

**Visualizing Water Quality in the
Adopt-A-Stream Program
with GIS**

Nona J. Yates

Abstract

The Adopt-A-Stream (AAS) program of Mississippi increases public awareness and involves citizens in water quality monitoring to protect state waters. The AAS program used a Microsoft Access database for notifying volunteers of new courses, creating appreciation certificates, and generating thank you letters. The AAS database is now linked to a hydrography GIS dataset providing the display of streams.

The geographic layer used to link with the database is the National Hydrography Dataset (NHD). By taking the existing AAS database and linking it with the NHD by stream name, the AAS coordinator was able to better inform volunteers. Volunteers can now be shown the locations of streams in their areas that are currently adopted, have been improved through adoption, and that are in need of adoption.

By displaying the currently adopted and impaired streams geographically, the AAS coordinator is able to see where more public awareness and participation is needed.

The Adopt-A-Stream (AAS) program of Mississippi increases public awareness and involves citizens in water quality monitoring to protect state waters. AAS of Mississippi is a cooperation of Mississippi Department of Environmental Quality (MDEQ), Mississippi Wildlife Federation, and Mississippi Department of Wildlife, Fisheries, & Parks Natural Science Museum. The four main goals of the program are (Volunteer Water Quality Monitoring Field Guide: Adopt-A-Stream Mississippi, February 2004, 5th Edition):

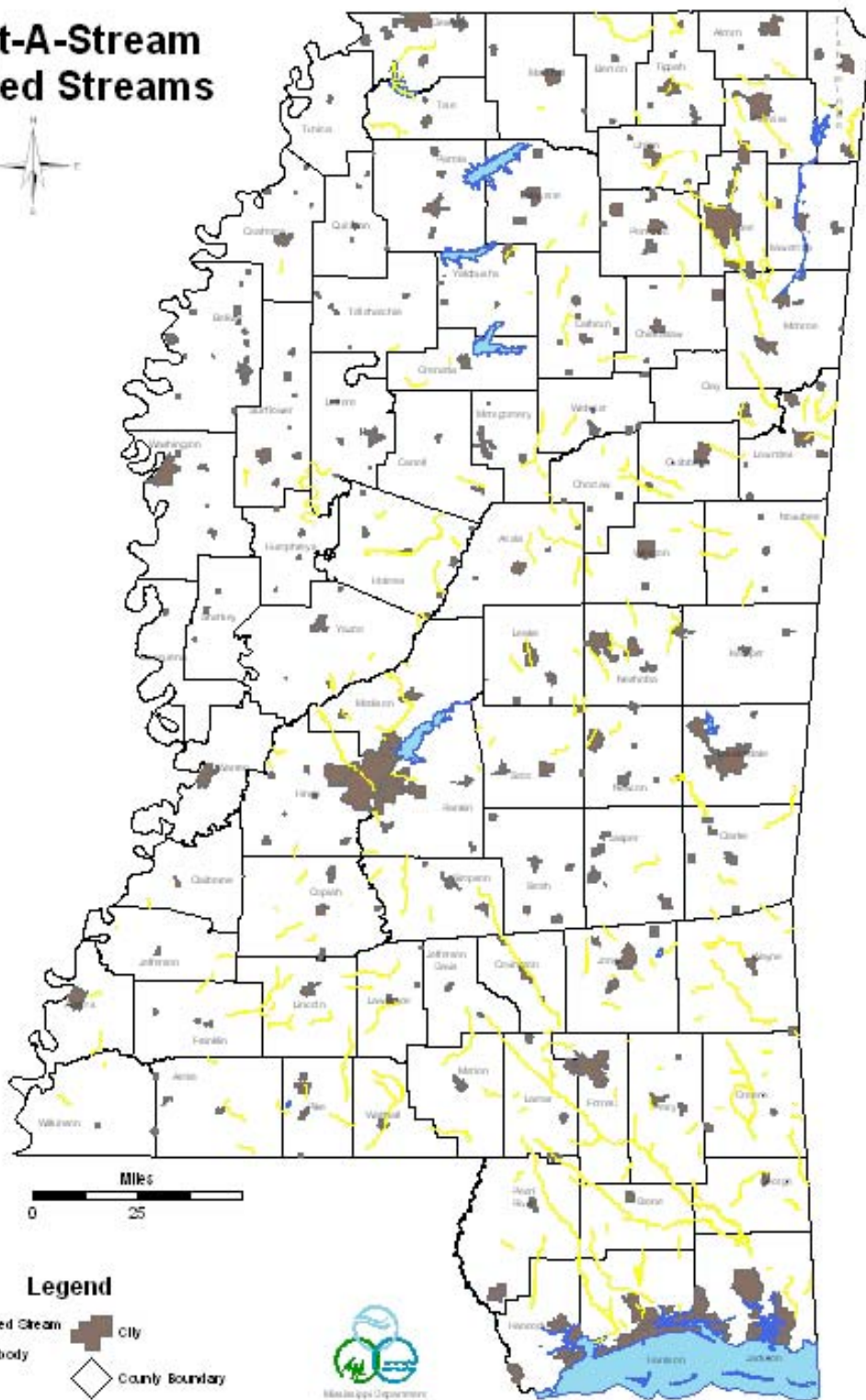
1. To educate Mississippi citizens about the value of clean streams, rivers, and estuaries and how pollution from point and nonpoint source affects water quality, wildlife, and fisheries, and ultimately humans;
2. To develop a quality volunteer water quality monitoring program to compliment existing government monitoring programs;
3. To collect baseline data on all streams and rivers in Mississippi for use as indicators of stream health;
4. To use the data to promote clean up of polluted streams and to maintain the health of clean streams for our children.

The Adopt-A-Stream program uses a Microsoft Access database to store volunteers names, addresses, and the names of adopted streams. This data was primarily used for notifying volunteers of new courses, creating appreciation certificates, and generating thank you letters.

ID	Stream Name	County	Location	County	County	County	County	County	County
01	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
02	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
03	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
04	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
05	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
06	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
07	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
08	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
09	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
10	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
11	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
12	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
13	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
14	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
15	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
16	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
17	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
18	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
19	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01
20	Abbeys Creek	Madison	3,367,850,000	Madison	MS	MDEQ	01	01	01

The Adopt-A-Stream database is now linked to a hydrography GIS dataset providing the display of streams with needed adoptions, existing adoptions, and overall stream quality. When people volunteer for the Adopt-A-Stream program, they want to know which streams need to be adopted. In the past, the AAS coordinator did not know which streams in their area had already been adopted. With the maps, they can choose a stream close to their home that needs to be adopted. The coordinator can also provide them with information on state operated monitoring stations, TMDLs, 303(d) waters, and 305(b) waters in their area based on maps we provide to him.

Adopt-A-Stream Adopted Streams



Miles
0 25

Legend

- Adopted Stream
- Waterbody
- City
- County Boundary

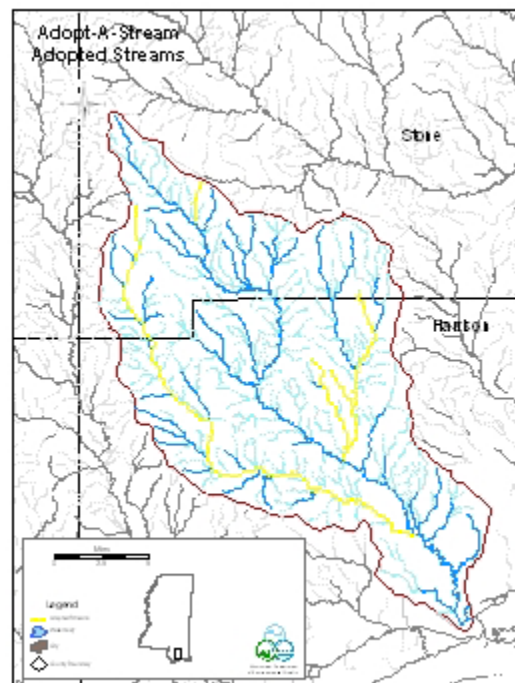


The geographic layer used to link with the database is the National Hydrography Dataset (NHD). The NHD is based upon the content of USGS Digital Line Graph hydrography data integrated with reach-related information from the EPA Reach File Version 3 on 1:100,000 scale. The NHD layer was produced by using the NHD Append Version 2.10 provided by USGS at <http://nhd.usgs.gov>. The NHD Append aml combines the features and tables from NHD workspaces into a single output NHD workspace. It calculates new topological relationships between the resulting features using CLEAN and BUILD.

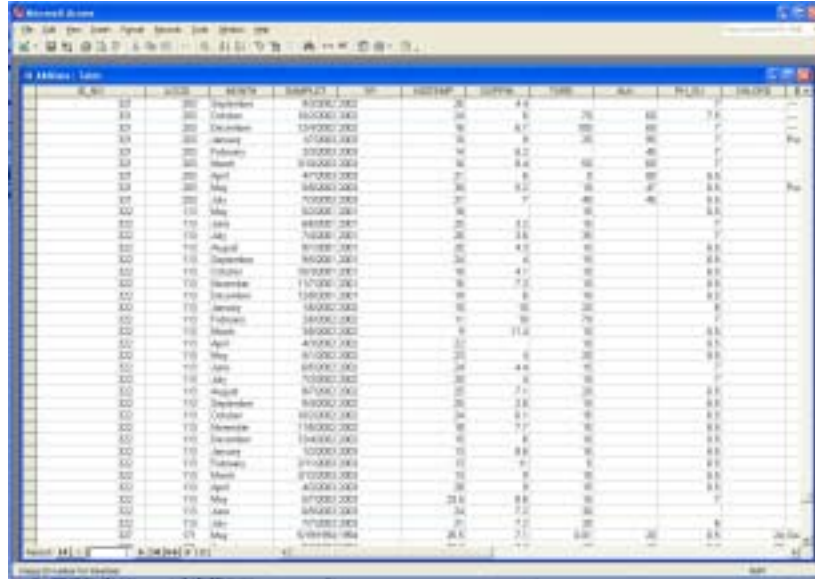
By taking the existing AAS database and linking it with the National Hydrography Dataset by stream name, the AAS coordinator can provide a better way to inform volunteers. Through visual and geographic aids, volunteers can now “see” the locations of streams in their areas that are currently adopted, have been improved through adoption, and are in need of adoption.

Displaying the currently adopted and impaired streams geographically, the AAS coordinator is able to see where more public awareness and participation is needed. We will also have the potential to display 303(d), 305(b), and TMDL layers with the adopted streams in an effort to coordinate better water quality monitoring with MDEQ monitoring staff.

Furthermore, the adopted streams can be used to the advantage of our Basinwide Approach Coordinators. MDEQ’s Basinwide Approach is a program to increase public awareness on the basin and watershed level. We have four basin coordinators for our eleven basins in Mississippi. These coordinators implement plans to improve water quality in their respective basin with the aide of volunteers.



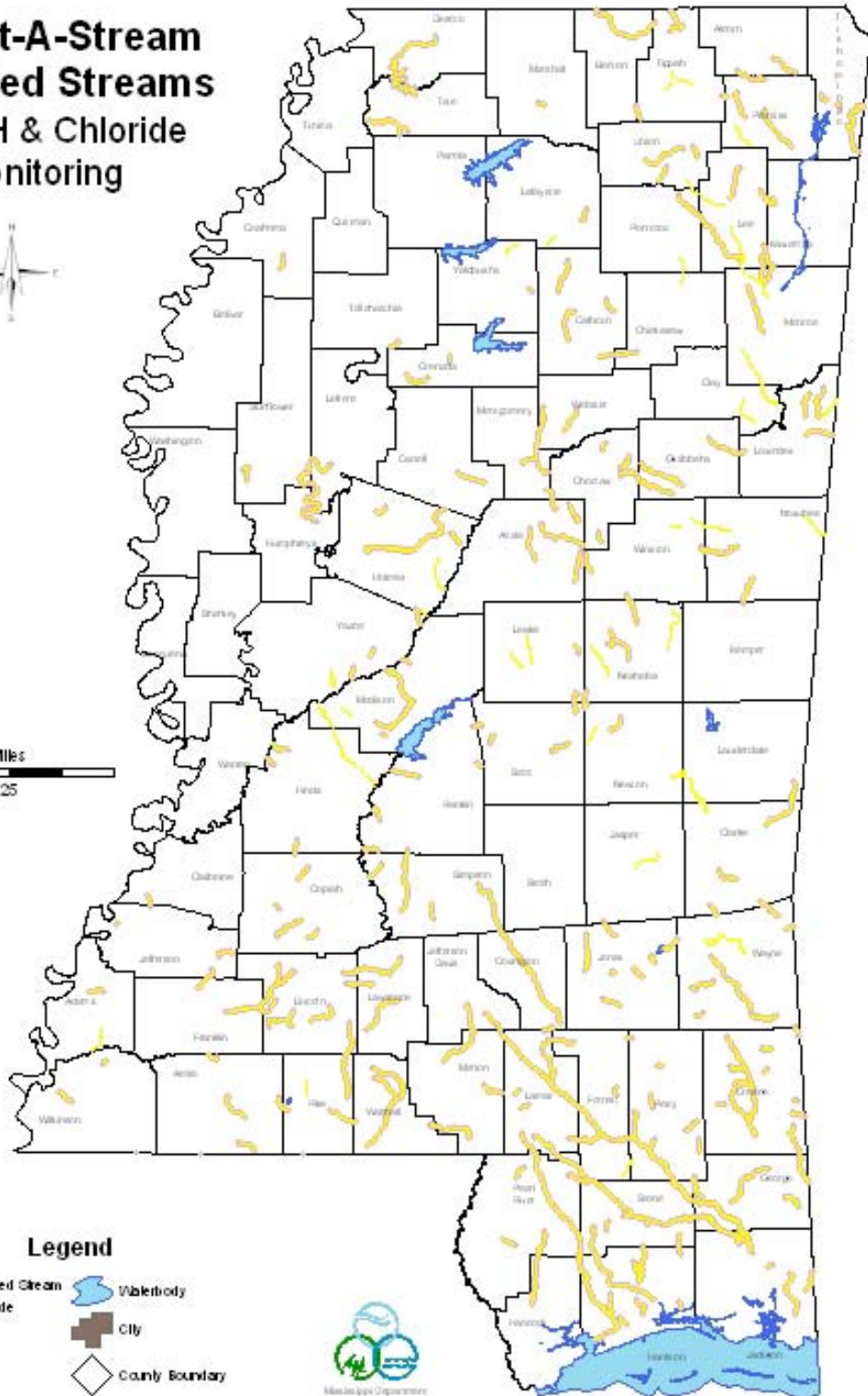
Additional information stored in the Adopt-A-Stream database is the monitoring data gathered by the volunteers. Chemical testing is to be performed for temperature, pH, alkalinity, turbidity, dissolved oxygen, and chloride.



The image shows a screenshot of a Microsoft Access database window. The window title is "Microsoft Access" and the table name is "Adopt-A-Stream". The table contains the following columns: ID, COUNTY, MONTH, SAMPLEID, SP, PRIORITY, TEMPERATURE, PH, ALKALINITY, TURBIDITY, DISSOLVED OXYGEN, and CHLORIDE. The data is organized into rows, with each row representing a specific monitoring event. The columns contain numerical values for the various parameters measured during each event.

ID	COUNTY	MONTH	SAMPLEID	SP	PRIORITY	TEMPERATURE	PH	ALKALINITY	TURBIDITY	DISSOLVED OXYGEN	CHLORIDE
19	200	December	8320000000		20	4.4					
19	200	December	8320000000		20	6.7					
19	200	December	8320000000		20	6.7					
19	200	January	8320000000		20	6.7					
19	200	February	8320000000		20	6.2					
19	200	March	8320000000		20	6.4					
19	200	April	8320000000		20	6.4					
19	200	May	8320000000		20	6.7					
19	200	June	8320000000		20	7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100	April	8320000000		20	6.7					
19	100	May	8320000000		20	6.7					
19	100	June	8320000000		20	6.7					
19	100	July	8320000000		20	6.7					
19	100	August	8320000000		20	6.7					
19	100	September	8320000000		20	6.7					
19	100	October	8320000000		20	6.7					
19	100	November	8320000000		20	6.7					
19	100	December	8320000000		20	6.7					
19	100	January	8320000000		20	6.7					
19	100	February	8320000000		20	6.7					
19	100	March	8320000000		20	6.7					
19	100										

Adopt-A-Stream Adopted Streams with pH & Chloride Monitoring



Legend

-  Adopted Stream
-  Chloride
-  pH
-  Waterbody
-  City
-  County Boundary



References

Adopt-A-Stream Mississippi Volunteer Water Quality Monitoring Field Guide, February 2004, Fifth Edition

<http://www.usgs.gov>

<http://www.maris.state.ms.us>

Mississippi Department of Environmental Quality, State of Mississippi Water Quality Assessment Basin Management Approach

Author Information

Nona J. Yates

DBA I

Mississippi Department of Environmental Quality, Office of Pollution Control

2380 Highway 80 West, Jackson MS 39204

voice: (601) 961-5371

fax: (601) 961-5357

nona_yates@deq.state.ms.us