



Advisory Board Meeting with  
USFWS  
July 9, 2024

# GA-FIT Advisory Board

- Murray Campbell, farmer & Lower Flint-Ochlockonee (LFO) Water Council (Chair)
- Donald Chase, farmer & Upper Flint Water Council
- David Dixon, Miller Brewing (retired) & LFO Water Council
- Tommy Dollar, farmer, Dollar Farm Products
- Adam Graft, farmer & Upper Flint Water Council (Chair)
- Connie Hobbs, Baker County Commission (Chair) & LFO Water Council
- Tom McCall, Georgia Farm Bureau (President)
- Marty McLendon, farmer & Flint River S&W Conservation District
- T.E. Moye, farmer & Georgia Federal-State Inspection Service (President)
- Andy Payne, farmer and Lower Chattahoochee S&W Conservation District
- Gordon Rogers, Flint Riverkeeper & Upper Flint Water Council
- Richard Royal, LFO Water Council
- Jayme Smith, City of Colquitt, Economic Development
- Jimmy Webb, farmer & LFO Water Council

## Technical Support Team



...and others as needed.

## Federally Listed Freshwater Mussel Species in the HCP Area







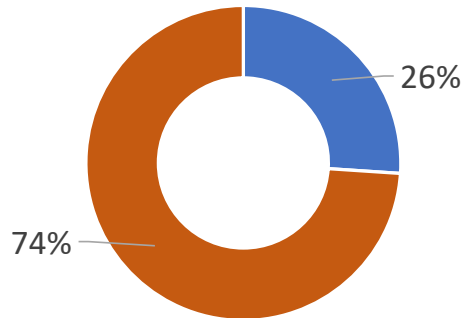
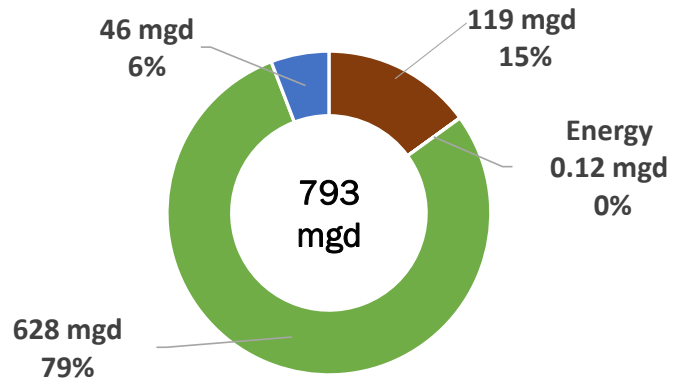
Scientific Name	Common Name	Federal Status	
<i>Hamiota subangulata</i>	Shinyrayed Pocketbook	Endangered	
<i>Medionidus penicillatus</i>	Gulf Moccasinshell	Endangered	
<i>Pleurobema pyriforme</i>	Oval Pigtoe	Endangered	
<i>Amblema neislerii</i>	Fat Threeridge	Endangered	
<i>Elliptoideus sloatianus</i>	Purple Bankclimber	Threatened	
<i>Alasmidonta triangulata</i>	Southern Elktoe	Proposed Endangered	

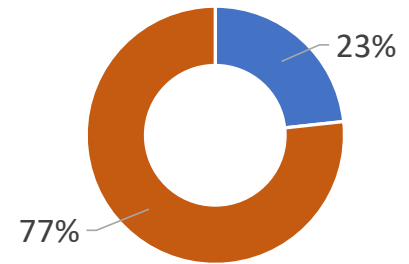
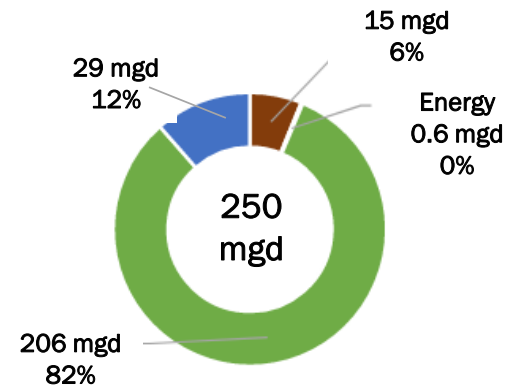
Photo credits: GADNR, USFWS

# 2020 Water Withdrawals (mgd)

Lower Flint-Ochlockonee



Upper Flint





# Lower Flint Region HCP Covered Area



# Lower Flint Region HCP Summary

Covered Species	Six listed species of freshwater mussels
Covered Area	Lower Flint River Basin (5 HUC 8's), Subarea 4 (Georgia portion), Sawhatchee Creek
ITP Permit Applicant & Holder	State of Georgia
Covered Activity	Agricultural water withdrawal program
Estimating Take	Hydrologic and habitat modeling
Evaluating Impact	Bayesian Network biological impacts model
Management Measures	Temporary source switching (Drought SWAP) Drought restrictions for new withdrawals Permit enforcement enhancements Temporary voluntary irrigation suspension Targeted flow augmentation Water quality improvements – sedimentation & erosion control Public education

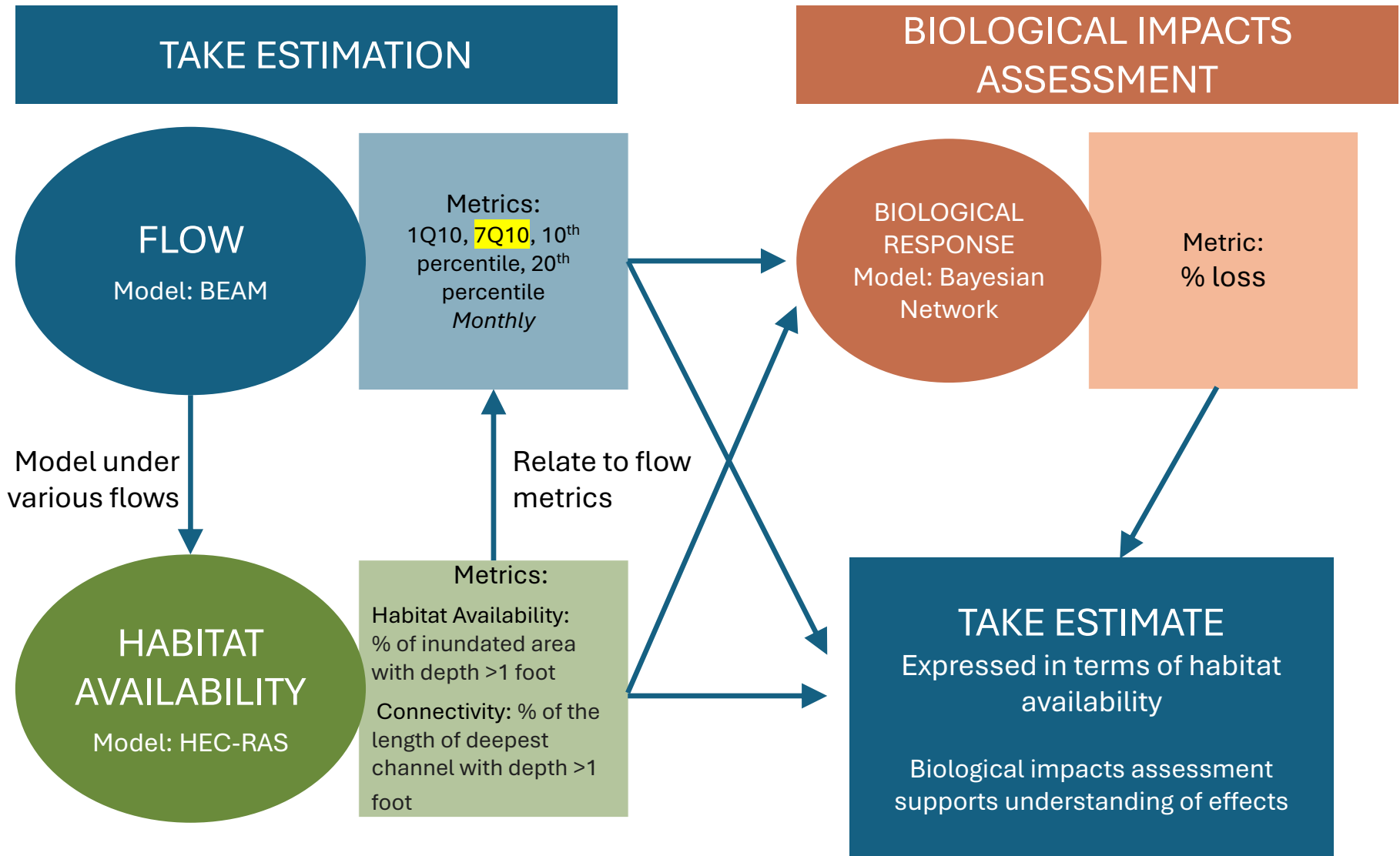
EPD Report on Activities  
Related to HCP  
Management Measures

*Anna Truszczynski*

HCP Modeling to Assess  
Impacts on Flows and Mussels  
*Preliminary Example of Results*

*HCP Modeling Team*

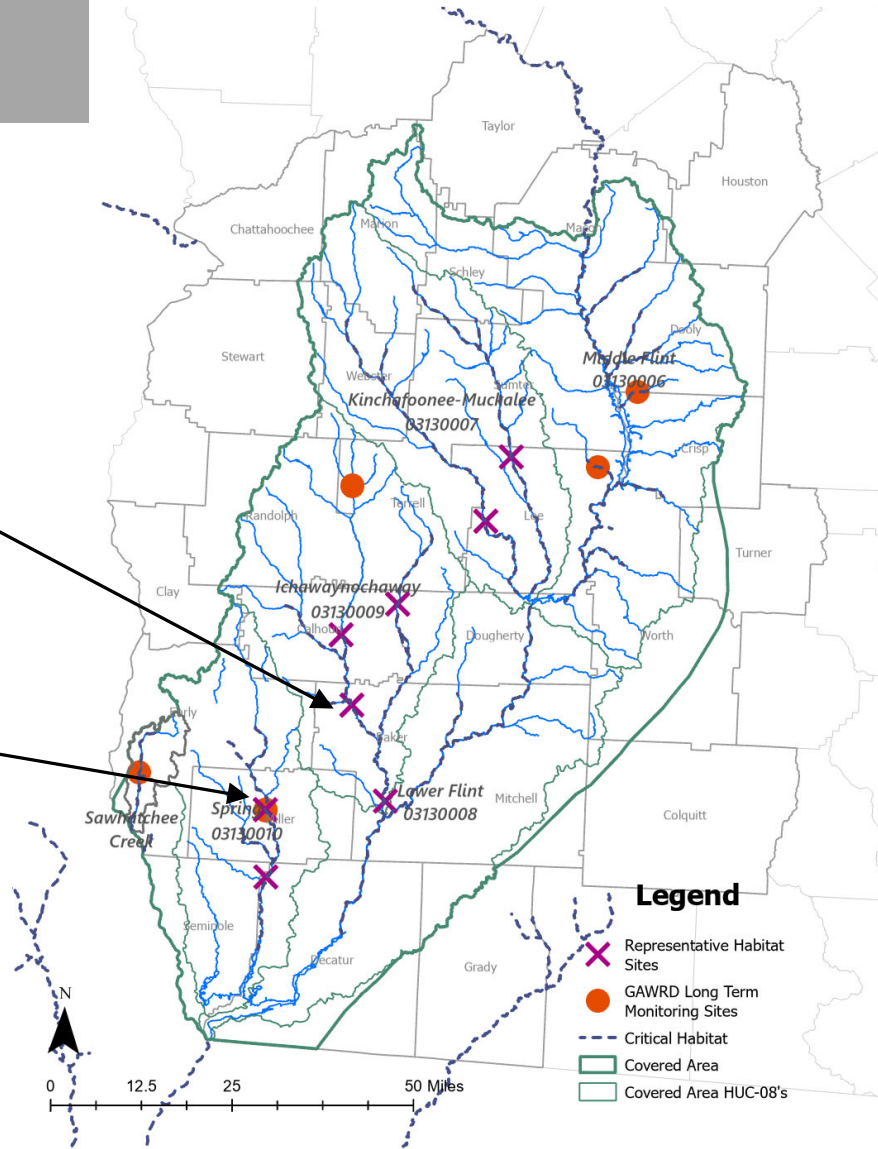




*Representative Reaches for Take Estimation Modeling*

Ichawaynochaway  
Creek at Milford

Spring Creek at  
Colquitt





Spring Creek at Colquitt  
June 27 & 28, 2024

## Modeling Scenarios

Alternative	Description
Baseline Scenario <i>baseline for analysis of take from proposed action</i>	Status quo on ag water use with no new/expanded withdrawals in covered area. This scenario would continue the 2012 permit suspension indefinitely. Not realistic for future management.
Ag 2060 Scenario <i>no HCP and limited actions to avoid, minimize, or mitigate take</i>	2012 permit suspension lifted Permitting for new and expanded ag water withdrawals proceeds under GAEPD's current rules procedures (including 2006 Flint Plan) Water demand forecasts from Regional Water Plans used to estimate 2060 withdrawals
Ag 2060 with HCP Scenario <i>proposed action</i>  <i>In today's presentation, results for this scenario only reflect <b>partial HCP implementation</b> (management measure #2). Future model runs will include the full set of management measures.</i>	2012 permit suspension lifted Permitting for new and expanded ag water withdrawals proceeds as proposed in the HCP Water demand forecasts from Regional Water Plans used to estimate 2060 withdrawals Implementation of the following avoidance/minimization measures: <ol style="list-style-type: none"> <li>1. Limiting withdrawals during drought through conditions in new/expanded agricultural water withdrawal permits</li> <li>2. Replace surface water withdrawals during drought with withdrawals from confined aquifers (Drought SWAP wells)</li> <li>3. Augmentation of streamflow during drought conditions</li> <li>4. Improvements in compliance with agricultural water withdrawal permits</li> <li>5. Voluntary and compensated irrigation suspension during drought in defined target areas</li> </ol> Implementation of sedimentation control practices as mitigation measures



## Model Outputs

*for each scenario*

*at each representative habitat site*

### Flow metrics (BEAM)

- Monthly 7Q10
- Monthly 1Q10
- Monthly 10<sup>th</sup> percentile
- Monthly 20<sup>th</sup> percentile

### Habitat metrics (HEC-RAS)

- Inundation metric: % of total inundated area at median growing season flow\* that has depth >1 foot
- Connectivity metric: % of the length of deepest channel (i.e., a longitudinal measure of distance along the thalweg) that has depth >1 foot

### Biological impact metric (Bayesian Network model)

- % loss (*by listed species or group of listed species*)

\*Median growing season flow (June-September) will be used as a reference condition to define area of potential mussel habitat at the representative sites

## Proposed Habitat Surrogate Take Estimate

### Change in available habitat

Expressed at each representative site  
for each covered species at that site  
based on change in inundation area metric

- The connectivity metric gives us more information about severe impacts to mussel populations
- The Bayesian Network model will help us to understand the impacts of habitat availability on mussel populations using best available data.
- Take may be expressed in terms of flow metrics for mainstem locations, if necessary

**Critical Habitat & Mussel Observations  
in Representative Reaches**

Representative Reach		Critical Habitat					Occurrence in Same HUC 10 GAWRD & Jones Center 2023-2024						
		Southern Elktoe	Shiny-Rayed Pocket-book	Purple Bank-climber	Gulf Moccasin-shell	Oval Pigtoe	Fat Three-ridge	Southern Elktoe	Shiny-Rayed Pocket-book	Purple Bank-climber	Gulf Moccasin-shell	Oval Pigtoe	Fat Three-ridge
Muckalee Creek		-	✓	✓	✓	✓	-	✓ <10 yrs	-	✓ >25 yrs	✓ >25 yrs*	-	
Kinchafoonie Creek		-	✓	✓	✓	✓	-	✓ 11-25 yrs*	-	✓ 11-25 yrs	✓ >25 yrs*	-	
Chickasawhatchee Creek South of Rte 234		-	✓	✓	✓	✓	✓	✓ >25 yrs	-	✓ 11-25 yrs	✓ 11-25 yrs	-	
Ichaway-nochaway Creek	S of Hwy91	✓	✓	✓	✓	✓	✓	✓ <10 yrs	✓ <10 yrs	✓ <10 yrs	-	-†	-‡
	N of Milford	-	✓	✓	✓	✓	✓	-	✓ 11-25 yrs	-	✓ >25 yrs	✓ >25 yrs	-
	N of Morgan	-	✓	✓	✓	✓	✓	-	✓ 11-25 yrs	-	✓ >25 yrs	-	-
Spring Creek	Colquitt	-	✓	✓	✓	✓	✓	-	✓ <10 yrs	-	-	✓ <10 yrs	-
	Brinson	-	✓	✓	✓	✓	✓	-	✓ <10 yrs	-	✓ >25 yrs	✓ >25 yrs	-

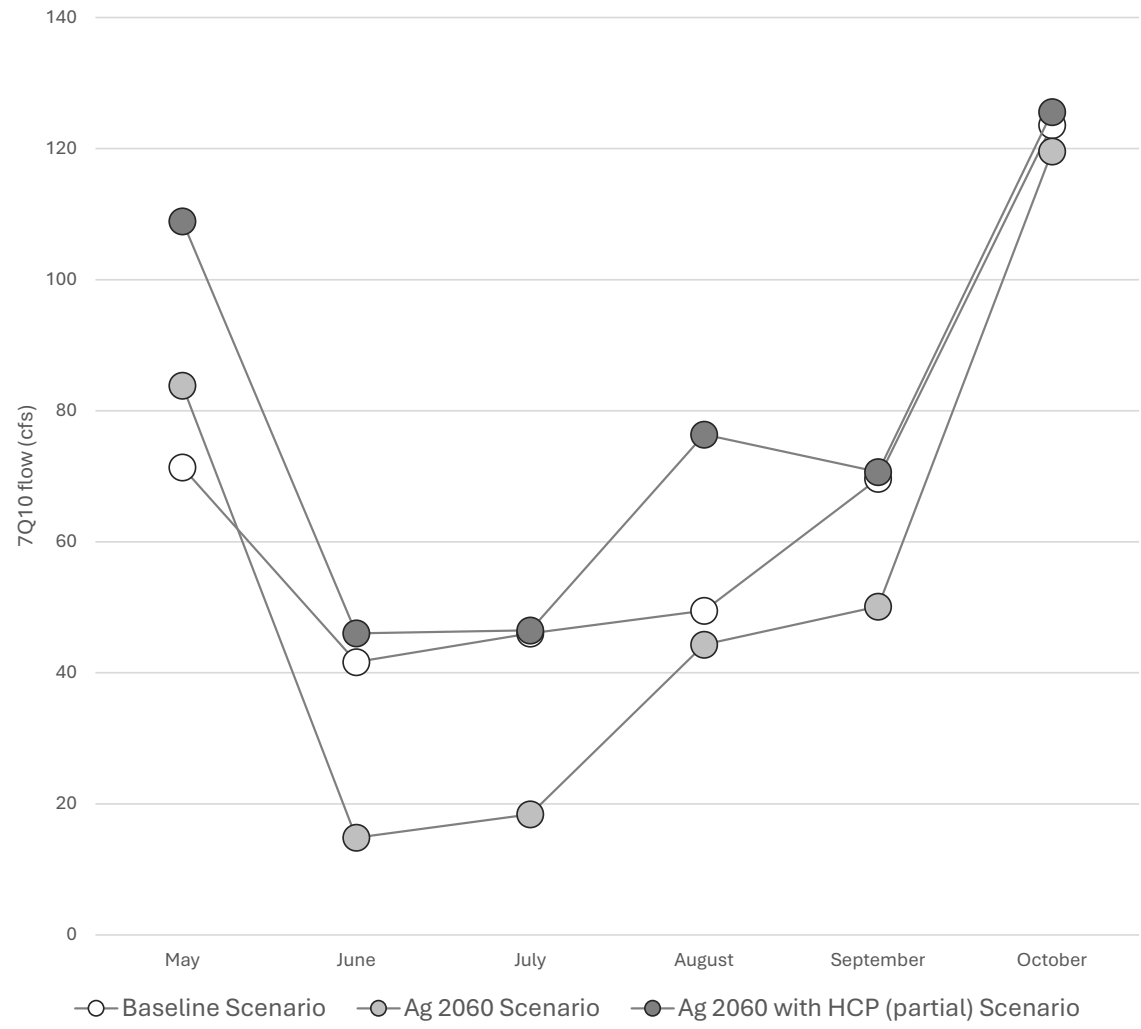
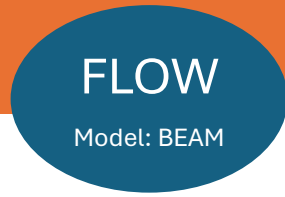
\* Site is just downstream of HUC10 with occurrence in past year.

† Site is just upstream of HUC 10 with occurrence (>25 years).

‡ Site is just upstream of HUC 10 with occurrence (<10 years) and close to another HUC 10 with occurrence (<10 years).

Estimated 7Q10 Flows: Ichawaynochaway at Milford  
 Period of Record 1939-2018

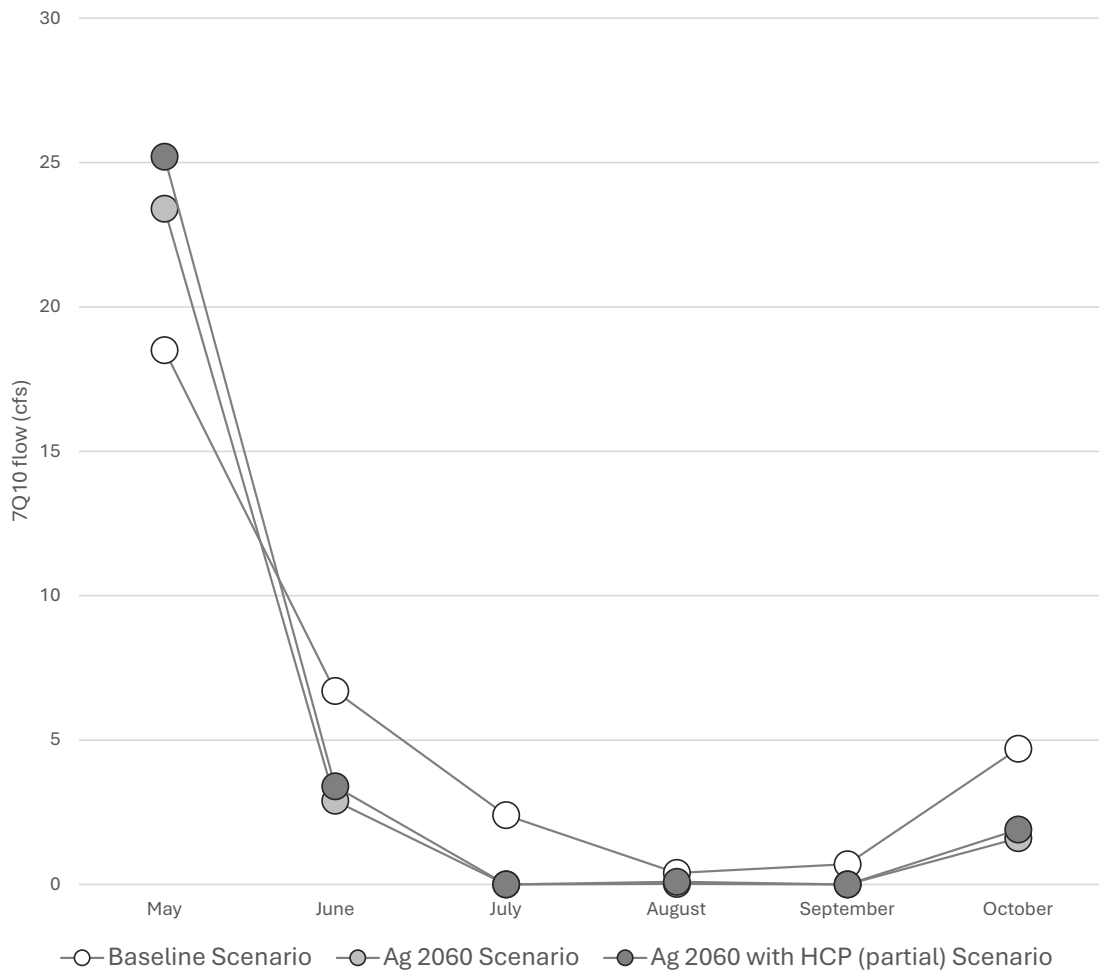
**PRELIMINARY RESULTS**  
 Use for discussion purposes only



Scenario	7Q10					
	May	June	July	Aug	Sept	Oct
Baseline	71.4	41.7	46.0	49.5	69.6	123.6
Ag 2060	83.8	14.9	18.4	44.3	50.1	119.6
Ag 2060 with HCP (partial)	108.9	46.0	46.5	76.4	70.7	125.6

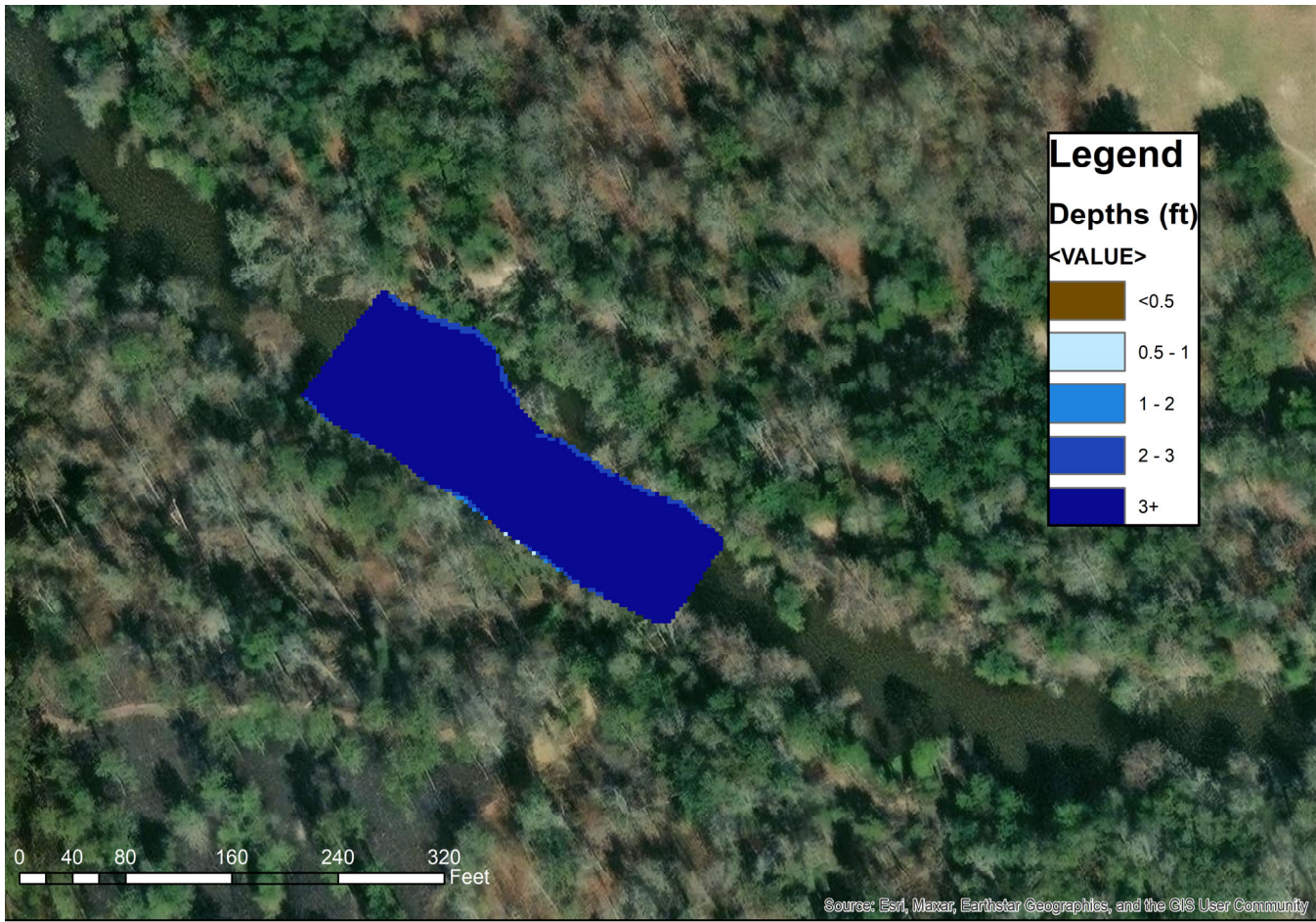
Estimated 7Q10 Flows: Spring Creek at Colquitt  
 Period of Record 1939-2018

**PRELIMINARY RESULTS**  
 Use for discussion purposes only



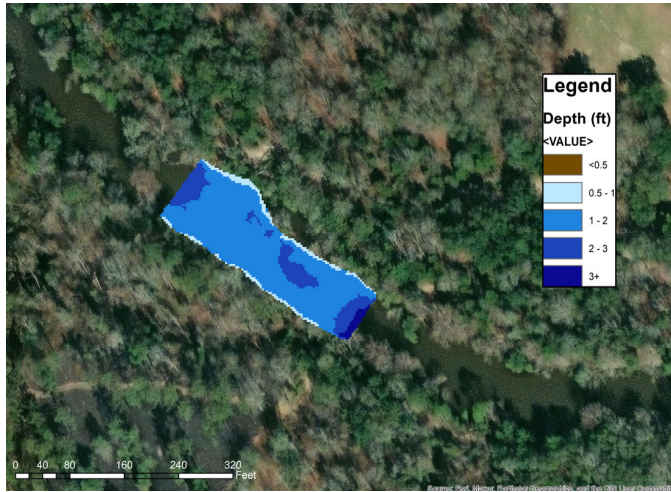
Scenario	7Q10					
	May	June	July	Aug	Sept	Oct
Baseline	18.5	6.7	2.4	0.44	0.7	4.7
Ag 2060	23.4	2.9	0.0	0.02	0.0	1.6
Ag 2060 with HCP (partial)	25.2	3.4	0.0009	0.09	0.0	1.9



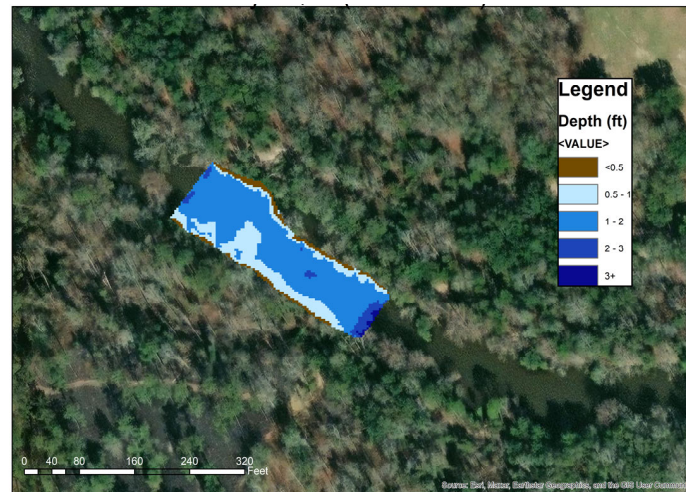


Flow: 287 cfs  
Inundation (>1 ft):  
30,582 ft<sup>2</sup>  
100%  
500,523 ft<sup>2</sup>/mile  
Connectivity: 100%  
Stream miles: 0.0611

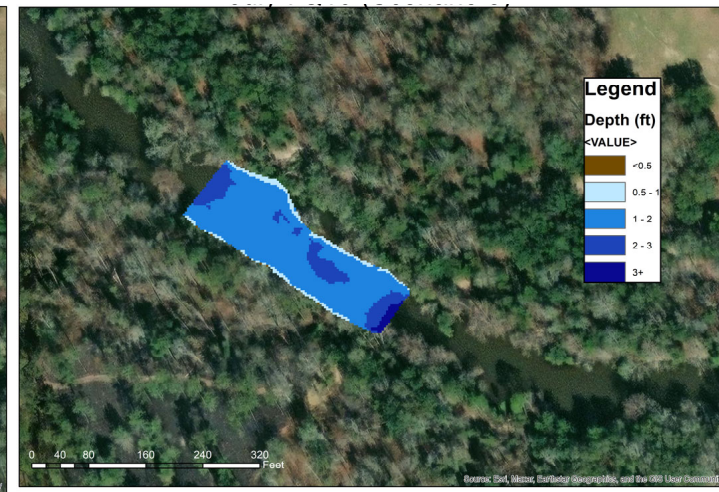
Baseline Scenario



Ag 2060 Scenario



Ag 2060 with HCP (partial) Scenario



46.0 cfs

Inundation (>1 ft):

28,224 ft<sup>2</sup>

92.3%

461,931 ft<sup>2</sup>/stream mile

Connectivity: 100%

18.4 cfs

Inundation (>1 ft):

21,051 ft<sup>2</sup>

68.8%

344,533 ft<sup>2</sup>/stream mile

Connectivity: 100%

46.5 cfs

Inundation (>1 ft):

28,305 ft<sup>2</sup>

92.6%

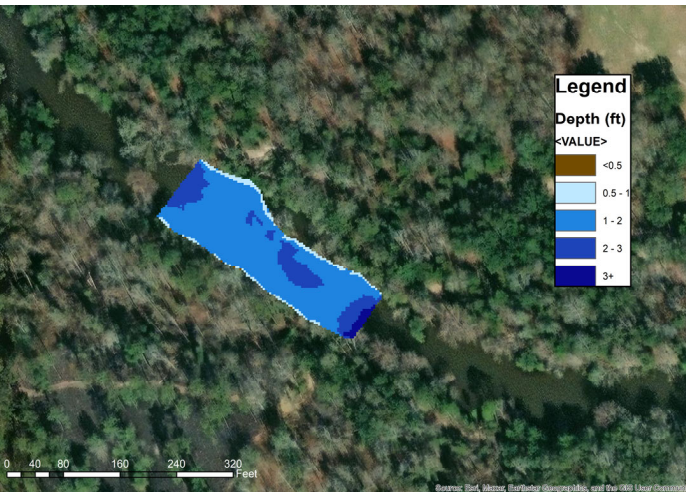
463,257 ft<sup>2</sup>/stream mile

Connectivity: 100%

Take Estimate: 0 ft<sup>2</sup>



Baseline Scenario



Ag 2060 Scenario



Ag 2060 with HCP (partial) Scenario



49.5 cfs

Inundation (>1 ft):

28,566 ft<sup>2</sup>

93.4%

467,529 ft<sup>2</sup>/stream mile

Connectivity: 100%

44.3 cfs

Inundation (>1 ft):

28,053 ft<sup>2</sup>

91.7%

459,132 ft<sup>2</sup>/stream mile

Connectivity: 100%

76.4 cfs

Inundation (>1 ft):

30,339 ft<sup>2</sup>

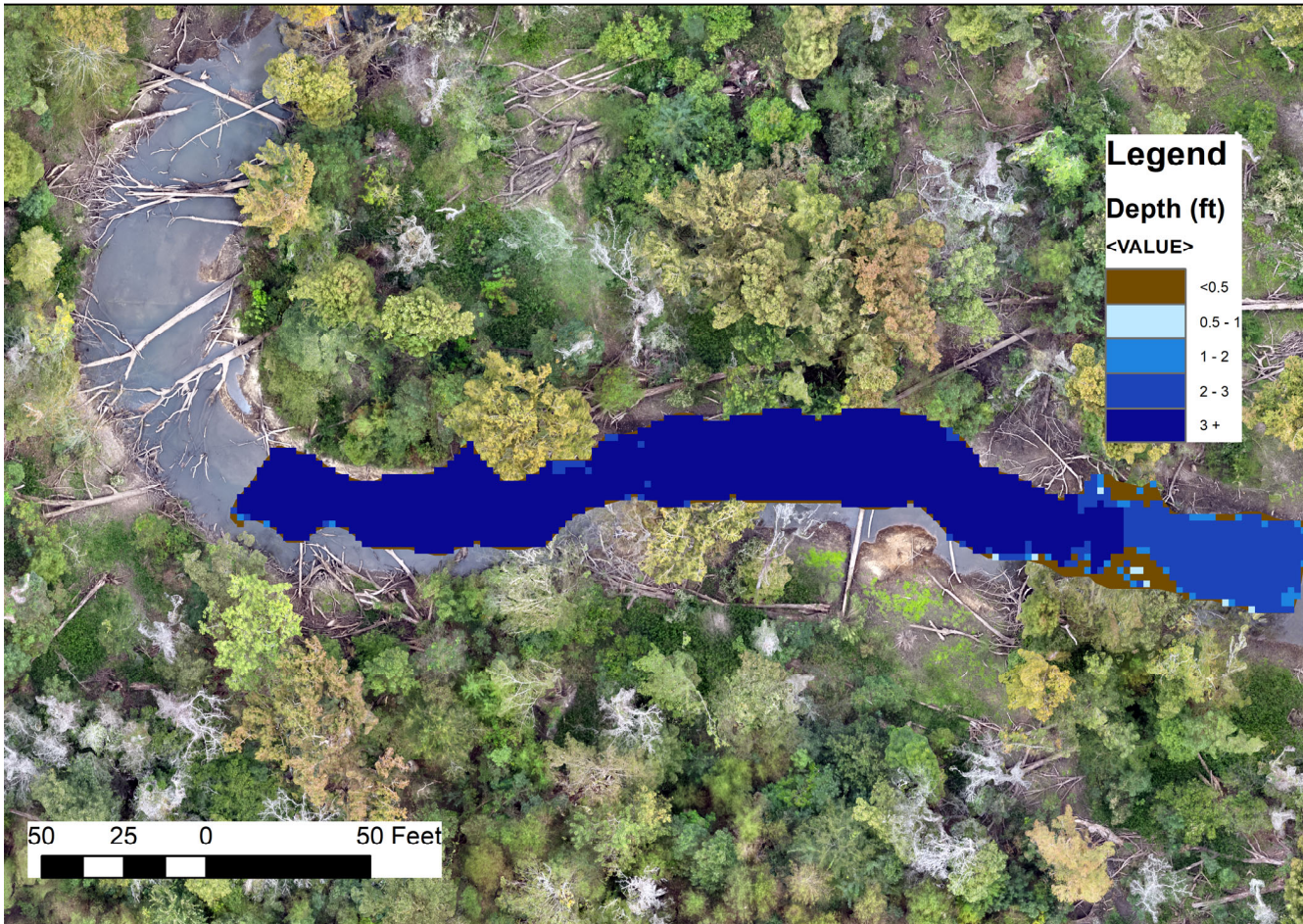
99.2%

496,547 ft<sup>2</sup>/stream mile

Connectivity: 100%

Take Estimate: 0 ft<sup>2</sup>

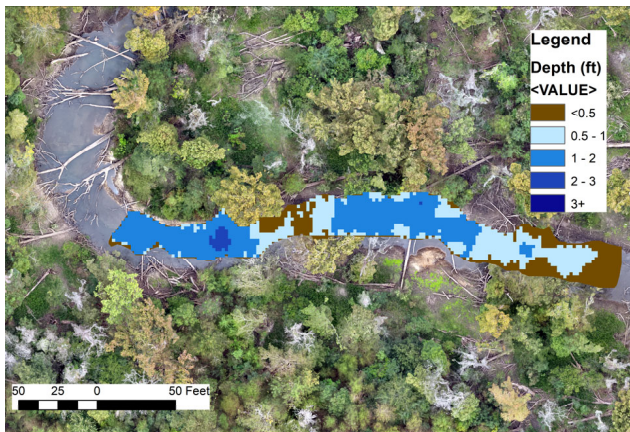




Flow: 64.1 cfs  
Inundation (>1 ft):  
7,782 ft<sup>2</sup>  
100%  
124,172 ft<sup>2</sup>/stream mile  
Connectivity: 100%  
Stream miles: 0.063



Baseline Scenario



2.41 cfs

Inundation (>1 ft):

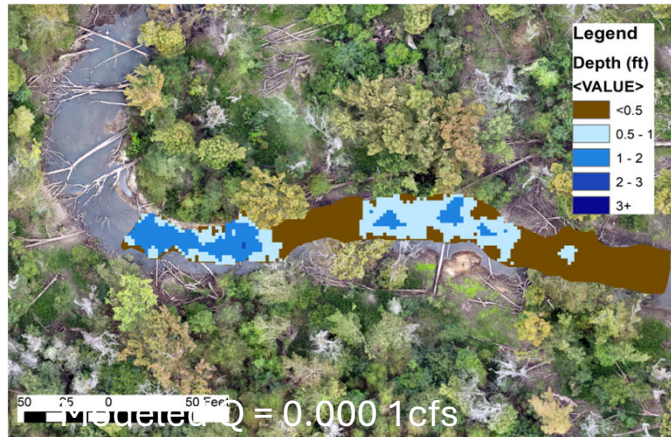
3,881 ft<sup>2</sup>

49.9%

62,101 ft<sup>2</sup>/stream mile

Connectivity: 56.6%

Ag 2060 Scenario



~0 cfs

Inundation (>1 ft):

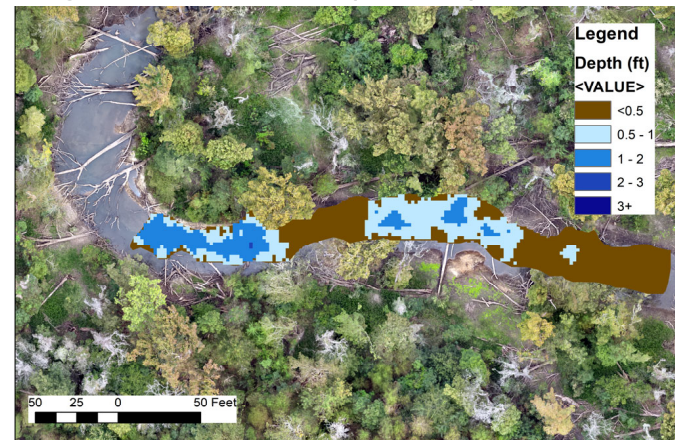
<1,475 ft<sup>2</sup>

<19.0%

<23,594 ft<sup>2</sup>/stream mile

Connectivity: <36%

Ag 2060 with HCP (partial) Scenario



0.0009 cfs

Inundation (>1 ft):

1,475 ft<sup>2</sup>

19.0%

23,594 ft<sup>2</sup>/stream mile

Connectivity: 36%

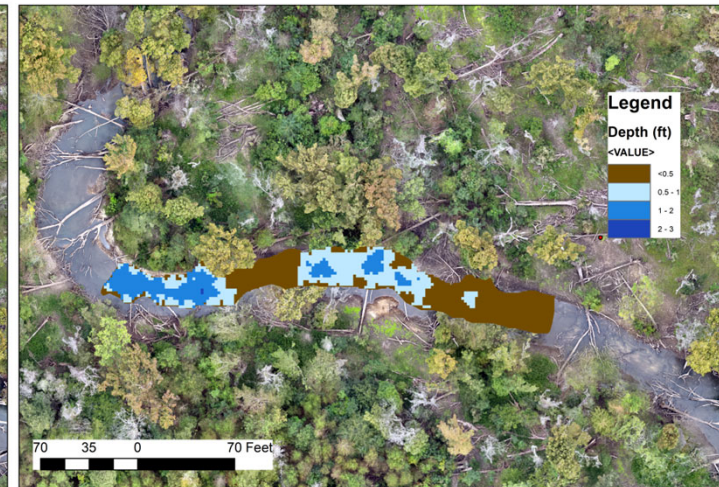
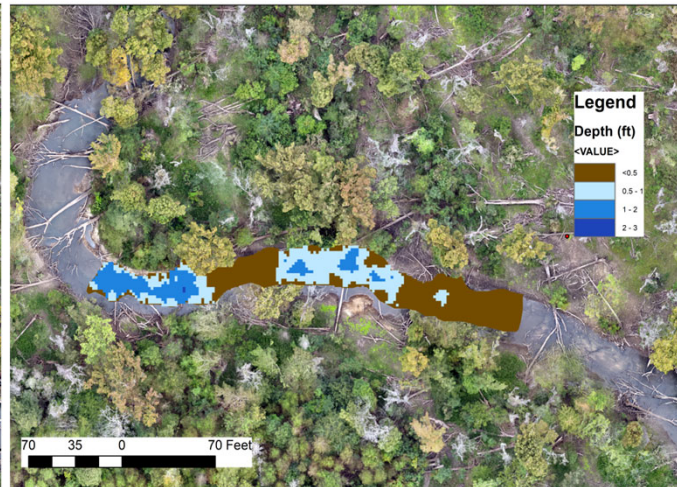
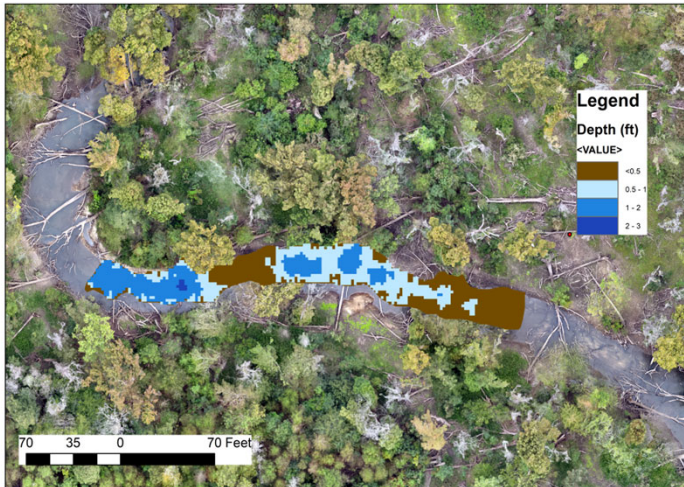
Take Estimate: 2,407 ft<sup>2</sup>  
30.9%; 38,507 ft<sup>2</sup>/stream mile



Baseline Scenario

Ag 2060 Scenario

Ag 2060 with HCP (partial) Scenario



0.44 cfs

0.02 cfs

0.09 cfs

Inundation (>1 ft):  
2,300 ft<sup>2</sup>  
29.6%  
36,800 ft<sup>2</sup>/stream mile  
Connectivity: 42.1%

Inundation (>1 ft):  
1,481 ft<sup>2</sup>  
19.0%  
23,703 ft<sup>2</sup>/stream mile  
Connectivity: 35.7%

Inundation (>1 ft):  
1,665 ft<sup>2</sup>  
21.4%  
26,641 ft<sup>2</sup>/stream mile  
Connectivity: 37.8%

**Take Estimate: 635 ft<sup>2</sup>  
8.2%; 10,159 ft<sup>2</sup>/stream mile)**

**PRELIMINARY RESULTS**  
 Use for discussion purposes only



**Ichawaynochaway at Milford**

Scenario	Probability of > 10% Loss of <i>Pleurobema pyriforme</i> (Oval pigtoe)	
	July	August
Baseline	11%	11%
Ag 2060	20%	11%
Ag 2060 with HCP (partial)	11%	11%

**Spring Creek at Colquitt**

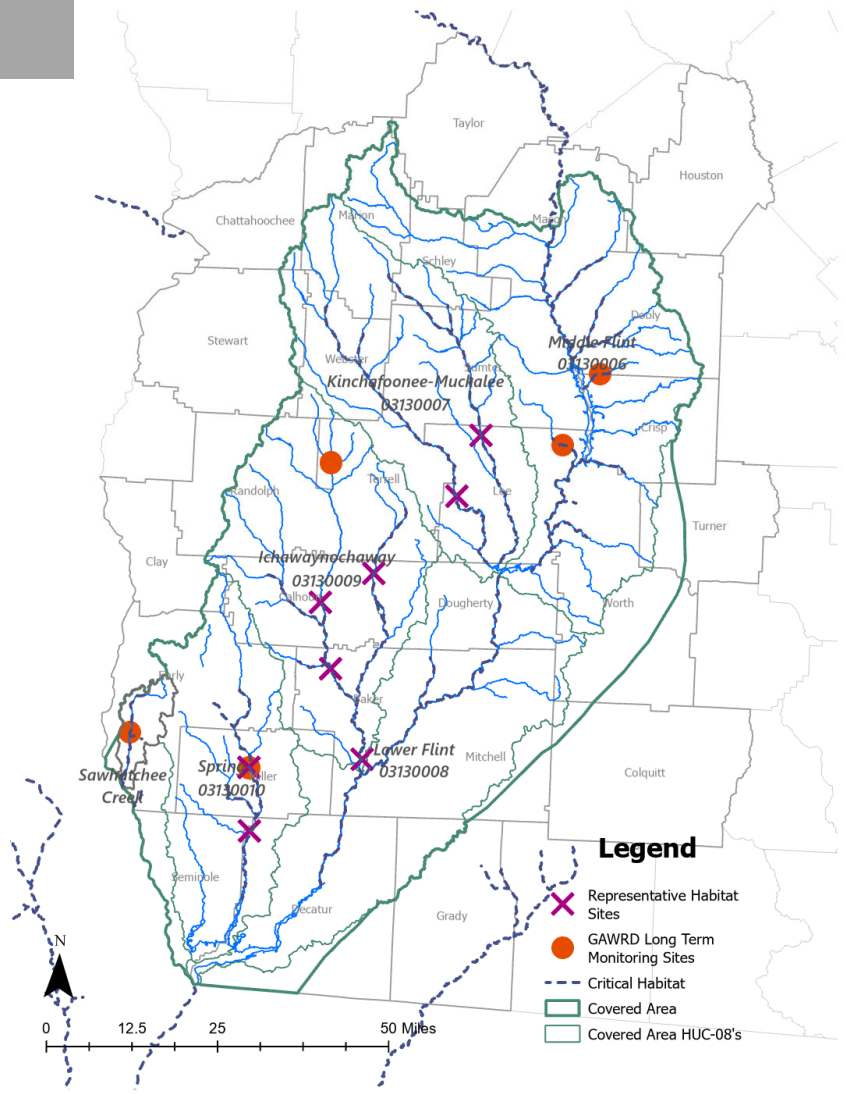
Scenario	Probability of > 10% Loss of <i>Pleurobema pyriforme</i> (Oval pigtoe)	
	July	August
Baseline	34%	23%
Ag 2060	68%	37%
Ag 2060 with HCP (partial)	42%	23%

*Challenges: Population Modeling  
Based on Long-Term Monitoring Sites*

- Data preparation needs
- Lack of flow variability during monitoring period
- Flow measured using “proxy” gauges for 3 of 5 monitoring sites and limited measure of flow at long-term monitoring sites
- Limited occurrences of listed species at some sites
- Difficulty tying mussel population estimates directly to inundation models



*Representative Reaches for Take Estimation Modeling*



[possible slide to recap of July 8 workshop]

# Caveats

## Preliminary results

- More management measures will be added to the Ag 2060 with HCP scenario
- Flows are directly modeled at some representative reaches but must be estimated at others
- Other flow metrics and other months will be evaluated
- Relationship between habitat metrics will be explored
- Bayesian network model is under development

## Significant limitations to understanding the distribution of the covered species

- Detection challenges
- Can't survey it all
- Focus on flow and habitat as surrogates

## Modeled results with projected outcomes

- Models built with best available information
- Continued effort to improve modeling tools
- Results and management response will be refined based on monitoring and enhanced modeling tools during HCP implementation (adaptive management)

# Observer Comments

# Next Steps

- DroughtSWAP – Permitting and installation of production wells
- Field team – mapping and sampling
- Modeling team – take estimation
- Revise draft HCP sections based on USFWS review
- Prepare draft for review: sections of HCP related to modeling results, take estimation, and conservation plan
- Next Advisory Board meeting – Schedule change