

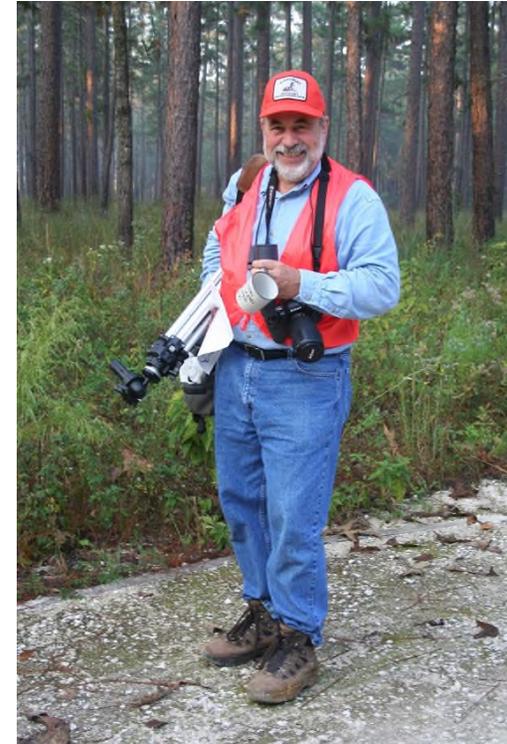
Volunteer Monitoring Case Studies in Georgia

A Review of Methods and Approaches to Engage Citizen Scientists

Harold Harbert, Seirisse Baker and Chelsea Hopkins
Georgia Environmental Protection Division
Georgia Adopt-A-Stream

The Early Years

- 1970s & 80s – Initial involvement in monitoring
 - Izaak Walton League of America, Sierra Club, Trout Unlimited, colleges and EPD employees
 - Some cities and counties initiated stream monitoring programs
- 1987 – EPA 319 grant funded citizen monitoring feasibility study
 - House program in DNR Environmental Protection Division
- 1992 – Georgia Adopt-A-Stream established
- 1995 – Created QAPP, QA/QC monitoring began
- 2009 – Launched online database driven website



Our current motive to observe and monitor streams is a continuation of our inclination to observe, understand, and live in consonance with our environment.

~ Ted Mikalsen

Overview

- Housed in State regulatory agency, EPD
- EPA 319 funded
- US EPA QAPP
- QA/QC certification workshops
- Website with online database
- Monitor physical, chemical and biological conditions
- Streams, lakes, wetlands, coastal waters



Keys to Success

- Focus on Local Coordinators and Trainers
- Emphasis on Education/Awareness
- Robust QA/QC program
- Online Database



Local Coordinators and Partners

- With limited staff, we needed help
- Attract regional and local government agencies, universities, watershed and not-for-profit organizations and citizens
- Local programs are ideally suited to address local water issues

70 Local Programs

- 48%
 - County
 - City
- 45%
 - NGOs
 - Watershed
 - Riverkeeper
- 7%
 - Regional
 - State

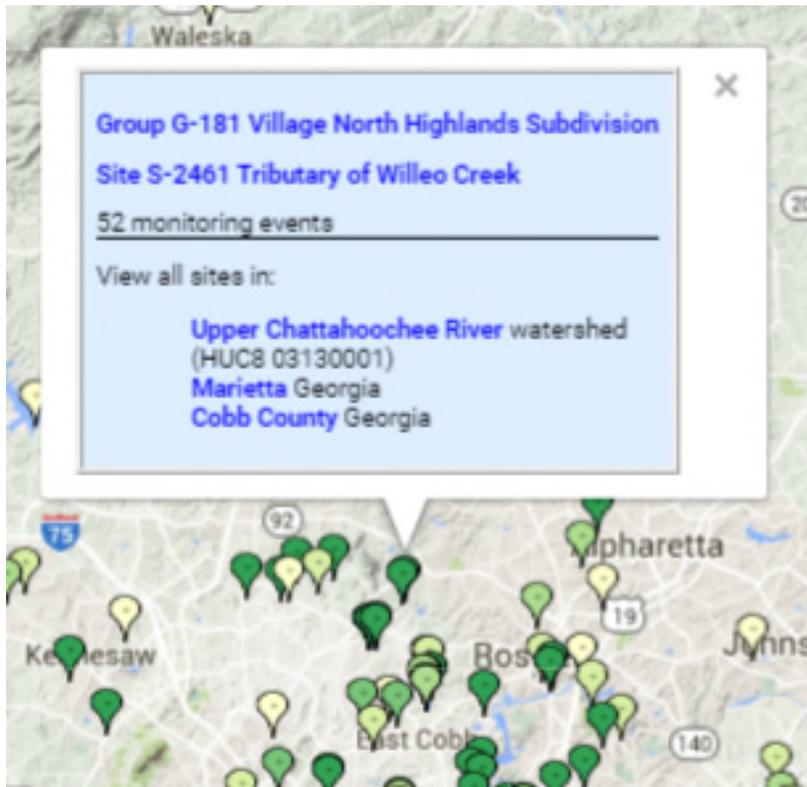
Citizen Scientists

- Nobody cares about their data more than the volunteer
- Volunteers get it, they can interpret water quality data
- Participation requires certification and recertification
- Responsible for equipment and maintenance
- Must set up monitoring schedule
- Conduct monthly monitoring
- Must enter and review data
- Follow up on problems
- And more...



Online Database

- Open source software
- Simple, intuitive navigation and design
- Integrated into website
- Input, view and download data
- Integrated QA/QC checks



- All data is publicly accessible
- Only certified volunteers can enter data

It's all about the Data

Data Entry Form

- Walks monitor through data entry process
- Built in QA/QC checks
- Flag quality assurance level
- Document monitoring and calibration methods

Instructions

1. Enter data for one or more of the following:

Site (required)
 Chemical
 Bacterial
 Macroinvertebrate

Visual Forms

Stream Habitat

2. Click below to view Required parameters, Errors, or Warnings:

View six required parameters

AAS monitors
 Total participants
 Site
 Event Date
 Event Time
 Time Spent Sampling

View one chemical warning

Dissolved Oxygen
 difference >0.6

View two bacterial warnings

3M total time should be between 23 and 25 hours
 Blank missing

3. Submit

Email
 Clear check box if you don't want email confirmation.

Clear form

You *cannot* submit a form that has Errors or missing Required Data.

You *can* submit a form that has Warnings, but it will be flagged as out of compliance with the AAS quality assurance plan.

Reagents

Select any expired reagents:

Alkaline Potassium Iodide Azide Manganous Sulfate Solution pH Wide Range Indicator
 Sodium Thiosulfate Starch Indicator Sulfuric Acid 1:1

Other:

Contact the State office at AAS@gaeprd.org to obtain replacement reagents.

Tests

Core Tests	Test 1	Test 2	Units	Average	Other Tests	Result	Units
Air Temp	12		°C	12.00	Alkalinity		mg/L (ppm)
Water Temp			°C		Ammonia-N		mg/L (ppm)
pH (+/-0.25)			Standard unit		Nitrate-N		mg/L (ppm)
Dissolved Oxygen (+/-0.6)	8.2	8.9	mg/L (ppm)	8.55	Orthophosphate		mg/L (ppm)
Conductivity			µS/cm		Sampling Depth		cm
Salinity			ppt		Settleable Solids <i>Enter 1 for Trace</i>		mg/L (ppm)
Secchi Disk (+/-10)			cm		Turbidity		NTU
Chlorophyll a			µg/L		If you have additional tests not found under Core Tests or Other Tests, enter them below. (Extra rows will be added as needed.)		

Test	Result	Units
<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments

Any chemical changes to note since you last sampled at this site?
 If so, please describe. Otherwise, please leave blank.

Bacterial Data

3M Petrifilm Method: Escherichia coli

Run three (3) plates/tests for each site, plus one (1) blank plate. Process within 0-24 hrs, incubate at 35°C ± 1°, and read at 24 ± 1 hr

blank	Plate					Find AVG of number of colonies total # colonies / total # of plates (do not include blank)	cfu / 100 mL
	1	2	3	4	5		
	333	366	150			(849 / 3) x 100 =	28300

Sample Holding Time	START		END		TEMPERATURE		Total Time
	Date	Time	Date	Time	Minimum	Maximum	
	04/27/2016 <small>mm/dd/yyyy</small>	5:00pm <small>hh:mm am/pm</small>	04/28/2016 <small>mm/dd/yyyy</small>	3:30am <small>hh:mm am/pm</small>	35.1 <small>°C</small>	35.5 <small>°C</small>	10.5 hours

Did you use a method other than 3M Petrifilm Plates? Yes No

Comments

It's all about the Data

- As volunteers enter data, **local partners receive real time water quality reports** and can address issues locally as they occur
- Relieves EPD and District Offices of fielding questions/addressing problems
- Reduces staff data entry time
- Improves data capture accuracy and efficiency



Georgia Adopt-A-Stream

GEORGIA'S VOLUNTEER WATER QUALITY MONITORING PROGRAM



Group Information

If this is an existing Adopt-A-Stream Group, select it from the **AAS Group** list.

Otherwise, enter your group's name in the **New Group** field.

AAS Group

New Group

Waterbody type
(stream, wetland, lake, or coastal water)

Waterbody name

Locate your site on the map, or enter the Latitude/Longitude if known.

You can enter **decimal degrees** or **degrees minutes seconds**.
Use spaces to separate degrees, minutes, and seconds.
Omit the negative sign in the longitude.

Latitude+

Longitude-

Save to Database

To quickly locate your site, enter a nearby road or address:

latitude: +031.7841
longitude: -087.3582

Right-click your site to select it:

Map

Map data ©2016 Google, INEGI Terms of Use Report a map error

Adopt-A-Stream Workshop Form

Workshop Participants:

Look up:

[New Contact](#)

Trainers:

Trainer 1:

Trainer 2:

Trainer 3:

Trainer 4:

Trainer 5:

Type of workshop:

- Chemical QA/QC
- Coastal Chemical QA/QC
- Macroinvertebrate QA/QC
- Bacterial QA/QC

- Chemical Trainer
- Macroinvertebrate Trainer
- Bacterial Trainer

- Amphibian Monitoring
- Freshwater Wetland Monitoring
- Visual Stream Survey
- Getting Started
- Intro to Monitoring

Location:

Date:

 (mm/dd/yyyy)

Duration:

 (minutes)



Georgia Adopt-A-Stream

GEORGIA'S VOLUNTEER WATER QUALITY MONITORING PROGRAM



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Did you know? You can view monitoring data in many different ways through the website. [Read more](#)



Apr 27, 2016	Groups	Sites	Events	Data	Volunteers	Newsletters
Currently active	261	705	6003	25362	3006	Jan-Mar 2016
Database totals	827	1985	35744	171302	23977	Archived

Thursday, April 28

[View monthly calendar](#)

[Print](#)

Friday, April 29

9:00am **Newton Co- Chemical Training**

Saturday, May 14

9:00am **Towns County Chemical and Bacterial Workshops**

Monday, May 16

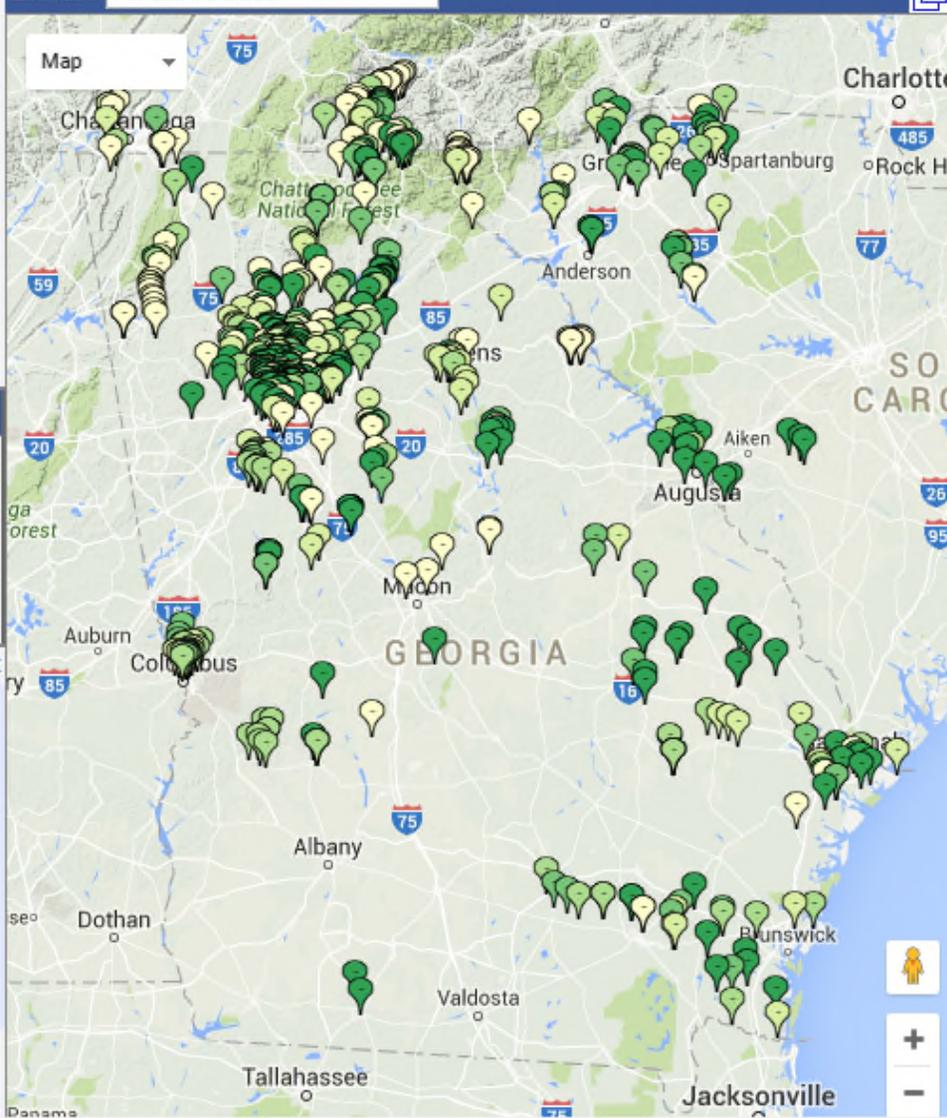
9:00am **Upstate SC Biological Training**

Friday, May 27

[+ Google Calendar](#)

AAS Coordinators and Trainers can post on the calendar. Contact the State Office for more information: aas@qaepd.org.

Show: [All active sites](#)



Success

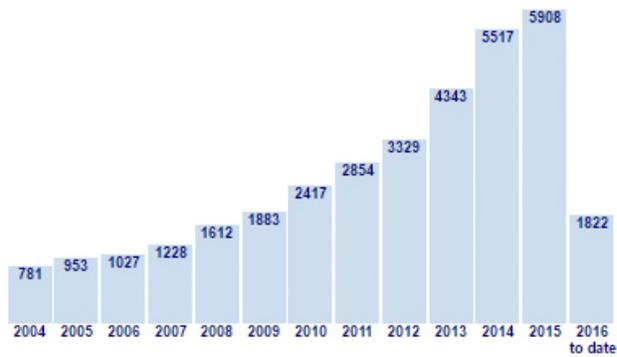
Active Groups by Year



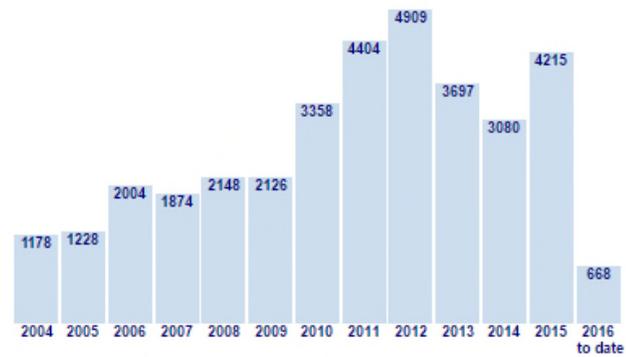
Active Monitoring Sites by Year



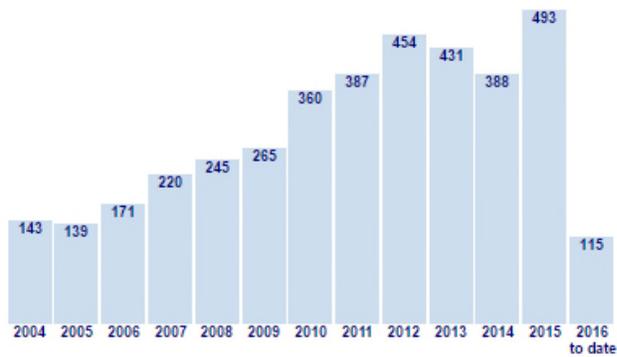
Monitoring Events by Year



Certifications Earned by Year



Workshops Conducted by Year

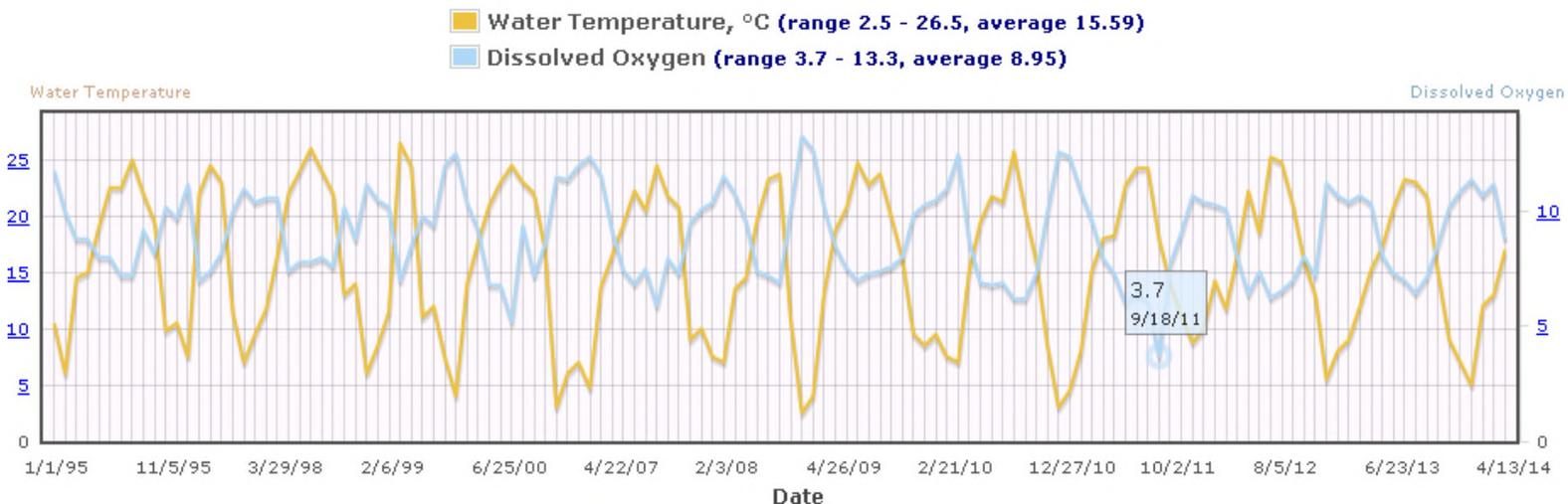


Active Trainers by Year



How Is Data Used?

- Trend analysis
- Identify sewage spills, leaking pipes, septic leaks
- Agriculture and forestry BMP and E&S issues
- Permit violations (non compliance, land applications)
- Develop watershed management plans
- Public education, student research, academia
- Data can help drive statewide monitoring plans
- Under a state approved monitoring plan, data can be used for 303(d) list
- Provide a snapshot of what's going on





Georgia Adopt-A-Stream

GEORGIA'S VOLUNTEER WATER QUALITY MONITORING PROGRAM



Adopt-A-Stream Calendar Citizen Monitoring Data Events Field Notes Monitoring Progress Contact Us



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Did you know? You can view monitoring data in many different ways through the website. [Read more](#)

Dec 15, 2015	Groups	Sites	Events	Data	Volunteers	Newsletters
Currently active	246	659	5493	22876	2923	Jul-Sep 2015
Database totals	794	1884	33236	60726	23417	Archived

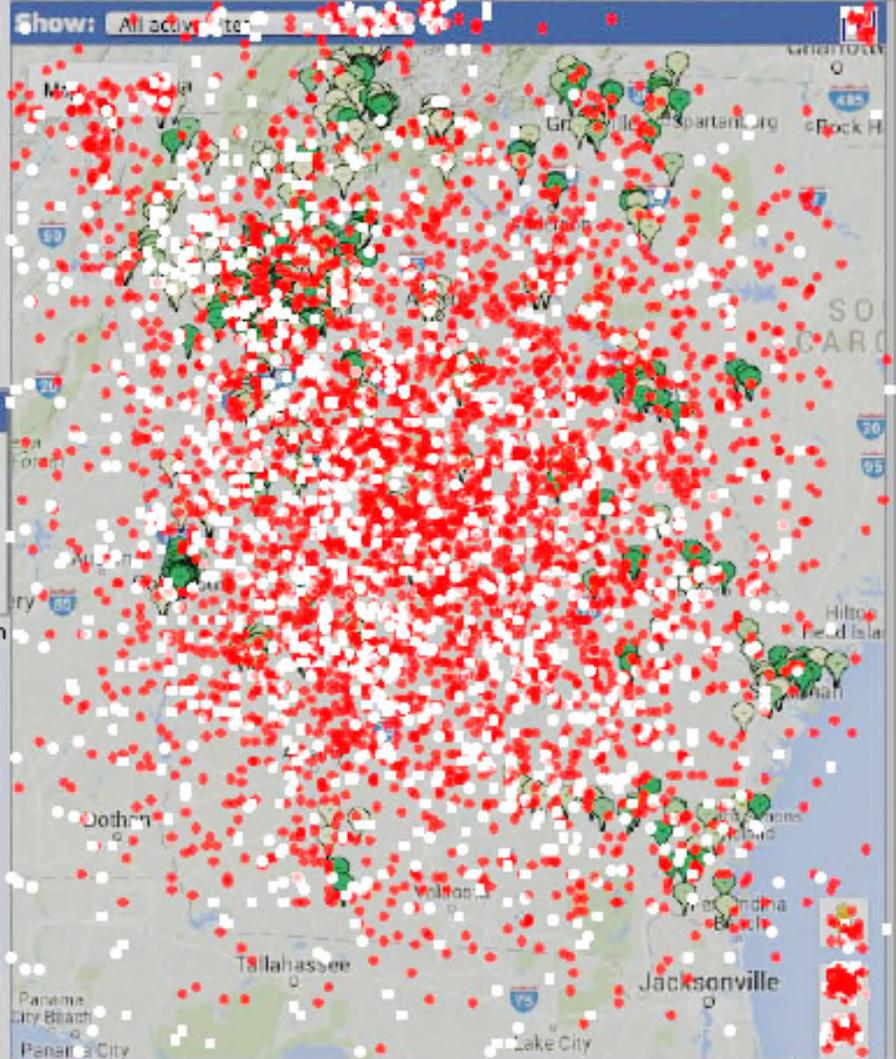
Dienstag, 15. Dezember [View in German](#) [Drucken](#)

Termine werden angezeigt ab 15.12.. [Frühere Termine suchen](#)

Termine werden angezeigt bis 15.1.. [Weitere Termine suchen](#)



AAS Coordinators and Trainers can post on the calendar. Contact the State Office for more information: aas@caepd.org



The preparation of this website was financed in part through a grant from the U.S. Environmental Protection Agency under provisions of Section 319(h) of the Federal Clean Water Act of 1987, as amended.

Georgia Adopt-A-Stream Environmental Protection Division, GA DNR
MLK Jr. Dr. S.E. Suite 1462 E Atlanta, GA 30333 404-663-1511 aas@caepd.org



Georgia Adopt-A-Stream

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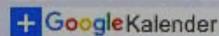
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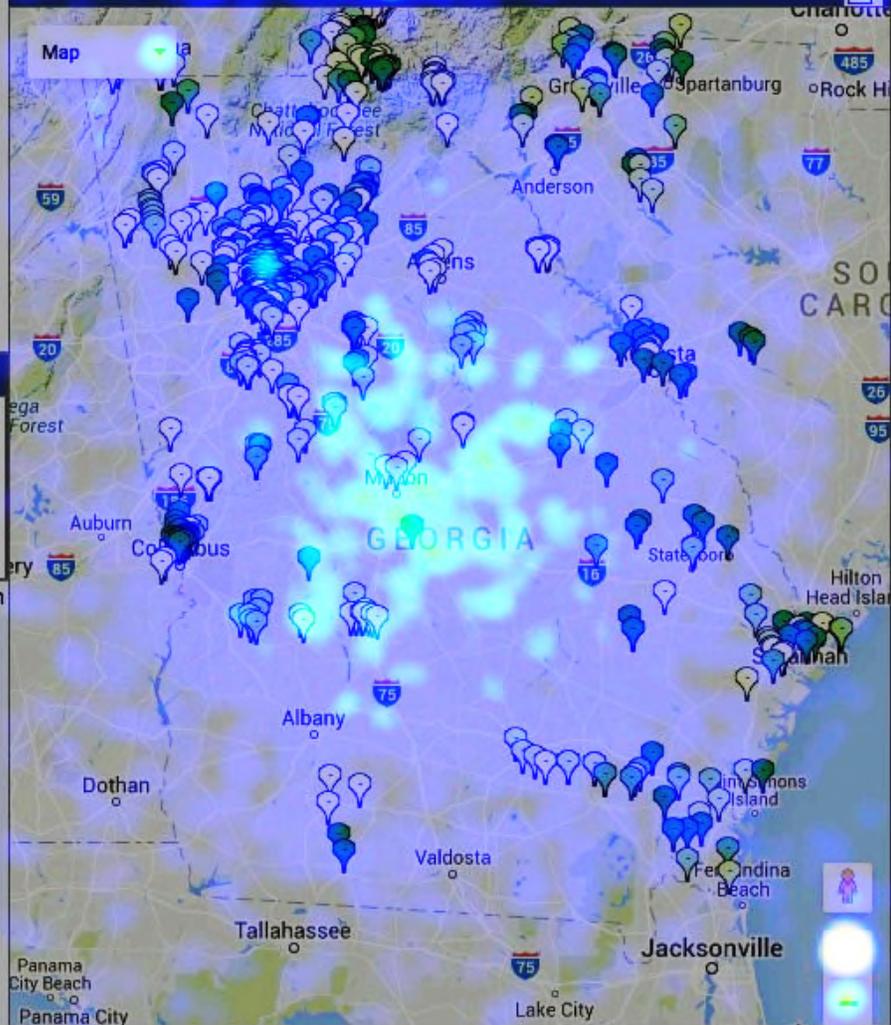
Termine werden angezeigt ab 15.12.. [Frühere Termine suchen](#)

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Show: All active sites



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Conclusion

- The technology is available to create a database to support national and international
- The cost is minimal – 25 to 50 thousand a year
- The impact is significant

But...

- Must be housed in an apolitical, education based NGO
- Must be lead by a consortium of partners
 - EPA, states, watershed groups, etc.

Questions?

