

# Invasive Fig Buttercup Must Die! Battle of the Reedy River

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&

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# SC Native Plant Society

- A statewide 501-c-3 environmental organization
  - I represent the Upstate Chapter
- Advocates for native plant protection, restoration
- Native plant species are the basis of sustainable ecosystems
- Native plants support active native wildlife communities.
- [www.scnps.org](http://www.scnps.org)



This is the on-going story of a war against an invasive plant.

And why it is important that we win.

But first, some terminology.

# Plant species status terminology

- Native – A species that developed “here”.
- Introduced (or exotic) –A species that was brought “here” by immigrating humans (or international plant hunters).
  - Naturalized – an introduced species that has adapted to survive “here” without management.
    - Invasive – a species (usually introduced) that overwhelms native communities “here”.
    - To be fair, some natives can behave invasively, given the right conditions.

# What do we mean by “here”?

- “Here” = The geographic region under consideration
- Each “here” is defined by its:
  - Climate - temperature, rainfall regimes
  - Soil types – determined by geology and climate
    - Soils determine fertility, acidity, water holding capacity

# Our “here” is the upper Piedmont of SC

- Uplands:

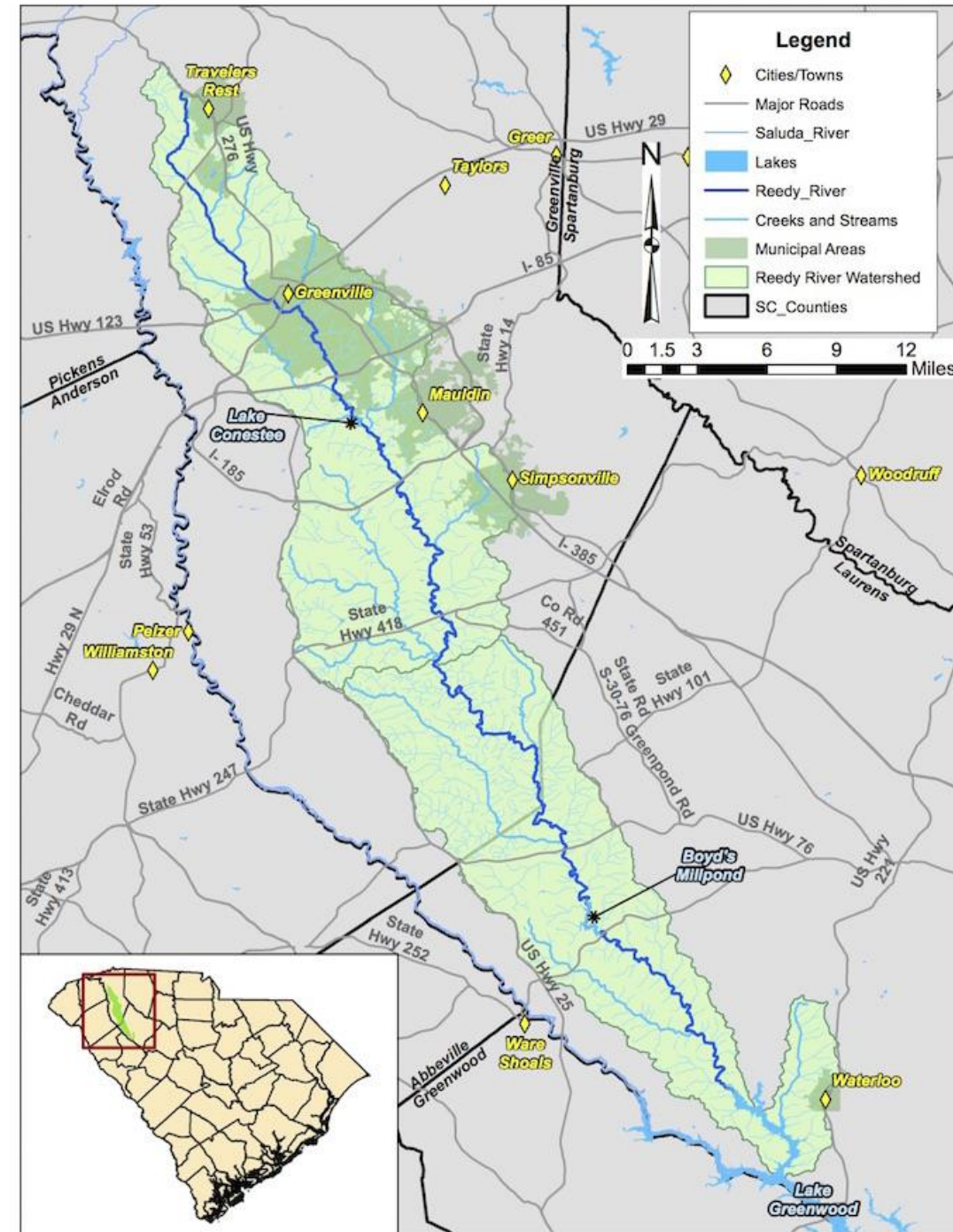
- Sandy soils with red clay subsoils
- Naturally low in most plant nutrients.
- Usually acid (low pH)

- Stream-side flood plains

- Silty loam soils out-washed from erosion of Uplands
- Can be fertile, commonly ample soil water.

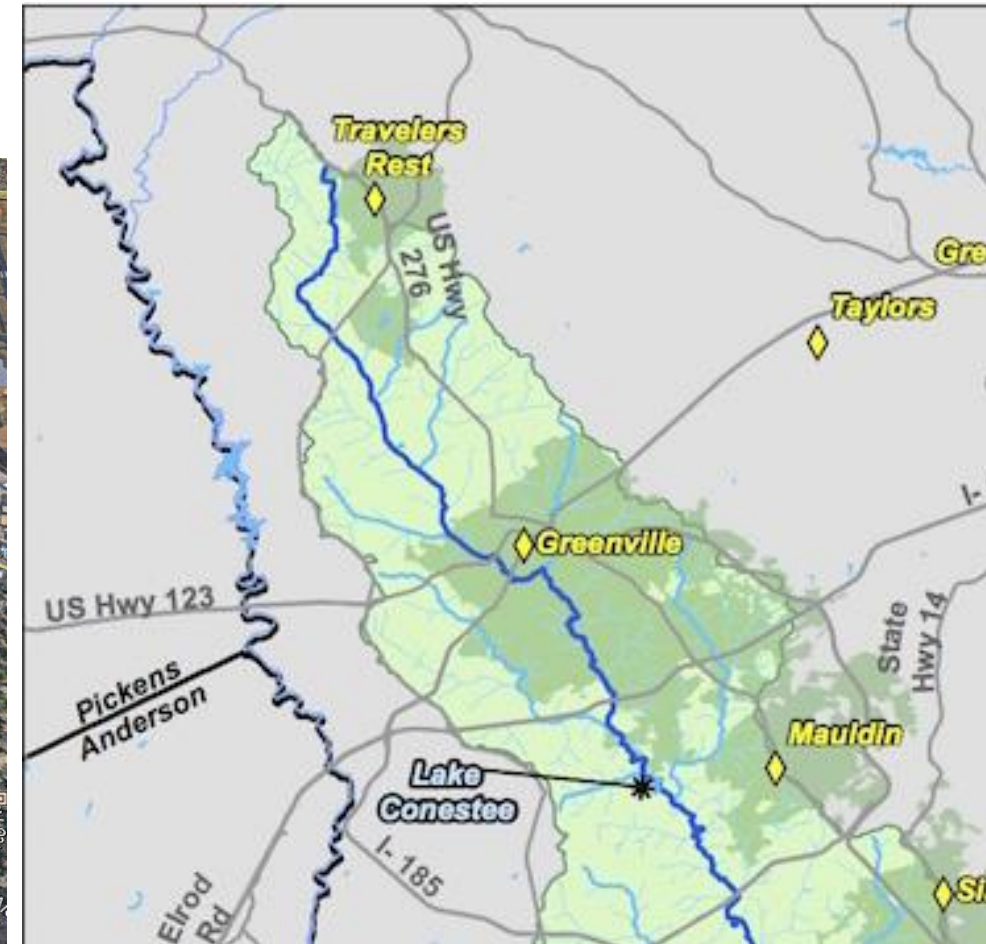
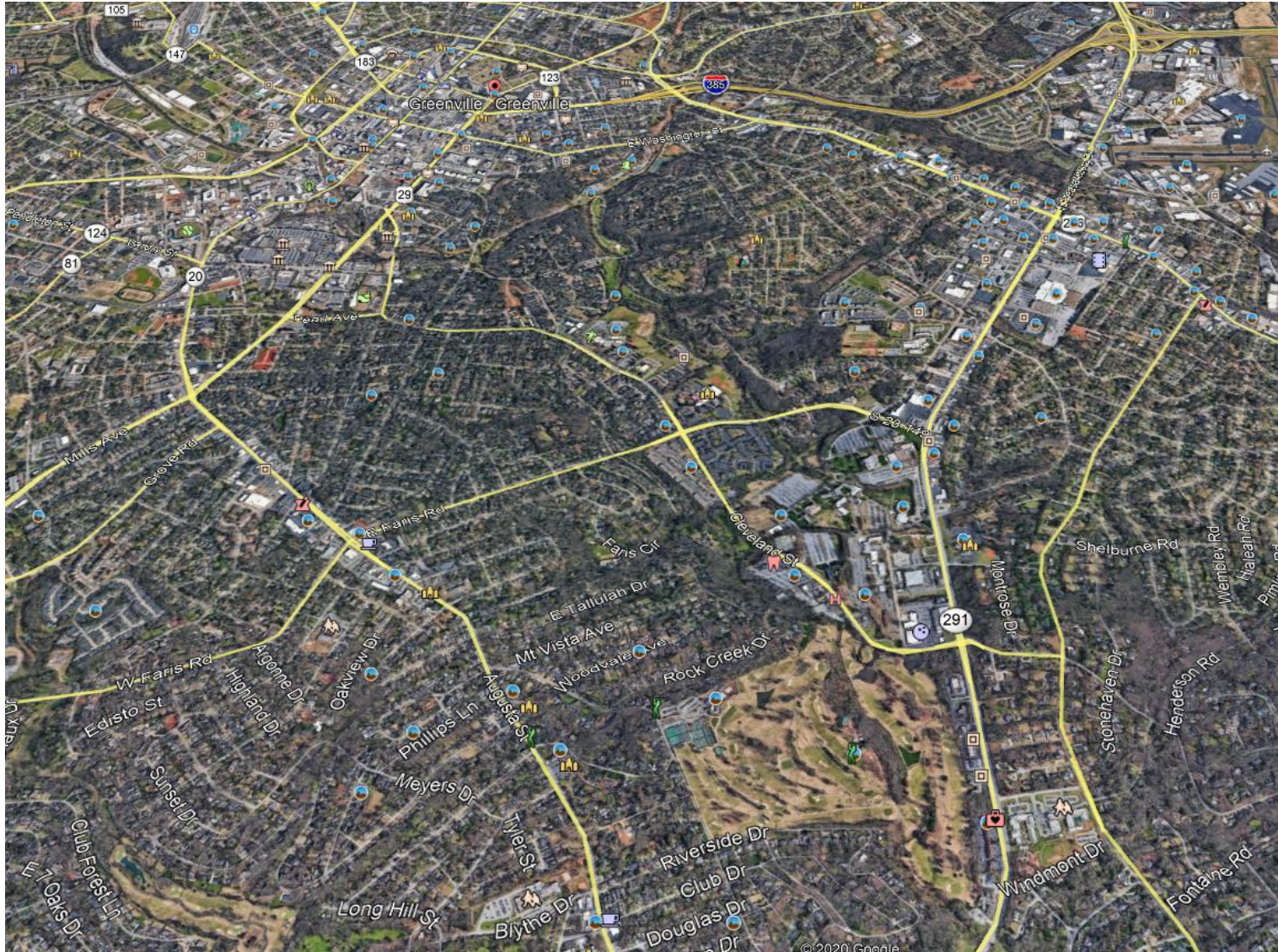
# Our specific “here” today? Reedy River watershed

- Lots of urban, industrial development





# Reedy River in Greenville





# Lake Conestee Nature Preserve (LCNP)

- Riparian zone of the Reedy River
- Mostly floodplain delta
- Formed from 128 years of sediment from Greenville being trapped behind Conestee Dam
- Conestee Dam built for water power for manufacturing





# Lake Conestee Nature Preserve



# LCNP

- Mostly floodplain soils with ample moisture
- Ample nutrients from sediment accumulation
- Support very diverse plant communities
- Diverse plant communities support diverse animal communities

# LCNP: A world-class bird-watching spot

- Rated by many experienced birders as one of the best birding sites in the SC Upstate.
- Featured as a SC birding hot-spot on:
  - [e-bird](#), a popular birder's cell phone app
  - and on the Carolina Bird Club website
  - And on Greenville County Bird Club website.
  - “a **birding** bonanza providing a home for 192 different types of birds”
  - Audubon Society: “**Lake Conestee Nature Park is the wintering grounds of the largest reported population of Rusty Blackbirds in South Carolina.**”



# LCNP Birding- most weekends

pileated woodpecker





# LCNP birding





# LCNP Birds





# Water birds





# Butterflies





# Lake Conestee Nature Preserve is a wonderful community resource

- Educational value
- A place to go and experience nature
- A place to find a bit of solitude



In late winter 2013 a birder reported a very troubling find:

- Reported an attractive plant with glossy green leaves and yellow flowers.
- There was a LOT of it
- He had just noticed the first sighting of fig buttercup in Greenville
- In a prime public natural area in an urban location.





And, there was a LOT of it!





So, in a site that normally supports  
these natives;

bloodroot, mayapple, wild geranium





And these.

Cardinal flower, trilliums, native grasses





Instead was this..





And only this. And lots of it



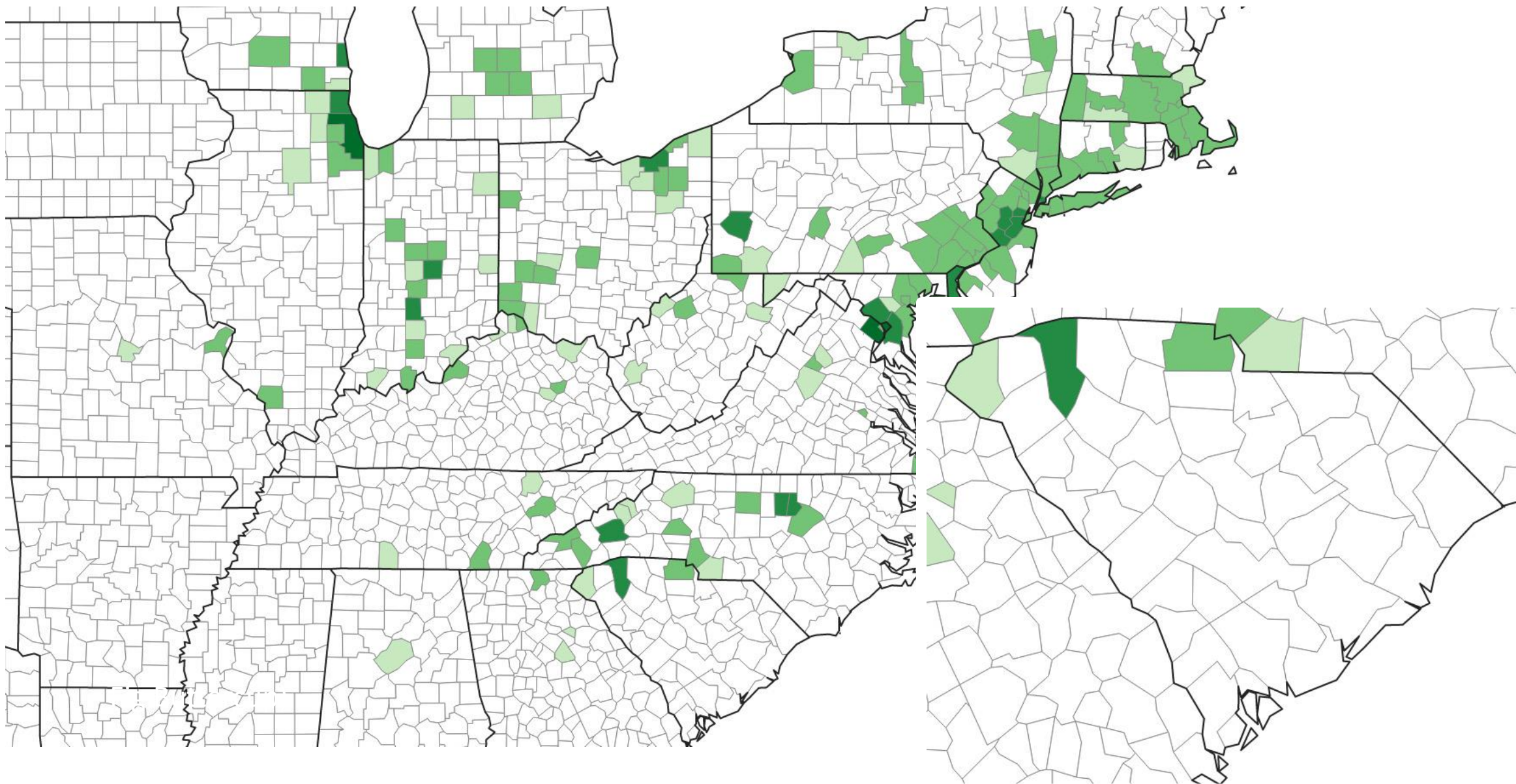


# Obviously an invasive plant species

- We ID'ed it as **Fig buttercup**, AKA **lesser celandine**
- *Ficaria verna*, AKA *Ranunculus ficaria*
- Learned that it came to the US from southern Europe.
- Was found in gardens in Philadelphia as early as 1867

A Google survey for *Ficaria verna* was troubling:

- Already invading floodplain areas in Northeast, Midwest and Pacific states
- A major problem in New England, mid-Atlantic states
- Also in midwestern states and Pacific Northwest
- Then we learned that it was causing concern in NC, TN.
- Then we learned that it was showing up in Rock Hill area





# Interesting seasonal development calendar for fig buttercup

- Starts growing in January when hardwood forests are leafless, and..
- Before native forest-floor plants become active





# The calendar according to Fig buttercup

- Emerges from overwintering underground form (tubers) in January





# The calendar according to Fig buttercup

- New seedlings show up in late January (from bulbils)



# The calendar according to Fig buttercup

- Begins to bloom in late February





# The calendar according to Fig buttercup

- Bulbils and underground tubers begin to show up in March





# The calendar according to Fig buttercup

- Full bloom in early April





# The calendar according to Fig buttercup

- New tubers and bulbils **fully formed** by late-April





# The calendar according to Fig buttercup

- Top growth begins to die back by early May.





# The calendar according to Fig buttercup

- Top growth disappears by mid-May
- All that's left is buoyant bulbils





# Then comes spring and summer high water events

- Fig buttercup propagules (tubers, bulbils) go on downstream “float trips”.
- Perfect dispersal and recruitment strategy for a plant that has invasive aspirations





Result? A very short seasonal window for effective fig buttercup control

- About four weeks in mid-March to mid April
- Control measures must be systemic.
  - Must kill all parts of the pest plant
- Control measures must be applied in VERY timely fashion
- Existing control protocols called for use of glyphosate (Roundup)

# Published control protocols

- Glyphosate (containing surfactant) a very effective systemic herbicide
- Put it on the leaves, and the plant disperses it throughout the plant
  - Tops, roots, reproductive structures die
- But:
  - Glyphosate (Roundup) has shown disturbing effects on frogs, salamanders
  - This was shown to be due to anionic surfactant used in the Roundup formulation
  - Monsanto brought out Aquamaster, a wetland-safe, **surfactant-free form** of glyphosate.
  - You have to add your own surfactant to make Aquamaster effective.
    - Non-ionic surfactant based on vegetable oil



# Our beginning strategy (late winter 2013)

- Use **Aquamaster** with non-ionic surfactant
- Use precise spot spray application,
- Minimize off-target spray contact.
- We recruited physically fit SCNPS members.
- Trained them in careful ID and precise spot application techniques.
- And gave them backpack sprayers
- Supplied them with precisely mixed herbicide + surfactant + a distinct blue marker dye

# We went out in teams to Lake Conestee Nature preserve

- Experienced applicators teamed with newly trained folks





Difficult areas to work in









We walked scores of miles spraying  
Soon after application, results looked promising

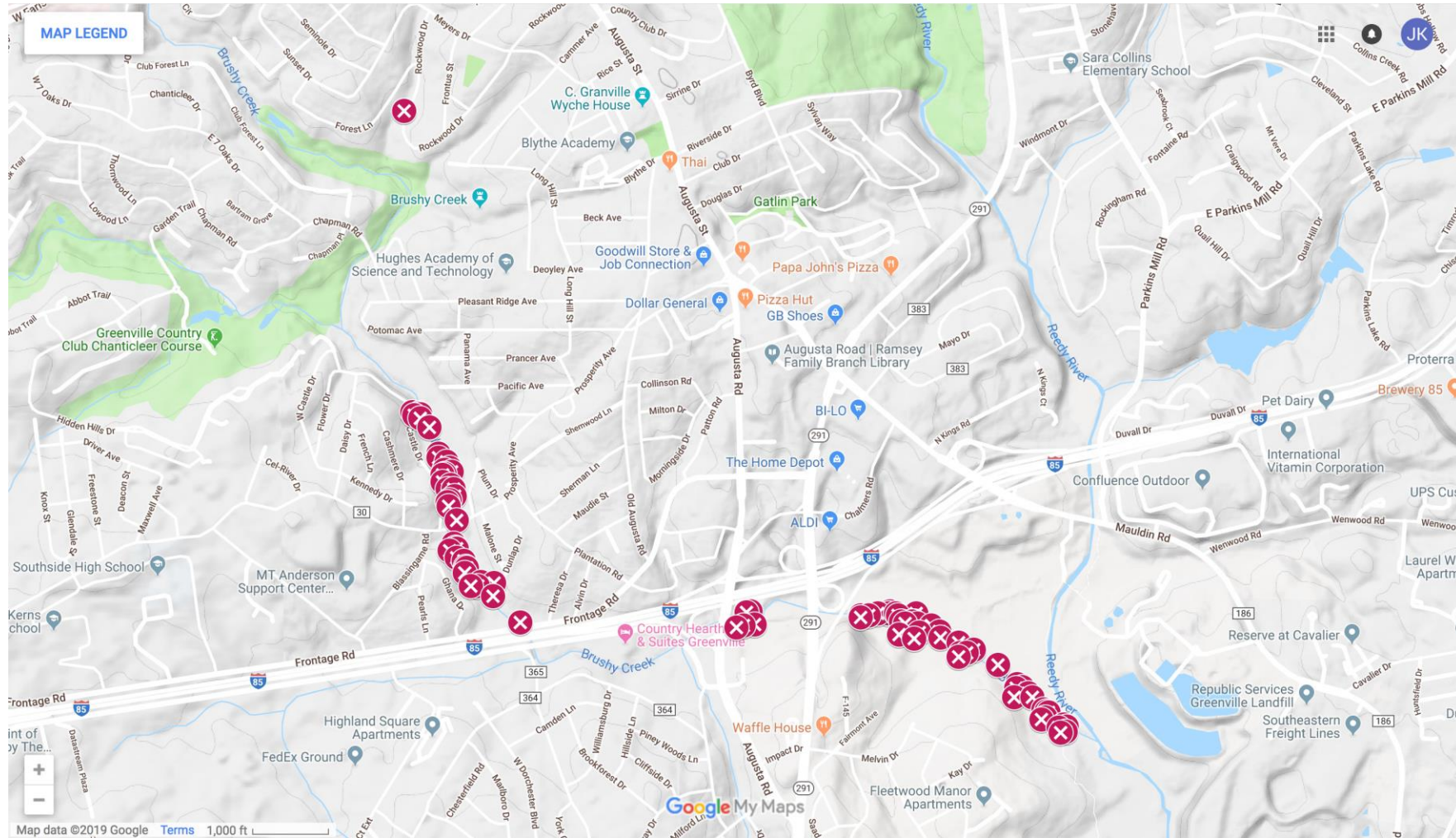


But, in a lunch-time bull-session, it occurred to us that...

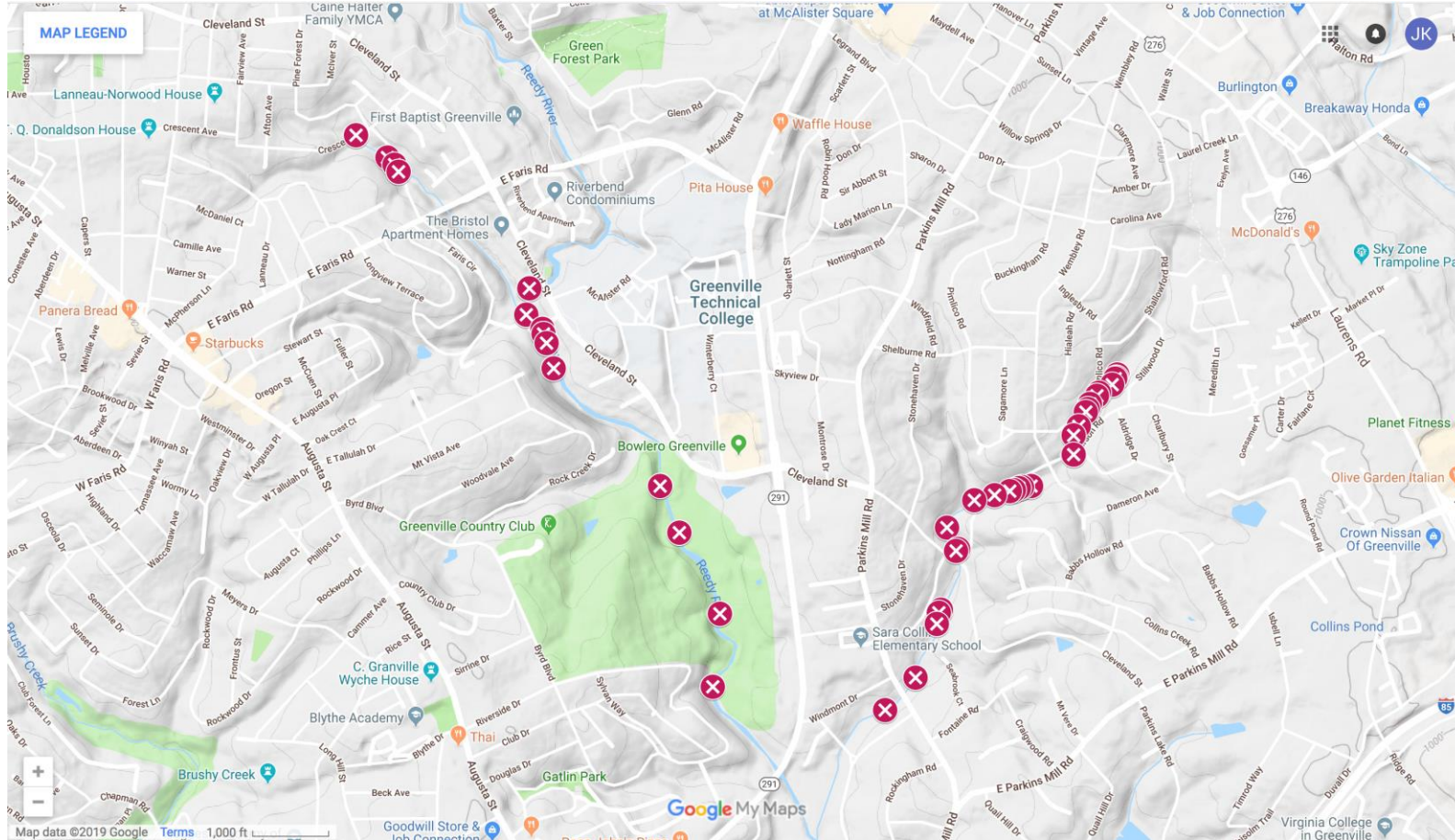
- No one would plant ornamentals in abandoned floodplains.
- So LCNP fig buttercup had to originate somewhere else.
- In other words, by invasion.
- So, we sent folks up the Reedy River, and into small tributaries.
- We found fig buttercup all along the way.
- With this survey, we identified fig butter cup source sites.
- The tributaries had not been not treated in our first year's effort



# Survey results1 –source site



# Survey results 2 source sites





# At each apparent source site..

- We queried the property owners about it.
- They had seen it in a friend's yard.
- Liked it, and got a little bit of it for their own yard.
- They had soon begun to notice that, "Yeah, it had begun to spread."
- We took them to the nearest stream-side, and they were mostly alarmed.

# So LCNP in late winter 2014?

- Huge Disappointment!!
- Much recovery of fig buttercup
- No surprise, given our survey findings in the tributaries
- So we expanded our treatment program to include:
  - Lake Conestee Nature Preserve **plus**
  - Source sites and tributaries



# Spring 2015 assessment

- Some better but certainly not adequate
- We determined that a **very few untreated** plants could produce enough bulbils to float downstream and re-infest.



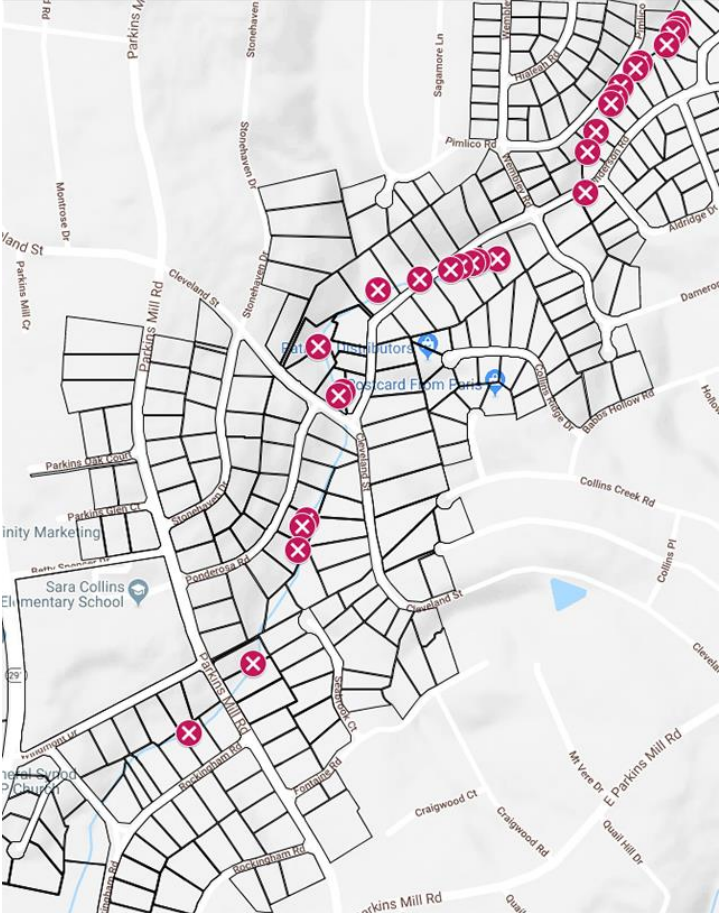
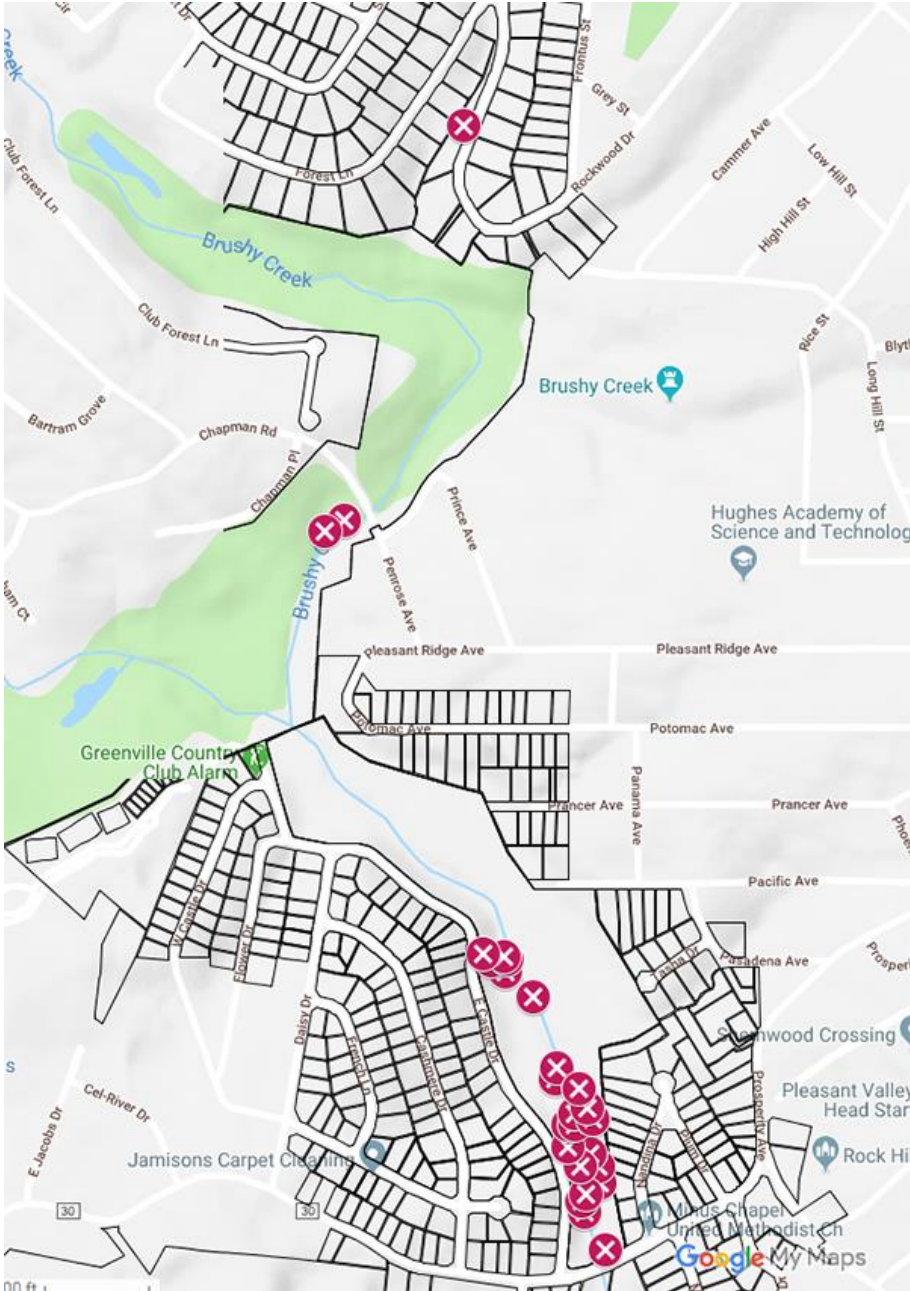
In the meantime,



- We engaged with Clemson's Dept. of Plant Industry (DPI)
- Responsible for invasive plant management in the State.
- They jumped on board with:
  - News articles
  - Publicity brochures
  - Professional surveys of the tributaries.



# DPI surveys



# DPI surveys

- Pinpointed FB occurrences, even single plants
- Also related occurrences to individual property parcels
- We were able to contact property owners with information brochures



# In 2019 we decided to call in “mercenaries”

- Contacted Invasive Plant Control, Inc. (IPC)
- Professional firm with excellent **national** reputation
- We hired IPC for three **2-man crew**-days on **SCNPS funding**
- ReWa (Greenville Water Treatment) folks funded one crew-day.
- So IPC put in a total of **four crew-days** of control treatment
- We were impressed with their rigor and amount of ground covered.
- So, we reserved space on their work schedule for Spring 2020.

# We knew that we needed more effort

- In 2020
- We raised funds to pay for a total of 13 crew-days in March, 2020
  - Got funding from
    - SC Native Plant Society, a 501-c-3.
    - SC Exotic Pest Plant Council, a 501-c-3
    - Friends of the Reedy River, a 501-c-3
    - Greater Greenville Master Gardeners, a 501-c-3
    - Greenville County Resource Conservation District.
    - And ReWa, Greenville Water Treatment Authority



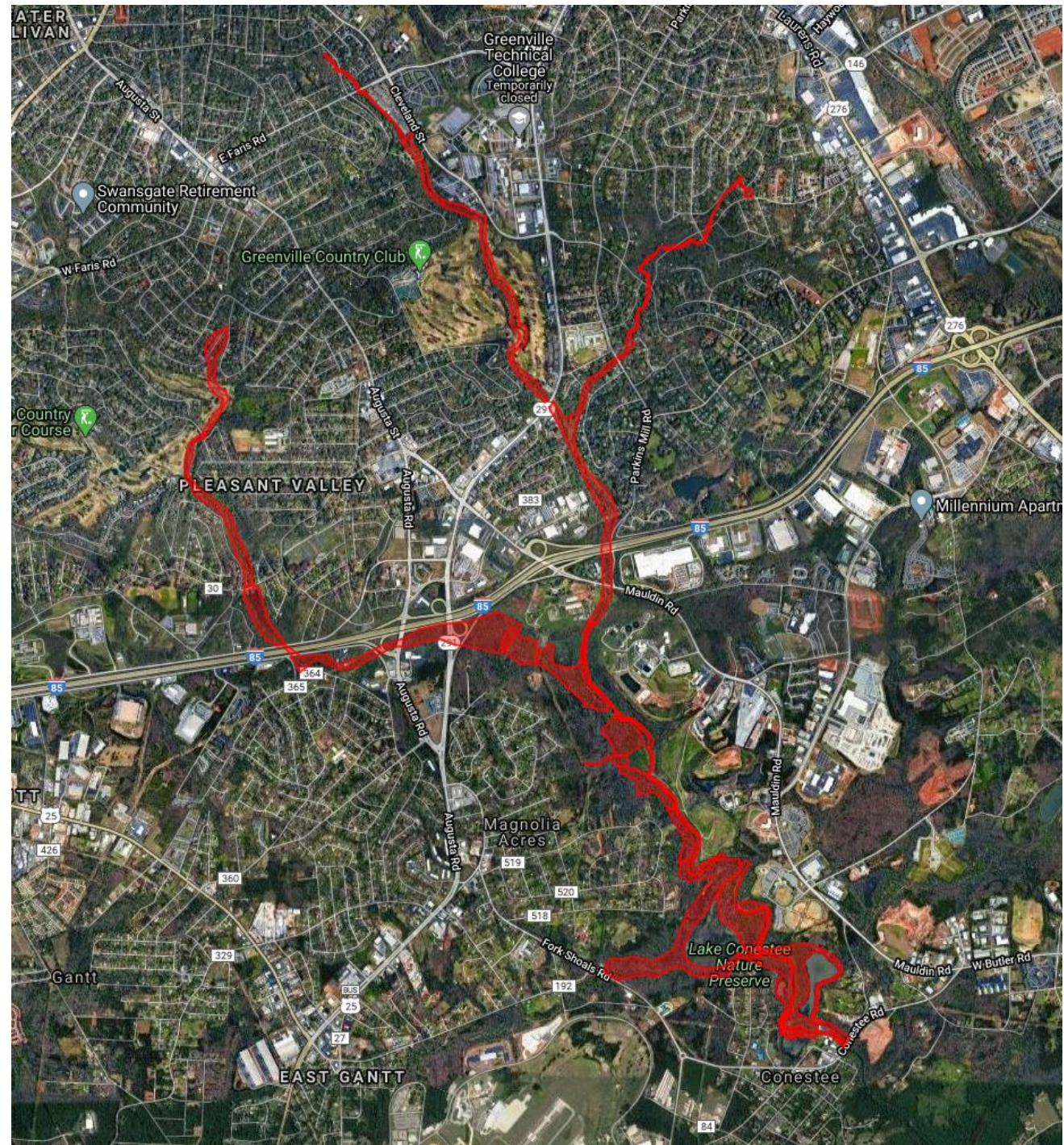
# Advantages of using IPC, Inc.

- They have much more experience, more control tools.
- They very thoroughly trekked the tributaries and LCNP.
- The biggest advantage: The crews are all YOUNG men, with lotsa' energy!





# IPC, Inc. work in Spring 2020





# Plans for 2021?

- We will assess the progress.
- Do more fund raising.
- More contracting with Invasive Plant Management, Inc, again.
- We are tentatively confident of this strategy.
- We were feeling pretty good, **BUT**..
- Flies are very proficient at finding ointment...

# But a recent setback...

- In spite of a **huge list of organization and agency web pages denouncing Fig Buttercup..**
- In the Northeast, Atlantic states, Southeast, Midwest, Southwest, Northwest...
- Declared illegal to own or sell in many states...
- In late March, a local, widely syndicated garden columnist's column in Spartanburg newspaper reads:
  - "One of the first to break the ground is *Ranunculus ficaria* "Brazen Hussy," a plant I first saw when visiting a garden in eastern Virginia...
  - I have had it for about 10 years and it comes back each February like clockwork and then it disappears, as the temperatures get warmer. **I have read that it is invasive, but I still have the two plants that I purchased from Plants Delights and it is not invasive where I have them growing."**
- **Grrrrrrr!**



# We sent her a nice message...

- Explaining that FB is VERY invasive
- That it is illegal to own and sell in SC
- Giving her an extensive list of internet sources
- Describing our herculean efforts to eradicate it.
- And asking her to consider issuing a retraction.
- No response whatsoever....

In summary:





South Carolina Native Plant Society  
approved this message.

[www.scnps.org](http://www.scnps.org)

