Alabama WaterSTAR: A New Groundwater Assessment Tool

Groundwater Protection Council 2023 Annual Forum

Tampa, FL September 12-14, 2023 Greg Guthrie, P.G. Groundwater Assessment Program *Geological Survey of Alabama*



Presentation Objectives

Provide	Provide an overview of basic features of the Alabama WaterSTAR application
Provide	Provide an overview of advanced features of Alabama WaterSTAR using example applications
Illustrate	Illustrate the ability to receive new well applications from drillers through the application
Illustrate	Illustrate how data will be served to the National Groundwater Monitoring Network
Illustrate	Illustrate how advance features will be used to inform the Alabama Drought Monitoring and Impact Group
Illustrate	Illustrate how advance features are can provide information for ongoing projects



Alabama WaterSTAR

Current database, RBDMS-Environmental homepage

Alabama WaterSTAR homepage



Developed in cooperation with:







Well construction, water level and water quality information at a site and project level are contained in the database

Site Details	Constr	uction / Aquifers	w	ater Level Measurem	ients	Sample Results	
Screen From Dep	th (Feet)	Screen To Depth (Feet)	Screen Material	Casing Fr	om Depth (Feet)) (
					642		
					590		
t.					510		
					0		
678		698		Unknown			
637		642		Unknown			
575		590		Unknown			
•							•

Site Details Co	onstruction / Aquifers	Water Level Measurements	Sample Results
Measurement Date 💙	Depth to Water (ft/bls)	Water Level Elevation 1	Pumping Rate (gpr
2019/11/14	68.78		
2019/04/23	68.45		
2017/09/25	85.9		
2017/02/28	92.2		
2013/01/01	85		450
2002/10/01	80.1		
2001/10/02	76.58		
2000/10/13	88.02		
4			Þ

Site Details	Construction / Aquife	rs Water Leve	Measurements	Sample Results
Sample Date 💙	Analyte/CAS #	Concentration	Units	USGS Grouping
1995/07/31		3	ug/L	
1995/07/31		0.48	mg/L	
1995/07/31		0.27	mg/L	
1995/07/31		15	mg/L	
1995/07/31		0.13	mg/L	
1995/07/31		0.22	mg/L	
1995/07/31		48.5	mg/L	
1995/07/31		0.2	mg/L	
1995/07/31		0.14	mg/L	-



Basic Features Site Explorer and Filters

Site Explorer

	Site Explorer		••••••••••••••••••••••••••••••••••••••
		This search will produce 35237 results.	
	Site Location		
	Meridian:	Township:	Township Dir:
	Select Multiple	= • 0 ×	Select Multiple
	Range:	Range Dir:	Section:
Long		Select Multiple	= v X
-86.4	8		
-86.4	County:	Quadrangle:	
96.4	select multiple		
-00.4	[©] Site Detail		
-86.4	GSA ID:	Alias:	Site Type:
-86.4	LIKE 🗸 🗙	LIKE 🗸	Select Multiple
-86.4	7 National Aquifer:	Local Aquifer	Included in NGWMN:
-86.4	A Select Multiple	Select Multiple	Select
-86.4	4 Agency:	Well Depth (Feet):	Sample Count:
-86.4	Select Multiple	- - • X	= • ×
-86.4	7 Water Level Measurement Count:		
-004	= v X		
-86.4	Site Lat/Long		
-86.4	4 If searching within this section, all three fields ust be entered. Bar	lius can remain zero if location is exact. Latitude must be between 30.1	7 and 35 10 degrees and Longitude must be between -88.45 and
-86.4	4 -84.82 degrees.		
-86.4	7 Latitude (NAD83):	Longitude (NAD83):	Radius (Feet):
-86 /	0 ×	= • 0 ×	= • ×
-00.4	Project Detail		
-00.4	Project Name:	Project Number:	Project Type:
		LIKE V	Select Multiple
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-86.5	1	Apply Filter Clear All Filters	
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MABAMA .

Applied Filters: GSA ID Site Type Section Township Range Latitude (NAD83) County 001A05001 Domestic Autauga 5 20N 16E 32.74367935384373 001A16001 Domestic Autauga 16 20N 16E 32.71542904126744 001A19001 Domestic Autauga 19 20N 16E 32.69595759729213 001A19002 Domestic Autauga 19 20N 16E 32.70082749887446 001A20001 Domestic Autauga 20 20N 16E 32.69486462483546 001A20002 Domestic Autauga 20 20N 16E 32.70099545688933 001A22001 Domestic Autauga 22 20N 16E 32.70056839307648 001A22002 Domestic Autauga 22 20N 16E 32.70056839307648 001A22003 Domestic Autauga 22 20N 16E 32.70056839307648 001A26001 Domestic Autauga 26 20N 16E 32.68715550347746 001A26002 Domestic Autauga 25 20N 16E 32.68793368557647 001A27001 Domestic Autauga 27 20N 16E 32.685462793923115 001A27002 Domestic Autauga 27 20N 16E 32.68562738941701 001A29001 Domestic Autauga 29 20N 16E 32.68548586024334 32.68530589207713 001A30001 Domestic Autauga 30 20N 16E 001A34002 Domestic Autauga 34 20N 16E 32.67518507446198 001B00003 Domestic Autauga 10 20N 15E 32.72917780287046 001B10001 Domestic Autauga 001B12001 Domestic Autauga 12 20N 15E 32.72915678745007 001B16001 Domestic Autauga 16 20N 15E 32.714178988835826 001B17001 Domestic Autauga 17 20N 15E 32.70880232787696 001B19001 Agricultural Autauga 19 20N 15E 32.69487108292064 35237 Total Results | Page 1 of 705 | Go to page: 1

Water Quality Explorer and Filters

This search will produce 63117 results.	
Analyte	
Analyte/CAS #:	
Select Multiple	
USGS Grouping:	
Select Multiple	
ample Detail	
Filter for Most Recent Sample Results?	
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Media:	
Select Multiple	

Sample Re	sults Explore	r			ĵ	₽
		Арр	lied Filters:			
GSA ID	Sample Date	Analyte/CAS #	Concentration	Units	USGS Groupi	ng
<u>125Y33001</u>	2019/11/19		15.5	degrees C		
<u>125Y33001</u>	2019/11/19		2.4	mg/L		
<u>125Y33001</u>	2019/11/19		449	mS/cm		
<u>125Y33001</u>	2019/11/19		7.1	SU		
<u>125Y33001</u>	2019/11/19		355	mV		
007L02002	2019/11/19		16.8	degrees C		
007L02002	2019/11/19		6.2	mg/L		
007L02002	2019/11/19		271	mS/cm		
007L02002	2019/11/19		7.6	SU		
007L02002	2019/11/19		298	mV		
007C34001	2019/11/19		18.1	degrees C		
007C34001	2019/11/19		6.4	mg/L		
007C34001	2019/11/19		257	mS/cm		
007C34001	2019/11/19		7.4	SU		
007C34001	2019/11/19		601	mV		
125LL25001	2019/11/06		16.9	degrees C		
125LL25001	2019/11/06		6.9	mg/L		
125LL25001	2019/11/06		307	mS/cm		
125LL25001	2019/11/06		7.6	SU		
125LL25001	2019/11/06		138	mV		
077S19001	2019/10/23		15.4	degrees C		
<u>077S19001</u>	2019/10/23		10.36	mg/L		
	<< <	> >> o to page: 1	63117 Total Resu	llts ∣Page 1 of 1	263	



Data searches using geospatial criteria: Polygon Square Circle Address





Provides a variety of time-series plots, hydrographs, box plots, water specific diagrams for water level and water quality data exploration







Advanced Features

Drillers are required to notify the state of new wells to be drilled – Form 60

REPORT OF DRILLED WALL				
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	Signed: James & Michael			



WaterSTAR will allow for electronic submission of the Form 60 and will assign new GSA site identifiers upon verification



ADEM Form 60 1/83

Advanced Features



Release Date: May 11, 2021



For Public Dissemination Alabama Drought Declaration

In accordance with the Alabama Drought Planning and Response Act (<u>Code of Ala. 1975</u>, §9-10C-1, et seq.) and the Alabama Drought Management Plan, the ADECA Office of Water Resources (OWR), based on a review of current and anticipated conditions, has declared the following portions of Alabama to be under the specified drought declaration levels.



Legend

No Drought

Declaration

Advisory

Watch

Warning

Emergency

All 9 Regions of the Alabama Drought Management Plan which include the counties of: Autauga, Baldwin, Barbour, Bibb, Blount, Bullock, Butler, Calhoun, Chambers, Cherokee, Chilton, Choctaw, Clarke, Clay, Cleburne, Coffee, Colbert, Conecuh, Coosa, Covington, Crenshaw, Cullman, Dale, Dallas, DeKalb, Elmore, Escambia, Etowah, Fayette, Franklin, Geneva, Greene, Hale, Henry, Houston, Jackson, Jefferson, Lamar, Lauderdale, Lawrence, Lee, Limestone, Lowndes, Macon, Madison, Marengo, Marion, Marshall, Mobile, Monroe, Montgomery, Morgan, Perry, Pickens, Pike, Randolph, Russell, Shelby, St. Clair, Sumter, Talladega, Tallapoosa, Tuscaloosa, Walker, Washington, Wilcox, and Winston.



Continuing widespread rainfall has resulted in the elimination of drought conditions in Alabama. However, with the approaching summer season and higher temperatures, we can anticipate the potential for conditions to return. OWR will continue monitoring our water resources and update this Declaration as needed.

Water managers are urged to carefully monitor conditions and encourage the wise and efficient use of our water resources. Public water system customers are encouraged to follow their local water system's recommendations regarding water use. All other water users should make prudent decisions on their water use to protect available resources.

For further information, please visit our web site at <u>water.alabama.gov</u> and follow the links for Drought Planning and Management. You may also reach our office at (334) 242-5499, fax at (334) 242-0776, or e-mail at <u>water@adeca.alabama.gov</u>.





Advanced Features

Display hydrographs for multiple wells







Projects – Data Served to NGWMN



National Ground-Water Monitoring Network

Project data includes:

- USGS principal aquifers
- Wells served to NGWMN
- Water-level variation from mean





Projects – Oil & Gas Water Disposal Wells

Project data includes:

- Water disposal wells from Oil & Gas Board RBDMS database
- Water injection wells from Oil & Gas Board RBDMS database
- Water chemistry
- Well construction
- Aquifer information





Projects - Water Quality Display and Access

- Hydrochemical data currently contained in a separate database and ported to ArcGIS online application
- WaterSTAR will provide a searchable and downloadable portal for water quality studies and data availability





Summary



- AL WaterSTAR, a new geospatial database, is being developed in cooperation with the GWPC and Coordinate Solutions to facilitate storage, retrieval, sharing, and analysis of data through one application.
- Basic functions of AL WaterSTAR include:
 - Storage of well and spring construction, location, aquifer, water levels and water quality parameters
 - Data filtering and retrieval by any parameter and/or geospatial criteria
 - Display data in graphical format
 - Export of filtered data in Excel format
- Advanced functions of AL WaterSTAR include :
 - Electronic submission of Notice to Drill new well forms
 - Serve data to the USGS National Groundwater Monitoring Network
 - Generate statistical hydrographs
 - Generate and display time-series plots from multiple sources
 - Retrieve data from the GSA Geochemical Laboratory database
 - Retrieve data from outside sources, e.g., USGS and EPA
- Wish List Inclusion of surface water data, e.g., stream characteristics, flow, water quality

Questions?

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Springs of Alabama







Geological Survey of Alabama Circular 207





