Water Quality Monitoring In Florida and Georgia

Suwannee Riverkeeper®

WWALS Watershed Coalition

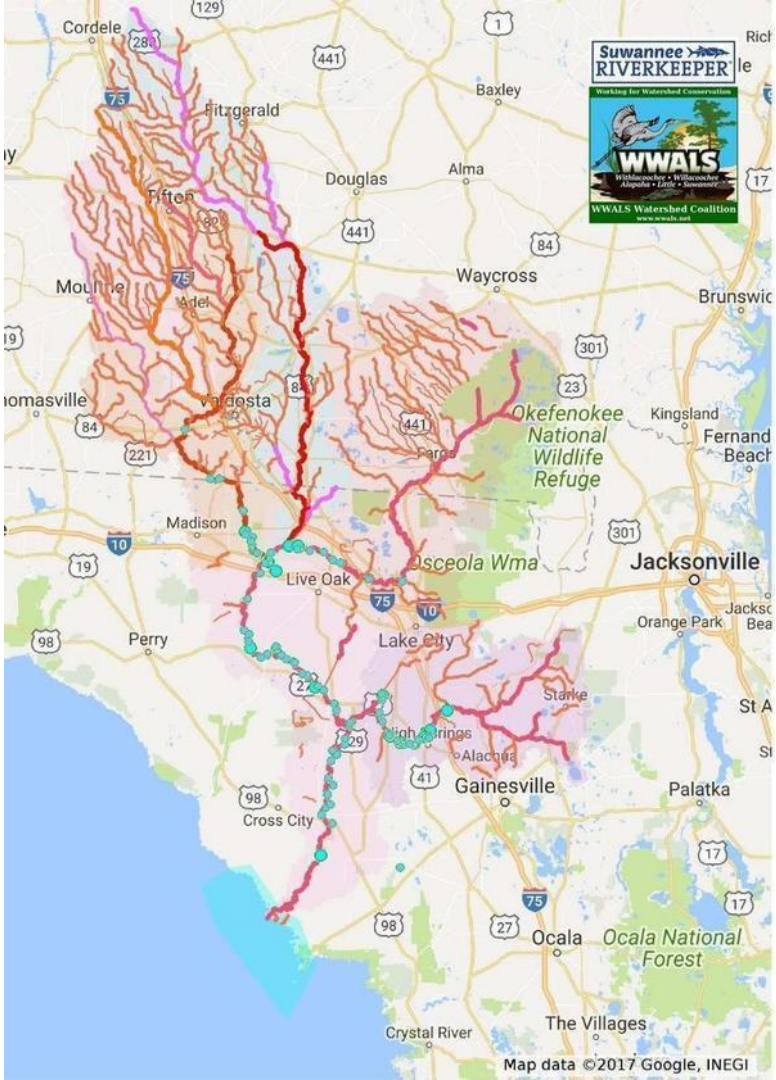
2018-04-19

Why Monitor?

- Pollutants from phosphate mines and pipelines, septic tanks & sewers, cows and deer, lawns & field fertilizer,
  - are getting into our rivers, springs, and water wells,
  - affecting fishing, swimming, tourism, health, economy.
- Where is it coming from? When? What is it? Who did it?
  - Issue safe or not advisories for landings, etc.
  - So we can help stop it,
  - Including raising political will for proper funding.

Where?

Rivers don’t stop because somebody drew a state line on a map.

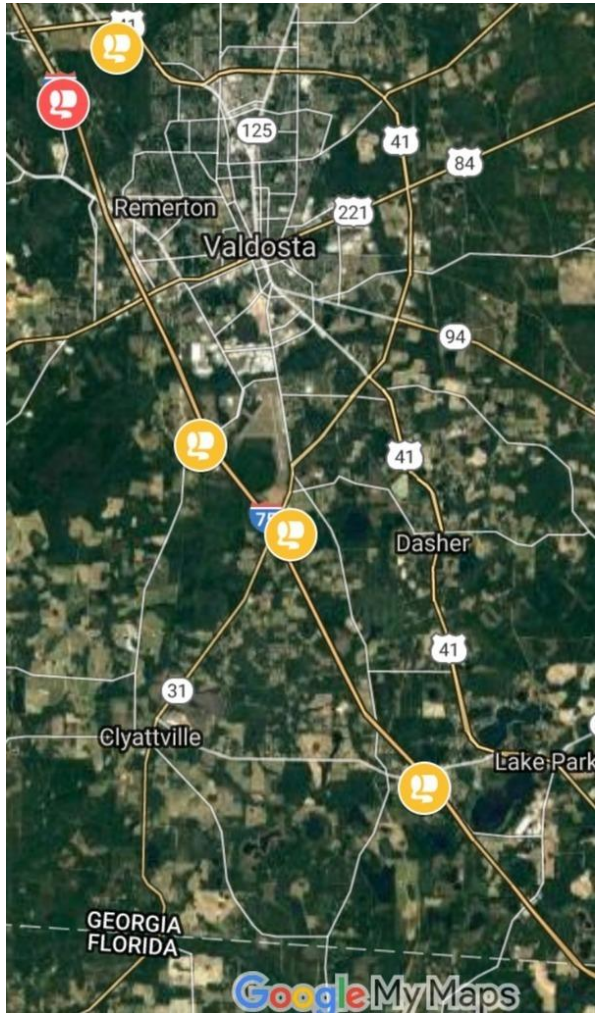


Sample where?

- Upstream and down: every landing, spring, swimming hole & pollution source
- Georgia:
  - Every wastewater treatment plant, plus http://wwals.net/blog/?p=37618
  - Mud Creek, upstream and downstream of industrial area
  - Grand Bay, downstream of Moody AFB bombing range, esp. for lead
- Florida:
  - Suwannee Power Plant and Pilgrim's Pride,
  - Dowling Park retirement,
  - Dairies in Suwannee County,
  - Old Town with all its septic tanks,
  - Santa Fe River @ US 129,
  - Santa Fe Confluence,

Tropical Storm Irma and after

- Tifton: 250,000 gallons
  - 2017-09-22: 250,000 gallons
- Lowndes County: 31,200 gallons
  - 2017-09-26: 25,000 gallons
  - 2017-09-12: 6,200 gallons from 4 lift stations,
- Quitman: 20-70,000 gallons
  - 2017-09-27: 20-70,000 gallons
- Valdosta: 900 gallons
  - 2017-09-12: 900 gallons
  - 2017-09-12: None from wastewater plants



Irma in Florida

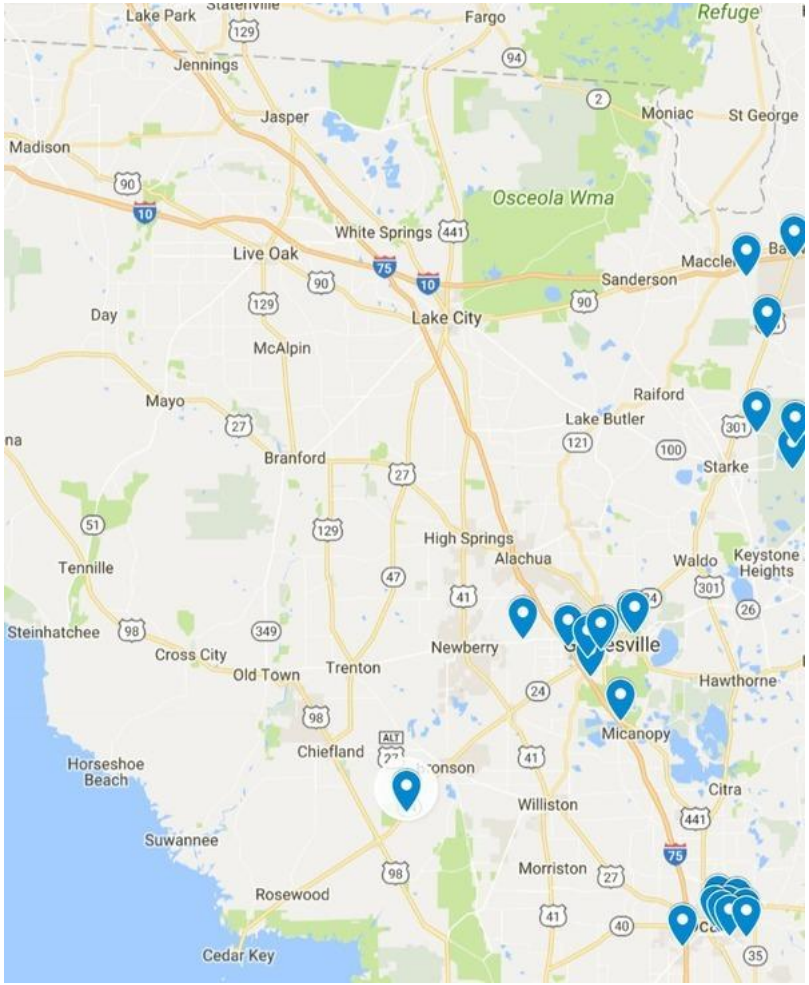
No Florida wastewater spills in Suwannee River Basin.

2017-09-18: Three Chemours mine overflows: Baker, Bradford Counties

Also shown: Two Camp Blanding vehicle accidents: Bradford County

What about septic tanks?

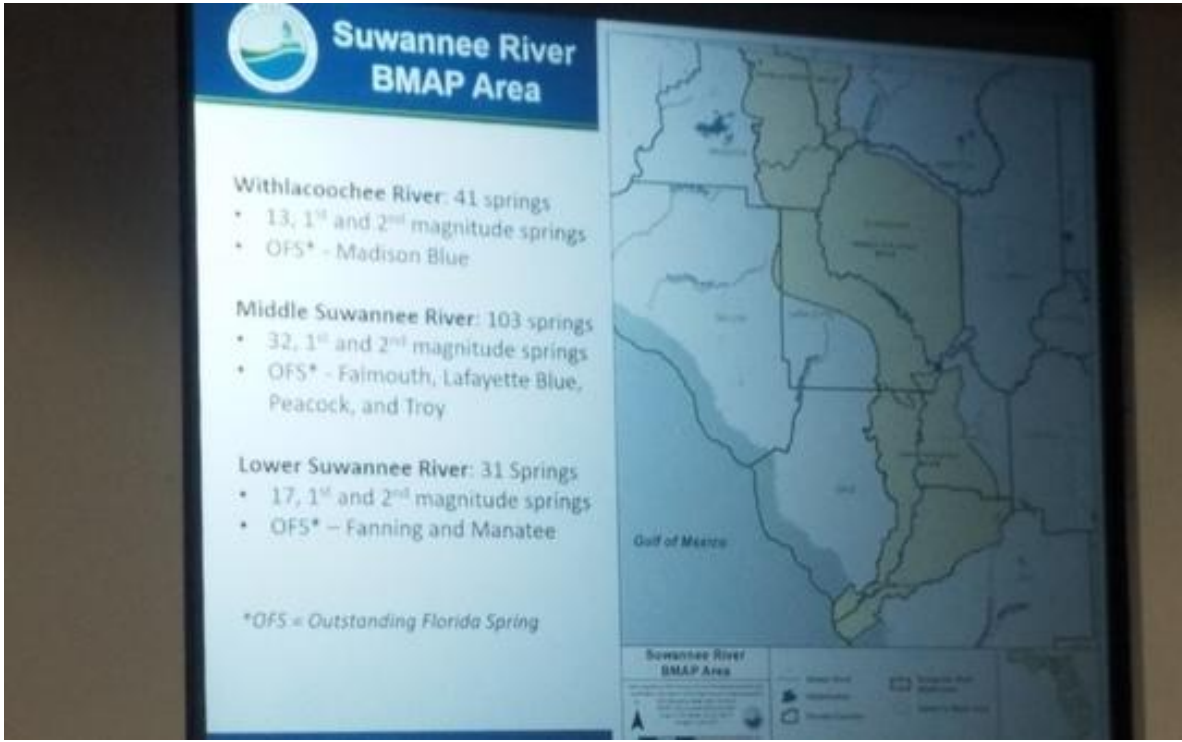
Sewage isn’t the whole story.



Basin Management Action Plans (BMAPs)

Nitrates from fertilizer runoff causing algae blooms, etc.

Must reduce by 83-92%, according to FDEP study.



Existing Data

EPA STORET

USGS: sparse and infrequent

FDEP: Florida Storet

SRWMD: frequent on some springs and stream segments

GA-EPD: Georgia Adopt-A-Stream

Cities of Valdosta, Tifton, Quitman, Adel, Moultrie, etc.

Counties of Hamilton, Lowndes, Tift, Brooks, Cook, Berrien, Colquitt, etc.

Lots of data, lots of gaps

- Need independent testing at GA-FL line
- Many landings and springs have sparse or no testing
- Many locations with testing have it only infrequently
- Need analysis up and down the rivers, across states
  - To detect movements of contaminants
  - To localize sources of contaminants
- Many different repositories and maps; interesting just to find the gaps

Test for what?

Four levels:

1. Visual or anecdotal: baseline and anomalies
2. Chemical: acidity to nitrates
3. Biological: sewage or cows?
4. Metallic: things that will give you cancer

I. Visual or anecdotal

- Take pictures; report with description: baseline or anomalies.
- Regularly in the same places if you can, preferably weekly.
- Plus anywhere and anytime: the more the merrier.
- No course nor certification necessary.
- No special equipment: smart phone, SLR, GoPro, drone, whatever.
- Georgia Adopt-A-Stream has a Visual Stream Survey Manual: https://adoptastream.georgia.gov/documents/visual-stream-survey-complete-manual
- Can report using Water Reporter: https://www.waterreporter.org/

II. Chemical

- Dissolved Oxygen (DO), pH, temperature, conductivity: standard tests.
  - Blackwater rivers: DO always lower and pH more acidic due to
  - the tannic acid from oak leaves that gives them their tea color.
- Nitrates, phosphorus: very important in Florida from agricultural runoff;
  - see Basin Management Action Plans (BMAPs)
- Must take a one-day course and be certified to do chemical testing.
- Testing kits or probes do cost money, chemicals also cost.
- Georgia Adopt-A-Stream has a Macroinvertebrate and Chemical Stream Monitoring Manual:

https://adoptastream.georgia.gov/documents/macroinvertebrate-and-chemical-stream-monitoring-manual

III. Biological: for sewage and other fecal contam.

- Must take a class and be certified to do biological testing.
- E. coli: must keep samples cool and get to lab within four hours.
  - Testing equipment is inexpensive; WWALS may want to buy a kit or two.
- Fecal coliform: expensive and must get to lab quickly
  - but an excellent followup to discoveries of E. coli.
  - Maybe UFL in Gainesville, FL.
  - UGA extension offices, can ship to Athens, Georgia, for test fee.
- Realtime flouroscope test for laundry detergent markers
  - Cattle and wildlife don't use laundry detergent
  - Can follow upstream to determine source
  - Expensive; need grants
- Georgia Adopt-A-Stream has a Bacterial Monitoring Manual:

https://adoptastream.georgia.gov/documents/bacterial-monitoring-manual-complete-manual

IV. Metallic: arsenic, copper, lead

- Arsenic: old fence posts, previous cattle dipping, etc.,
  - Has been found in some wells and may be detected in streams.
  - Causes cancer and other diseases.
  - Check downstream of chicken CAFOs
- Copper: check Mud Creek downstream of timber processing plant.
- Lead: GA-EPD TMDL for Withlacoochee River upstream of Valdosta
  - And Suwannee River tributaries Suwanacoochee Creek and Jones Creek

http://wwals.net/?p=37992

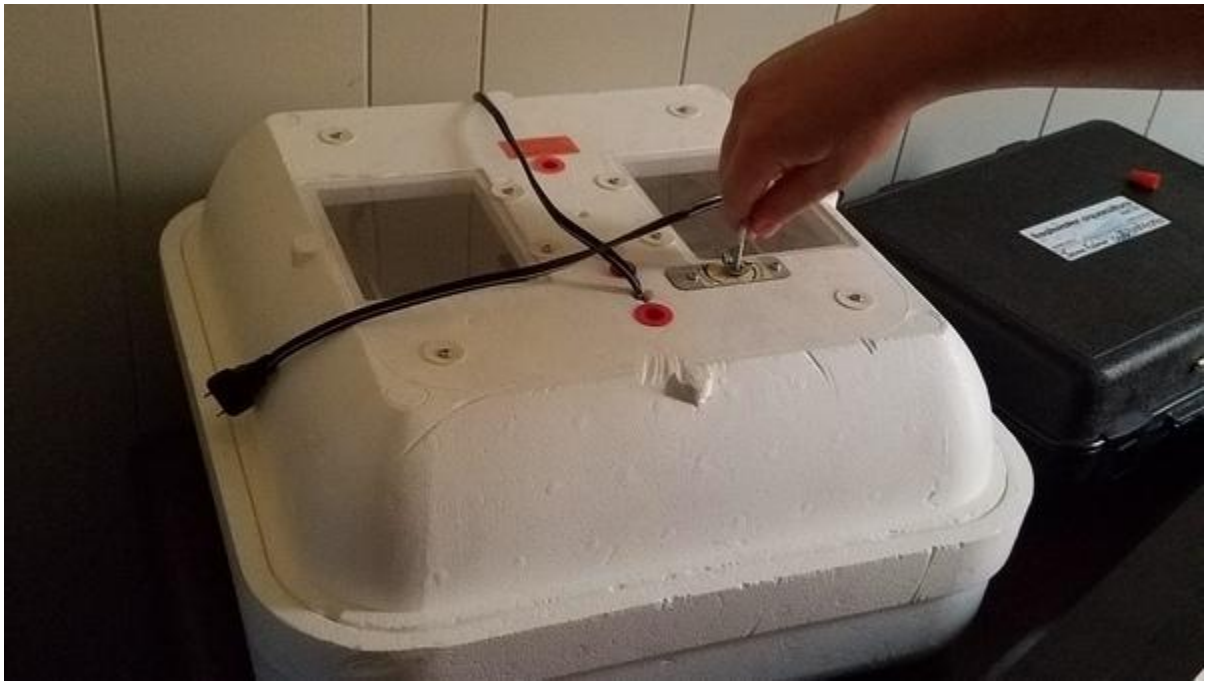
- UGA Extension tests for metals: fee per test plus cost of expedited shipping.

How frequently?

- Start with monthly
- Work up to weekly
- Georgia Adopt-A-Stream only wants monthly
- But we need to collect weekly and sometimes more frequently
  - To detect effluents traveling down the rivers
  - To post advisories
- Ideally, continuous monitoring everywhere
  - Equipment to do that is getting less expensive

Analyze Where?

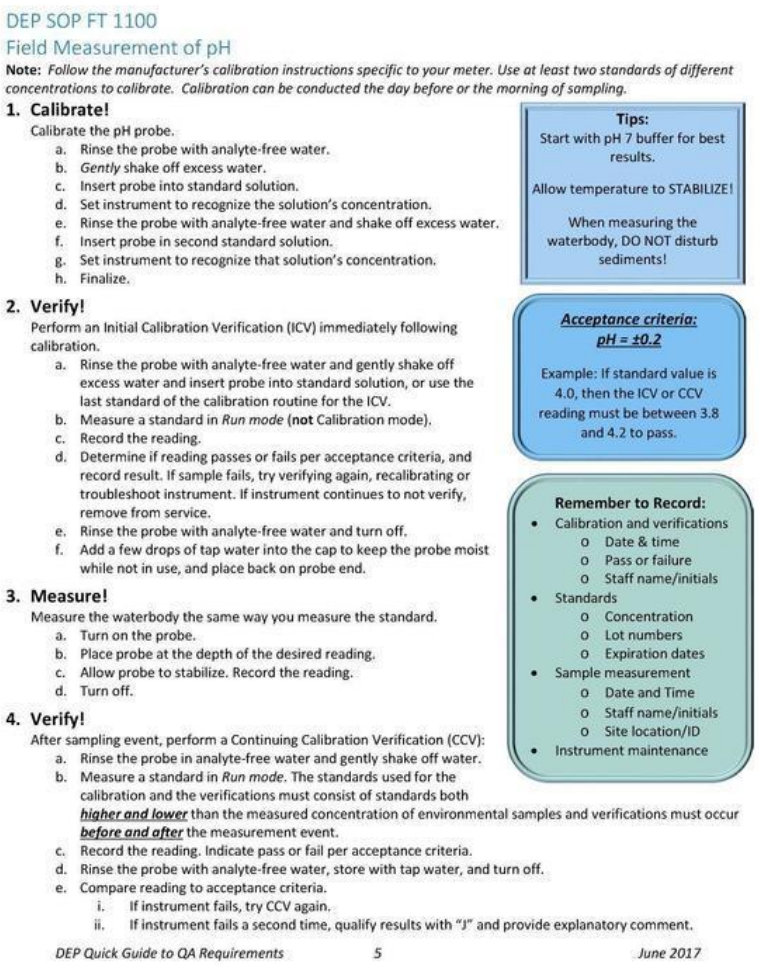
- U. Florida in Gainesville?
- Valdosta State?
- Southern Georgia Regional Commission (SGRC) in Valdosta for E. coli
- Other?



Who will certify results?

ASTM Standards

- In Georgia, actionable tests have to be taken by certified testers
  - Certified by Georgia Adopt-A-Stream
- In Florida: no state certification
  - Water quality monitoring programs: organize volunteer and coordinator training, field proficiency demonstrations, documentation of procedures, etc.



DEP SOP FT 1100

Field Measurement of pH

Note: *Follow the manufacturer's calibration instructions specific to your meter. Use at least two standards of different concentrations to calibrate. Calibration can be conducted the day before or the morning of sampling.*

1. Calibrate!

Calibrate the pH probe.

a. Rinse the probe with analyte-free water.
b. *Gently* shake off excess water.
c. Insert probe into standard solution.
d. Set instrument to recognize the solution's concentration.
e. Rinse the probe with analyte-free water and shake off excess water.
f. Insert probe in second standard solution.
g. Set instrument to recognize that solution's concentration.
h. Finalize.

Tips:
Start with pH 7 buffer for best results.

Allow temperature to STABILIZE!

When measuring the waterbody, DO NOT disturb sediments!

2. Verify!

Perform an Initial Calibration Verification (ICV) immediately following calibration.

a. Rinse the probe with analyte-free water and gently shake off excess water and insert probe into standard solution, or use the last standard of the calibration routine for the ICV.
b. Measure a standard in *Run mode* (**not** Calibration mode).
c. Record the reading.
d. Determine if reading passes or fails per acceptance criteria, and record result. If sample fails, try verifying again, recalibrating or troubleshoot instrument. If instrument continues to not verify, remove from service.
e. Rinse the probe with analyte-free water and turn off.
f. Add a few drops of tap water into the cap to keep the probe moist while not in use, and place back on probe end.

Acceptance criteria:
pH = ±0.2

Example: If standard value is 4.0, then the ICV or CCV reading must be between 3.8 and 4.2 to pass.

Remember to Record:

- Calibration and verifications
  - Date & time
  - Pass or failure
  - Staff name/initials
- Standards
  - Concentration
  - Lot numbers
  - Expiration dates
- Sample measurement
  - Date and Time
  - Staff name/initials
  - Site location/ID
- Instrument maintenance

3. Measure!

Measure the waterbody the same way you measure the standard.

a. Turn on the probe.
b. Place probe at the depth of the desired reading.
c. Allow probe to stabilize. Record the reading.
d. Turn off.

4. Verify!

After sampling event, perform a Continuing Calibration Verification (CCV):

a. Rinse the probe in analyte-free water and gently shake off water.
b. Measure a standard in *Run mode*. The standards used for the calibration and the verifications must consist of standards both ***higher and lower*** than the measured concentration of environmental samples and verifications must occur ***before and after*** the measurement event.
c. Record the reading. Indicate pass or fail per acceptance criteria.
d. Rinse the probe with analyte-free water, store with tap water, and turn off.
e. Compare reading to acceptance criteria.
   i. If instrument fails, try CCV again.
   ii. If instrument fails a second time, qualify results with "J" and provide explanatory comment.

DEP Quick Guide to QA Requirements 5 *June 2017*

Very useful reference

Thank you, Kristin Sapp.

Quick Guide to QA Requirements for Volunteer Sampling Programs

DEP-AEQA-001/17

Aquatic Ecology and Quality Assurance Section

June 2017

Funding sources (equipment, travel, lab tests, etc.)

- Funding sources really like water quality monitoring:
  - It's not controversial.
  - Who wants dirty water, after all?
- RC&D
- Soil & Water Conservation District
- Community Foundations
- Public health
- Corporate (even utilities)
- Banks (yes, really; grants from banks)
- Membership fee to join a sampling club
- Crowdfunding

Record where?

Wanted: a single place to put visual, chemical, biological, and metallic tests

- Consistent across levels
- Consistent across state lines
- Comparable across watersheds
- Easy for individual testers or watersheds to input data
- And get it back out

Well, that’s a nice dream, but it doesn’t exist.

Florida repositories

FDEP

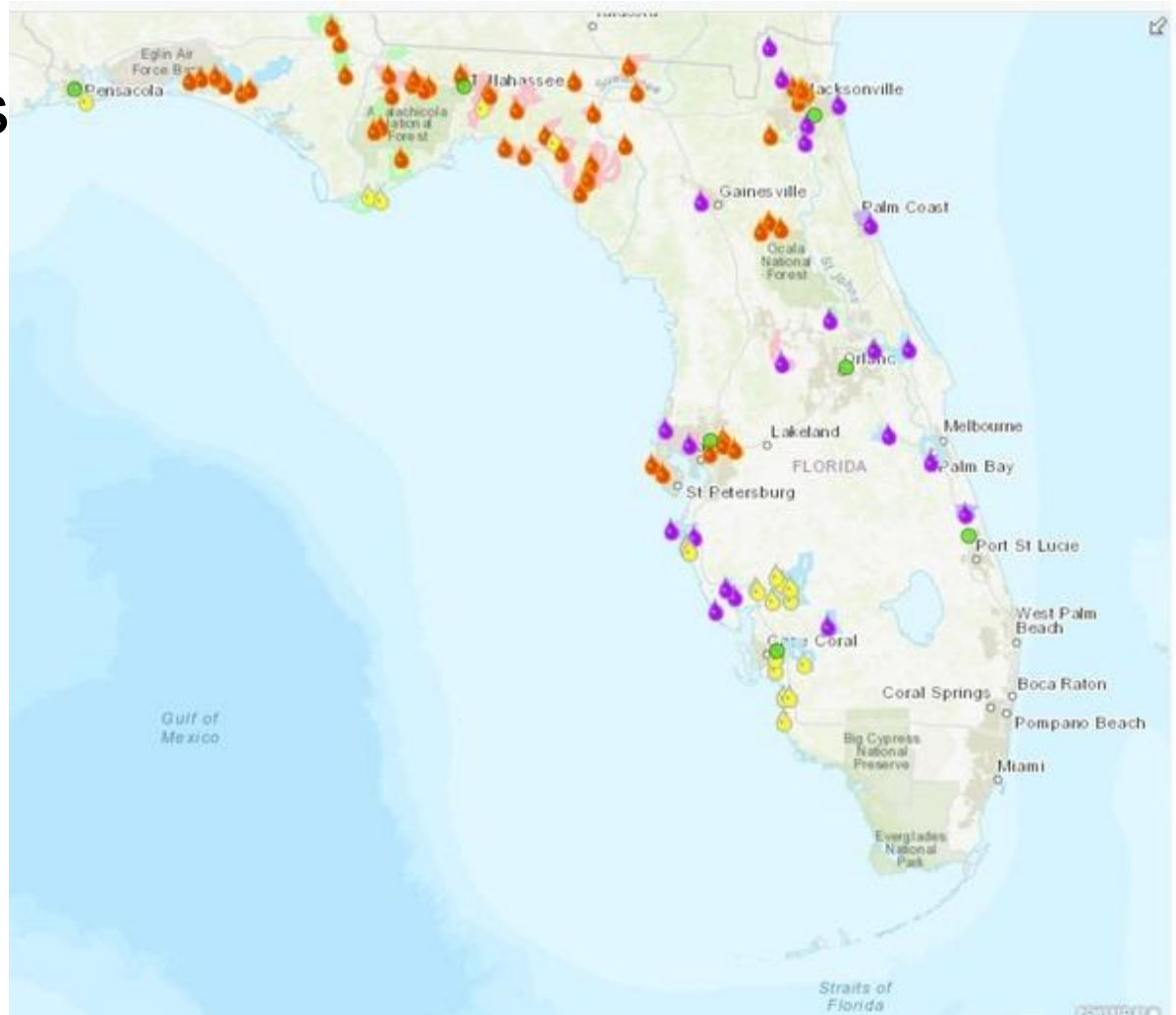
SRWMD

Florida Lakewatch

Others?

Most data by contractors,

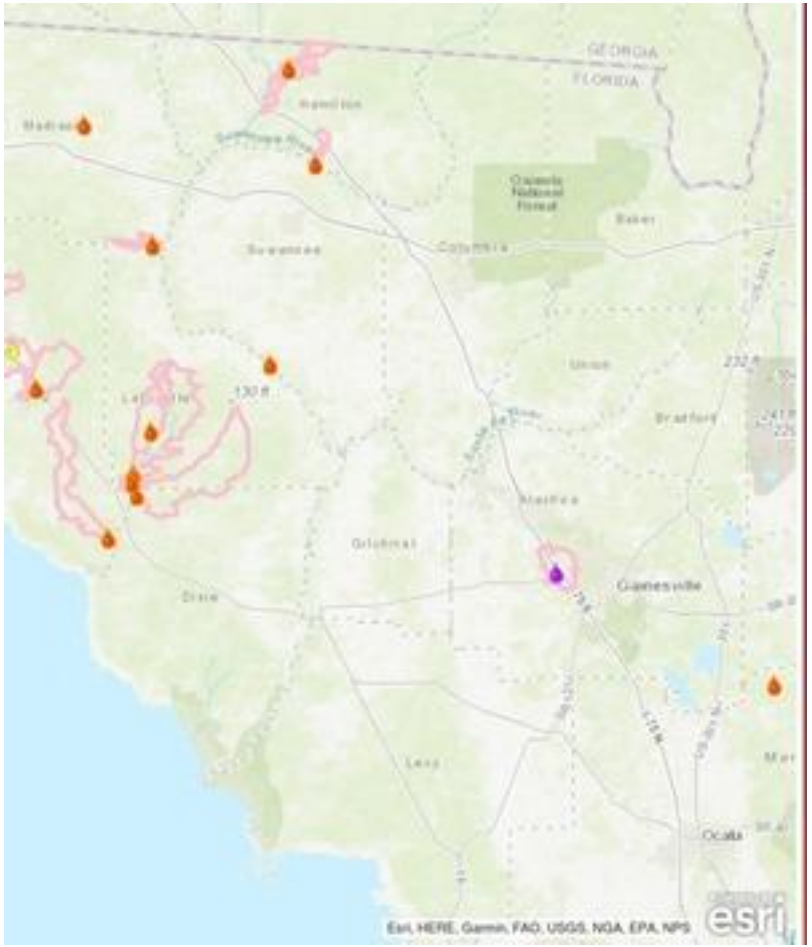
Not volunteers



Florida: infrequent and sparse

According to FDEP.

SRWMD does more frequent sampling of certain springs; has its own maps.



Georgia repositories

Georgia Adopt-A-Stream

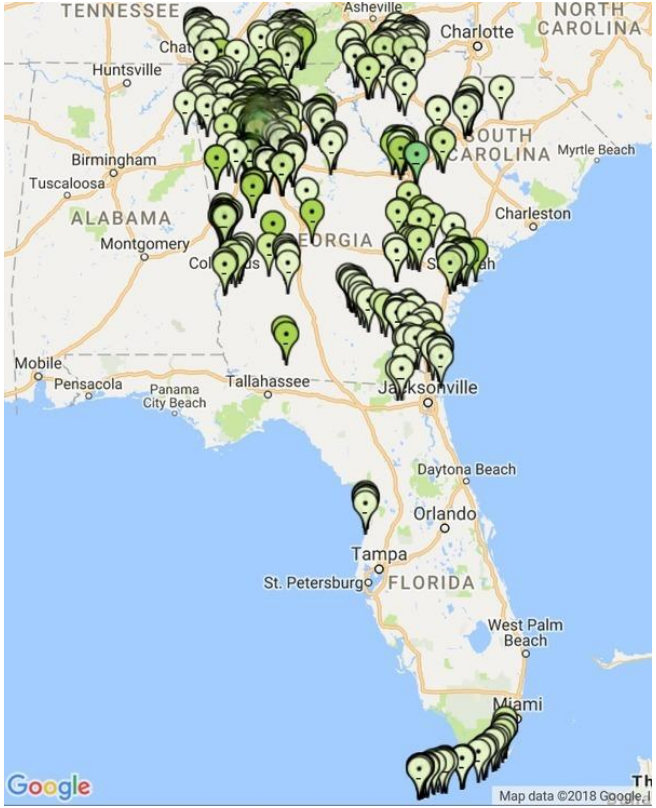
Used by most Georgia Riverkeepers

Also data from AL, TN, SC, and FL

Including FL Keys and both sides of St Mary's River.

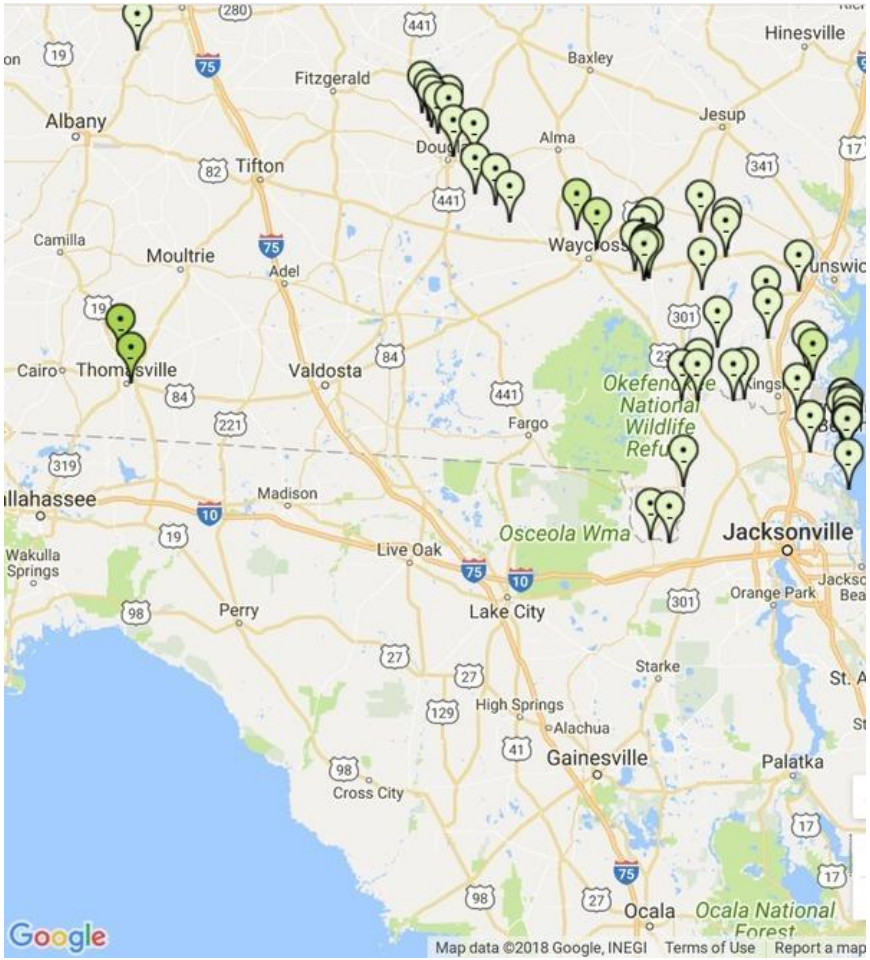
Only certified testers can input data.

Sample by sample, not in bunches.



Big gap:
Suwannee River Basin

Nobody else will do this for us.



What about visual or anecdotal surveying?

- People post on facebook, twitter, instagram, etc. all the time.
  - Try finding those posts later.
- **Water Reporter**:

www.waterreporter.org/

Used by many Waterkeepers

Anybody can sign up and report pictures and text

Only group organizers can input chemical or biological test data

Group organizer can get all group data back out for other use.

What can you do?

- Volunteer!
- Sign up on the sheet here, or online at wwals.net
- Sign up on Water Reporter https://www.waterreporter.org/
  - Join the Suwannee Riverkeeper group
  - Get the smartphone app
  - Go ahead and report pictures and text
- When we're ready, get trained for chemical, biological, or metallic testing
- Meanwhile, anything you report can help detect problems for further testing

Report what pictures and text?

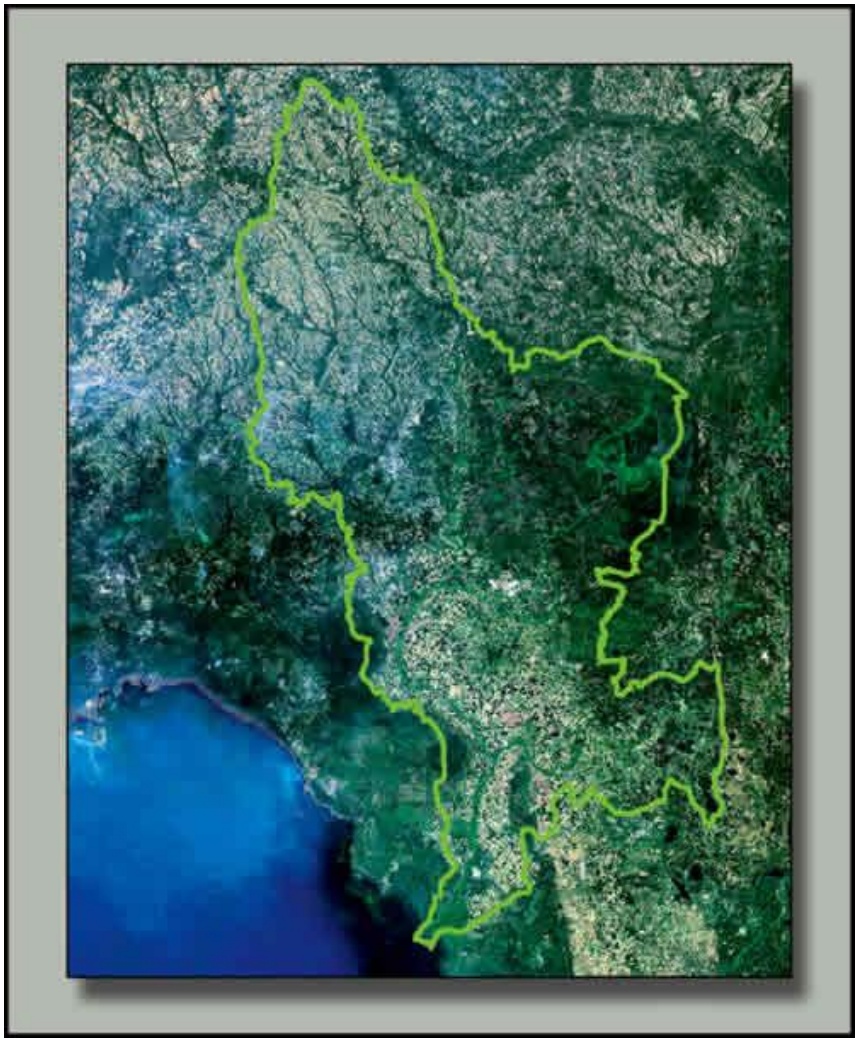
The Good	**The Bad**	**The Ugly**
Tea-colored river water	Deadfalls	Fish kills
Blue-green spring water	Detergent foam	Fish lesions
Happy people paddling, Swimming, diving, fishing	Algae blooms	Livestock in water
Gators, sturgeon, manatees	Broken sediment fences	Effluent pipes
Shoals exposed	Trash and debris	Chemical spills
Shoals underwater	Erosion	Failing septic systems
	Invasive species	

Volunteer to organize!

Suwannee River Basin:

- 9,950 square miles
- 3 hours end to end
- Okefenokee Swamp
- to the Gulf
- Two states: FL, GA

Need local groups up and down the rivers



Organize what?

- Procedures and documentation
- help find more volunteers,
- help coordinate with local governments,
- help get volunteers (and maybe labs) from local colleges,
- help get volunteers from local high schools and middle schools,
- Help maintain the database (CS),
- help with apps for collecting information,
- help with social and other media for getting the results out,
- help raise funds for equipment and testing?

It’s an opportunity

To find and fix water problems

To motivate proper funding of state and federal agencies

To motivate funding to replace septic tanks

To meet new people and do something fun and useful with them.

Let’s do it!

Contact

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