

Upper Flint

Upper Flint Council Meeting

November 13, 2023



**GEORGIA
WATER PLANNING**

waterplanning.georgia.gov

Agenda

Objectives:

1. Hear updates on Frost Protection Permitting and GA-FIT
2. Provide input to upper basin flows seed grant project
3. Learn about feral hog control and water quality impacts
4. Review fact sheets
5. Hold first Upper Flint Flows committee meeting (committee members)

| | |
|----------|---|
| 9:45 am | Registration |
| 10:00 am | Welcome, Agenda Review – <i>Kristin Rowles, GWPPC</i> |
| 10:10 am | Chair's Report – <i>Adam Graft, Chair</i> |
| 10:20 am | GAEPD Updates – <i>Johanna Smith, GAEPD</i> |
| 10:30 am | Upper Flint Flows Seed Grant Discussion – <i>Ben Emanuel, American Rivers</i> |
| 11:10 am | Frost Protection permitting – <i>Ania Truszczynski, GAEPD</i> |
| 11:40 am | GA-FIT Report – <i>Mark Masters, GWPPC</i> |
| 12:00 pm | Lunch |
| 12:45 pm | Fact Sheet Review – <i>Meagan Szydzik, GWPPC</i> |
| 1:00 pm | Feral Hogs Presentation – <i>Steve Golladay, Jones Center at Ichauway and Justine Smith, UGA Warnell School of Forest Resources</i> |
| 1:45 pm | Next Steps – <i>Meagan Szydzik, GWPPC</i> |
| 1:50 pm | Adjourn Regular Meeting |
| 2:00 pm | Upper Flint Flows (IN-12) Committee meeting (1 hour) |



Introductions

ADAM GRAFT

Council Chair for:
Upper Flint
jgraft@bellsouth.net
(229) 942-0508

JOHANNA SMITH

Georgia EPD

Liaison for:
Upper Flint
Johanna.Smith@dnr.ga.gov
(470) 632-3158

ROB BOCARRO

Black & Veatch

Council Advisor for:
Upper Flint
bocarrora@bv.com
(770) 754-0318

JASON HOWARD

Black & Veatch

Council Advisor for:
Upper Flint
howardje@bv.com
(770) 521-8133

KRISTIN ROWLES

GWPPC

Council Lead for:

Upper Flint
krowles@h2opolicycenter.org
(404) 822-2395

MARK MASTERS

GWPPC

Council Advisor for:
Upper Flint
mmasters@h2opolicycenter.org

MEAGAN SZYDZIK

GWPPC

Council Advisor for:
Upper Flint
mszydzik@h2opolicycenter.org
(770) 543-8497

CLETE BARTON

Georgia EPD

Regional Water Planning Lead:

Clete.barton@dnr.ga.gov



Upper Flint Council Members

| Name | City | County |
|-------------------------------|------------|------------|
| Brian Belcher | Ellaville | Schley |
| Barry Blount | Americus | Sumter |
| Michael Bowens | Vienna | Dooly |
| Gene Brunson | Reynolds | Taylor |
| Thomas Burnsed | Meansville | Pike |
| Donald Chase | Oglethorpe | Macon |
| Brad Ellis | Vienna | Dooly |
| Beth English | Vienna | Dooly |
| Steve Fry | Williamson | Pike |
| Adam L. Graft, Chair | Americus | Sumter |
| Jack Holbrook (Alternate) | Preston | Webster |
| Terrell Hudson | Unadilla | Dooly |
| Raines Jordan | Talbotton | Talbot |
| Bob Melvin | Oglethorpe | Macon |
| Kenneth L. Murphy | Gay | Meriwether |
| Sen. Ed Harbison (Ex-Officio) | | |

| Name | City | County |
|--------------------------------------|-------------|---------------|
| Gary Powell | Buena Vista | Marion |
| Jim Reid | Americus | Sumter |
| Gordon Rogers, Vice Chair | Talbotton | Talbot |
| Charles Rucks | Brooks | Spalding |
| Bill Sawyer | Ellaville | Schley County |
| Walter E. (Butch) Turner | Reynolds | Taylor |
| Brian Upson | Griffin | Spalding |
| George (Teel) Warbington (Alternate) | Vienna | Dooly |
| Rodney Wilson | Zebulon | Pike |
| Benjamin (Joel) Wood | Cordele | Crisp |
| Ben Haugabook | | Macon |



Chair's Report

Presented by Chairman Graft



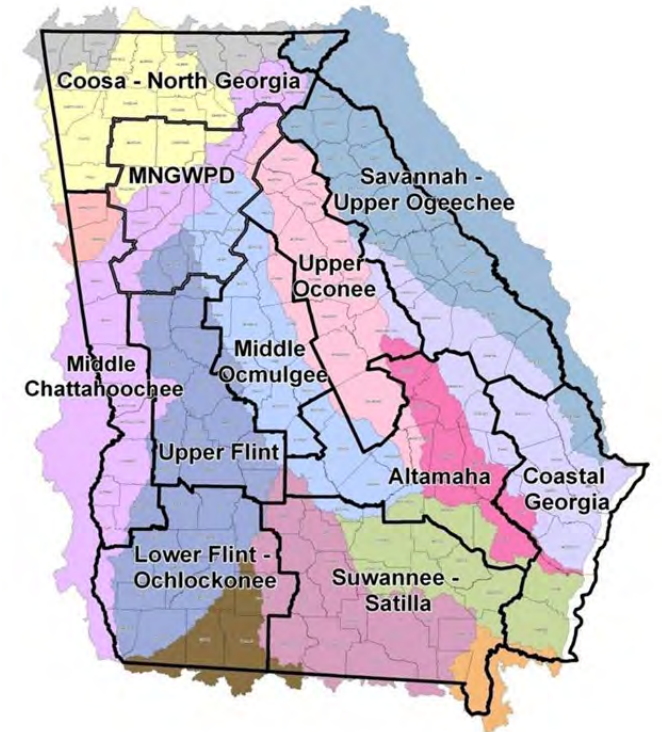
GA EPD Report

Presented by Johanna Smith, GA EPD



FY24 Seed Grant Application Period

- Applications received through Oct. 31, 2023
- No applications received in this region
- Next funding cycle will be announced in July 2024

A screenshot of the Georgia Department of Natural Resources Environmental Protection Division website. The page title is "City of Happy | Trash Free Waters Education". It shows the "RWP Seed Grant Application" form. The form has two sections: "Application Section 1: Project Description" and "Application Section 2: Budget". Both sections have a "Complete" status and an "Edit" button. A "Submit" button is visible at the top right of the form area. The page also includes a "Welcome, jaykisha13@gmail.com" message and a "Order by: Newest to Oldest" dropdown menu.

EPD Updates: construction/stormwater

- EPD's issuance of the construction stormwater general permits was challenged in July
 - <https://epd.georgia.gov/watershed-protection-branch/stormwater>
 - Construction sites continue to be covered under the 2018 general permits, which remain in effect during the duration of the legal challenge
- Last week, EPD released a draft Guidance for Requests to Disturb 50 Acres or More under the NPDES Construction Stormwater Permits
 - No more than 50 acres of disturbance is allowed at any one time unless the permittee has received prior written authorization from the appropriate EPD District Office
 - The draft guidance outlines the review criteria and specifies design components expected for such requests
 - Virtual meeting will be held on December 7 and comments are welcome by December 15



EPD Updates: public drinking water systems

- Public drinking water systems: lead service line inventories (due Oct. 2024)
 - EPD & GEFA implementing an online system to accept & track these submissions
 - Training sessions are being held to support systems with implementation
 - <https://epd.georgia.gov/watershed-protection-branch/drinking-water>
- New Drinking Water Operator Classification
 - Operator Class III G was created by Georgia Board of Examiners for Certification of Water & Wastewater Treatment Plant Operators and Laboratory Analysts
 - Applies to operators of groundwater systems serving a population of 1,000 – 9,999
 - Updates to drinking water rules are proposed (comment period ended on Nov. 9) to incorporate this new classification



Upper Flint Flows Seed Grant

Presented by Ben Emanuel, American Rivers





Alan Cressler

Regional Water Planning Seed Grant Update

Seed Grant Project: Evaluating Options for
Improving Drought Resilience of the Upper Flint



UNIVERSITY OF
GEORGIA
River Basin Center



AMERICAN
RIVERS

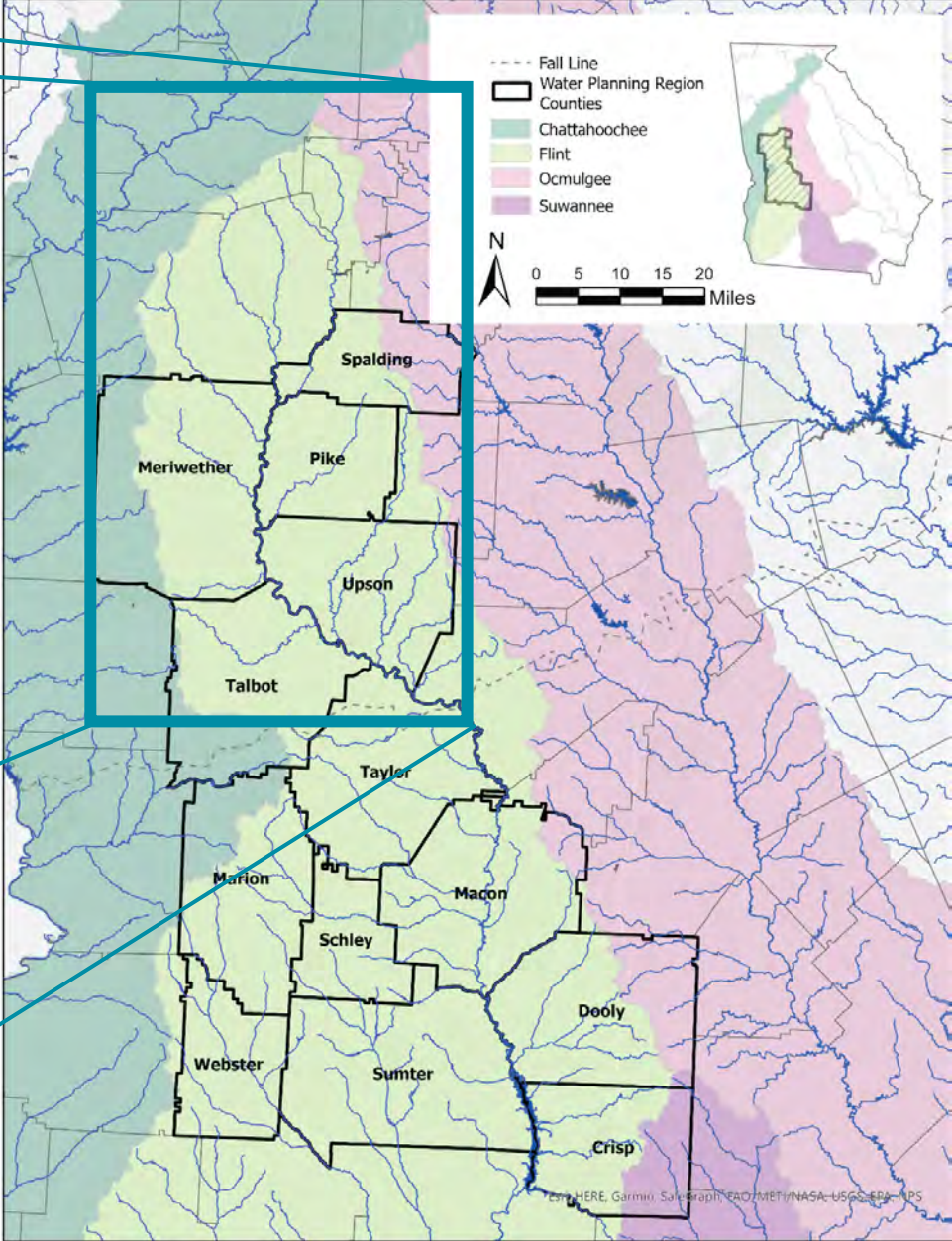
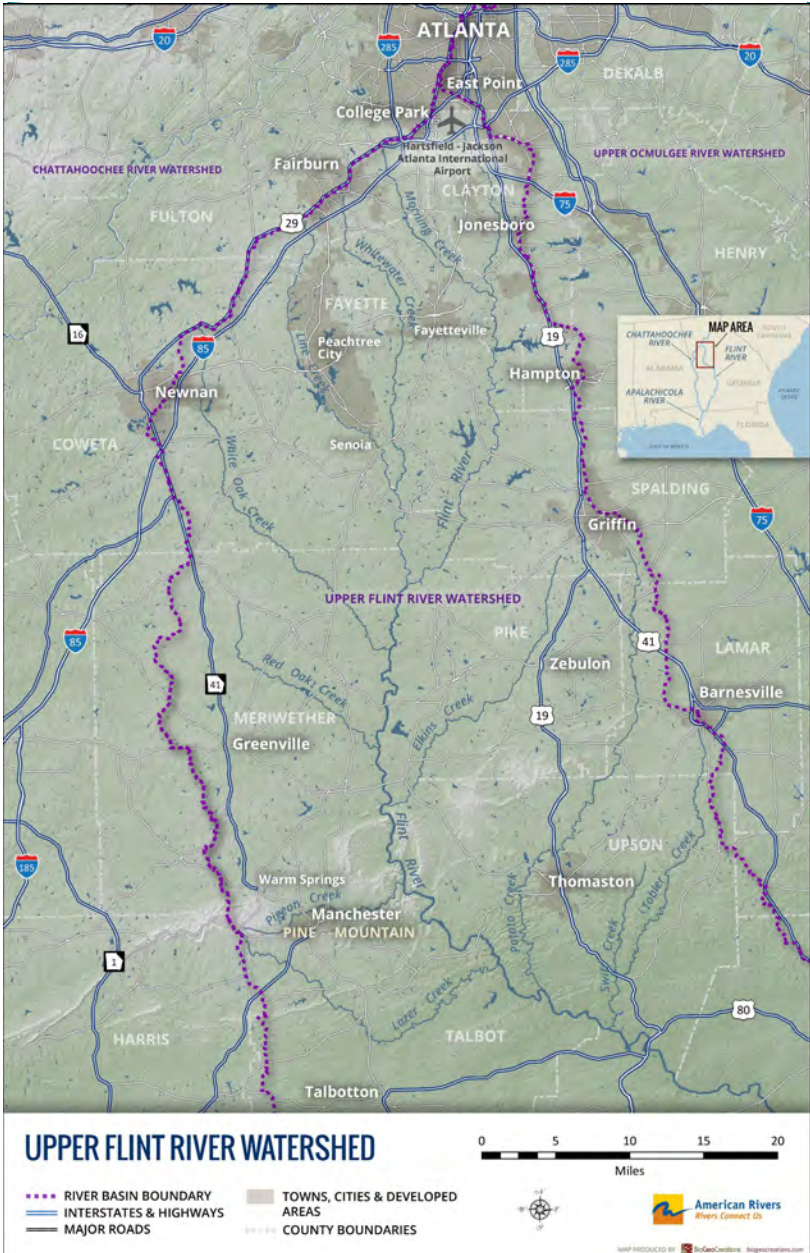
Regional Water Planning Seed Grant Update

Evaluating Options for Improving Drought Resilience of the Upper Flint

- Project Background
- Project Overview and Updates
- Council Input: Where you come in!

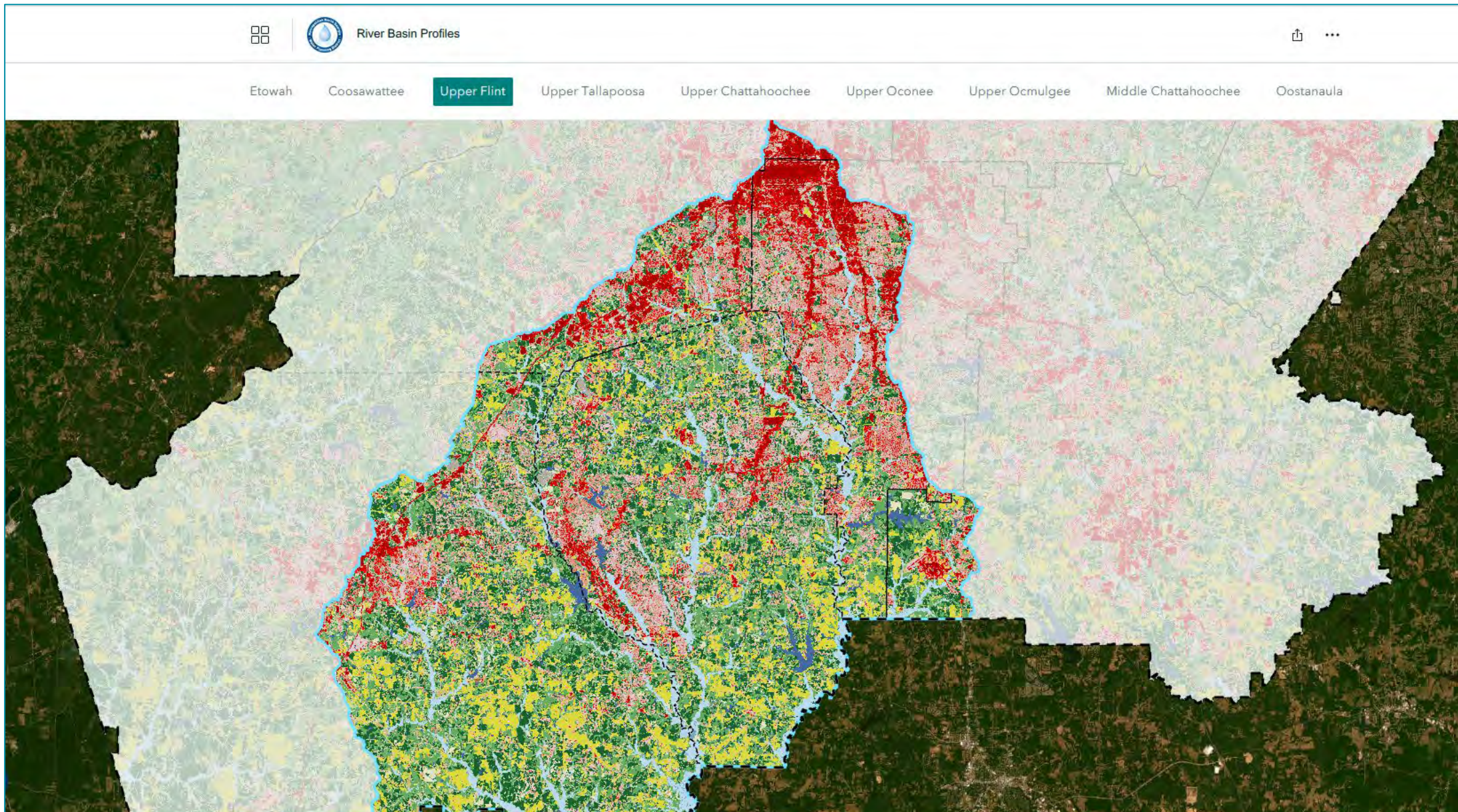


Piedmont Flint River Basin | Upper Flint Water Planning Region

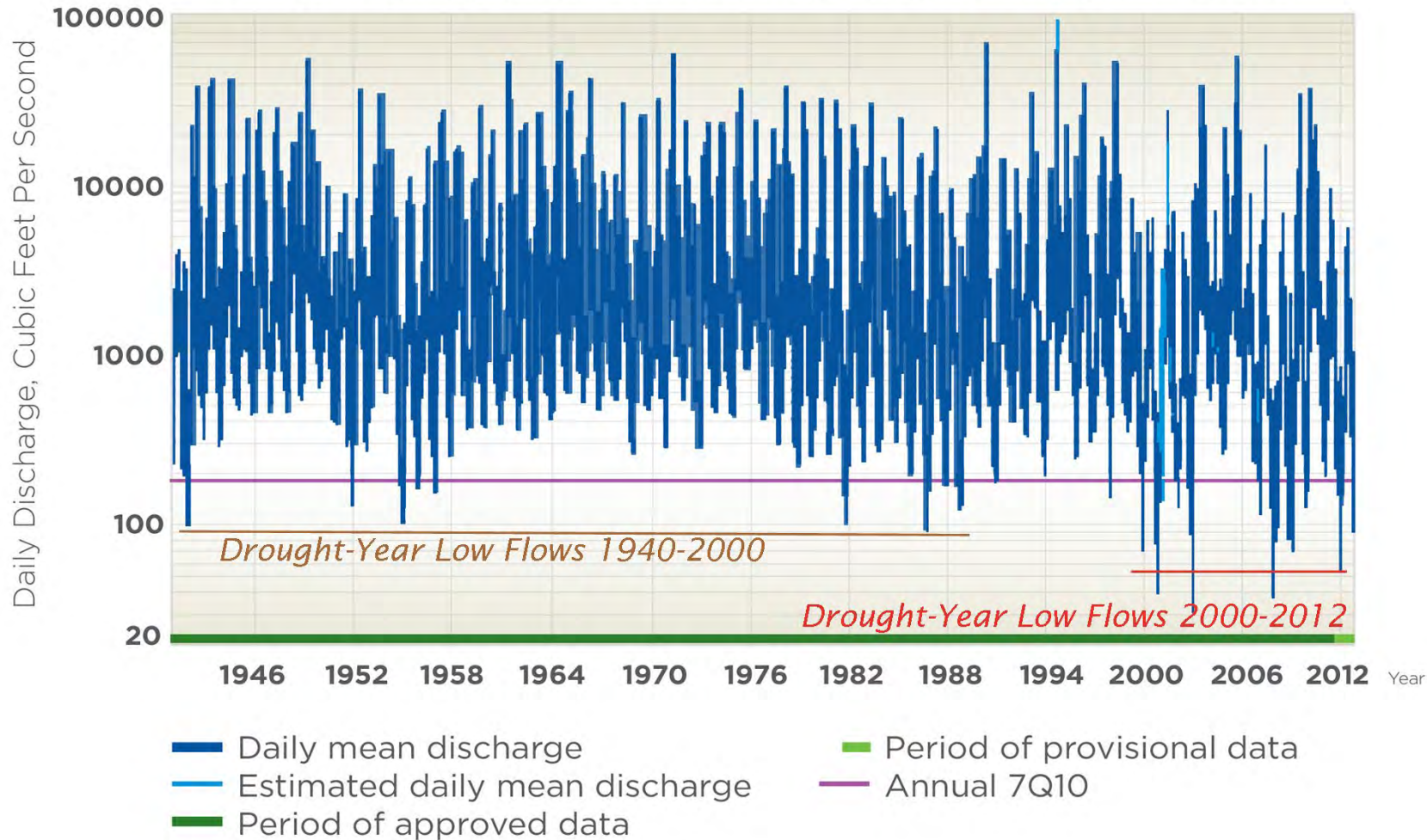


Urbanized Landcover: Flint River Headwaters Area (2019)

*From: River Basin Profiles, Metropolitan North Georgia Water Planning District
Source: NLCD 2019*



Daily Discharge, Flint River at Carsonville Gauge, 1940-2012



Drought History:
Unprecedented
Low River Flows in
Five Drought
Events Since 2000



Background: Upper Flint River Working Group

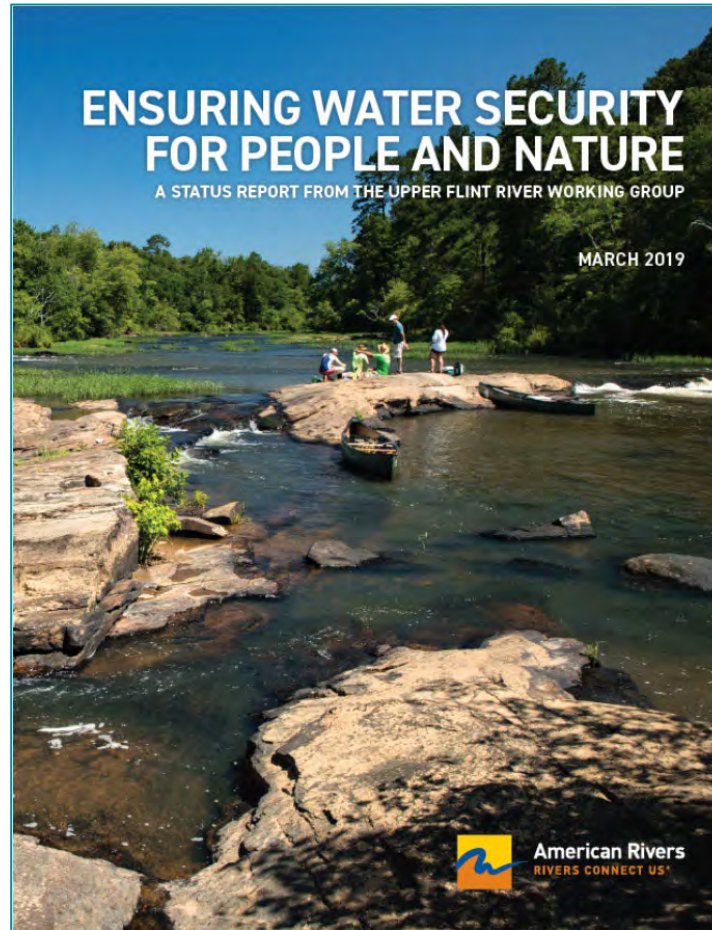


Photo: Gordon Rogers



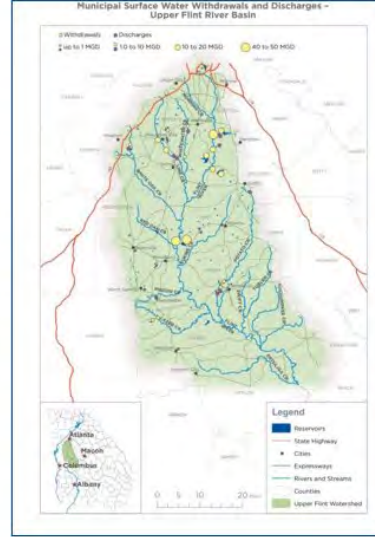
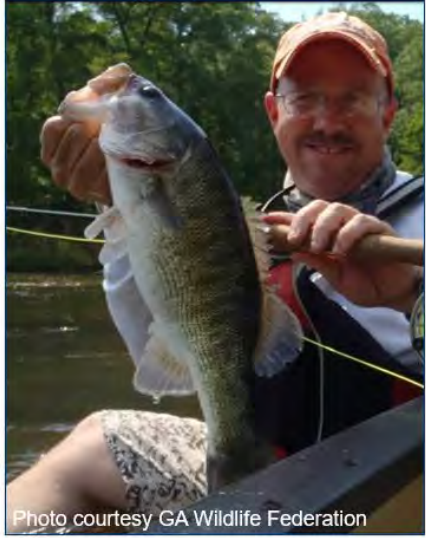
GUIDANCE ON DROUGHT RESILIENCE FOR PEOPLE AND NATURE IN THE UPPER FLINT RIVER BASIN

**Presented to the Upper Flint Water Planning Council
from the Upper Flint River Working Group**

Nov. 12, 2021

Background:
Seed Grant Project



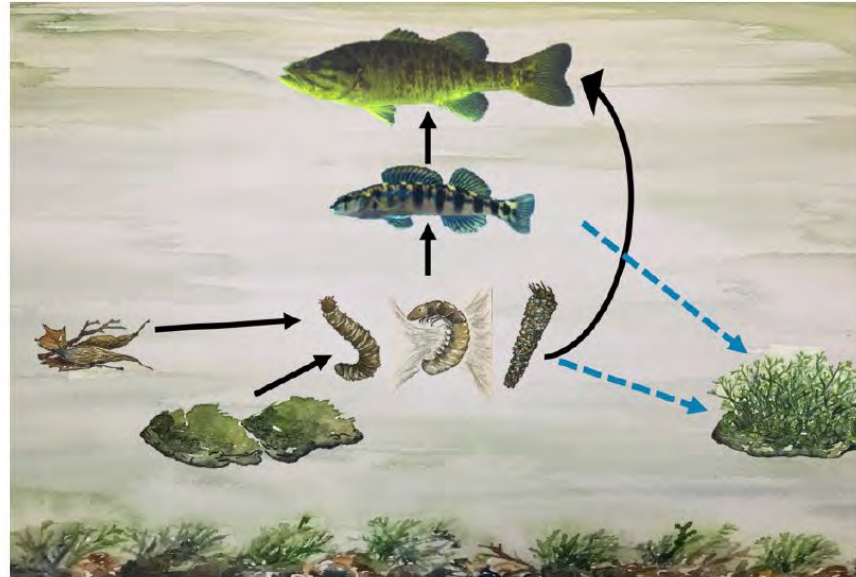


Shared Goal: to ensure the resilience of river-related values to drought conditions

**Background:
Seed Grant Project**

Seed Grant Project Overview

Evaluating Options for Improving Drought Resilience of the Upper Flint



Seed Grant Project Overview

Seed Grant

1. Predict ecological consequences of droughts of varying severity and duration.
2. Evaluate the potential for various drought-response management actions to mitigate ecosystem effects at various drought severities.
 - a) Potential management actions to be identified in collaboration with the Working Group and the Council.
3. Evaluate the potential for long-term management actions to increase drought resilience in the basin. Effects to be evaluated using the BEAM model.



Project Overview

Ecological Drought Resilience

Flows for
species and
habitat

Based on an approach ecologists
call “Functional Flows”

Identify a few dimensions of the
natural flow regime that we can tie
to support of riverine ecosystems

May be more practicable for water
planning



Project Overview

Ecological Drought Resilience



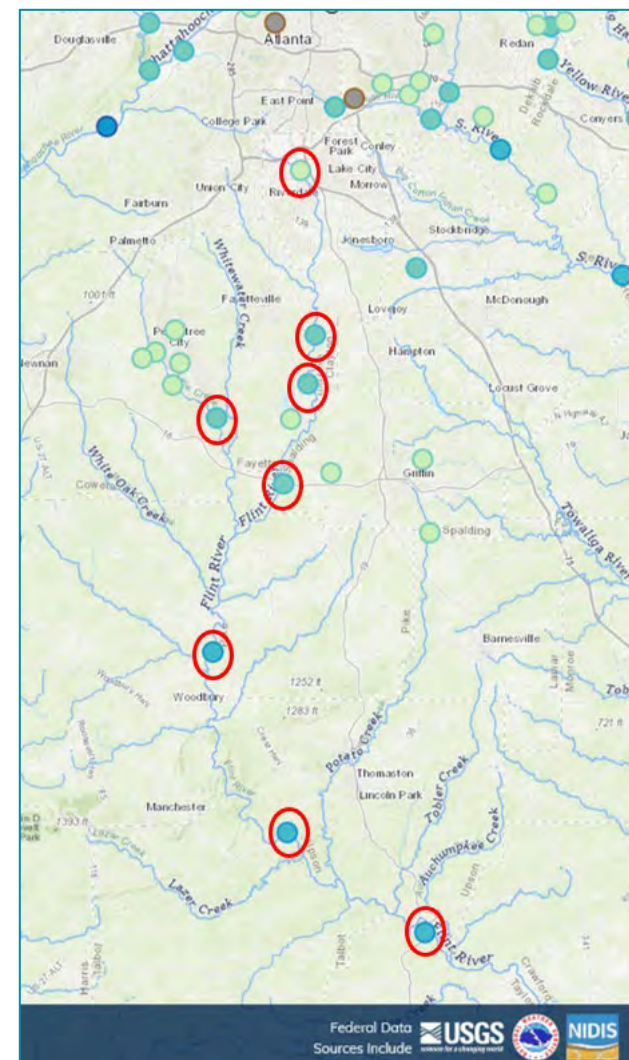
3 x 750 in





Initial Analysis: Hydrologic Conditions of the Upper Flint Basin

| Name | Period of record | Drainage area (mi ²) |
|---|----------------------------------|----------------------------------|
| Flint River at GA 85, Near Forest Park, GA | 2018 to present | 6.51 |
| Flint River Near Lovejoy, GA | 1985 to present | 127 |
| Flint River at Woolsey Road, Near Woolsey, GA | 2007 to present | 160 |
| Flint River Near Griffin, GA | 1937 to present | 272 |
| Flint River Below Big Branch, Near Molena | 2004 to present | 794 |
| Flint River Near Thomaston, GA | 1966 to 1992; 2017 to present | 1220 |
| Flint River at US 19, Near Carsonville, GA | 1911 to present | 1850 |
| Line Creek Near Senoia, GA | 1964 to present | 101 |

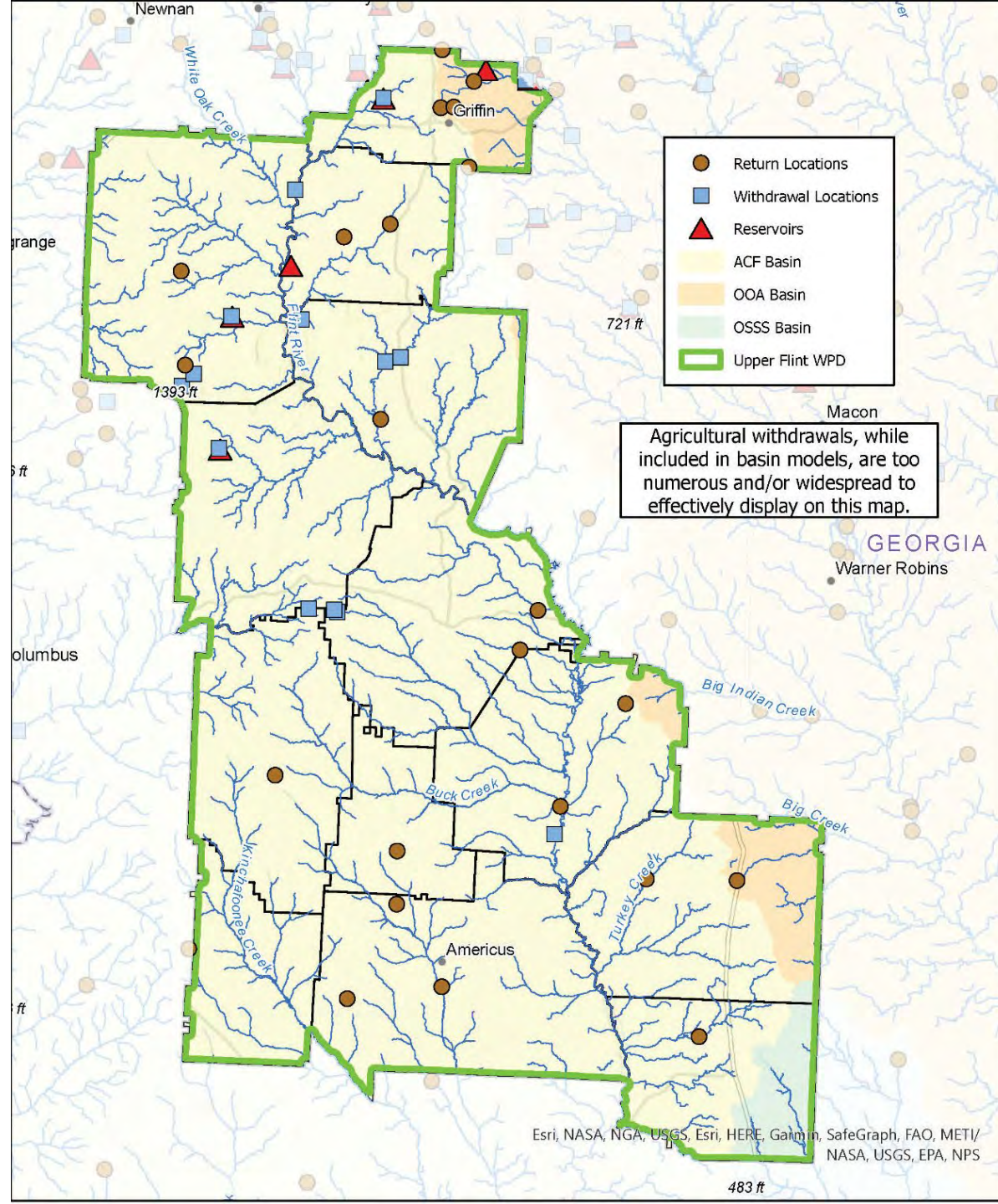


Initial Analysis: Hydrologic Conditions of the Upper Flint Basin

- Events below 500 cfs occurred throughout the period of record at the Carsonville gauge, but look to be occurring more frequently since the 1980s.
- Events below 100 cfs did not occur until the 1950s, and occurred more frequently after 2000.
- Preliminary interpretation suggests that there are avenues for reducing the frequency and severity of low-flow excursions through management actions.



Upper Flint Regional
Water Plan, Figure 3-2:
BEAM Model
Schematic for the
Upper Flint Water
Planning Region



Basin Environmental Assessment Model (BEAM)



Upper Flint Regional Water Plan Recommendation

Information Need 12: Conduct a feasibility assessment of interventions that would improve flows in the Upper Flint River Basin. Evaluate each option with respect to costs, expected flow benefits, implementation barriers, and other factors that would affect the likelihood of success. The following potential interventions should be included in the feasibility assessment:

- Convert LAS (municipal & industrial) in the upper basin to direct discharge
- Establish greater storage capacity in the upper basin
- Reverse IBTs
- Convert existing septic systems to sewer
- Guide future development to sewer instead of septic
- Changes in reservoir management by upper basin utilities



Stakeholder Input and Engagement

Primary Project Stakeholders:

- Upper Flint Regional Water Planning Council
- Upper Flint River Working Group
- Metropolitan North Georgia Water Planning District



Stakeholder Input and Engagement

Input that will support this project:

- Suggestions on the highest priorities for assessment among various potential management actions.
- Any additional ideas for assessment.
- Collaboration in the interpretation of flow benefits expected from management actions, and their value to uses in the basin.





Alan Cressler

Thank You!

Ben Emanuel
Director, Southeast Conservation
American Rivers
bemanuel@americanrivers.org



IN-12: Conduct a feasibility assessment of interventions that would improve flows in the Upper Flint River Basin. Evaluate each option with respect to costs, expected flow benefits, implementation barriers, and other factors that would affect the likelihood of success. The following potential interventions should be included in the feasibility assessment:

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 - Establish greater storage capacity in the upper basin
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-

Additional Ideas?

- Improved stormwater management, especially green stormwater infrastructure
- Floodplain restoration
- Other nature-based solutions
- Quarry storage
- ...?



Frost Protection Permitting

Presented by Ania Truszczyński, GA EPD





GEORGIA
DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Frost Protection Permitting

Upper Flint Regional Water Planning Council
November 13, 2023





FROST PROTECTION PERMITTING

- From Hartsfield-Jackson International Airport in Atlanta to the most southwestern corner of Georgia
- Subarea 4 of the ACF basin – south of Dooly County, area of significant hydraulic connection between the Flint River and its tributaries with the Floridan aquifer
- Small portions of Chattahoochee, Ochlockonee, and Suwannee River Basins are included in Subarea 4

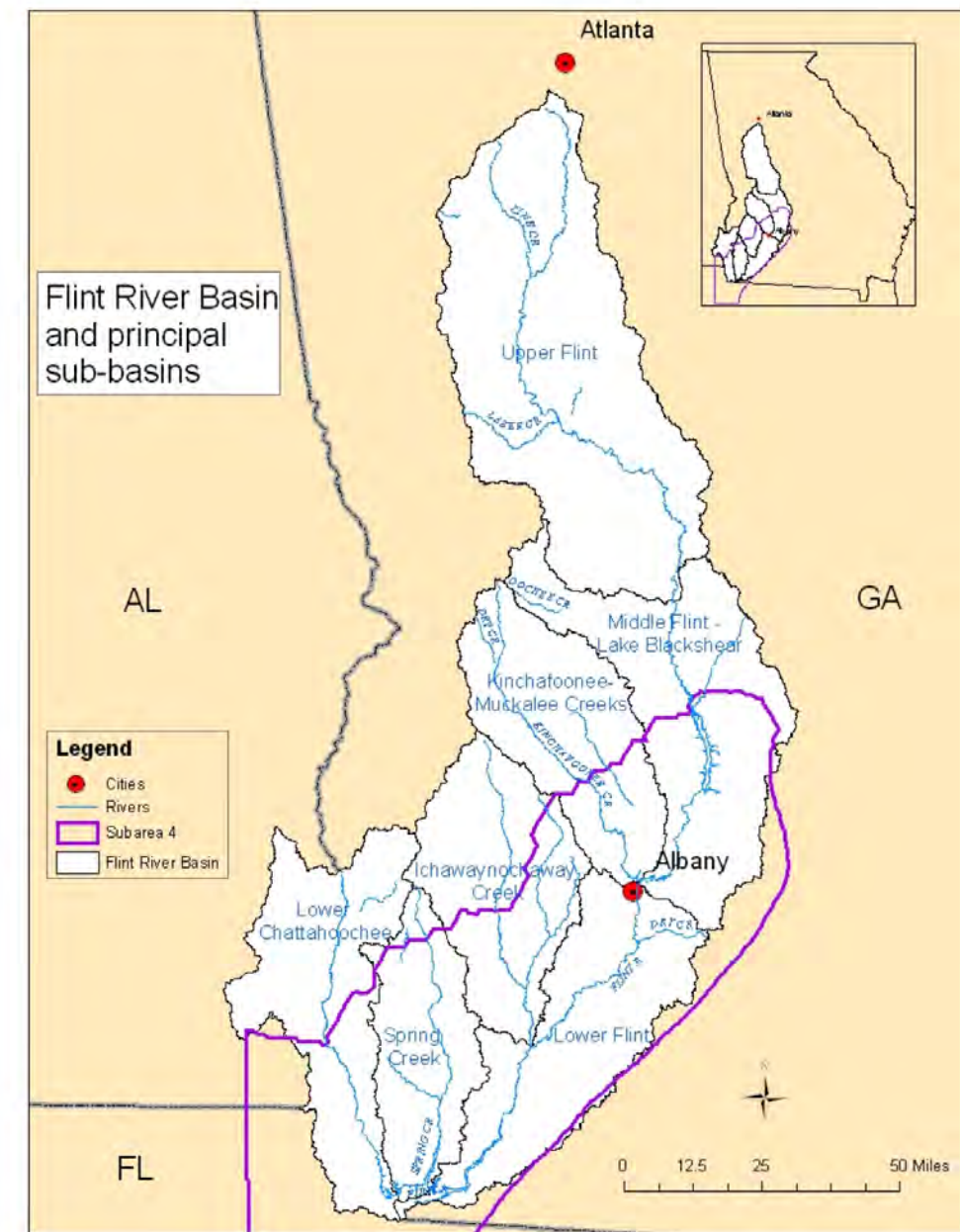


Figure 0.1: The Flint River Basin and sub-basins



FROST PROTECTION PERMITTING

- Agricultural water withdrawal permitting – 1988
- Water withdrawal permitting moratorium – 1999
- Flint river drought protection act – 2000
- Flint River Basin Regional Water Development and Conservation Plan – 2006
- Original Regional Water Plans for Upper & Lower Flint – 2011
- Water withdrawal permitting suspension – 2012
- Florida v. Georgia – 2013
- First update of the RWP for Upper & Lower Flint – 2017
- Seed Grant: Water Supply Alternatives for Agricultural Surface Water Irrigators in Ichawaynochaway Sub-Basin – 2017
- Florida v. Georgia – 2021
- Agricultural Water Source Conversion for Streamflow Resilience (ASU and EPD ARPA grant) – 2022
- Second update of the RWP for Upper & Lower Flint – 2023



Figure 0.2. Classification of HUC-12 watersheds in the lower Flint River Basin.



FROST PROTECTION PERMITTING

- In recent years, various types of citrus, blueberries, and other berry crops have emerged as attractive commodities for some farmers in southwest Georgia.
- These crops cannot be successfully cultivated without frost protection, which can require the application of large amounts of water directly onto plants to protect them during freezing temperatures.
- Water withdrawal permits are required for large amounts of water (100,000 gallons per day or more).
- Frost protection permits are not currently an option for farmers in the lower Flint River Basin (FRB) because of the permitting suspension implemented since July 2012.



FROST PROTECTION PERMITTING

- EPD has been evaluating various options for agriculture water withdrawal permitting in the lower FRB.
- Because the use would be limited to the traditional recharge season and limited in quantity, frost protection permits are anticipated to have a negligible effect on flows in the lower Flint River Basin.
 - Frost protection is needed as temperatures reach 35 degrees Fahrenheit.
 - Frost protection permits are anticipated to be used exclusively during the recharge season (October 15 – April 15).
 - Frost protection permits are used only a few days each year.
- As a result, frost protection permits are a reasonable step in re-evaluating the permitting approach for agricultural water withdrawals in the FRB.



FROST PROTECTION PERMITTING

- EPD solicited targeted and broad feedback on the proposed permitting framework.
- EPD shared information about the proposed frost protection permitting framework with:
 - Georgia Farm Bureau
 - Georgia Agribusiness Council
 - Georgia Fruit and Vegetable Growers Association
 - Georgia Association of Groundwater Professionals
 - All Georgia State Senators and Georgia House Representatives whose districts include a portion of the suspension area
 - The Commissioner of the Georgia Department of Agriculture
 - The GA-FIT Advisory Board



FROST PROTECTION PERMITTING

- Frost protection permitting was discussed at both the Upper and Lower Flint Regional Water Planning Council meetings, which occurred on June 9 and June 15, respectively.
- EPD hosted a stakeholder meeting on Wednesday, June 21 in Albany, Georgia.
- Written comments were accepted through June 30, 2023.
- Following the stakeholder meeting in Albany, a citrus farmer in Lee County invited EPD staff to view the irrigation infrastructure at his farm and offered to provide more information about citrus's water needs. EPD visited the farm on July 12. Representatives from GFB, GAC, GFVGA, GDA, Georgia Association of Groundwater Professionals, and UGA Extension also attended.
- EPD also visited a blueberry farm on July 12 to view the irrigation infrastructure and learn more about blueberry's water needs.



FROST PROTECTION PERMITTING

- EPD received 27 substantive comments from 13 commenters. The comments generally focused on:
 - The opportunity to explore frost protection permitting in the red and yellow zones;
 - Who should be eligible to participate in the permitting program (existing permit holders only, everyone, etc.);
 - Whether dedicated wells for frost protection were necessary, or whether a farmer could use a single well for both frost protection and production;
 - Whether variable rate motors should be allowable;
 - Whether telemetry should be required; and
 - Whether surface water should be an allowable water source for frost protection.



FROST PROTECTION PERMITTING

- Thanks to the robust feedback received, EPD started accepting applications for **frost protection permits** for water withdrawals from the **Floridan aquifer** for withdrawals in the **green zone** of the suspension area starting **September 1, 2023**.
- Farmers in the **yellow and red zones** of the suspension area can submit **Letters of Interest** to EPD. EPD staff will begin reviewing and evaluating the Letters of Interest to determine the potential impact in the yellow and red zones from frost protection permitting. EPD staff will work with stakeholders throughout this review process.



FROST PROTECTION PERMITTING

- EPD has received two applications for 70 new acres irrigated from the Floridan Aquifer in the Green Zone – one in Mitchell and one in Baker County.
- EPD has received 16 Letters of Interest for 165 new acres irrigated from the Floridan Aquifer in the red zone, all in Baker County. EPD has not received any Letters of Interest for the yellow zone.



HABITAT CONSERVATION PLAN

- The lower Flint River Basin is home to four species of endangered mussels and one threatened mussel.
 - As of June 20, 2023, the United States Fish and Wildlife Service is in the process of listing another mussel in the basin as endangered.
- A Habitat Conservation Plan is a
 - tool that can help us protect the water resource for all its users.
 - “planning document designed to accommodate economic development to the extent possible by authorizing the limited and unintentional take of listed species when it occurs incidental to otherwise lawful activities.”
- The State of Georgia, with support from the GWPPC, plans to develop a HCP and apply for an Incidental Take Permit for agricultural water use in the lower Flint River Basin.



HABITAT CONSERVATION PLAN

- The Habitat Conservation Plan will be based on technical hydrologic and biological information and include both regulatory and voluntary actions that will protect surface water flows and water quality in the lower Flint River Basin. Some potential actions include:
 - Voluntary irrigation suspension auctions;
 - Voluntary participation in a source-switching program;
 - Increased adoption of enhanced water conservation practices, including sensor-based soil moisture monitoring and irrigation scheduling;
 - Conservation easements;
 - Targeted flow augmentation projects;
 - New and expanded water use where capacity exists.





HABITAT CONSERVATION PLAN

- The 2012 suspension was intended to protect existing users and the water resource. EPD was to evaluate the suspension annually, with future modifications possible depending on the condition of the water resource.
- The Habitat Conservation Plan provides a comprehensive way of revising the suspension and developing an informed and defensible water management approach, particularly for drought.
- The development of a Habitat Conservation Plan includes technical activities that will provide important information about capacity; where capacity exists, new and expanded permits could be considered.
- Farmers in the area have experienced five different permitting regimes in the last 40 years. The process of developing the Habitat Conservation Plan will be engage stakeholders and be important for making a practical water management program that can provide farmers with regulatory certainty and protect the water resource.



CONTACT

Anna (Ania) Truszczyński

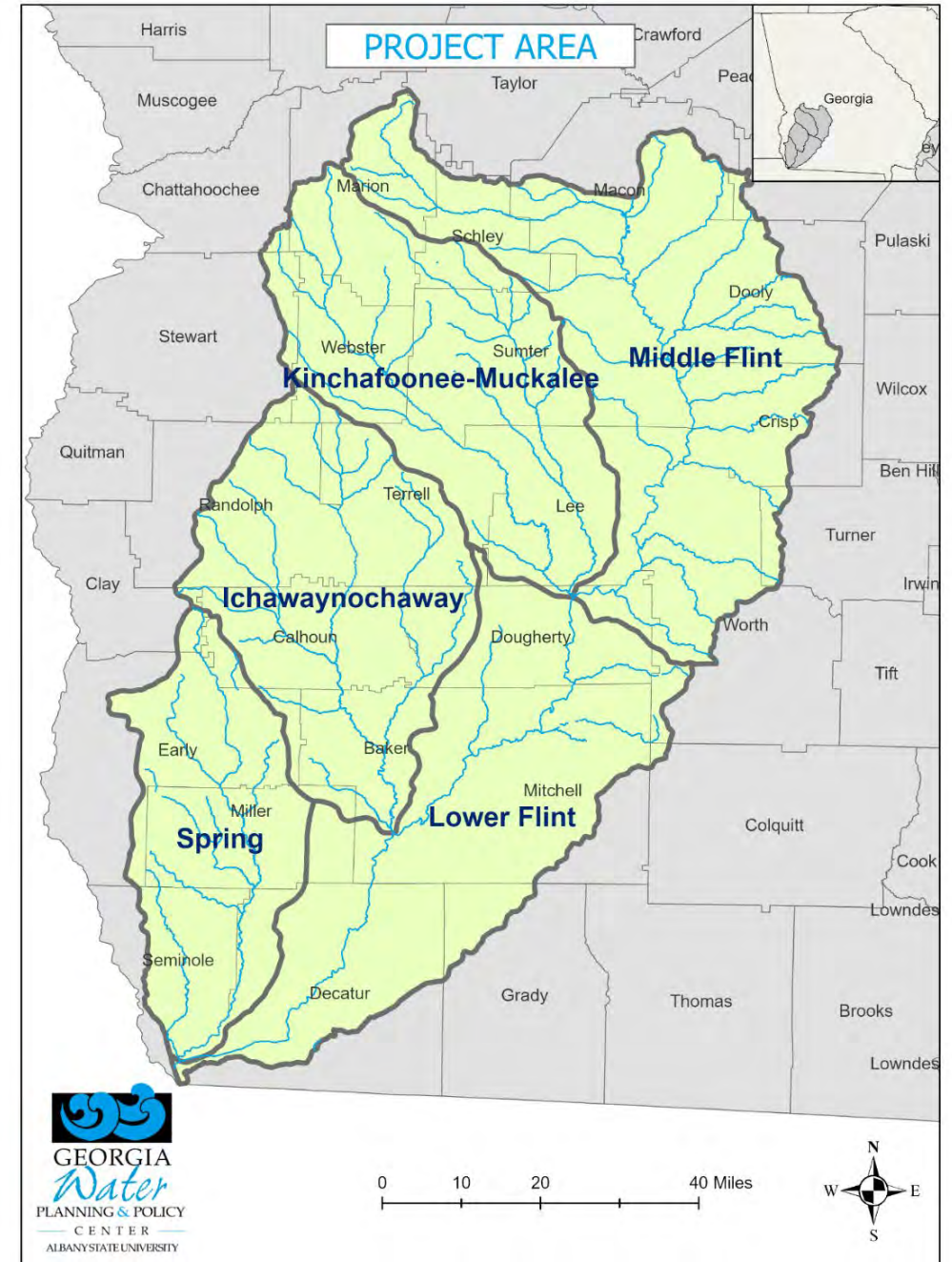
anna.truszczyński@dnr.ga.gov

470-384-7440

GA-FIT Report

Presented by Mark Masters, GWPPC





GA-FIT Advisory Board

- Murray Campbell, farmer & Lower Flint-Ochlockonee (LFO) 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. Moya, 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

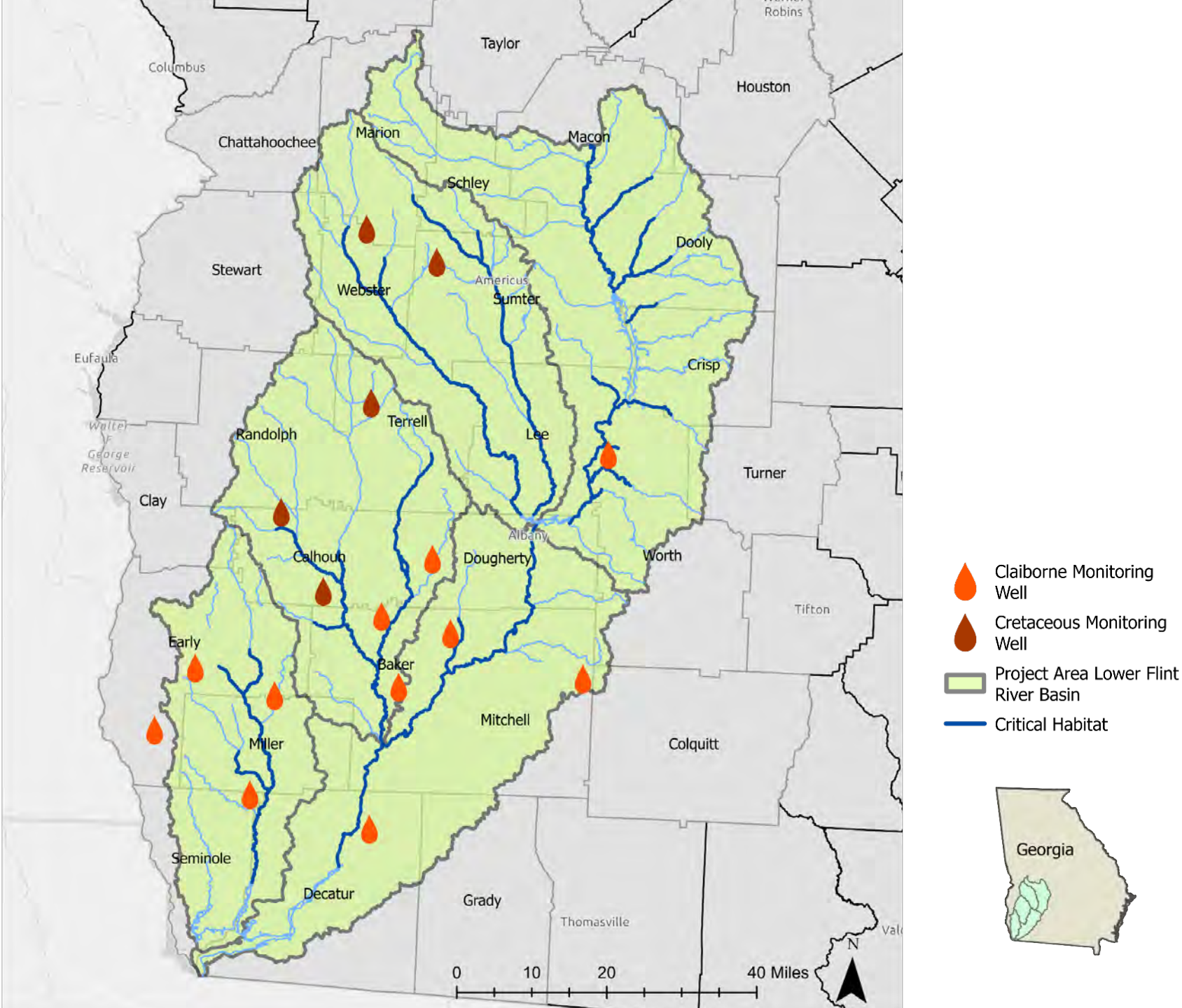


...and others as needed.

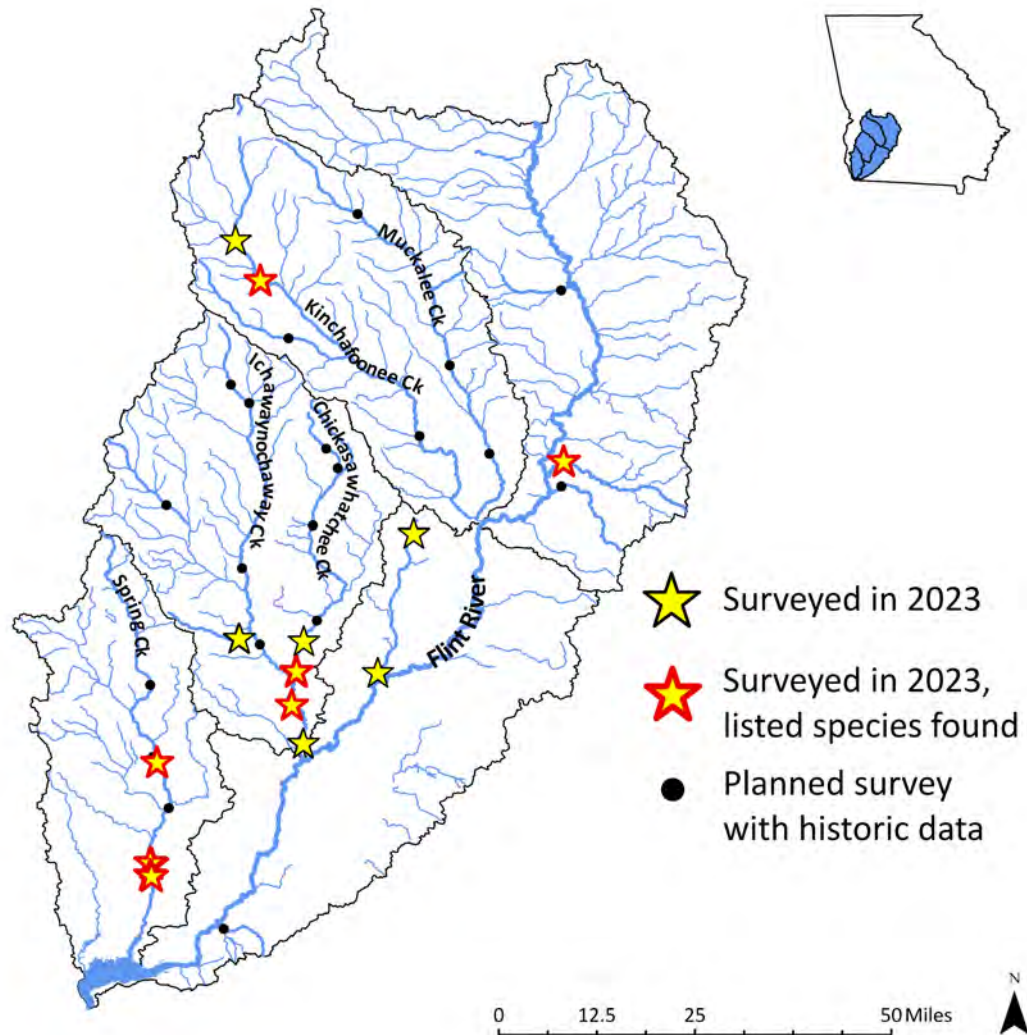
Project Updates

- GA-FIT Voluntary Irrigation Suspension Auction
- Drought SWAP Applications and Prioritization
- Monitoring Wells/GW Research
- Mussel Surveys and Habitat Mapping
- State and Federal Coordination Meetings
- Management Alternatives: Stream and Aquifer Modeling
- USFWS HCP Planning Grant
- Draft HCP Development

Monitoring Wells



Mussel Survey Progress

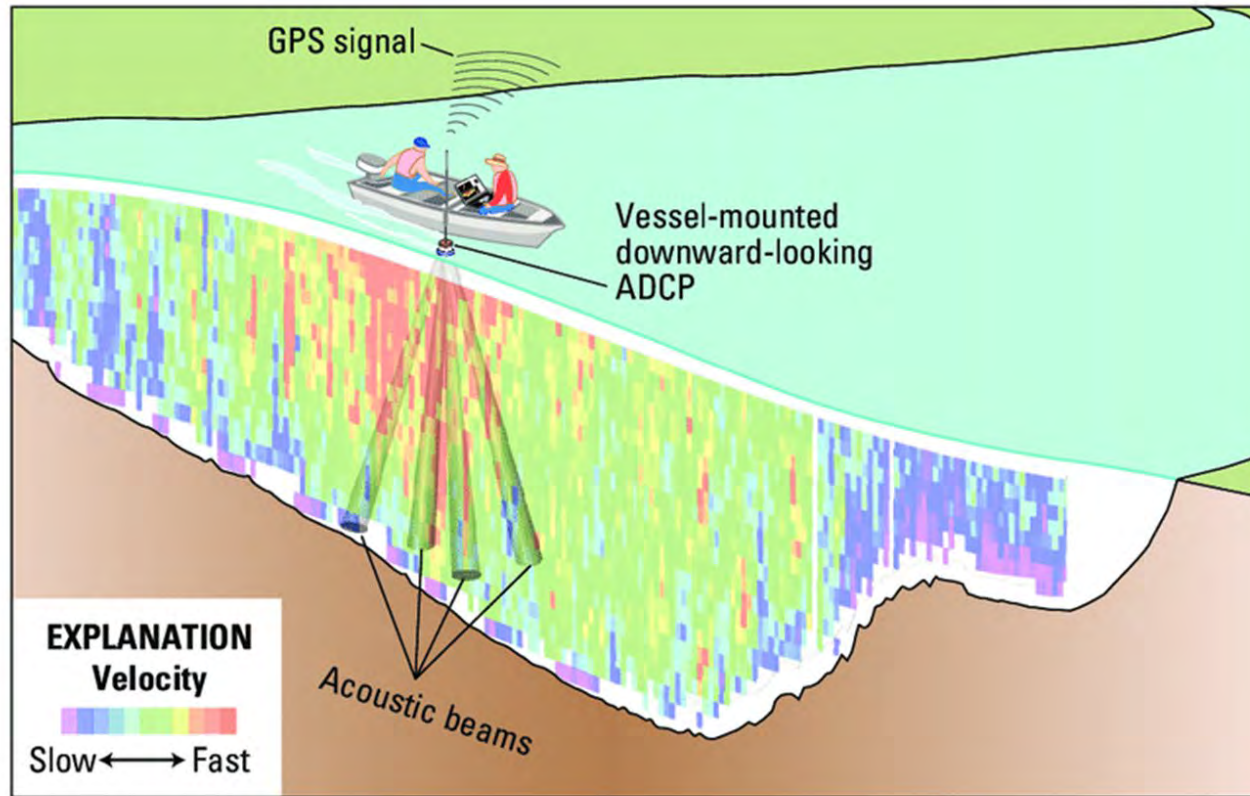


Oval Pigtoe



Shiny-rayed
Pocketbook

Stream Bathymetry



Acoustic Doppler Current Profiler – uses sound (sonar) to measure water depth and velocity



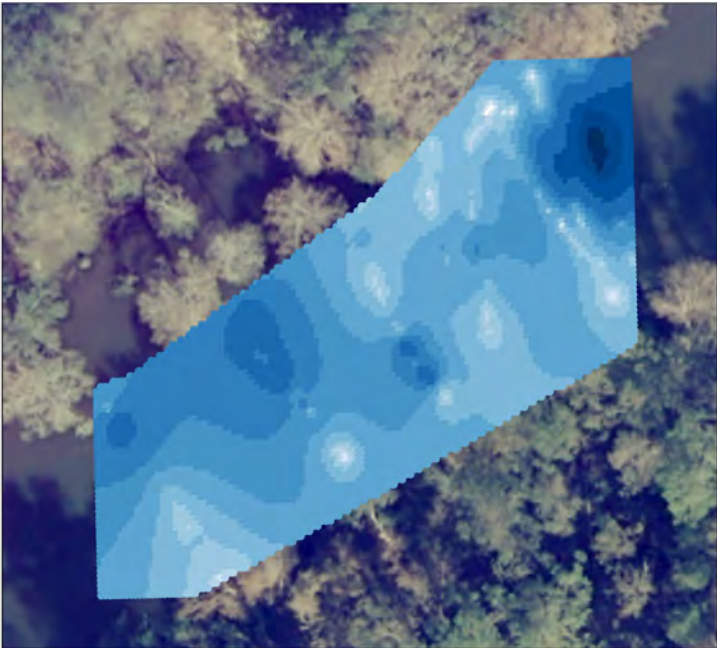
Our goal – create a bathymetric map of stream reaches to see how habitat inundation changes with discharge.

Biological Goals

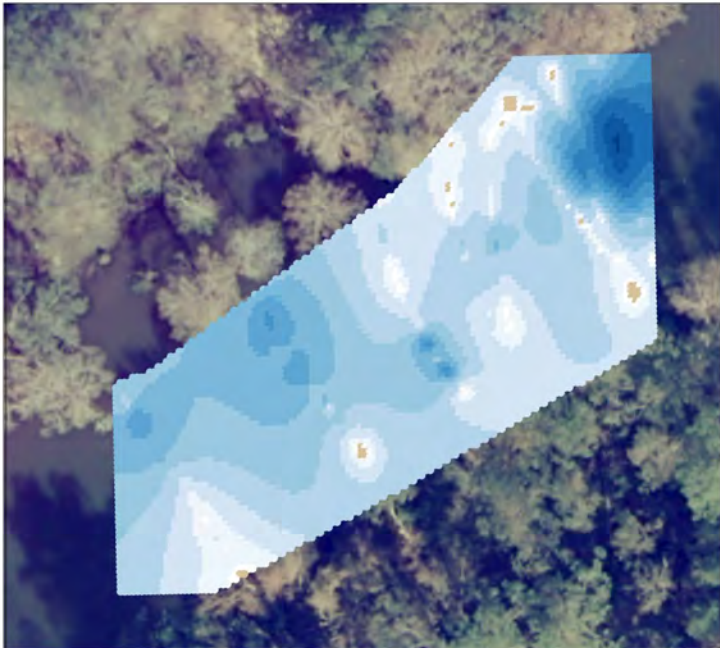
- Supported by measurable objectives
- Connect to management actions
- Address information needed to refine longer-term actions
- Address streamflows and habitat
- May vary by sub-basin or habitat



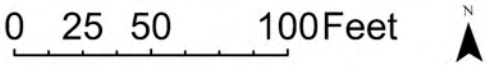
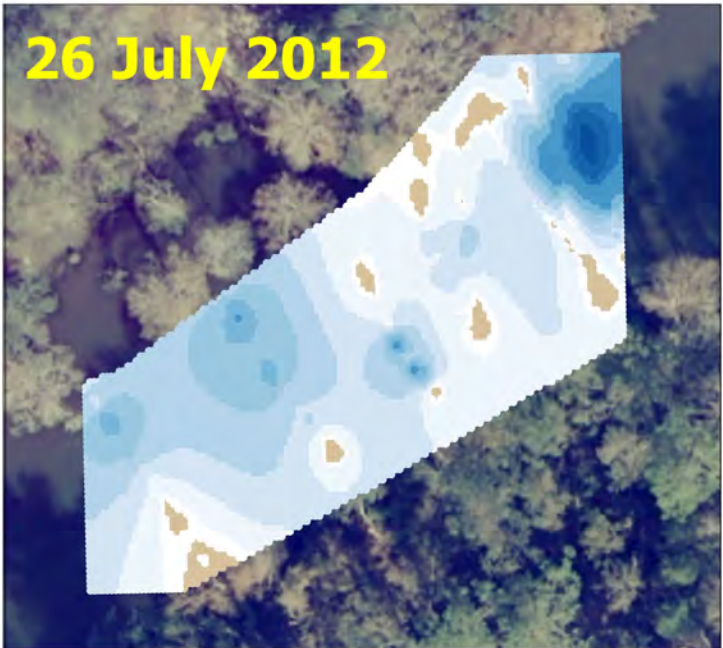
611 cfs, ~30th percentile



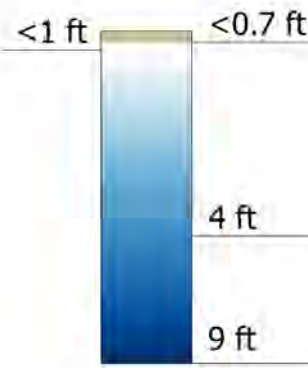
135 cfs, ~20th percentile



33 cfs, lowest flow of record

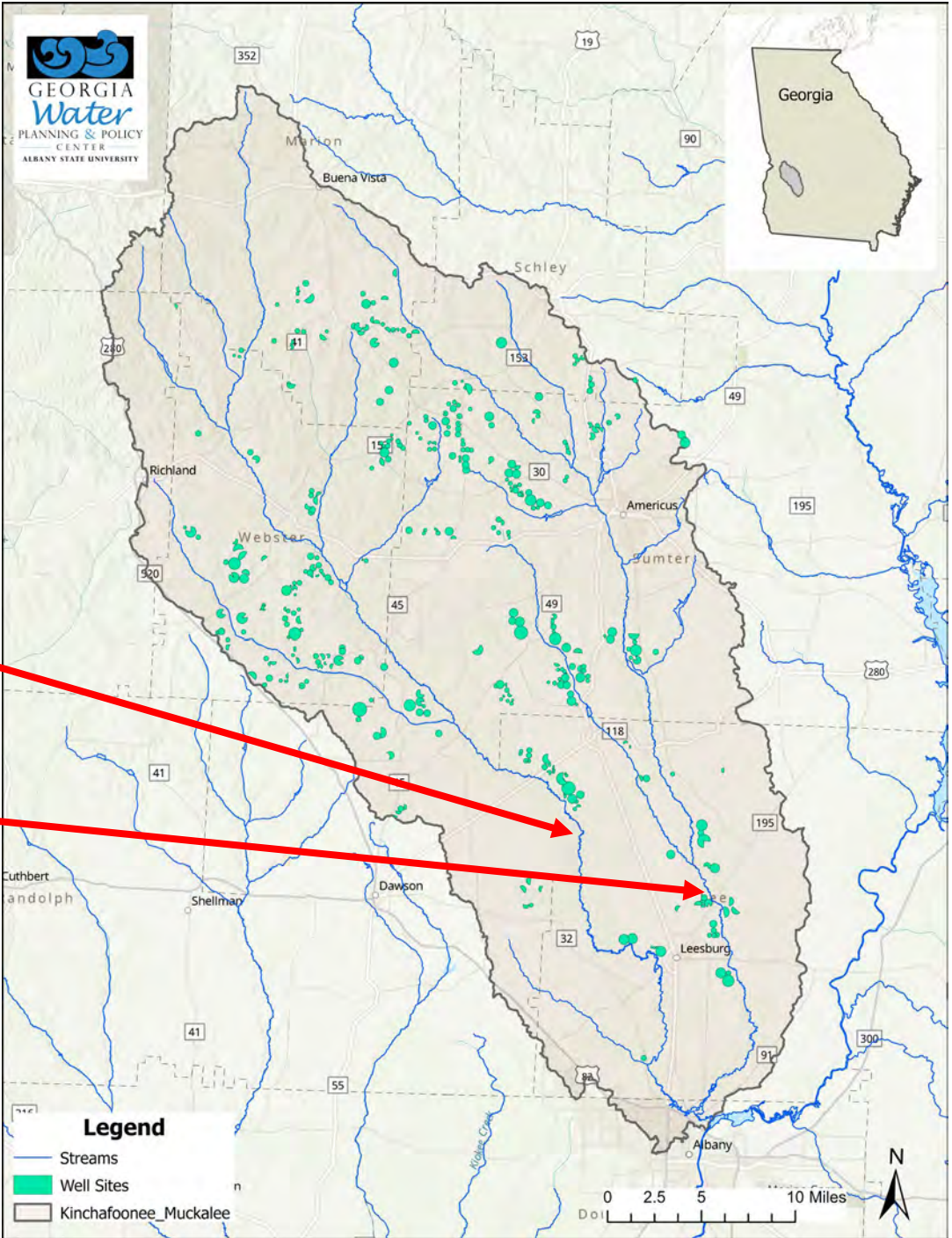


Water Depth

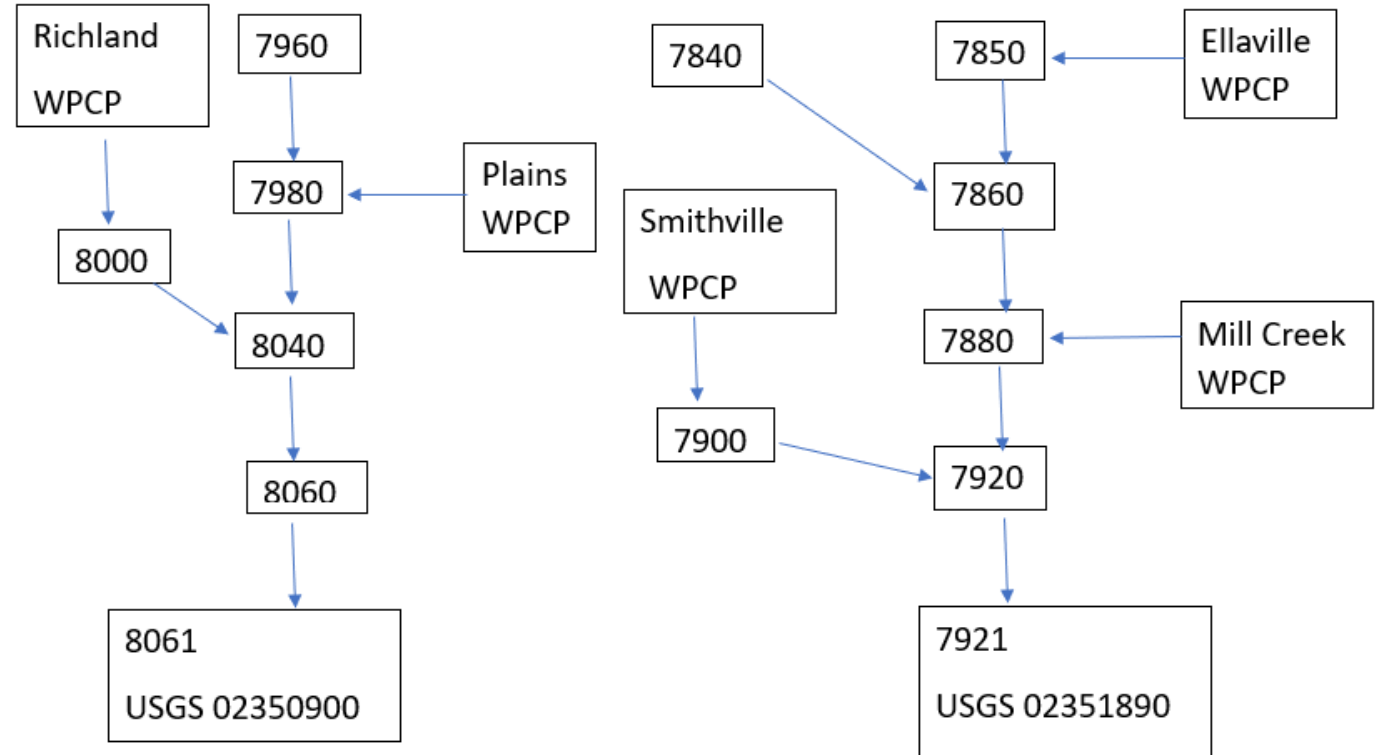
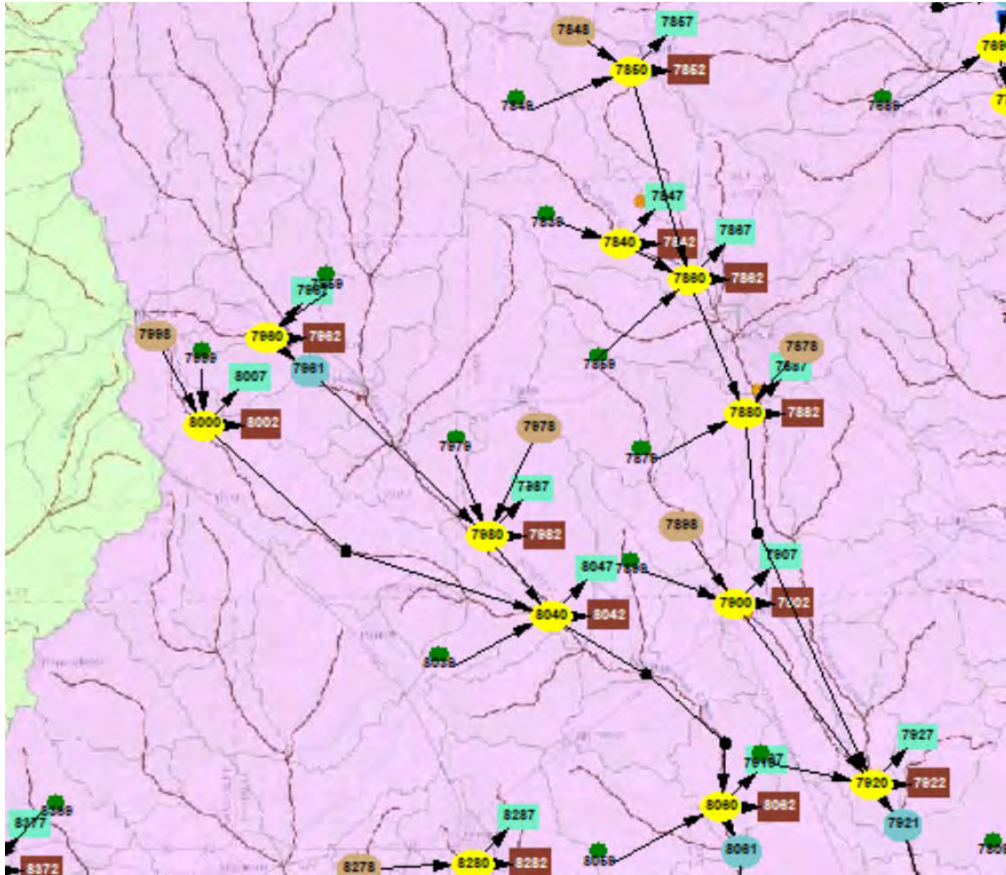


Kinchafonee-Muckalee Scenario

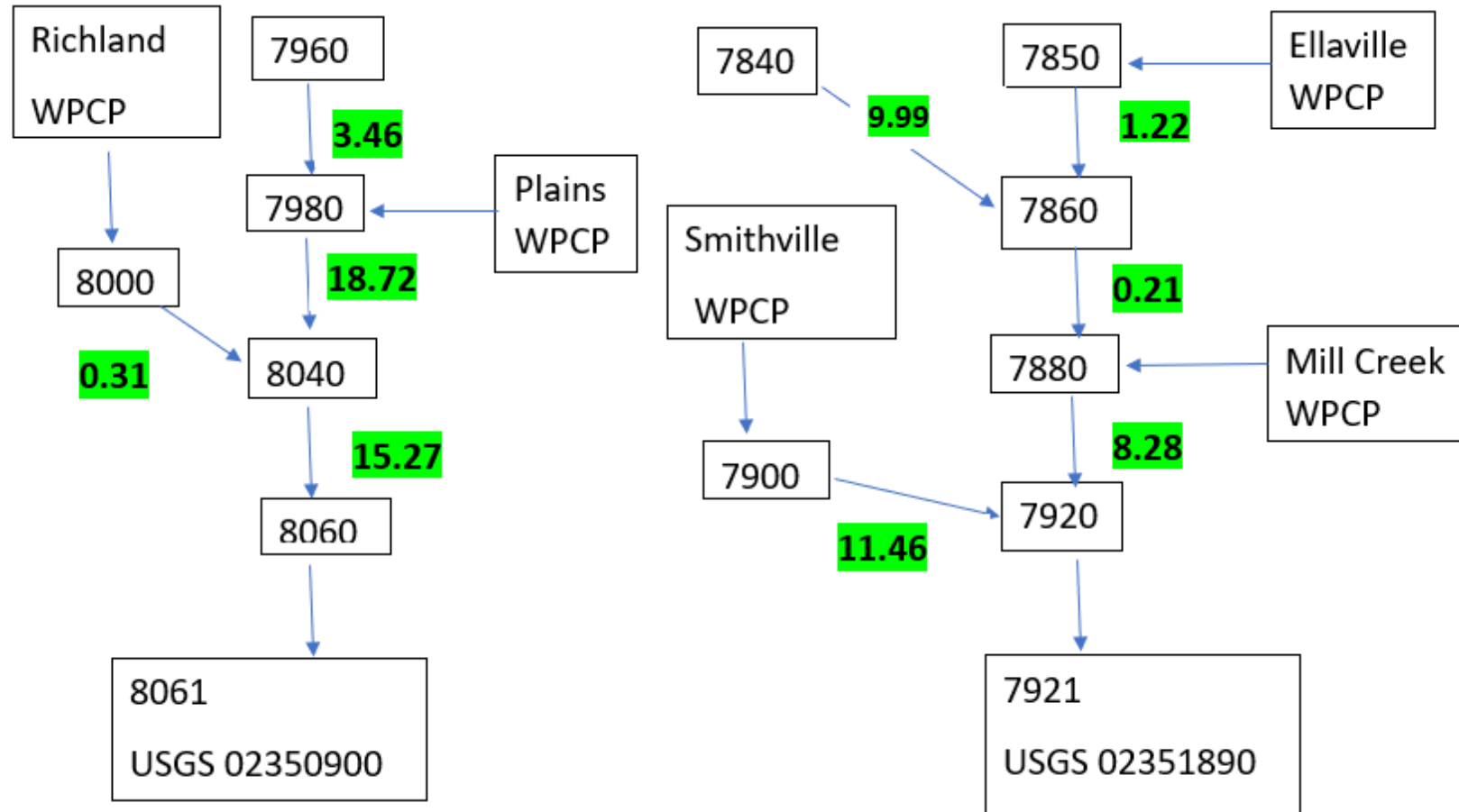
| SURFACE WATER SCENARIO | |
|--|--------------------------------|
| USGS Gage | Surface Water Acres Above Gage |
| 02350900 Kinchafonee Creek at Pine Wood Road, near Dawson, GA | 8,921 |
| 02351890 Muckalee Creek at GA 195, near Leesburg, GA | 7,729 |



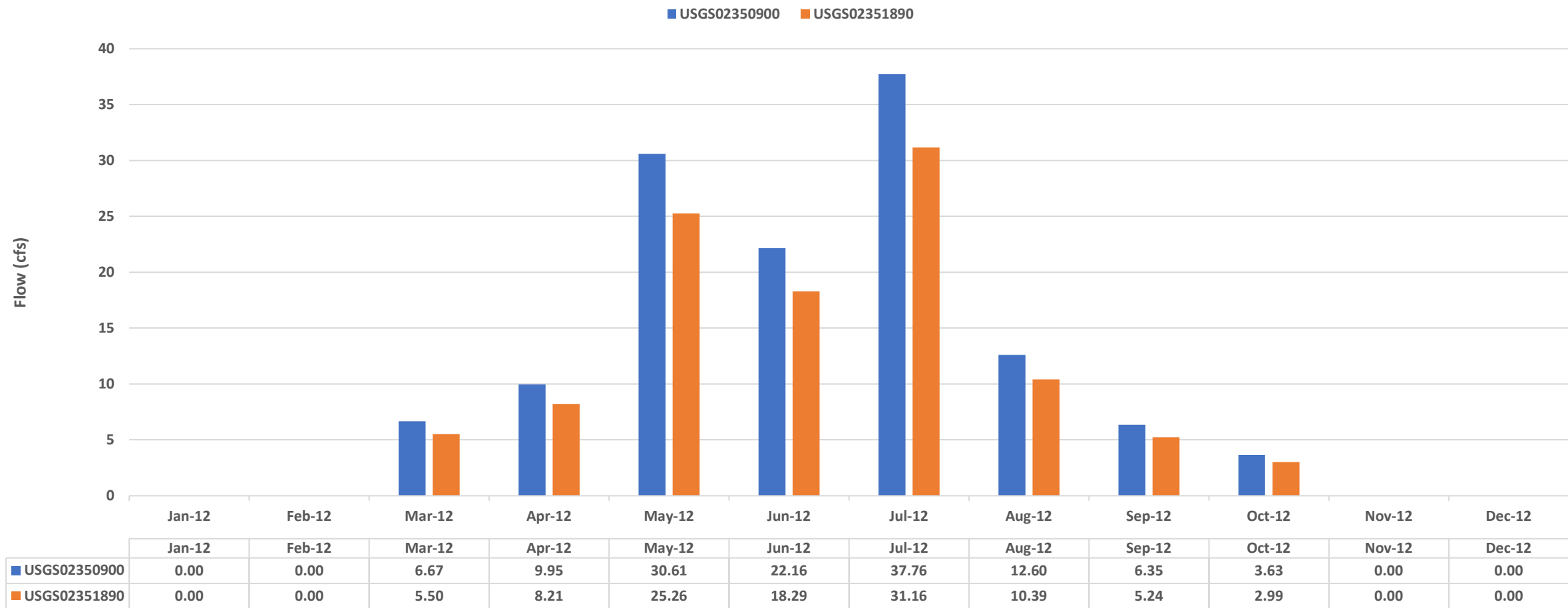
BEAM Nodes above USGS 02350900 & USGS02351890



Benefit flow in July 2012 above USGS 02350900 & 02351890 (Unit in cfs, highlighted in green)

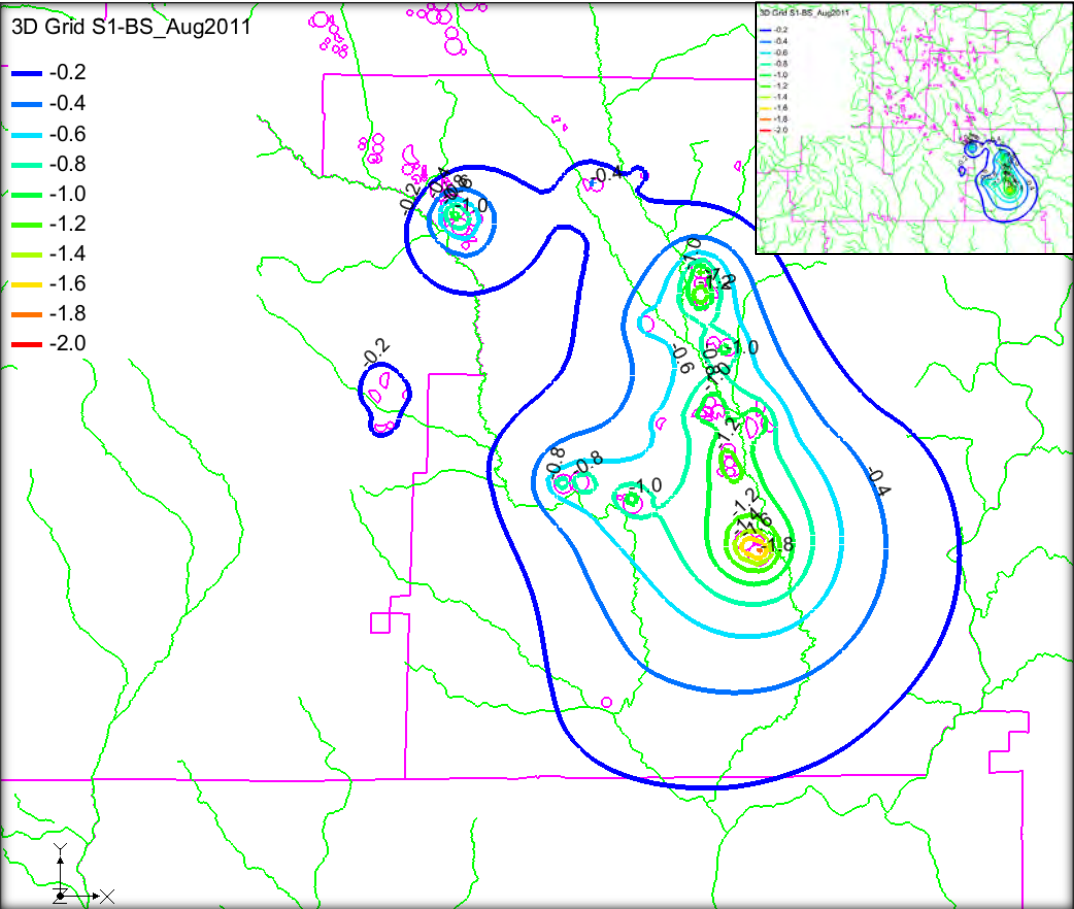


Benefit Flow in 2012 above USGS 02350900 & 02351890



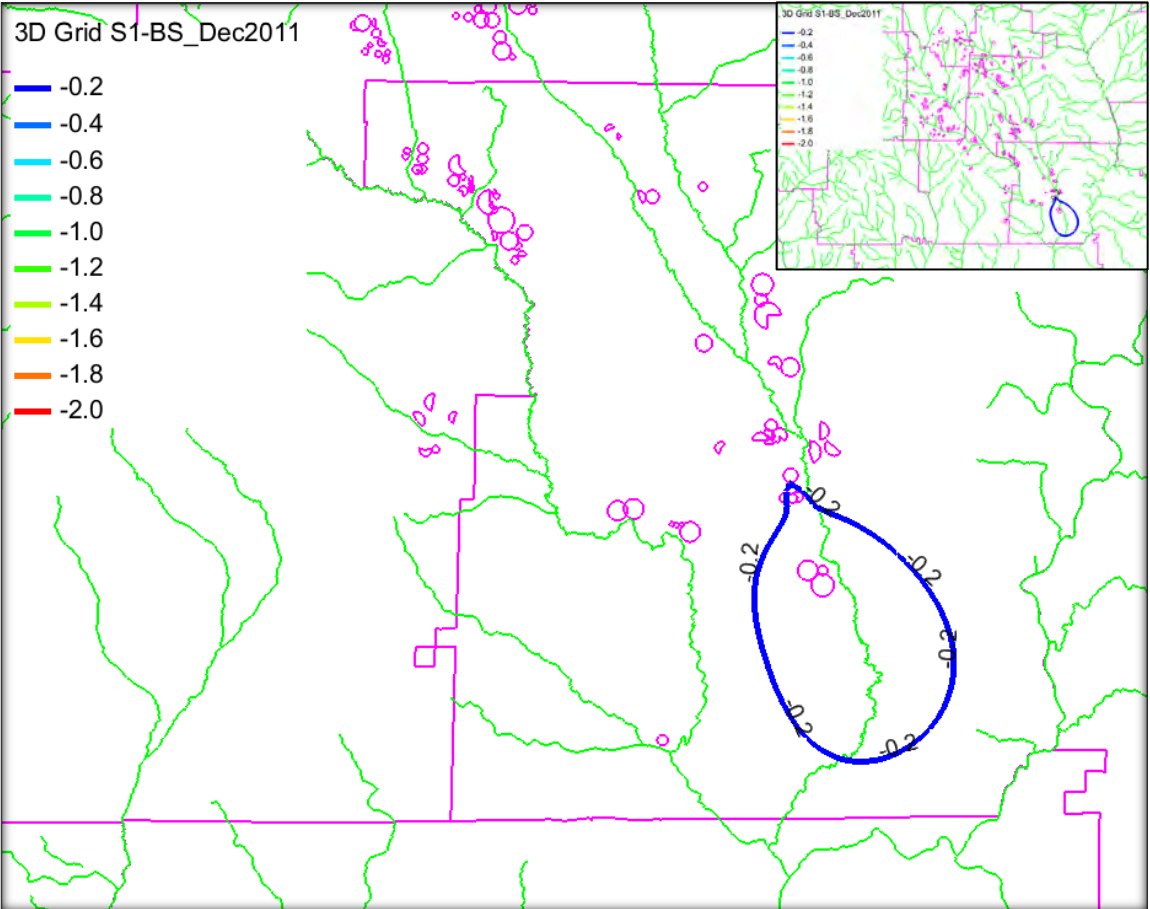
Scenarios 1 & 2: Claiborne Aquifer Results (Layer 3)

Peak Season (August 2011) Drawdown in the Claiborne Aquifer(Layer3)



Up to 1.8 feet of drawdown at the lowest point in the cone of depression in August 2011 with the highest monthly application depth

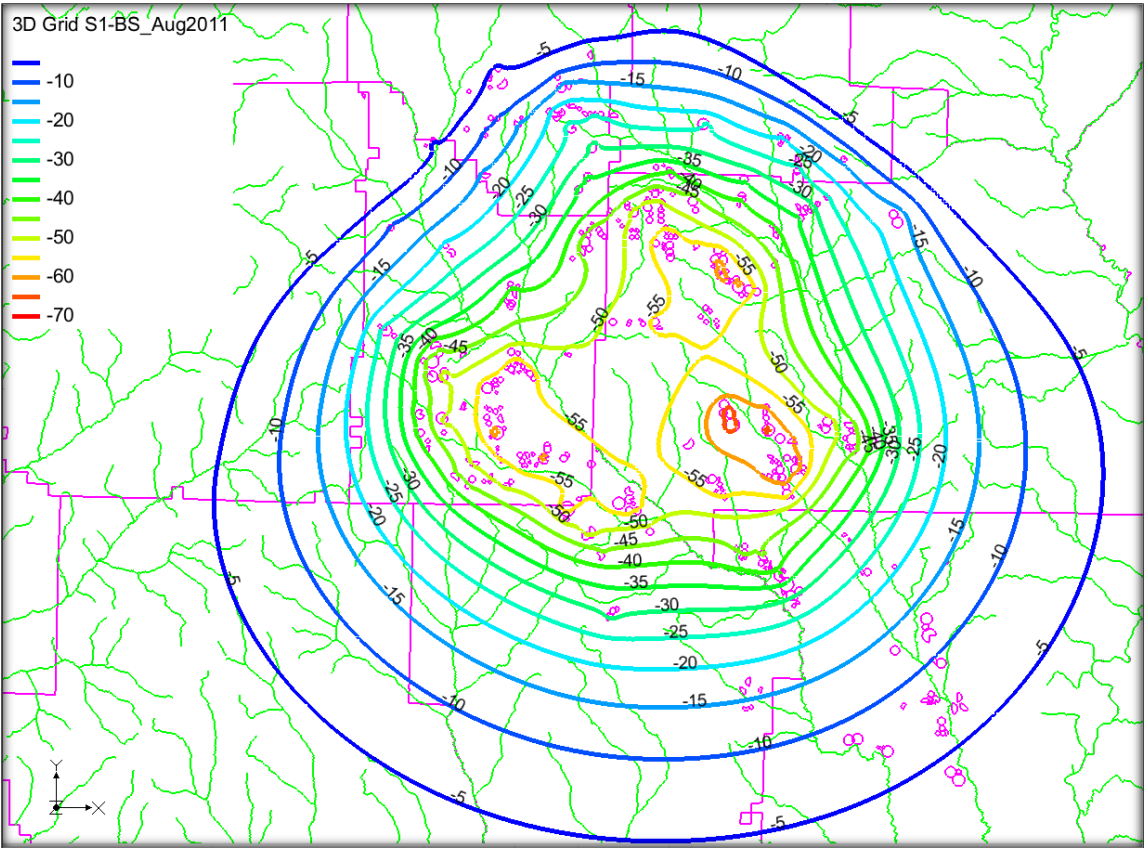
Post-Season (December 2011) Drawdown in the Claiborne Aquifer(Layer3)



At the end of the growing season, the drawdown taking place at the peak of the season disappears, leaving very little residual effect

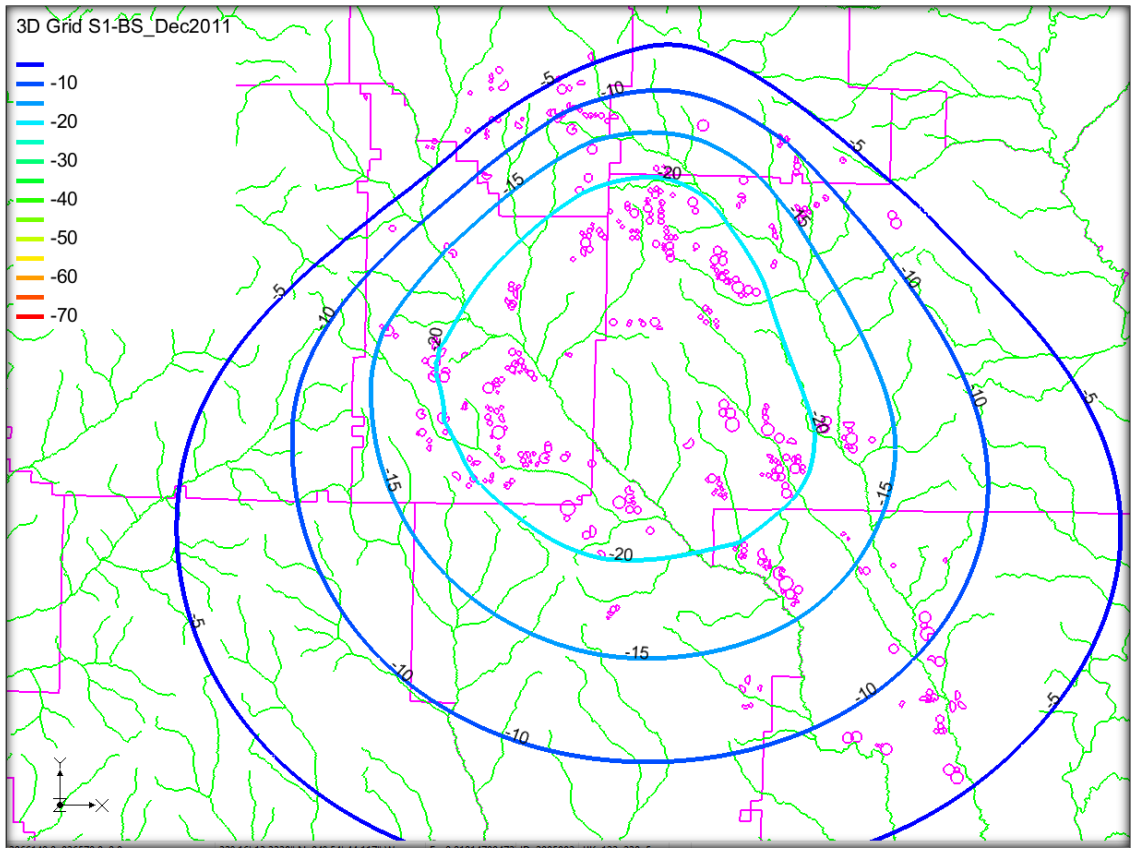
Scenario 1: Providence Sand Aquifer Results (Cretaceous)(Layer 5)

Peak Season (August 2011)
Drawdown in the Providence Sand Aquifer(Layer5)



Up to 68 feet of drawdown at the lowest point in the cone of depression in August 2011 with the highest monthly application depth

Post-Season (December 2011)
Drawdown in Providence Sand Aquifer(Layer5)



Up to 25 feet of residual drawdown at the end of the growing season

Management Actions to be evaluated

Drought management to avoid and minimize low flows

- Source switching (surface water to confined Claiborne or Cretaceous aquifer)
- On-farm conservation planning and BMP implementation (irrigation scheduling, soil moisture sensors, etc.)
- Voluntary temporary suspension of irrigation through incentives (Flint River Drought Protection Act)
- Low flow restrictions on surface water permits
- Streamflow augmentation

Actions to mitigate impacts to mussel populations

- Public education
- New/expanded water use in areas where resource capacity exists
- Agricultural easements, solar conversion or other that remove land from irrigation
- Expand lands managed for restoration forestry
- BMPs to reduce nonpoint source runoff (dirt roads, agricultural lands)
- NPDES permit revisions for point sources
- Reintroduction of mussel populations (first step: genetic analysis)
- Fish passage restoration

Others?

Habitat Conservation Plan (HCP)

HCP must include:

- Assessment of the likely impacts on the species
- Measures that the permit holder will take to avoid, minimize, mitigate, and monitor the impacts to the species
- Biological goals and objectives
- Adaptive management, as needed to address scientific uncertainty
- Discussion of alternatives considered
- Identification of funding to implement the plan
- Monitoring and reporting
- Compliance with public participation requirements of National Environmental Policy Act



Lunch



Fact Sheet Updates

Presented by Meagan Szydzik, GWPPC



Feral Hogs

Presented by Steve Golladay, Jones Center at Ichauway and
Justine Smith, UGA Warnell School of Forest Resources



Wild Pig Removal and Water Quality Responses: A Pilot Project on Private Lands in Southwestern Georgia



Research Team: S.W. Golladay, J.L. Smith, F.E. Kruis, L.C. Sweeney,
M.T. Mengak, and L.M. Conner



Wild Pigs Cause Economic Losses

- US Damage – \$1.5 to \$2.5 billion per year
- Georgia 2014 – Statewide results
 - \$98.9 million to crops
 - \$51.7 million to items other than crops
 - \$150+ million total estimated damage
- Southwestern Georgia 2012 \$51 million
- Pigs are *almost* as environmentally destructive as humans



Non-Ag Damage by Wild Pigs



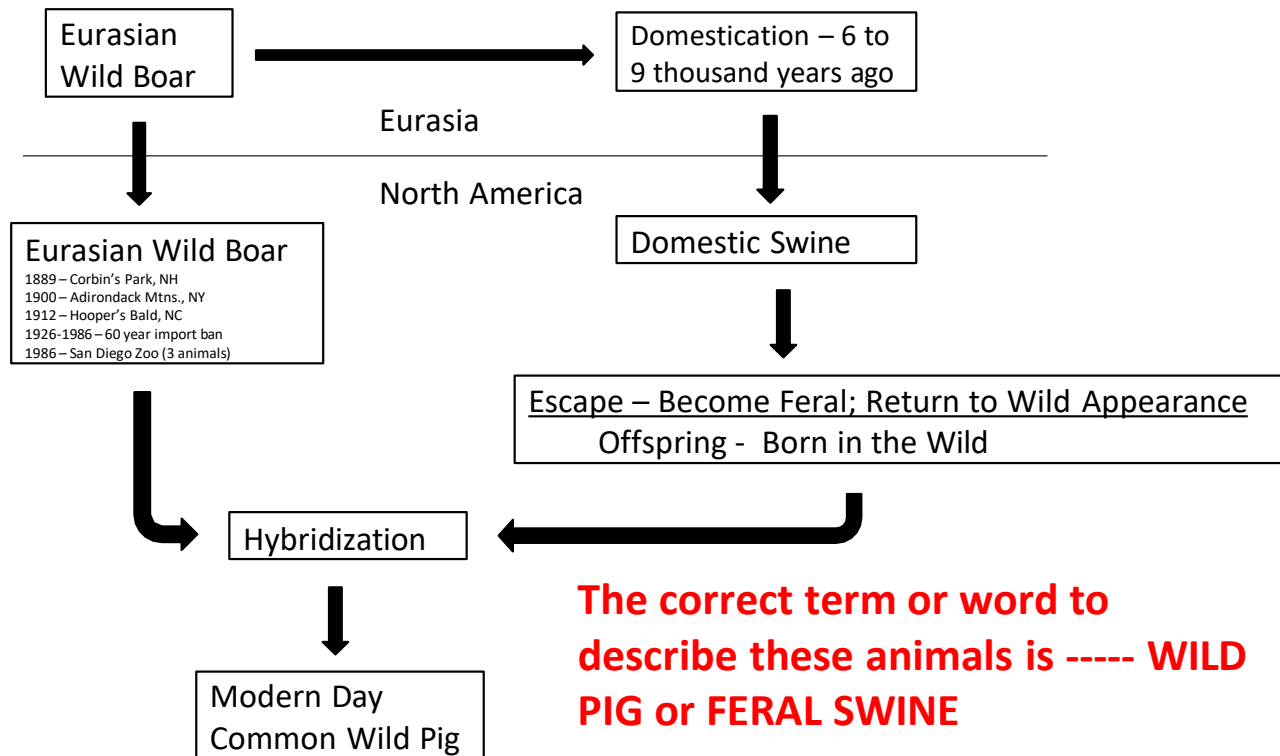
Vehicle collisions



Wild pigs dig the suburbs



Origin of Wild Pigs

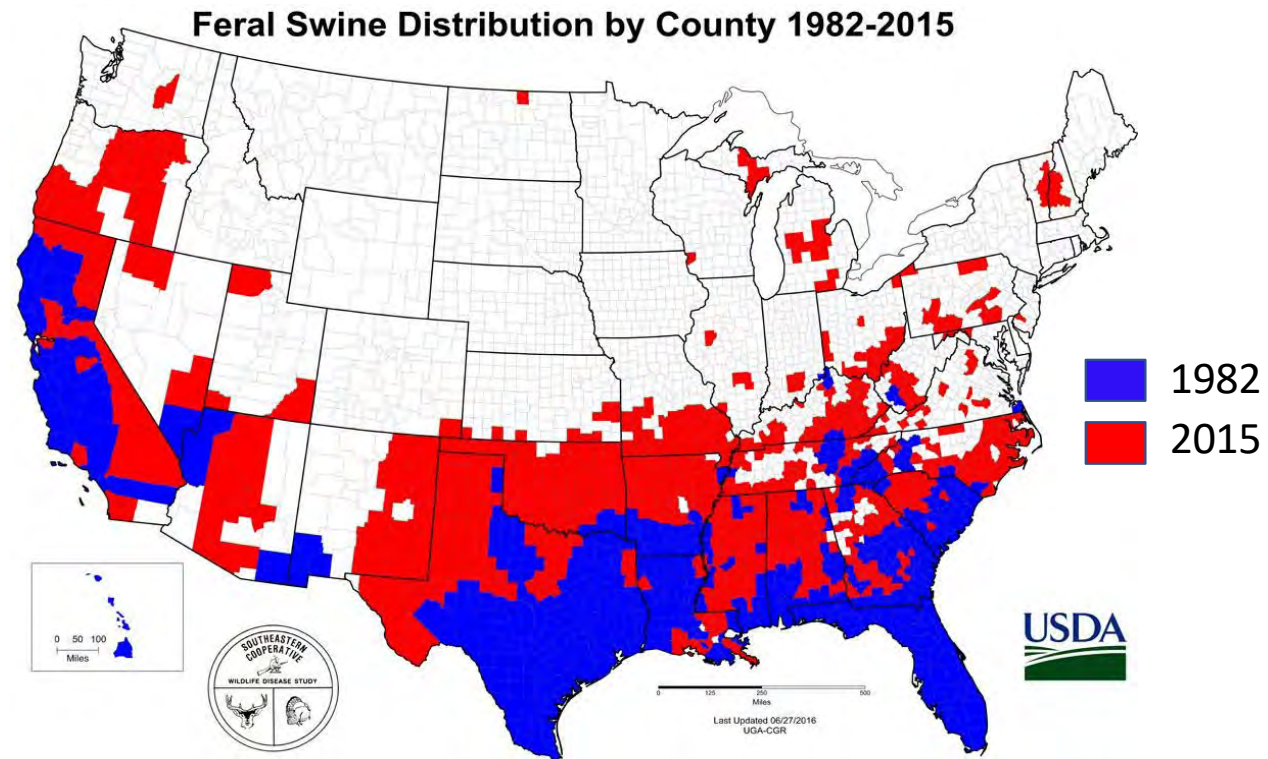


Pig Biology (for aquatic scientists)

- **“Pigs are born pregnant”**
 - Highest reproductive rate of any mammal their size
 - Average litter size is 4-6
 - 1 or 2 litters per year
- **“In a litter of 8 piglets, 9 will survive”**
 - 80-90% survival
 - Few wild predators
- **“Any fence that can hold water can hold a pig”**
 - Intelligent
 - Escape and move in and out of backyard pens
 - Learn to avoid baited traps and areas where hunting occurs



Wild Pig Map



Damage to Streams, Wetlands, Riparian Areas

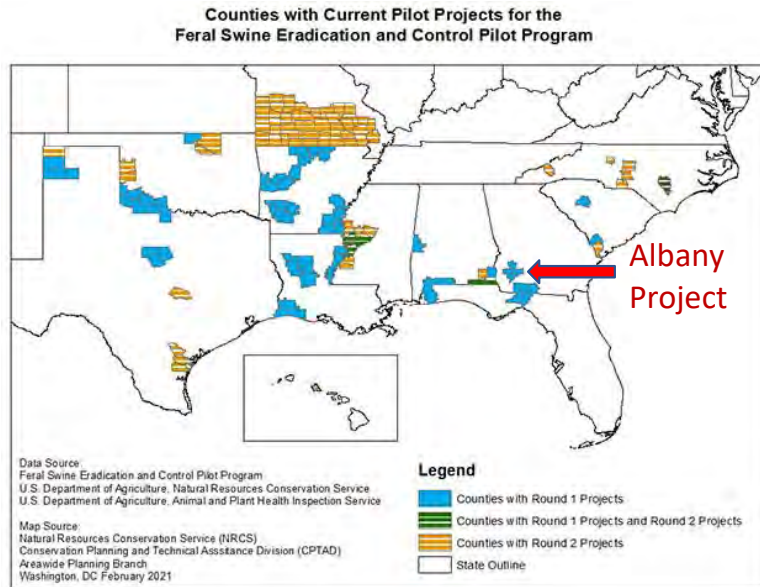


- Soil disturbance
- Increase erosion
- Nutrient release
- Loss of plant and animal species

Watershed effects not well known



National Feral Swine Eradication and Control Pilot Program

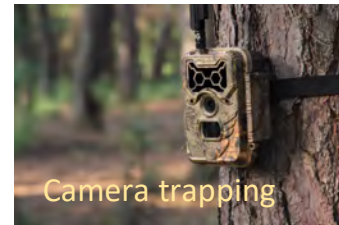


- 20 pilot programs in Round 1 (blue)
- 2018 Farm Bill administered by NRCS
- Wild pig removal by APHIS
- Damage assessments to crops and farmlands
- Landowner outreach and partnerships
- Research on wildlife and effects on water quality



Albany GA Pilot Project

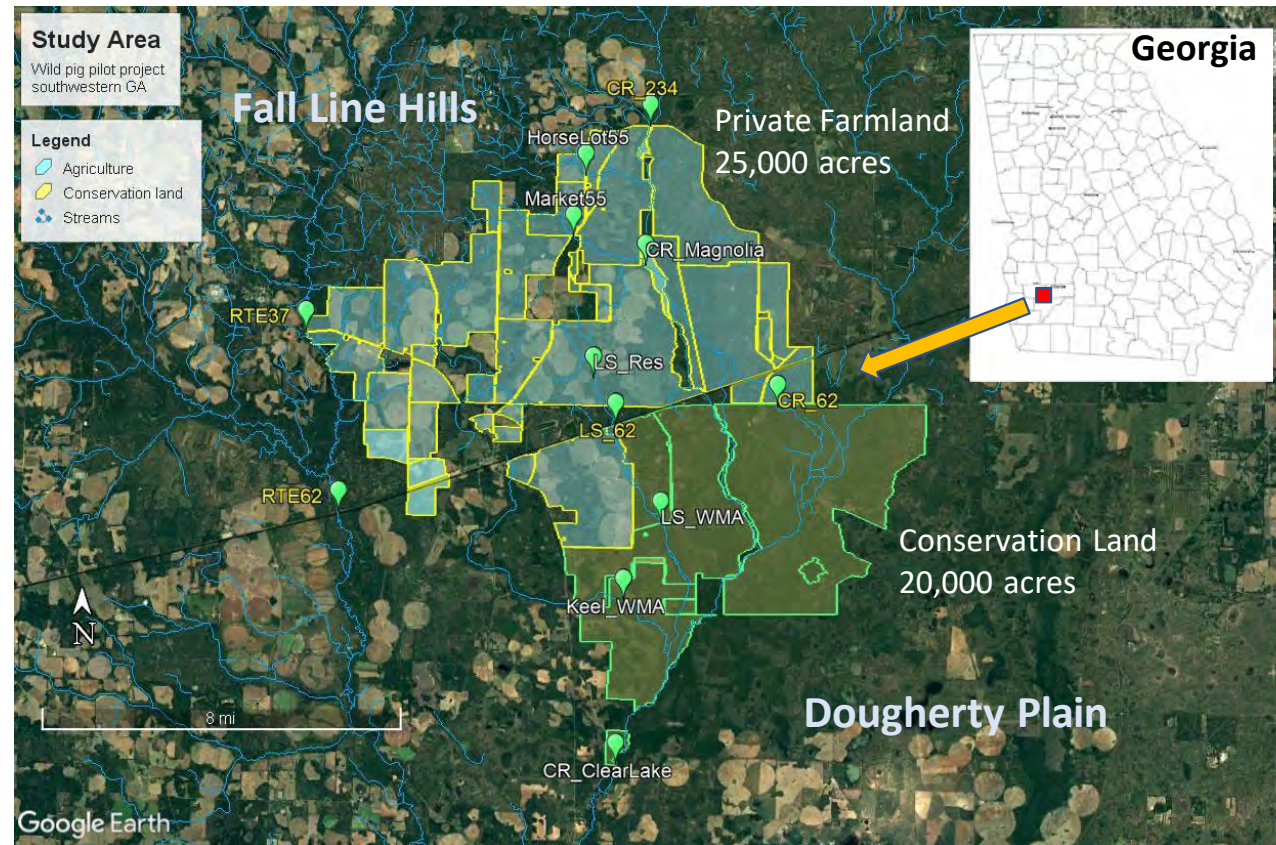
- 1) Compare effectiveness of hunting versus trapping for wild pig removal
- 2) Assess damage to crops from wild pig during removal
- 3) Assess wild pig populations, movements, and activity during removal
- 4) Assess water quality effects of wild pig removal
- 5) Evaluate landowner perceptions of wild pigs and removal activities



Removal techniques



Network of Sampling Sites Albany GA Pilot Project

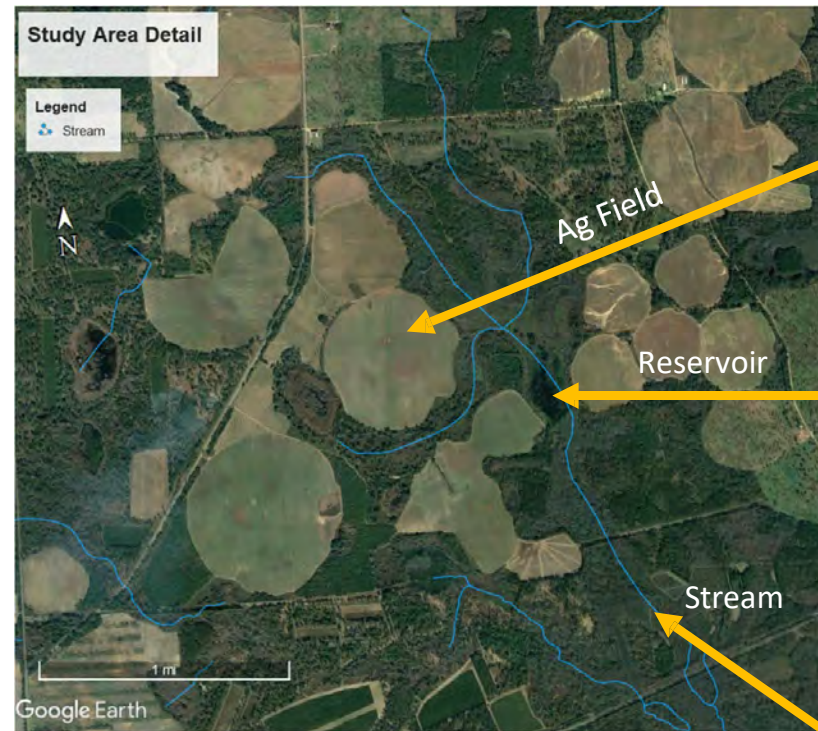


Real World Science Adventure

- 1) Wild pigs are everywhere!?!? (no reference sites)
- 2) Every farm is different. (no replication)
- 3) Wild pigs are smart, they move when pursued. (variability)
- 4) Removal started before research was funded. (because 2020)
- 5) Study area has two physiographic districts (surface drainage NW, groundwater drainage SE) (more variability)



Study Area Detail



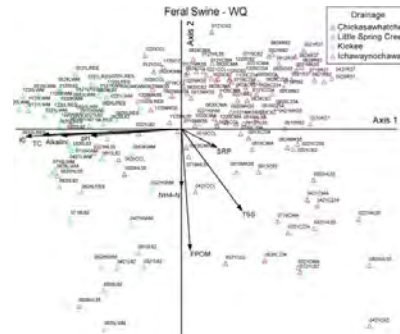
Field Sampling



Monthly replicated samples at all sites

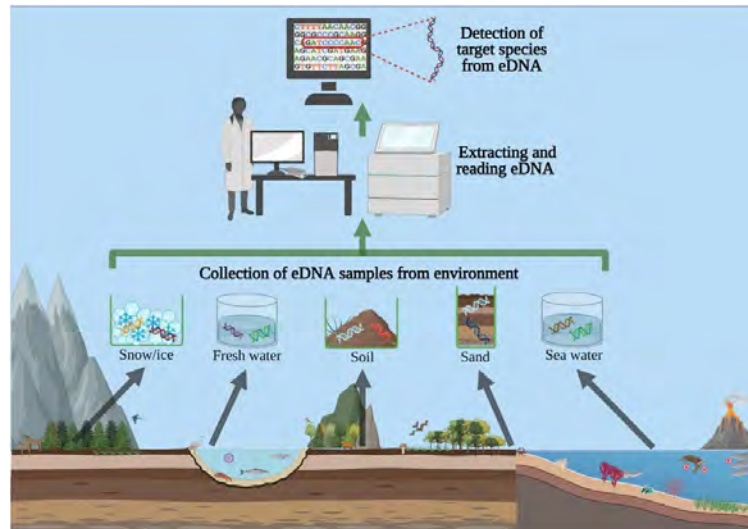


Laboratory Analysis



Data Analysis

e-DNA to Detect Feral Swine



Liam Whitmore, University of Limerick, [CC BY-ND](#)

e-DNA is specific genetic material traces present in the environment due to animal activity.

Jones Center collects water

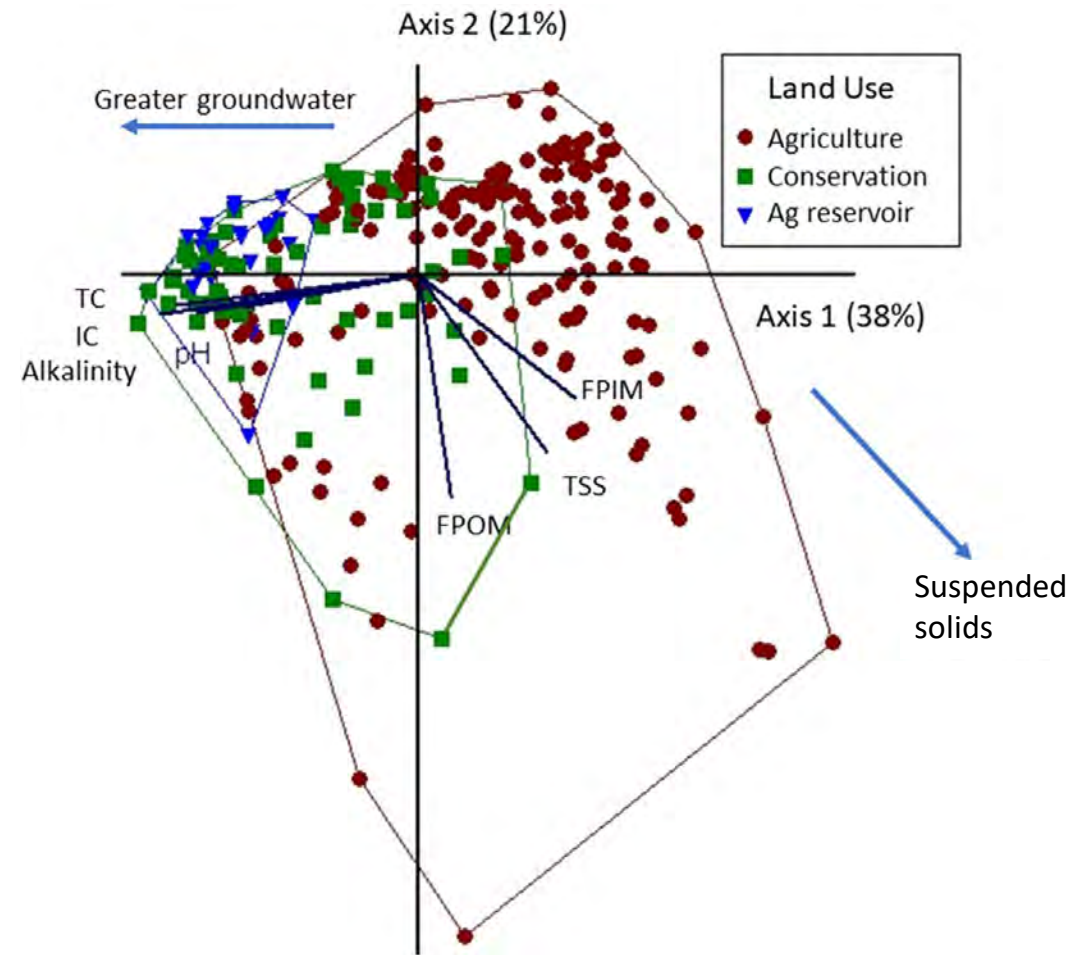


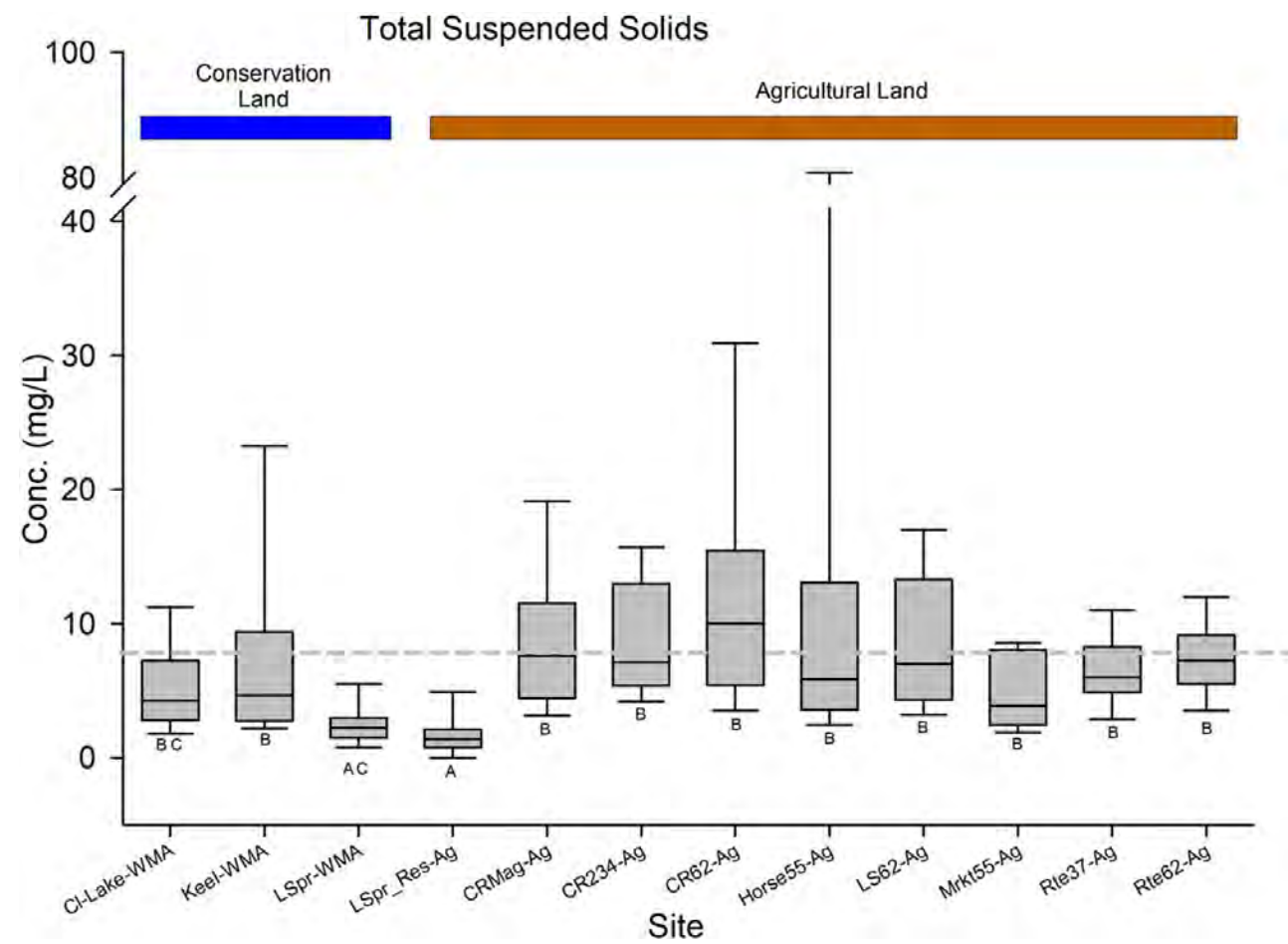
UGA Veterinary Sciences Lab in Tifton does genetic analysis

Water Quality Summary August 2020 – August 2022

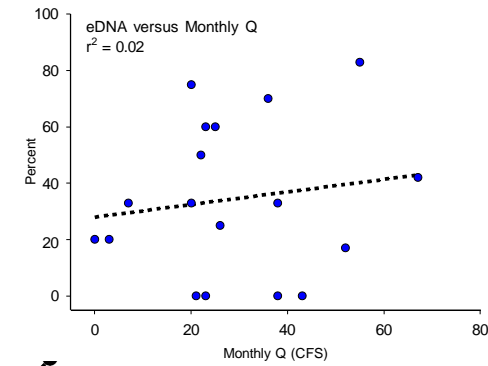
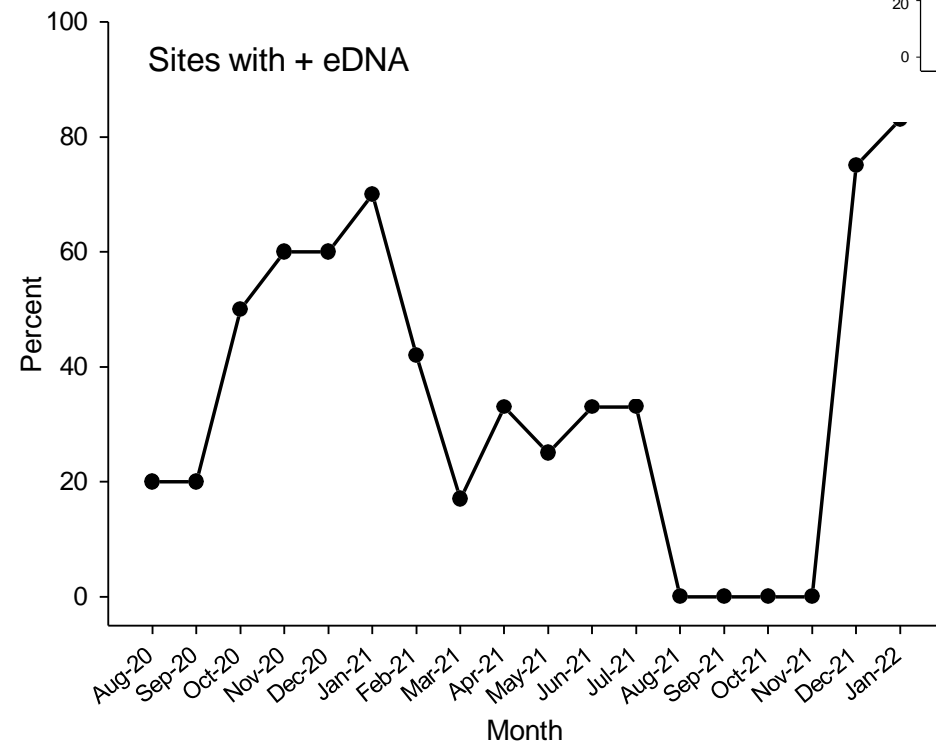
| Site | Position | pH | Alkalinity | TSS | FPOM | TOC | TC | IC | NH4-N | NO3-N | SRP |
|----------|----------|------|------------|-------|-------|------|-------|-------|--------|---------|------|
| CR_234 | C-1 | 5.98 | 113.36 | 5.37 | 1.65 | 9.45 | 29.98 | 20.53 | 27.48 | 120.50 | 2.92 |
| CR_HL | C-2 | 6.04 | 86.09 | 19.38 | 12.25 | 9.67 | 27.40 | 17.73 | 220.73 | 559.91 | 7.62 |
| CR_MK | C-3 | 5.92 | 72.70 | 4.96 | 1.30 | 9.32 | 23.93 | 14.62 | 69.59 | 536.86 | 3.38 |
| CR_Mag | C-4 | 5.87 | 68.25 | 8.72 | 2.20 | 7.89 | 19.92 | 12.03 | 34.78 | 255.54 | 4.03 |
| CR_62 | C-5 | 5.74 | 54.33 | 12.16 | 2.77 | 7.55 | 18.32 | 10.84 | 26.54 | 154.08 | 3.88 |
| CR_CL | C-6 | 5.98 | 113.36 | 5.37 | 1.65 | 9.45 | 29.98 | 20.53 | 27.48 | 120.50 | 2.92 |
| Ich_Rt37 | I-1 | 5.19 | 18.84 | 6.71 | 1.71 | 5.66 | 8.79 | 3.13 | 16.51 | 650.81 | 2.63 |
| Ich_rt62 | I-2 | 5.34 | 26.92 | 7.47 | 1.76 | 5.53 | 10.13 | 4.69 | 17.74 | 622.10 | 2.66 |
| KE_WMA | K-1 | 6.21 | 153.62 | 7.69 | 2.86 | 9.23 | 40.78 | 31.55 | 744.00 | 119.62 | 3.23 |
| LS_RES | L-1 | 6.17 | 154.73 | 1.76 | 1.07 | 4.42 | 34.58 | 30.17 | 55.27 | 572.60 | 1.84 |
| LS_62 | L-2 | 6.19 | 150.37 | 9.12 | 3.94 | 4.15 | 34.71 | 30.57 | 30.87 | 1398.81 | 1.65 |
| LS_WMA | L-3 | 6.20 | 157.24 | 2.77 | 1.40 | 6.43 | 39.12 | 32.69 | 63.88 | 1301.07 | 2.26 |

Water quality appears to be good. Caveats: monthly grab samples, no event samples





Preliminary eDNA Results

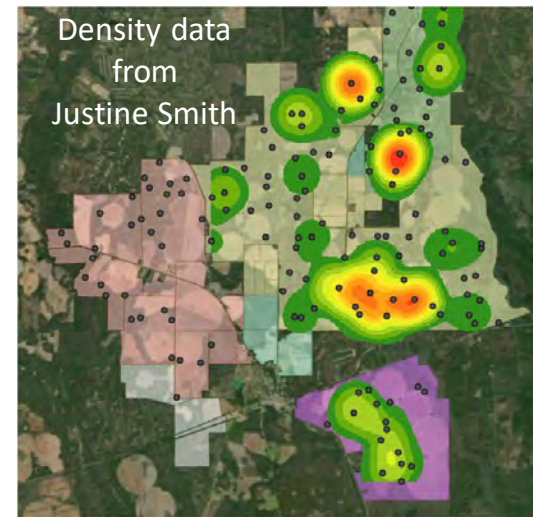
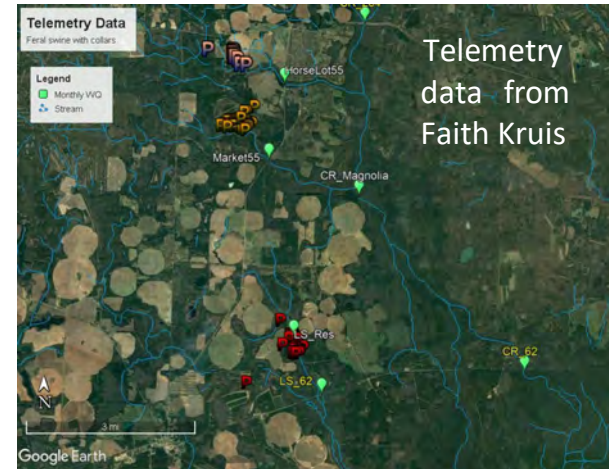


- We can detect it!
- Levels are low
- Interpretation will likely rely on wild pig data
- No simple relationship with discharge

Continuous Water Monitoring



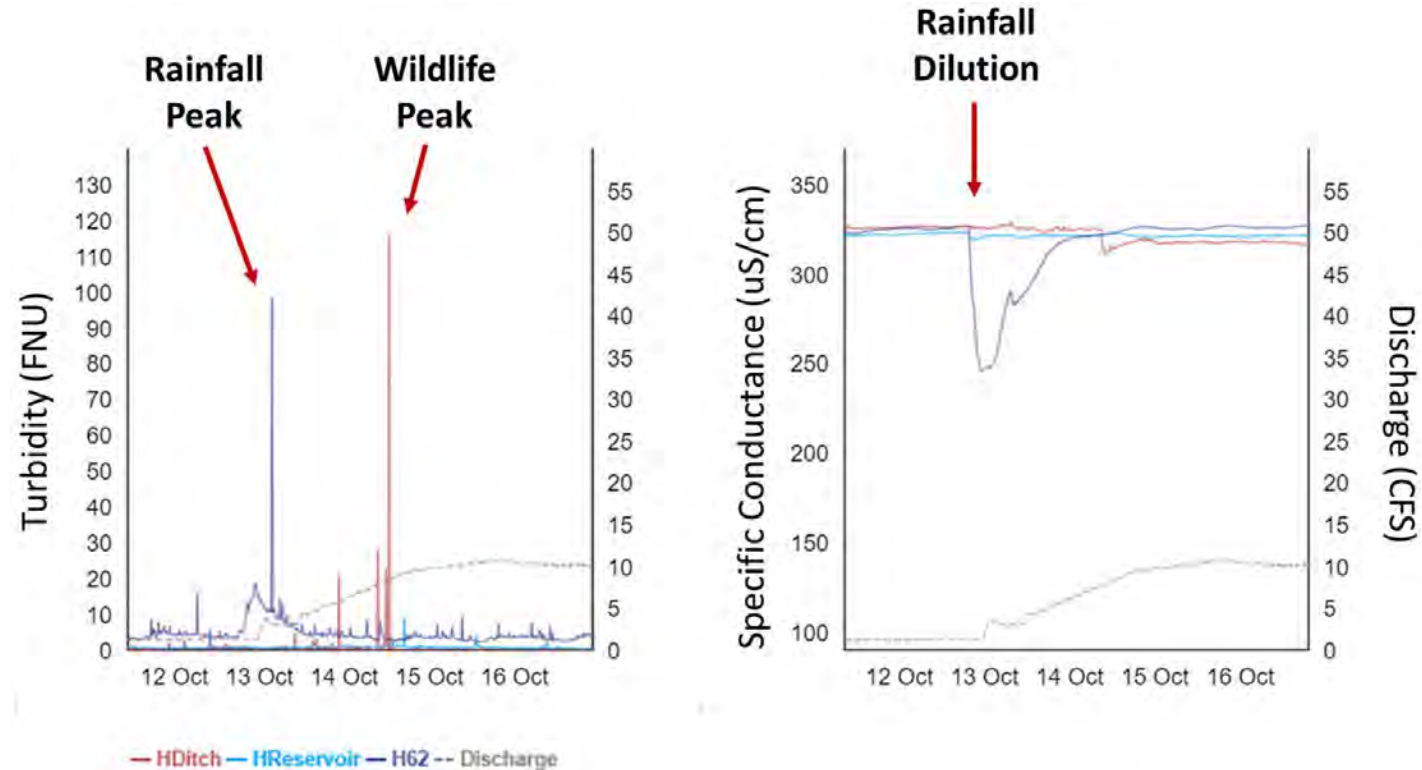
- Installed sondes (temperature, specific conductance, turbidity)
- Provide finer resolution in detecting effects of feral hog activity



Sonde Map



Example from Continuous Records



What Have We Learned?

- 1) Water quality appears to be good in the project area
 - Sampling has limitations
- 2) TSS, eDNA, turbidity, and specific conductance are useful in assessing wild pig effects on water quality
 - There is no single water quality indicator
- 3) Proximity to project boundaries and refuges from control measures may result in water quality degradation within the project area
 - Streams flow across the landscape, upstream activities matter
- 4) Next step is to incorporate wild pig activity data into our analyses





Questions? Field Assistance

- Brian Clayton
- Chelsea Smith
- Maxine Hauser
- Jamie Rogers

Support

- USDA NIFA
- Flint Soil Water Conservation District
- Jones Center at Ichauway
- Warnell School of Forestry and Natural Resources.

Next Steps

Presented by Meagan Szydzik, GWPPC



Next Steps

- Future Council meetings
 - Look out for emails for scheduling
 - Additional topics of interest?
- Committee meetings for Upper Flint Flows (IN-12)



Adjourn



Upper Flint Flows (IN-12) Committee

