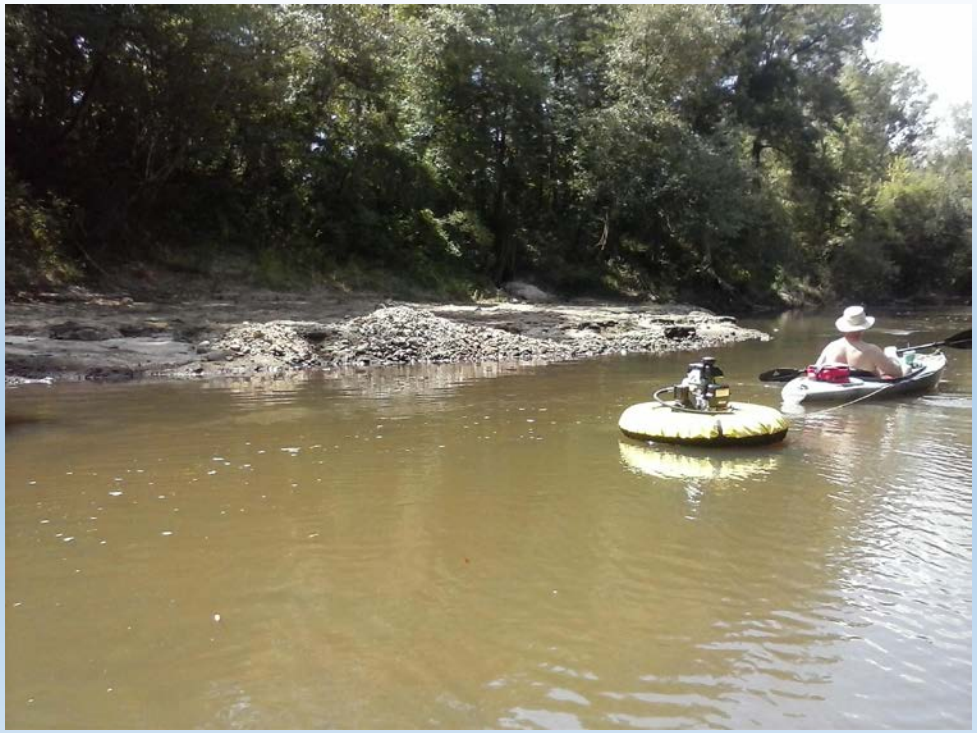
Updated Sampling of Federally Listed Mussels in the Upper Pea River

Jonathan M. Miller & Paul M. Stewart

Background

- Unionids are the second most endangered fauna in North America
  - 72% of 298 North American species imperiled
- 182 species native to Alabama (more to come?)
- 59 species federally listed
- 21 native species of mussels in Choc-Pea
- Bioindicators



Background

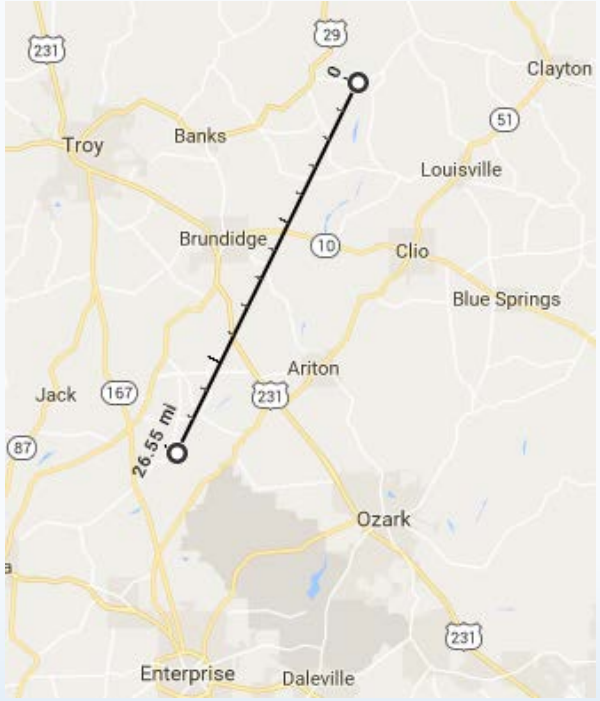
- Eight species federally listed T&E in SE AL (USFWS 2012)
- Species listed as T&E in Pea River watershed (5 sp)
- Recent studies have targeted preferred habitat by some species (Niraula et al. 2015a, Niraula et al. 2015b, Niraula et al. *In press*)
  - Flow
  - Instream habitat
  - Stable substrate (lack of sedimentation)
- The results were further taken to implement in the field

And it all started with:
"Ain't this one of them mussels that you're looking for"
Meanwhile a buddy begins singling out juvenile
P. strodeanum from an abundance of *Corbicula* sp. in small pits in hardpan

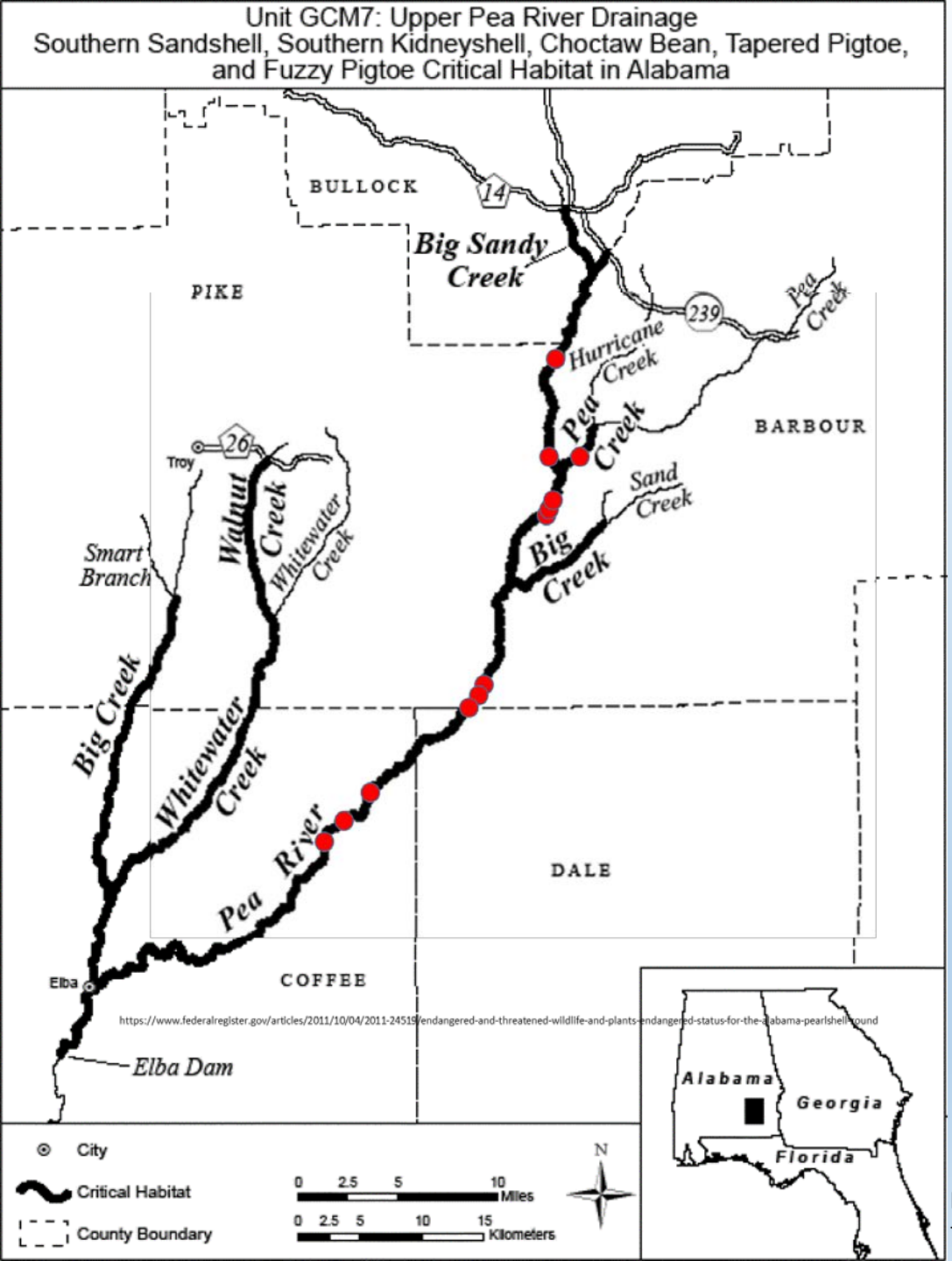
Objectives

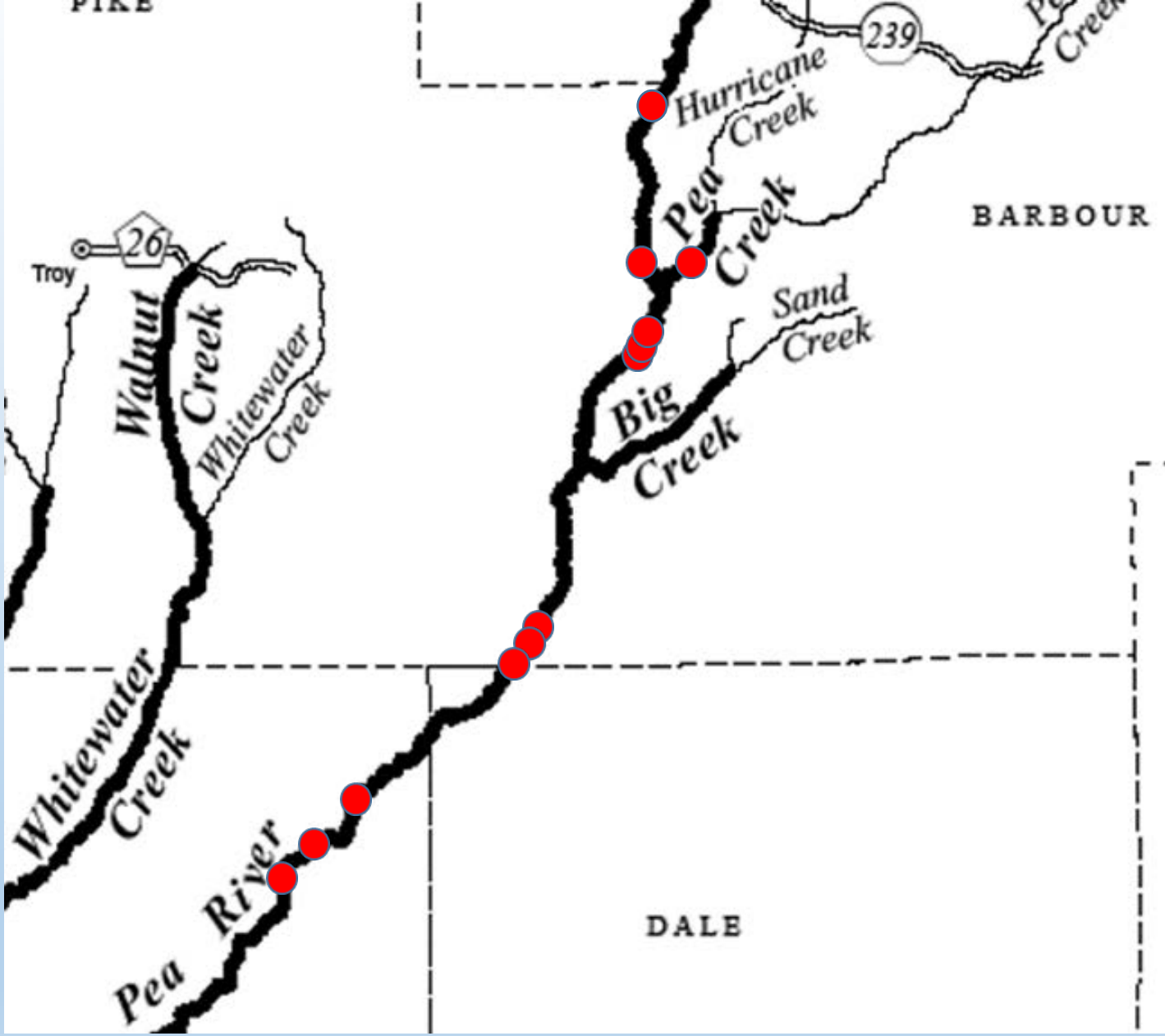
- Determine if recent research on preferred habitat can be applied in the field to locate the federally listed species, and if so…
- Determine if *Hamiota australis*, *Fusconaia burkei*, *Pleurobema strodeanum*, *Obovaria choctawensis*, and/or *Ptychobranchus jonesi* are still found in the upper reaches of Pea River and tributaries.
- Determine status of populations if found (e.g., abundant, few, or none)
  - By reach/area

Methods



- Sites from ~1.5 km S of Bullock County (CR44) to Snell Grove (CR138)
  - Number of sites = 12
  - Counties: Pike, Barbour, Dale, and Coffee
  - ~43 linear km reach
- Preferred sampling occurred during low water levels to adjust for criteria during low flow conditions (flow!)
- Locations were sampled after searching for habitat (visually then tactile)
- Generally followed protocols (Carlson et al. 2008), but targeted
  - minus distance/time requirements





12 Sites sampled

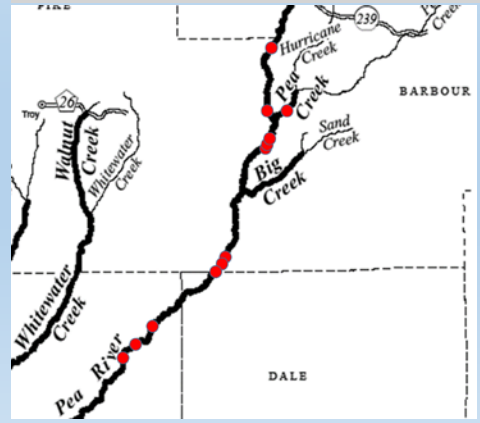
https://www.federalregister.gov/articles/2011/10/04/2011-24519/endangered-and-threatened-wildlife-and-plants-endangered-status-for-the-alabama-pearlshell-round

Results

Sites north to south

Site		Species	Live (Dead)		Notes	Search time	Area searched
1	CR 6628					3 hrs	100m
2	Pea Creek CR9	*F. burkei*	3			2 hrs	50m
		A. radiatus	1				
3	HWY 130	*F. burkei*	1		Lg	2 hrs	
4	Barbaree property	*P. strodeanum*	12			3.75 hrs	20x15m
		H. australis	9				
		A. radiatus	7				
5	Barbaree property	*P. strodeanum*	2		all juv	3 hrs	150x18m
6	Barbaree property	*P. strodeanum*	6		1 juv	3 hrs	50x20m
		F. burkei	1				
		H. australis	1				
7a	Jack Jones	*P. strodeanum*	145		many juv	1 hr	30m left bank DS of bridge
		F. burkei	5		1 juv		
		H. australis	11		3 juv		
		A. radiatus	1				
7b	Jack Jones	*P. strodeanum*	42		~22 juv	1 hr	100m left bank DS of bridge
		F. burkei	5		1 juv		
		H. australis	4		1 juv		
		A. radiatus	1				
8	DS of Jack Jones	*P. strodeanum*	4(25)	25	all juv	1.5 hrs	
		F. burkei	1				
		H. australis	4(11)	11	Males dead, conglutinate		
9	DS of Jack Jones	*P. strodeanum*	2		all juv	0.17 hrs	5m
10	US of 107	*P. strodeanum*	1			0.75 hrs	30m of 1 bank
		H. australis	1				
11	Btw Johnsons and Snellgrove	*P. strodeanum*	8		all juv	0.33 hrs	Channel 10x10m
12	Snellgrove					1 hr	100m right bank US

Totals	T & E Live	268
	P. strodeanum	222
	F. burkei	16
	H. australis	30
	A. radiatus	10
	Person/hrs	22.5



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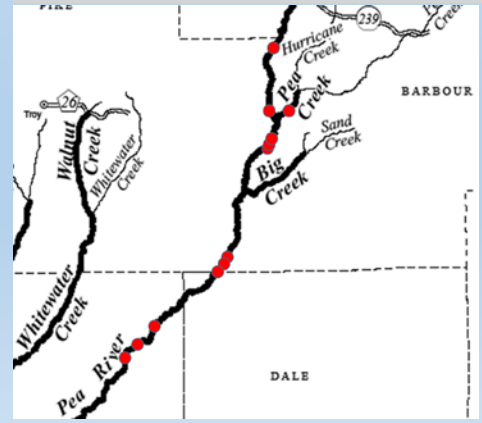


Results

- Targeting preferred habitat greatly reduced search time.

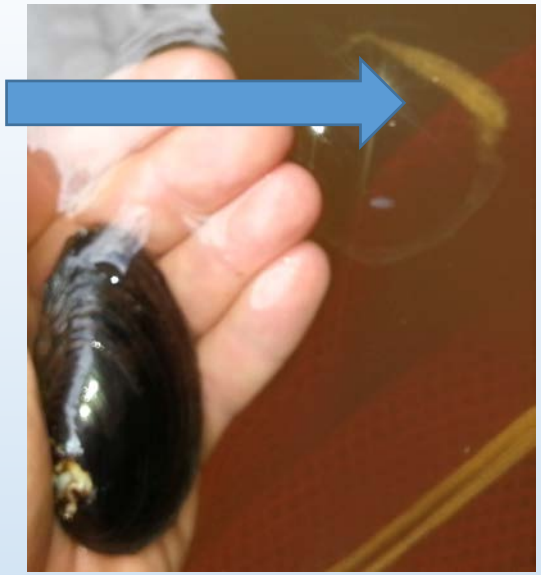
- *Hamiota australis*, *Fusconaia burkei*, and *Pleurobema strodeanum* are still found in at least specific reaches of the upper Pea River and Pea Creek near the confluence.
  - Other tributaries were searched but yielded very poor results

- Status of populations:
  - Remnant populations in areas with quality habitat
  - Few locations with larger populations
  - By reach/area – to be determined (good places and bad)
  - *Pleurobema strodeanum* was the most common of the listed species

Discussion

- Federally listed species were commonly (often easily) found by implementing previously found habitat preferences/requirements for targeted searches in preferred microhabitats
  - *Pleurobema strodeanum*, *Hamiota australis*, *Fusconaia burkei*
  - Candidate species also found on many occasions (*Anodontoides radiatus*)
  - Juveniles common at some locations, so recruitment is happening
    - Is recruitment spurred by some environmental influence (high recruitment of similar age groups, with large gaps)? *P. strodeanum* and *F. burkei*
- Sites impacted by large amounts of sediments typically low to no T & E species
    - Exception – *H. australis* (likes to move around)

Superconglutinate



Discussion

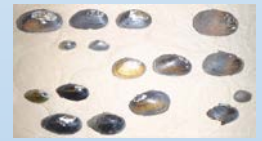
- Habitat specifications greatly reduced search time
- *Pleurobema strodeanum* fairly abundant in some reaches
- *Hamiota australis* (traveler) sparse but sometimes common
- *Fusconaia burkei* and *Anodontoides radiatus* usually rare
- Upstream reach may be limited to these species due to flow requirements
  - Most northern site with no flow during low water conditions
    - near Bullock county
- No indication of *Ptychobranchus jonesi* or *Obovaria choctawensis*
  - Different habitat preferences/requirements?

Discussion

- Targeting habitat preferences, especially during low flow, has shown to be highly beneficial, although not always reliable.
- Furthermore, the now common shifting coarse sand that has flooded our rivers and blanketed habitat throughout the watersheds does not appear to support any of the native mussels as long-term viable habitat.

Future of the Study

- CHRISTMAS DAY FLOOD ESTABLISHES NEW PEAK STAGE OF RECORD, BREAKING THE PEAK STAGE OF 25.0 FEET IN 1929. (usgs.gov)
  - How do such flows impact mussel assemblages, especially species of concern? Dead shells on sand bars and stranded individuals have been common.



- So far, 2016 has been a wet year (1 sample).
- Continued surveys concentrating in the upper and lower reaches of the current study.
  - Where is *Ptychobranchus jonesi* from Gangloff & Hartfield (2009) survey?
    - Different habitat criteria and many hours of search time
  - *Obovaria choctawensis*?

Unknown species (2012)

Acknowledgements

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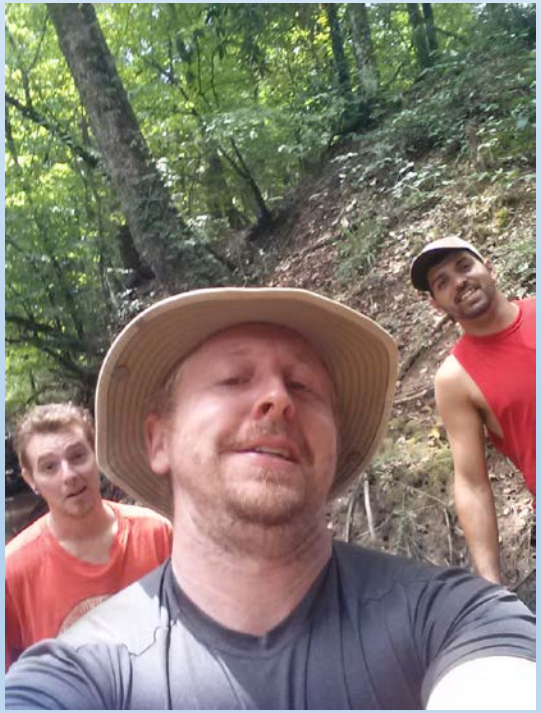

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