Gantt Lake Mussel Relocation

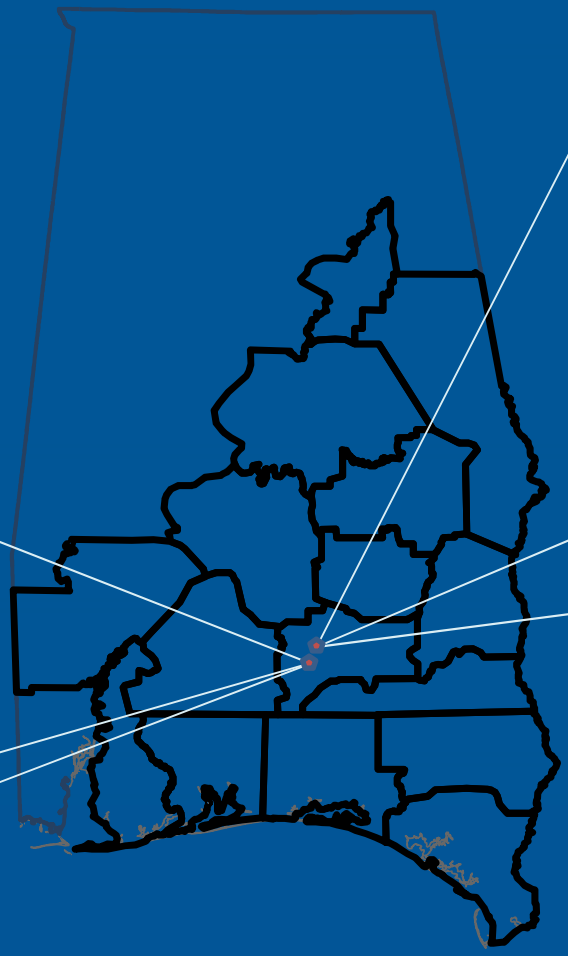
Alabama Rivers & Streams Network
January 14-15, 2020

Presenter: Trent Carnley

PowerSouth Service Territory

Gantt Hydroelectric Plant

Point A Hydroelectric Plant



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Why Drawdown?

- PowerSouth Point A and Gantt Dams must be routinely drawn down to perform safety inspections and necessary repairs to avoid an unplanned drawdown.

Year	Month	Duration	Rate	Level/Degree	Gantt or Point A	Reason
2017	September	13 weeks	0.5ft/day or 1.0ft/day	to run of river	Point A	To perform safety maintenance on dam.
2006	Mid October	5 weeks (Est.)	0.5 ft./day	5 ft. expected	Gantt	Coordinated maintenance activities with a drawdown requested by the Alabama DOT for bridge repair.
2005	Mid October to early December	~7 weeks	1-2 ft./day	6-7 ft.	Point A	Instrumentation installation for FERC requirement and gate repair at Point A.
1978-2005	*	2-4 weeks	Est. 1 ft./day	3-6 ft.	Both	During 1995-2005 timeframe (and probably for many years prior) each lake was lowered 3-6 feet for minor repairs and to allow landowners to repair seawalls and piers. These events occurred every 3-4 years.
1998	*	3 weeks (Est.)	Est. 2 ft./day	~6 ft.	Gantt	Siphon gate repair following damage that resulted from a flood.
1994	Nov 1 - Dec 9th	5 weeks	*	~6 ft	Gantt	Install boatramp at Clearview
1989-1991	*	~2 years	*	to run of river	Point A	FERC/AEC structural upgrades
1983-84	*	*	*	to run of river	Both	Gantt 4 (gate) installation, spillway rehab and Point A tainter gates maintenance.
1978	October 5th	~8 weeks	*	~16 ft.	Gantt	Work on tainter gates

Gantt Dam - 1929

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Avoiding a 1929 Repeat

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Gantt & Point A Lakes:
Fusconaia Escambia (Narrow Pigtoe)

- *Fusconaia escambia* listed as a candidate species in 2005.
- *Fusconaia escambia* discovered in Gantt Lake during 2006 drawdown.
- Eight Alabama mussel species (including *Fusconaia escambia*) and their critical habitat (including Gantt & Point A, Conecuh River, Patsaliga Creek) were listed in the Federal Register October 10, 2012.

Photos courtesy of USFWS.

Terms and Conditions of the USFWS Biological Opinion

- Conduct an **effort to recover, tag, and translocate listed mussels stranded on the substrate (dry lakebed)** following these drawdowns at Gantt and Point A Lakes.
- Conduct a study to examine the **survival of mussels that burrow** during the drawdown.
- **Delay the effective start date** on any PowerSouth permitted shoreline development projects until the mussel relocation effort has taken place.
- To the extent practicable, PowerSouth should **limit public access to the dry lake** or river bed during the drawdown by gating or cabling off public access points.

Burrowing Study

Gantt Lake Drawdown

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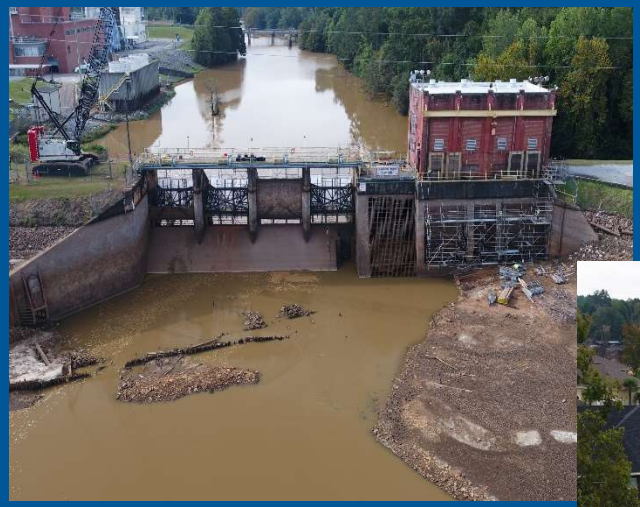
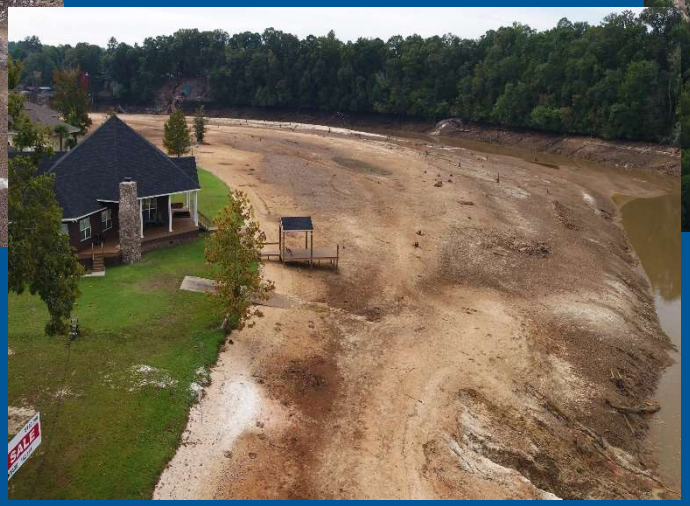
The Drawdown

- The lake was lowered **slowly for the first ten days** (six inches the first two days then one foot day for the next eight days) to allow mussels the chance to burrow.
- The remaining water (past 8 feet) was then released at a quicker rate based on safety.





Gantt Mussel Relocation Effort

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What was Involved?

- **Six different State or Federal agencies,** students from **five different colleges,** fellow power producer Alabama Power Company**,** multiple engineering firms, and several other helpful organizations assisted with the relocation of stranded mussels.
- Each day of the mussel relocation there was approximately **35-70 people** from PowerSouth, the Agencies, and local colleges assisting with 96 different people participating throughout the week.
- The Lake was divided in to **160 grids.**
- Teams traversed the exposed lake bottom by grid each day looking for stranded listed and state species of concern mussels.
- Mussels were **bagged by grid**, which helped us to know where to concentrate search efforts for the next day.
- Teams delivered the rescued mussels to Point A Lodge where they were tagged and data logged (**measurements, tag #, relocation destination**).
- Teams from the Agencies relocated all of the mussels to Point A Lake.

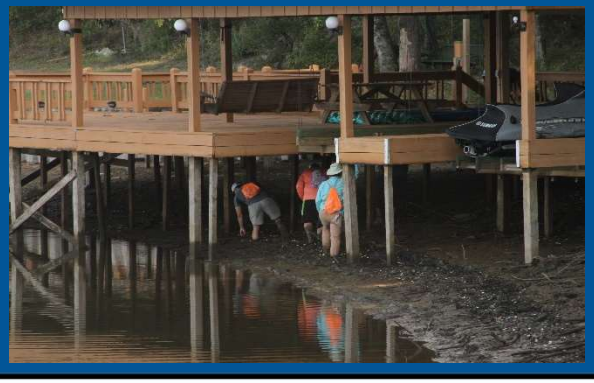
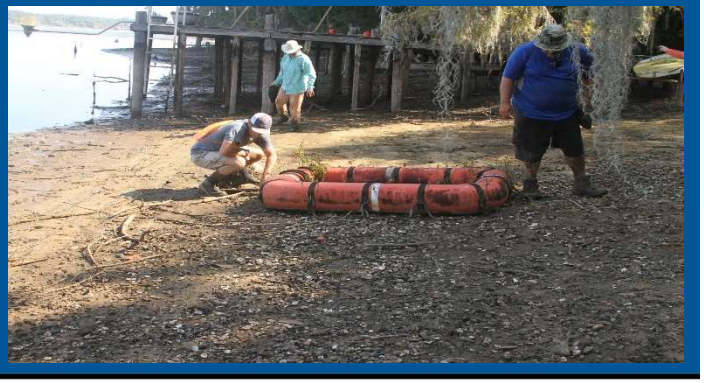
Lots of Hard Work









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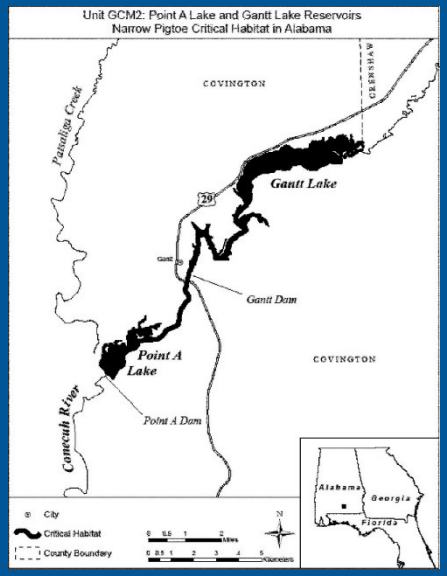
A Field Guide to Freshwater Mussels in Point A and Gantt Lakes

Federally Threatened or Endangered

Narrow pigtoe (*Fusconaia escambia*)
Federal Status – **Threatened**
AL State Rank – Imperiled
Maximum length: 3"
Locally common within Point A and Gantt Lakes, also known from Patsaliga Creek and upper Conecuh River.
Narrow pigtoe will be the most commonly encountered Federally listed species in the project area. **(Heavy shelled)**

Choctaw bean (*Obovaria choctawensis*)
Federal Status – **Endangered**
AL State Rank – Imperiled
Maximum Lenth: 2"
Unlikely to occur within the reservoir, may occur in the riverine portions, but uncommon.

Southern kidneyshell (Ptychobranchus jonesi)
Federal Status – **Endangered**
AL State Rank – Critically Imperiled
Maximum Lenth: 3"
Unlikely to occur within the reservoir, may occur in the riverine portions, but uncommon.



Alabama Species of Concern

Fuzzy pigtoe (*Pleurobema strodeanum*)
Federal Status – **Threatened**
AL State Rank – Imperiled
Maximum Lenth: 3"
Uncommon within the reservoir, also known from Patsaliga Creek and upper Conecuh River.

Southern sandshell (*Hamiota australis*)
Federal Status – **Threatened**
AL State Rank – Imperiled
Maximum Lenth: 3"
Unlikely to occur within the reservoir, may occur in the riverine portions, but uncommon.

Cypress floater will be located throughout Point A and Gantt Lakes in mud to muddy sand, often mixed with fine detritus. Will likely occur in backwater sloughs of creeks. **(Very thin shelled)**

Cypress floater (*Anodonta hartfieldorum*)
Federal Status – None
AL State Rank – Critically Imperiled
Maximum length: 4.5"
Common throughout Point A and Gantt Lakes, also locally common in Patsaliga Creek and upper Conecuh River.

The Gulf lilliput is sexually dimorphic. Females (top left) are more inflated posteriorly than males (bottom right).

It typically inhabits stream or lake margins in substrates of sand and sandy mud.

Gulf lilliput (*Toxolasma sp.*)
Federal Status – None
AL State Rank – Imperiled
Maximum length: 2"
Common throughout Point A and Gantt Lakes, and from Patsaliga Creek and upper Conecuh River.

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A Field Guide to Freshwater Mussels in Point A and Gantt Lakes

Common Species – No Mussel Salvage

Giant floater (*Pyganodon grandis*)
Maximum length: 5“
Common throughout Point A and Gantt Lakes, also locally common in Patsaliga Creek and upper Conecuh River. Found in mud to muddy sand, often mixed with fine detritus. Will likely occur in backwater sloughs of creeks. Giant floater has more inflated umbo than cypress floater or paper pondshell. **(Thin shelled)**

Paper pondshell (*Utterbackia imbecillis*)
Maximum length: 4“
Very common throughout Point A and Gantt Lakes, also common in Patsaliga Creek and upper Conecuh River. Found in mud, sandy mud, and sand substrates in standing or slow-flowing water. Will likely occur in backwater sloughs of creeks. Has straight dorsal margin with umbo typically evan with hinge line, usually shiny. **(Thin shelled)**

Southern rainbow (*Villosa vibex*)
Maximum length: 4“
Common throughout Point A and Gantt Lakes, and very common in Patsaliga Creek and upper Conecuh River. Found in slow to moderate current in sandy mud, sand, and gravel substrates. Typically shiny with green rays usually wider and darker posteriorly.

Little spectaclecase (Villosa lienosa)
Maximum length: 2.5“
Common throughout Point A and Gantt Lakes, and very common in Patsaliga Creek and upper Conecuh River. Found in slow to moderate current sand, sandy mud and fin gravel. The little spectaclecase is sexually dimorphic. Females (bottom) are more inflated posteriorly than males (top).

Gulf spike (*Elliptio pullata*)
Maximum length: 4.5“
Most commonly encountered mussel throughout Point A and Gantt Lakes, also very common in Patsaliga Creek and upper Conecuh River. Found in multiple habitat types, ranging from fine to coarse sediments. **(Heavy shelled)**

Asian clam (*Corbicula fluminea*)
Maximum length: 2“
Exotic clam (not a mussel) that is the most abundant and ubiquitously distributed bivalve in inland waters. Very common throughout Point A and Gantt Lakes and surrounding creeks.

The Asian clam can be easily identified by its round to triangular shape with numerous evenly spaced, thin, concentric ridges.

Be careful not is mistake a juvenile narrow pigtoe for an Asian clam.

Florida sandshell (*Lampsilis floridensis*)
Maximum length: 5“
Uncommon within Point A and Gantt Lakes, but more common from Patsaliga Creek and upper Conecuh River.
Found in slow to moderate current in sand to sandy mud substrate. Shell is yellow and shiny, but more elongate than southern fatmucket. **(Heavy shelled)**

Southern fatmucket (*Lampsilis straminea*)
Maximum length: 4.5“
Uncommon to common within Point A and Gantt Lakes, but more common from Patsaliga Creek and upper Conecuh River.
Found in slow to moderate current in sandy mud, sand and gravel substrates. Shell is yellowish to brown and shiny, but less elongate than Florida sandshell.

Photo credits: U.S. Fish and Wildlife Service, PowerSouth Energy Cooperative, and Michael Gangloff, Appalachian State University

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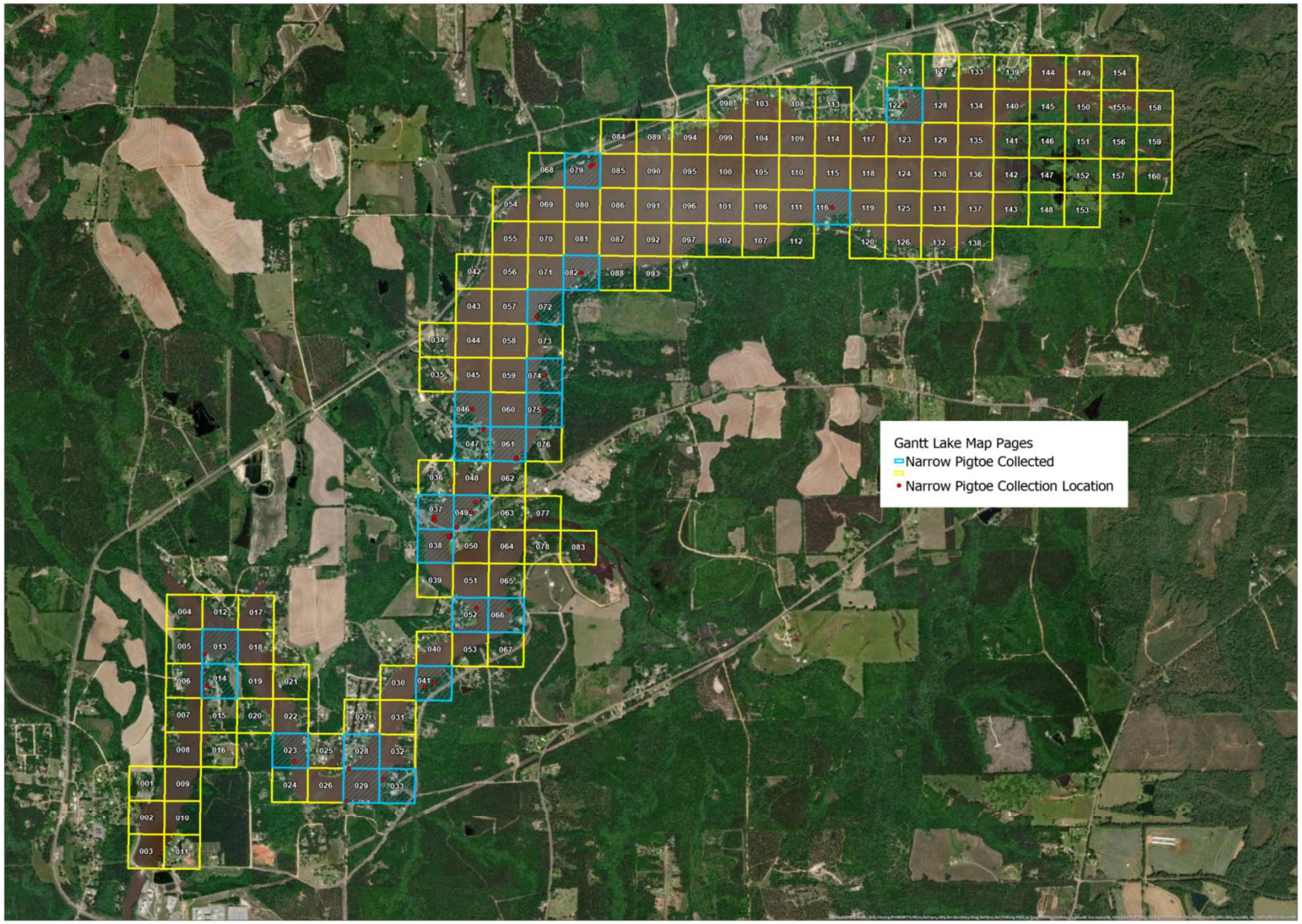
Counting, Tagging, Measuring, and Recording

Fusconaia escambia Data Points

- 3,817 FE were relocated to Point A Lake during relocation and study.
- 569 FE were found in Grid 074.
- 1,732 Live FE (45%) were collected from grids 72,73,74,75, and 76. These grids consisted of 0.75 miles along the east shore, north of Dunn's Bridge
- FE were found as shallow as one foot and as deep as eight.
- Largest FE 90mm and smallest 18mm.
- Most observed FE tracked the receding water.



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Relocation to Point A Reservoir

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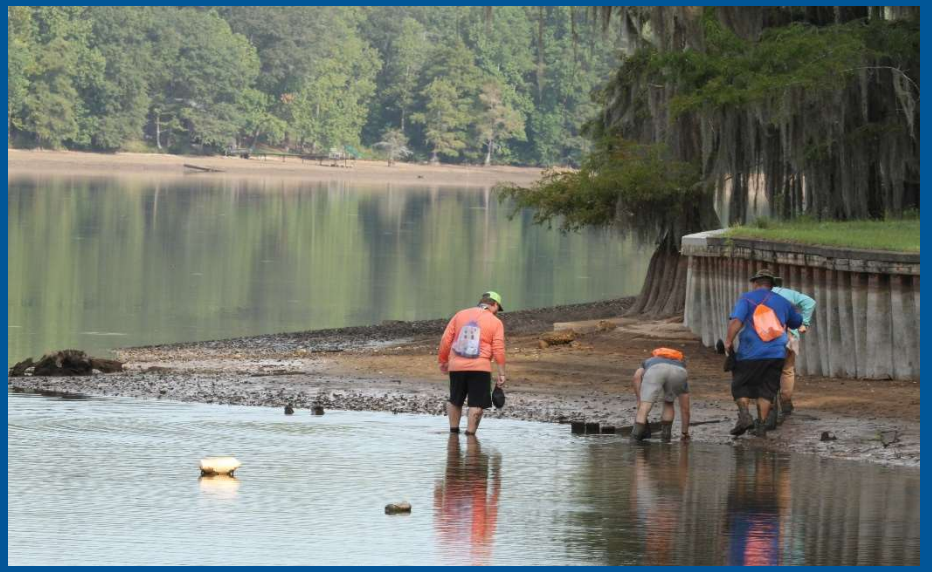
Lots of Hard Work

Lots of Hard Work



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How Many Mussels?

- 8,780 *Anodonta hartfieldorum* (Cypress Floater)



- 3,817 *Fusconaia escambia* (Narrow Pigtoe)


- 12,730 Total Mussels Relocated

Other Mussel Species

- Most species observed tracked the water as it was receding to a degree.
- The *Anodonta hartfieldorum* were plentiful through out the lake.
- At least thirteen different species of mussels were identified in Gantt Lake: *Anodonta hartfieldorum*, *Elliptio pullata*, *Fusconaia escambia*, *Lampsilis floridensis*, *Lampsilis straninea*, *Pyganodom grandis*, *Toxolasma* sp., *Utterbackia imbecillis*, *Villosa lienosa*, *Villosa vibex*, *Quadrula succissa*, *Megalonaias nervosa*, *S. williamsi*

Mussels on the Move

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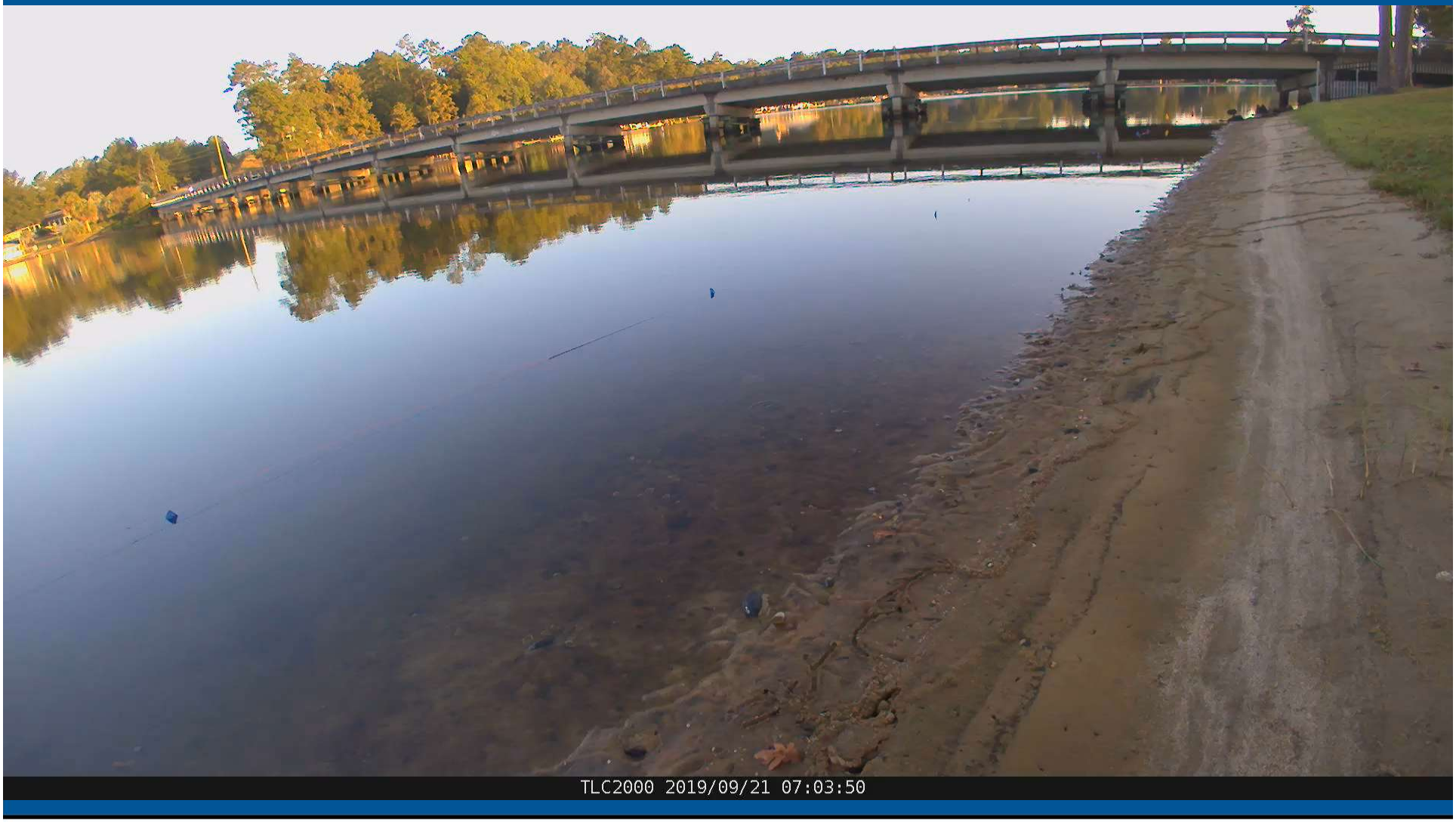
Mussels on the Move



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Thanks for the Help!

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Questions?