

Suwannee River Water Management District Data
Provider to NGWMN Final Report

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SUWANNEE RIVER
WATER MANAGEMENT DISTRICT

Tara Rodgers, Hydrologic Data Services Chief

Tara.Rodgers@srwmd.org

386-647-3108

Alejandro Arteaga Garcia, Data Manager

Alejandro.Garcia@srwmd.org

386-647-3157

9225 County Road 49

Live Oak, FL 32060

386-362-1001

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Description of Agency

The Suwannee River Water Management District (District, or SRWMD) is a regional government agency responsible for protecting and managing water resources in north-central Florida. The District is one of five water management districts created by the Florida Legislature with the passage of the Water Resources Act in 1972. A governing board of nine members, who live in the District, establishes District policies. Governing board members are unpaid volunteers appointed by the Governor and confirmed by the Florida Senate for four-year terms. The District encompasses 7,640 square miles and all or part of 15 counties in north-central Florida. The District includes all of Columbia, Dixie, Gilchrist, Hamilton, Lafayette, Madison, Suwannee, Taylor and Union counties, and parts of Alachua, Baker, Bradford, Jefferson, Levy and Putnam Counties. The District contains over 300 documented springs, including the highest concentration of freshwater springs in Florida, and the highest concentration of first magnitude springs in the United States. Major rivers in the District include Suwannee, Santa Fe, Withlacoochee, Aucilla, Alapaha, Ichetucknee, Fenholloway, Steinhatchee, Econfinia, Waccasassa, and the Wacissa.

The District has three primary hydrogeologic units, in descending order:

- The unconfined surficial aquifer system (SAS) in areas with some degree of confinement present, upon which the SAS sits
- The intermediate aquifer system/intermediate confining unit (present in the northeastern and eastern portions of the SRWMD)
- The Floridan aquifer system underlying the entire District

The Floridan is a carbonate (limestone) aquifer that varies in degree of confinement but is continuous throughout the District. It is the primary source of this area's drinking and irrigation water. The Floridan aquifer system is represented by the Upper Floridan aquifer, mid-Floridan confining unit where present, and Lower Floridan aquifer. In the District, the mid-Floridan confining unit is generally poorly defined, as is the presence of the Lower Floridan aquifer. Nearly all wells for all water use types produce water from the Upper Floridan Aquifer in our region.

Description of Monitoring Network

The mission of the District's Water Resources Monitoring program is to provide quality-assured water data for use in research, resource protection, planning, public safety, recreation, and education. The District is committed to documenting our hydrologic conditions for present and future stewards of the unique water resources in our community. SRWMD operates an extensive in-house hydrologic monitoring network including 207 groundwater wells with over 180 of them on a real-time basis, 46 surface water locations of which at least 10 are springs, 42 rain gages, and over 970 water-use locations.

The District currently provides information for 85 sites on the NGWMN Data Portal.

-Monitoring Category

- 47 Surveillance
- 38 Trend

-Subnetwork

- 21 Background
- 25 Known Changes
- 39 Suspected/Anticipated Changes

Work Plan Summary

- I. Site Selection**
- II. Subnetwork Assignments**
- III. Description of Web Services**

Suwannee River Water Management District originally proposed a 2-year project. During the first year the District took steps to establish web services suitable for the NGWMN. This included establishing the IT infrastructure, the web services setup, and the analysis of SRWMD stations that would be suitable for the Network. The stations were further examined to determine what Subnetwork and Category were best represented and metadata information was collected. The information was subsequently added to the NGWMN Well Registry, and lastly data collected from the stations was made available through the NGWMN portal. For the second year, SRWMD requested funds to cover the annual web services licensing fees to provide persistent data services.

At the time of proposal, monitoring of the Floridan aquifer was deemed underrepresented in the NGWMN. The District had many monitoring wells which could be selected to be included in all subnetwork categories: Background, Suspected Changes, and Documented Changes. Tom Mirti, then Deputy Executive Director, with over 27 years of experience at the District, was tasked with reviewing and classifying the most appropriate potential sites using the Tip Sheet on Well Selection Criteria for Water Levels and guidance given in the report, "Statistical Evaluation of Hydrologic Data in Northeastern Florida and Southern Georgia" (Bin

Gao, Kathleen McKee, Osvaldo Gargiulo, and Wendy Graham, St. Johns River Water Management, Contract #25325). Spatial well density at aquifer units was considered and one goal was to provide an even distribution for addition to the network. Wells with extended period of record were also favorable for addition.

After sites were selected, Connie Woodward, Data Manager at the time, was tasked with the collection of the required data elements for the selected sites, making them available through the Well Registry, identifying any data element gaps, and populating the site and network data. The Well registry was successfully populated by February 10, 2020.

Contracted work with Kisters was done to develop an add-on to the District's Hydstra database to provide web services in a WaterXML2 format as specified in the agreement. Product development was not part of the original plan for providing web services, however making this change was more cost effective in the long run and streamlined the data processing to minimize likelihood of connection problems. This change was approved by both parties before the development process was underway.

When our technical manager and Kisters contractor were ready to test the WaterXML2 connection to the NGWMN portal, the portal was not set up yet on the NGWMN side to be able to accept that format. NGWMN programmer availability caused several intermittent delays during this stage of completion. At this point, it is also likely the COVID19 situation may have caused some availability or technological delays.

The data transfer workflow was ultimately set up by establishing a licensed copy of the Hydstra database on a second server outside of the SRWMD firewall. Data files from our production Hydstra database are copied over to the web accessible Hydstra database hourly, or as often as required. This maintains the web accessible Hydstra database as current as the production database.

During the second year of support, SRWMD continued persistent data services through the web service interface, overseeing the collection of data from the sites selected for the NGWMN. The District ensured data access was available via the web services, and system maintenance was performed as needed. Some occasional maintenance has been necessary on the Syncovey software (recommended by Kisters) that is used for automatically scheduled data transfers into the secondary server. File transfers sporadically clash with other applications using the data and the files must be removed before the transfer jobs can move them again. Maintenance has also included the annual software license renewal of Hydstra/WSI and Hydstra/KiWIS.

At the end of this agreement period, the District will maintain data continuity to the NGWMN. SRWMD hopes to re-apply for future partnership opportunities with the NGWMN.

Data Management Plan

Types of Data:

Water-level data to assess the conditions of the water resources in the Floridan Aquifer region that the Suwannee River Water Management District monitors. Most samples (>87%) are taken from dedicated wells. The District uses dataloggers on a telemetry setup to record water level data with both shaft encoders and pressure transducers. Hydrologic data collection staff routinely visit sites at determined intervals and automated alerts are setup to address anomalies or equipment failures as soon as possible. Staff monitor graphs of site data daily as well as battery voltage. Staff are also tasked with data QA/QC after collection.

Survey grade GPS equipment used to refine the latitude, longitude, and land surface elevations of all sites.

Historic water-level data previously collected by the agency made available through the web services connected to the NGWMN portal.

Data File Format:

All data was entered into agency databases or into the NGWMN Well Registry.

Stored internally at the SRWMD in Hydstra (Kisters Pty Ltd. 7777 Greenback Lane, Suite 209, Citrus Heights, CA 95610-5800) phone 916.723.1441, kna@kisters.net)

Policies for access and sharing:

All data collected for the project available through the NGWMN Data Portal without restriction

Provisions for re-use or re-distribution:

All data from this project shall be publicly accessible through the National Ground Water Monitoring Network Data Portal.

Data shall be marked as Quality Assured, or Provisional.

Suwannee River Water Management District shall not be held liable for any injury or damage caused by the use of data distributed as a public records request regardless of their use or application. SRWMD does not guarantee the accuracy, or suitability for any use of these data, and no warranty is expressed or implied. For more information please contact the SRWMD at 386-362-1001.

Data Backup Plan:

The backup schedule for the database and web services server is a full backup on

Saturday, differentials each night until the next Saturday when the next full backup runs. In essence, 2 full backups one week apart and then nightly differentials for the current week. These backups are rolled to disk once a month and taken offsite, where we have a 2-month rotation.

Data collection and management at the District follows the Standard Operating Procedures established by the USGS, and the Florida Department of Environmental Protection, DEP QA Rule, Florida Administrative Code, Chapter 62-160.

Table 1. Wells added to NGWMN

Site#	Latitude	Longitude	Well Depth (ft)	NatAqfrDesc	LocalAquiferName	AquiferType	WWellCharsDesc	WWellTypeDesc	WWellPurposeDesc
S082202001	29.821837	-82.079707	208	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S072215001	29.882603	-82.081955	324	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S062102001	30.00429	-82.171471	294	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S042236001	30.106994	-82.049967	438	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S111811001	29.547306	-82.489961	60	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S101634001	29.570233	-82.697063	88	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S101722001	29.605434	-82.6064	252	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S101516017	29.610944	-82.816611	80	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S102006001	29.64973	-82.344198	406	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S091420001	29.693056	-82.925167	65	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Other
S091607001	29.724639	-82.746667	103	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S081926001	29.75858	-82.388682	284	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation

S081313005	29.782128	-82.968971	35	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
N011610001	29.824243	-82.59809	287	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S072132001	29.848919	-82.218521	206	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S071528001	29.849298	-82.808271	130	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S072002001	29.9154	-82.284744	202	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S061734010	29.920444	-82.608056	87	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S061629001	29.939126	-82.73605	75	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Known Changes	Surveillance	Other
S061401003	29.997131	-82.862383	48	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S051933001	30.017349	-82.414047	254	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S051428004	30.021194	-82.928306	50	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S051819001	30.039384	-82.5564	120	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Other
S041827002	30.109802	-82.496567	214	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S041402002	30.165316	-82.888428	156	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S041705001	30.175156	-82.636161	836	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S031923004	30.212889	-82.391235	253	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation

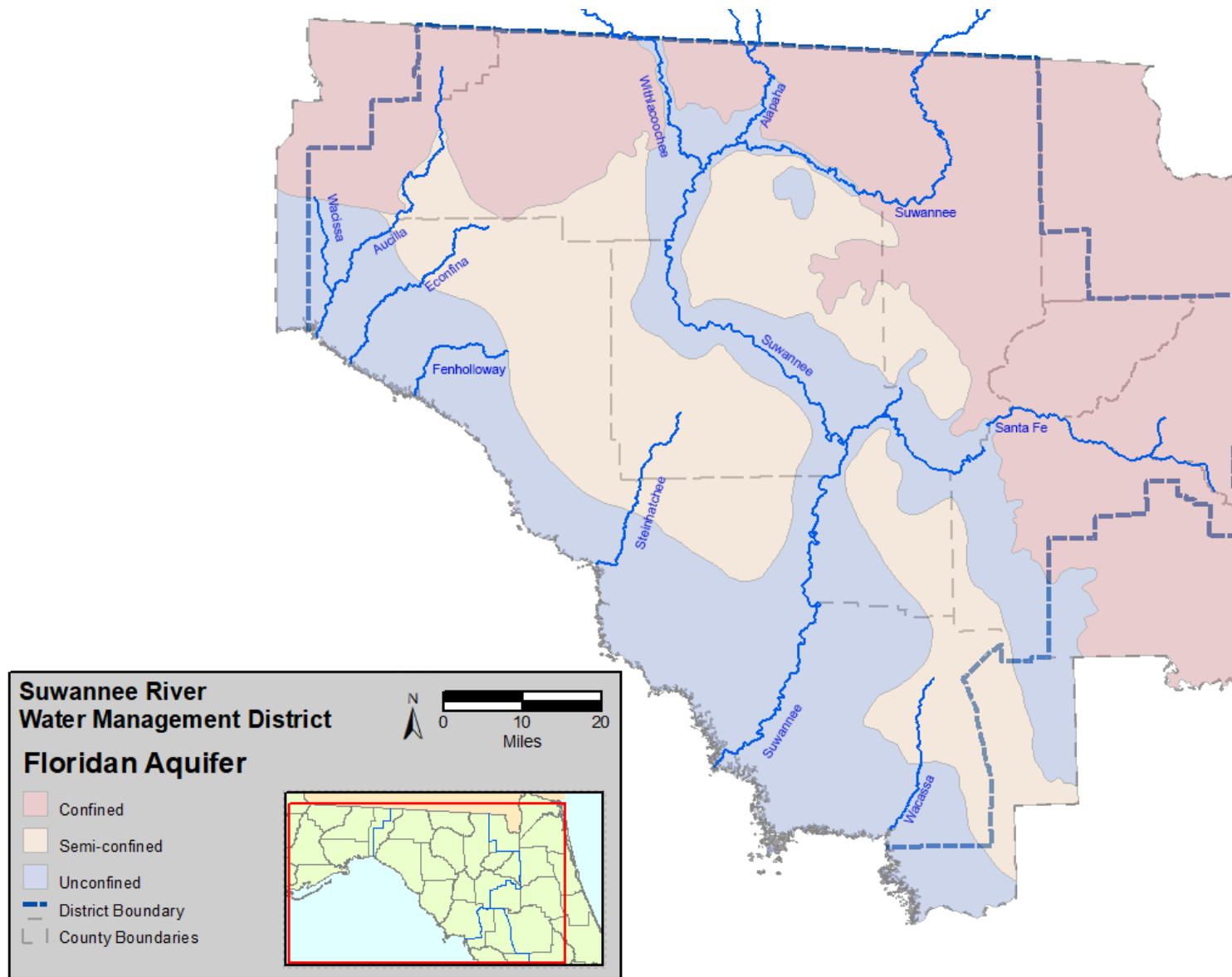
S031601012	30.256944	-82.668611	361	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Surveillance	Dedicated Monitoring/Observation
S021624001	30.305876	-82.660661	167	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Other
S021711003	30.326389	-82.58575	262	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S021805001	30.343538	-82.526396	220	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S011535004	30.352245	-82.781321	148	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S011727001	30.380526	-82.606213	228	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S011511001	30.411925	-82.783296	160	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Other
N011422007	30.476135	-82.907919	105	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
N021432001	30.533444	-82.942167	167	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S121330002	29.413266	-83.04399	40	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S141305001	29.296556	-83.032472	25	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S141429001	29.237583	-82.936028	442	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Known Changes	Trend	Dedicated Monitoring/Observation
S121508005	29.448871	-82.832357	33	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S141707004	29.281012	-82.655578	242	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S121717003	29.446322	-82.633639	247	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation

S131736001	29.319222	-82.569694	86	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S111117007	29.526951	-83.24126	36	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S101210001	29.624949	-83.104748	215	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S091212003	29.719857	-83.070412	45	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S081132001	29.749239	-83.241087	92	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S080907003	29.794778	-83.466804	37	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S061025003	29.927322	-83.279233	61	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S061114001	29.964794	-83.202759	147	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S061005001	29.984724	-83.344658	43	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S051331003	29.999253	-83.057599	44	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S050928004	30.025055	-83.434454	60	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S051214008	30.04713	-83.081607	52	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S051311001	30.065111	-82.978389	136	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Other
S051208001	30.068111	-83.137703	71	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S051004001	30.072823	-83.318943	46	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation

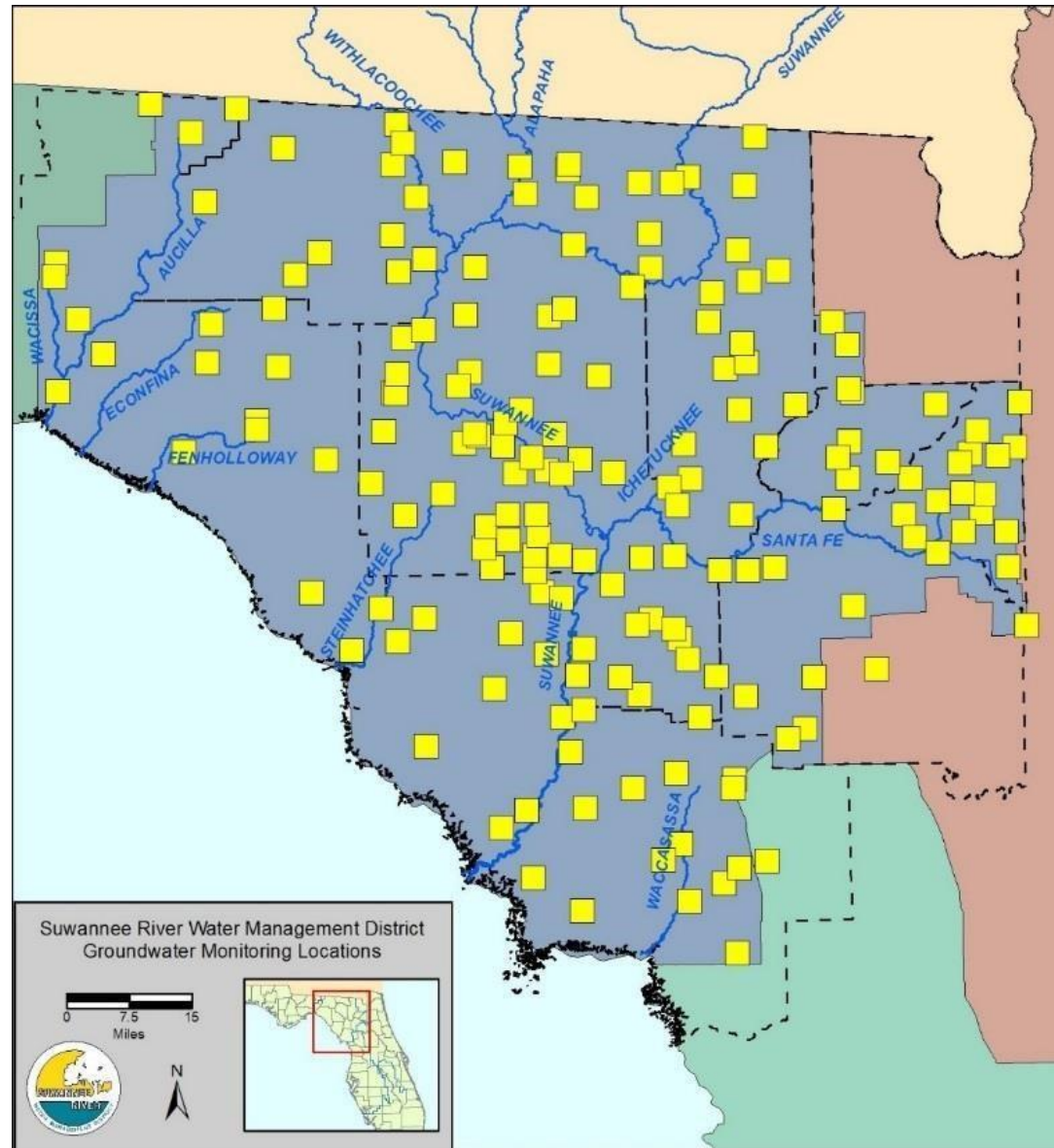
S040736005	30.094578	-83.571411	34	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S041329001	30.108139	-83.044056	247	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S041014001	30.140028	-83.298919	106	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Other
S041112005	30.151452	-83.169401	144	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S031232001	30.176222	-83.145944	124	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Other
S030833001	30.186986	-83.527793	68	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S031012001	30.234906	-83.277068	72	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Other
S031105006	30.249132	-83.238403	75	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S021335001	30.270306	-82.986028	160	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S021231001	30.275037	-83.153466	110	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S020828001	30.289213	-83.536204	69	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S020802001	30.346938	-83.493137	100	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S011035001	30.349778	-83.2865	78	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Other
S010920002	30.385038	-83.443858	113	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Background	Trend	Dedicated Monitoring/Observation
S011011002	30.413806	-83.297698	80	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation

N011316001	30.483389	-83.030194	167	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
N021332004	30.531194	-83.041694	103	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
N021125001	30.540187	-83.171305	195	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
N020822002	30.5667	-83.514618	81	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
N021002001	30.607028	-83.287472	282	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Trend	Other
S040407001	30.147073	-83.968928	12	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
S020433001	30.27169	-83.927086	30	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
N030524001	30.645194	-83.77975	122	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Trend	Dedicated Monitoring/Observation
S050615002	30.040958	-83.717447	38	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
N010719001	30.473944	-83.671639	229	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation
S030730001	30.195926	-83.669929	142	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Surveillance	Dedicated Monitoring/Observation
S020731002	30.263613	-83.660912	57	Floridan aquifer system	Upper Floridan aquifer system	UNCONFINED	Background	Trend	Dedicated Monitoring/Observation
N030727001	30.636822	-83.606722	181	Floridan aquifer system	Upper Floridan aquifer system	CONFINED	Suspected / Anticipated Changes	Surveillance	Dedicated Monitoring/Observation

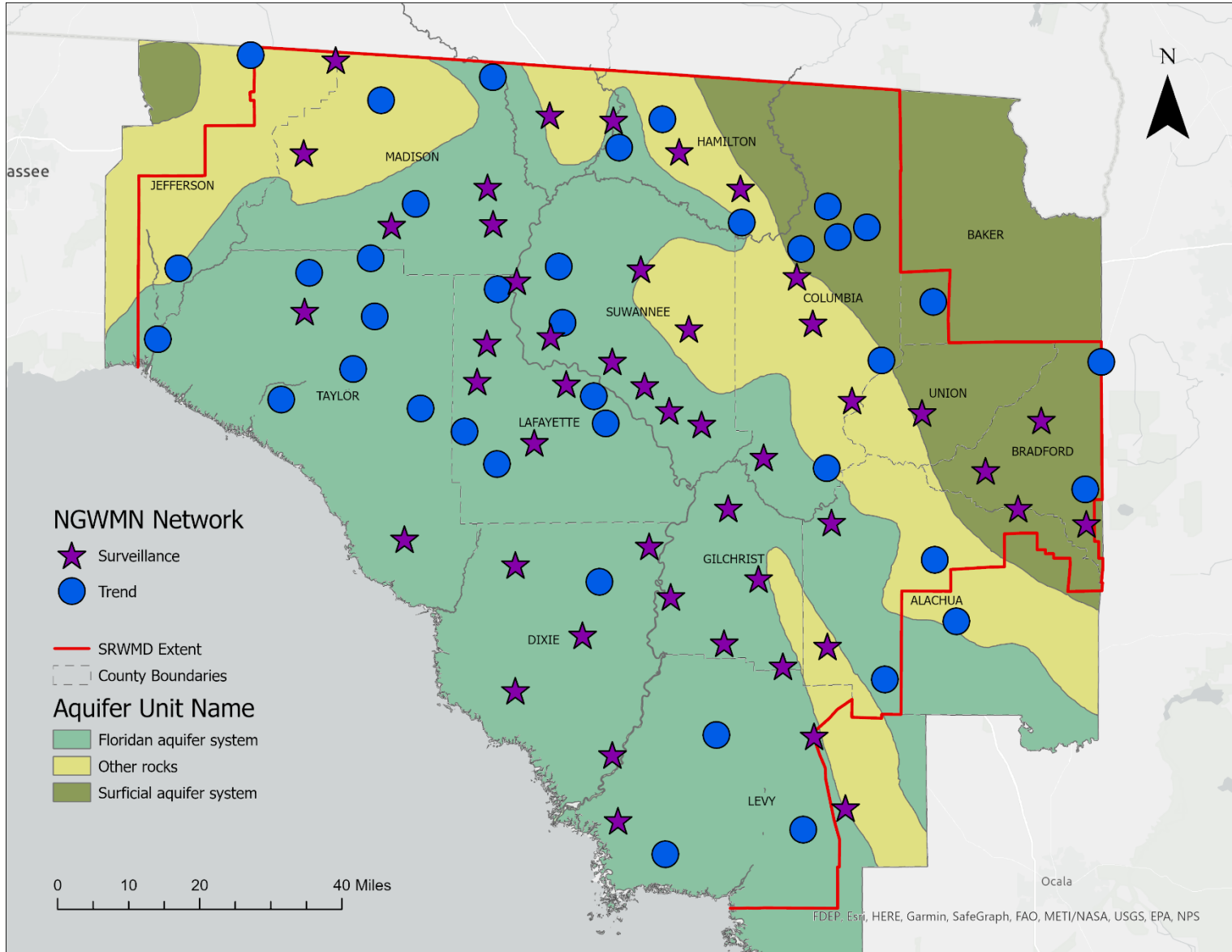
Map 1. Floridan Aquifer Within SRWMD Monitoring Extent



Map 2. SRWMD Monitoring Network



Map 3. NGWMN Monitoring Category



Map 4. NGWMN Subnetwork Sites

