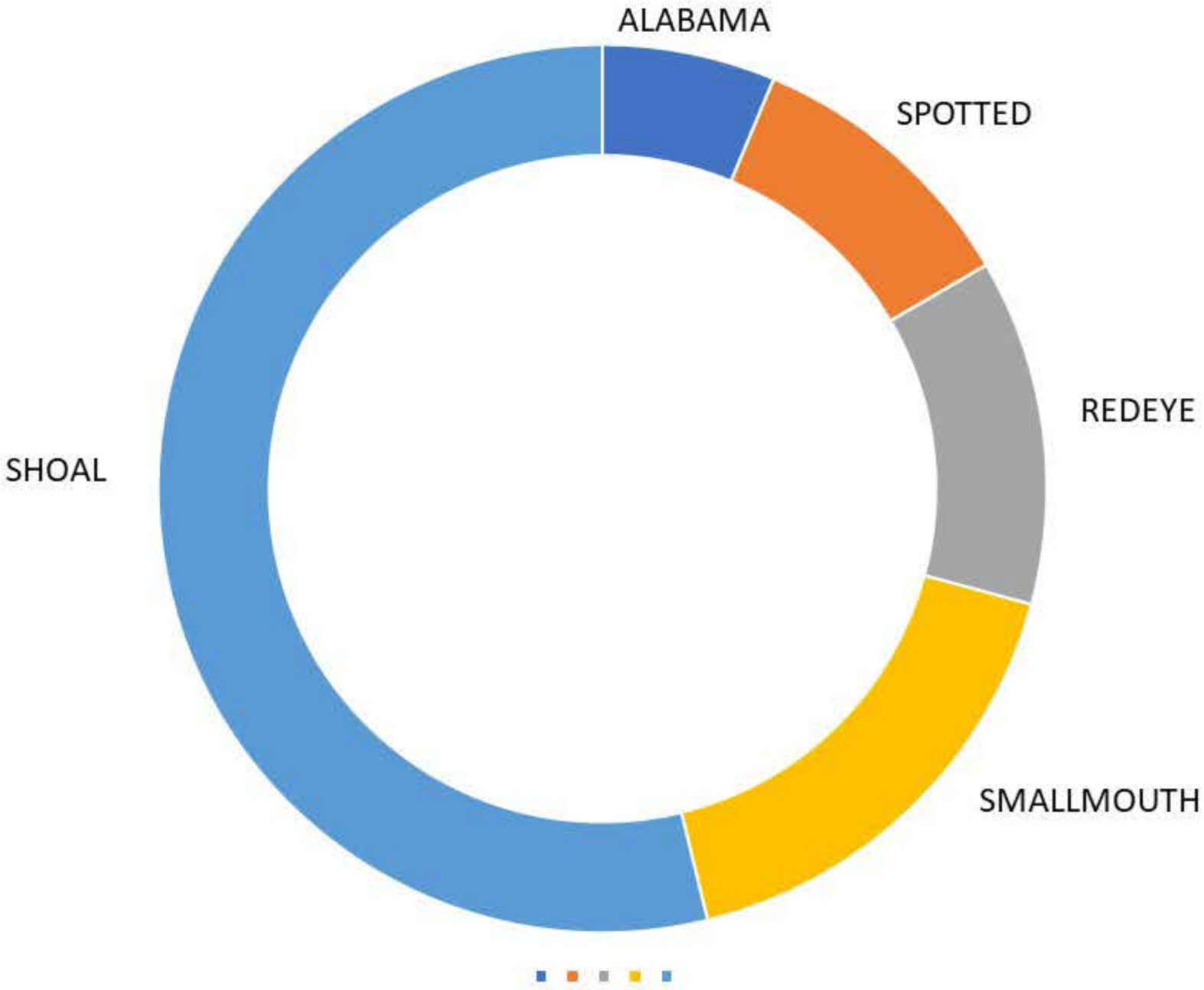
- Do not respond well to impoundment, particularly “serial” impoundment
- Restrict movement within river and between river/tributaries
  - Affects Gene Flow?
  - Original condition = one continuous metapopulation
  - Now: multiple isolated populations
- Eliminate preferred spawning habitat and alters flow regime – hydropeaking
  - Decreased recruitment

How Do Dams Affect Shoal Bass?

- Change from river to reservoir does not favor Shoal Bass
  - Spotted/Alabama Bass thrive there
  - Source for invasion into tributary streams
  - Spotted Bass recruitment less affected by hydropeaking
  - Do not require shoal areas for spawning


ALABAMA BASS
ALABAMA BASS
SMALLMOUTH BASS
ALABAMA BASS
SPOTTED BASS
SPOTTED BASS
ALABAMA BASS
Stevenson
Cloudland Canyon SP
LaFayette
Summerville
Calhoun
Chattahoochee NF
Smithgall Woods Dukes Creek SP
Mossy Creek SP
Don Carter SP
Silver City
Commerce
Red Top Mountain SP
Sugar Hill
Kennesaw
Picketts Mill Battlefield Historic Site
Athens
Jacksonville
Douglasville
Atlanta
Monroe
Freedom Riders NM
Panola Mountain SP
Greensb
ega NF
Oconee NF
Griffin
Indian Springs SP
Roanoke
LaGrange
Gray
exander City
F. D. Roosevelt SP
Griswoldville Historic Site
Valley
Balls Ferry
GEORGIA
Reeltown
Butler
Columbus
Cochra
ry
Unadilla
Hurtsboro
Andersonville NHS
Florence Marina SP
Webster County
Abbevil
0
25
50mi
Clayton
Georgia Veterans SP

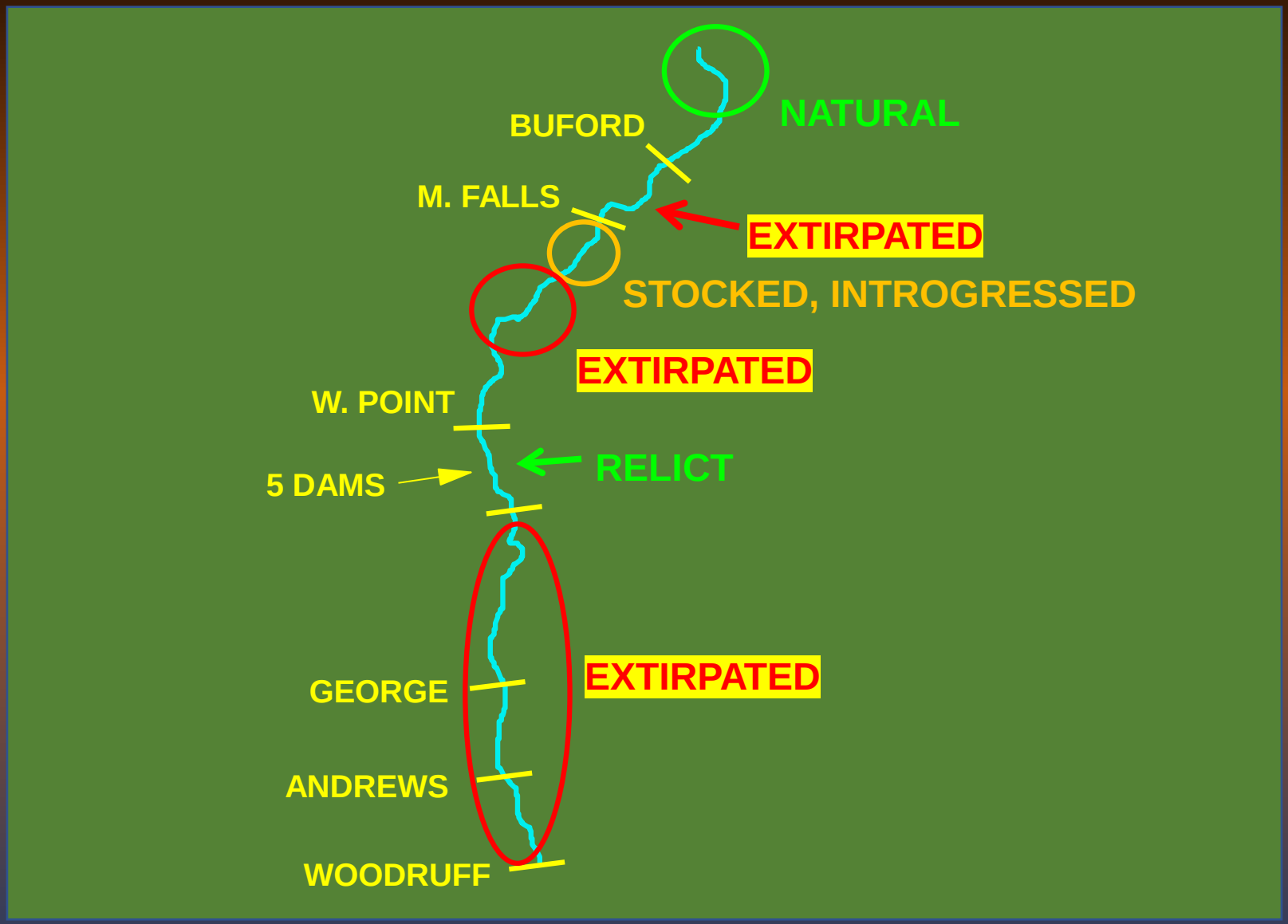
What could this fish be?


ALABAMA
SPOTTED
REDEYE
SMALLMOUTH
SHOAL

The “Real” Chattahoochee Bass

“Micropterus genericus”

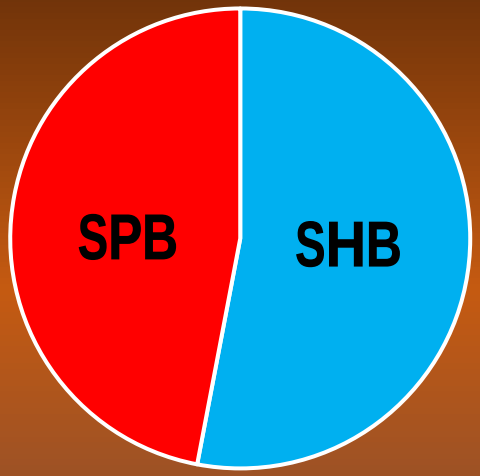
SHOAL BASS POPULATIONS IN THE CHATTAHOOCHEE



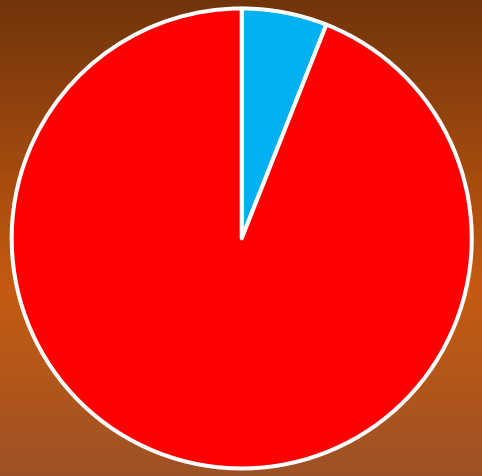
How Did We Get to This Point?

Black Bass Species Shift – Halawakee Creek, Alabama

1968-1969

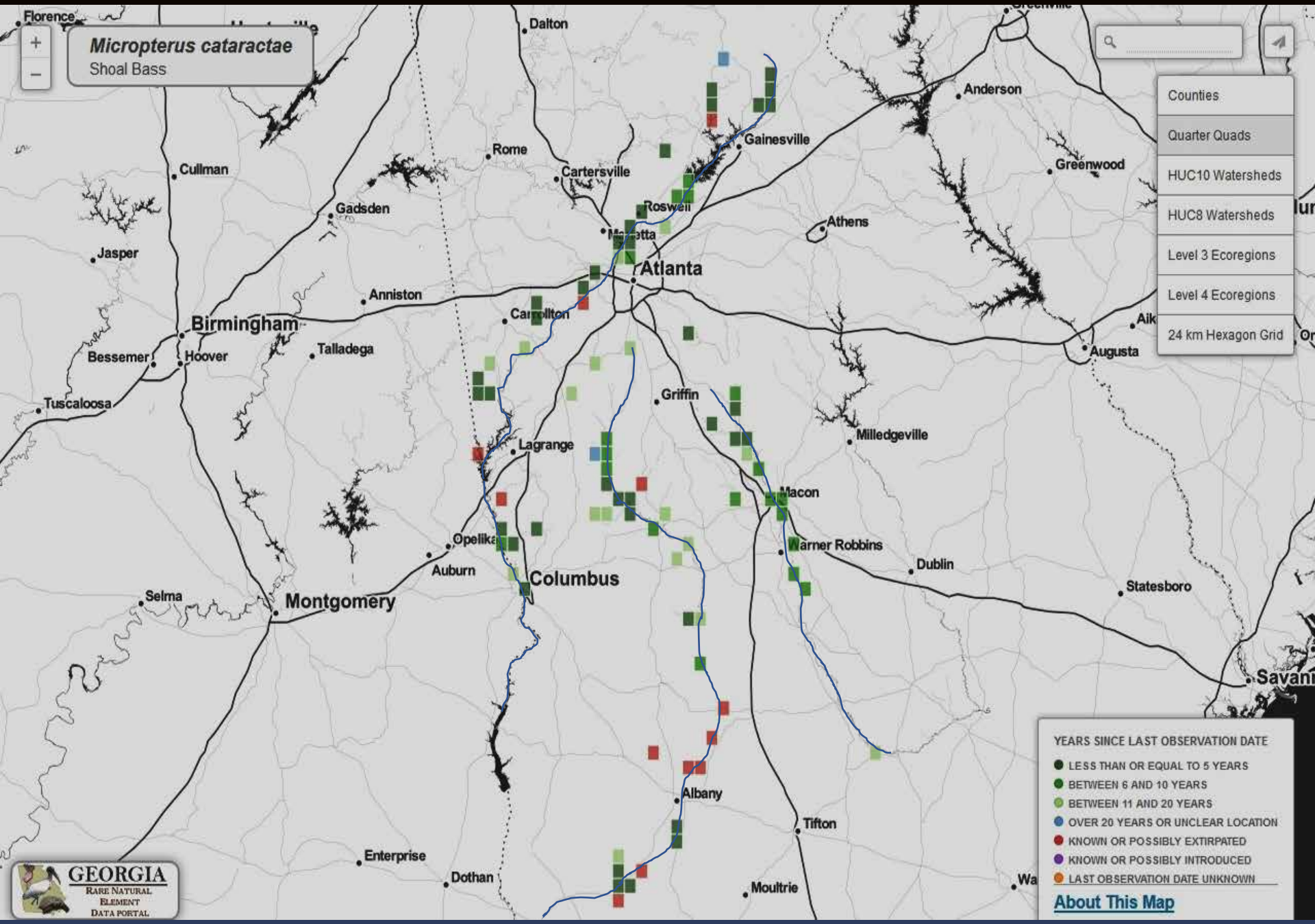


2005-2006



How Can a Sportfish Almost Go Extinct from a Major River System Without Anyone Noticing?

- "Species Borrowing" as a Surrogate for Knowledge


Micropterus cataractae
Shoal Bass
Counties
Quarter Quads
HUC10 Watersheds
HUC8 Watersheds
Level 3 Ecoregions
Level 4 Ecoregions
24 km Hexagon Grid
YEARS SINCE LAST OBSERVATION DATE
LESS THAN OR EQUAL TO 5 YEARS
BETWEEN 6 AND 10 YEARS
BETWEEN 11 AND 20 YEARS
OVER 20 YEARS OR UNCLEAR LOCATION
KNOWN OR POSSIBLY EXTIRPATED
KNOWN OR POSSIBLY INTRODUCED
LAST OBSERVATION DATE UNKNOWN
About This Map
GEORGIA
Rare Natural Element Data Portal
Florence
Dalton
Anderson
Cullman
Rome
Cartersville
Gainesville
Greenwood
Gadsden
Athens
Jasper
Atlanta
Anniston
Birmingham
Bessemer
Hoover
Talladega
Augusta
Tuscaloosa
Griffin
Lagrange
Milledgeville
Macon
Opelika
Warner Robbins
Auburn
Columbus
Dublin
Selma
Montgomery
Statesboro
Albany
Tifton
Enterprise
Dothan
Moultrie

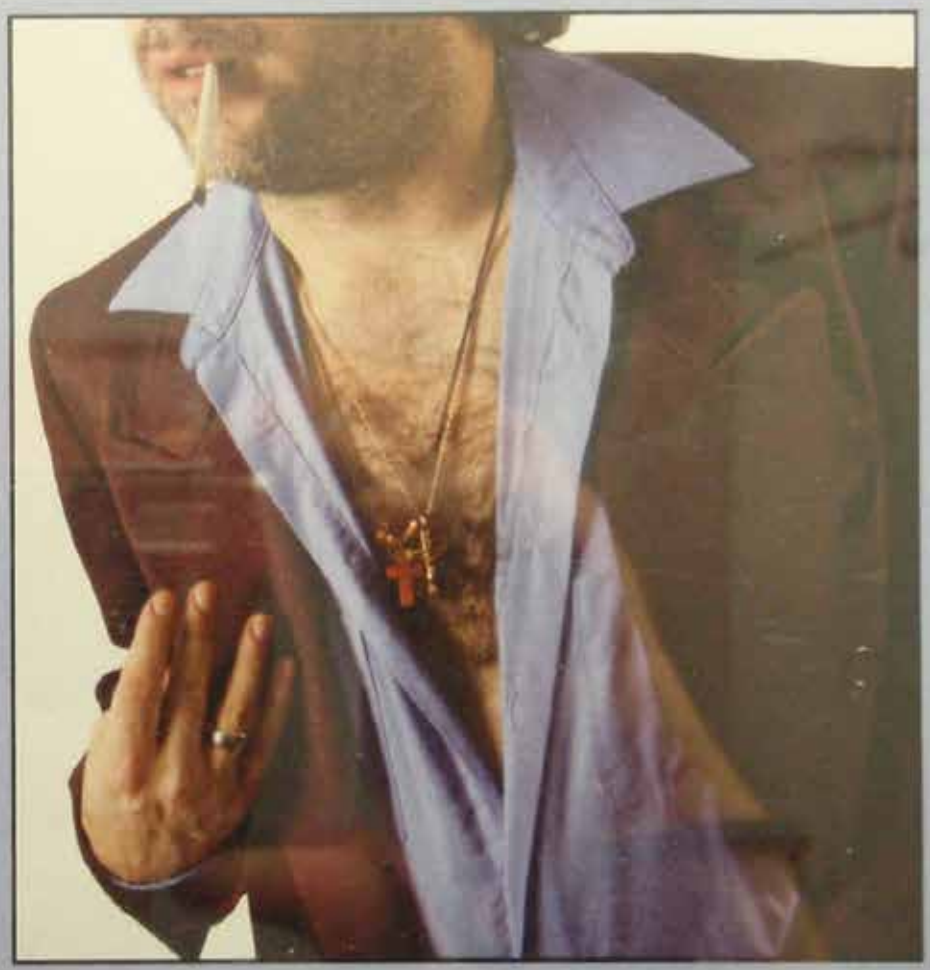
From 1998 to 2013, GADNR Stream Team Collected Shoal Bass 16 times in 7 different creeks...

... out of 259 possible samples in 169 creeks.

They also failed to collect Shoal Bass in 11 streams where good populations are known.

Sampling Overconfidence Syndrome

How you may picture yourself.



What you may actually look like.

Sampling for these fish be like…

Challenges

- ACF Basin Large and Extremely Diverse
  - ~ 51,000 km^2; 5^o of Latitude; 1300 m of relief
  - Completely Different Geology N à S
  - 122 Fish – 16 Listed, 17 Introduced, 8 Endemic
  - 30 Mussels – 11 listed, 3 Introduced
- Atlanta in the North; Extensive Agriculture in the South
- Many Agencies Regulating Various Aspects of Ecosystem
- Many Data Gaps Remain, Including Distribution
  - Fish is Very Hard to Sample Using Conventional Gears
- Much Stream Degradation Likely Occurred Before WWII


“Problems are Opportunities!”


Georgia
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Fishing.com


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GEORGIA
POWER
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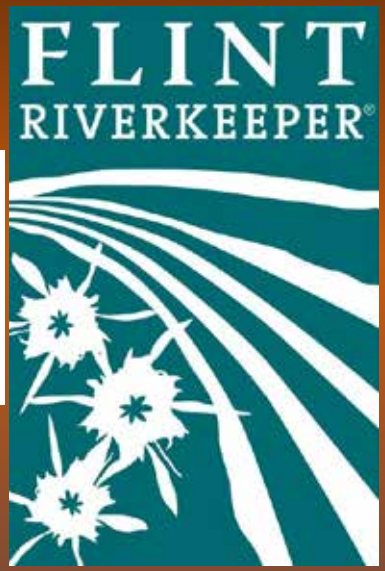
ALABAMA
WILDLIFE & FRESHWATER FISHERIES


NATIONAL FISH AND WILDLIFE FOUNDATION
NFWF


AUBURN
UNIVERSITY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GEORGIA
DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION


CHATTAHOOCHEE
RIVER CONSERVANCY