



WWALS Watershed Coalition, Inc.
the WATERKEEPER® Alliance Affiliate for the upper
Suwannee, Withlacoochee, and Alapaha Rivers
a 501(c)(3) nonprofit charity
PO Box 88, Hahira, GA 31632
850-290-2350
wwalswatershed@gmail.com
www.wwals.net



December 5, 2016

To: nfrwsp-comments@sjrwmd.com

Cc: Amy Brown
Senior Hydrologist
Suwannee River Water Management District
386.362.1001
ALB@srwmd.org

Noah Valenstein
Executive Director
SRWMD
(386) 688-6653
NDV@srwmd.org

Re: **North Florida Regional Water Supply Plan**

Dear Ms. Brown and Mr. Valenstein,

Thank you for providing an opportunity to comment on the NFRWSP. Here are some comments about water supply, aquifer recharge, threats, peer review, modeling, comment area, involving Georgia, MFLs for the upper Suwannee River and nearby springs, and river water quality monitoring. WWALS congratulates everyone involved for the multi-year process that has gotten this far, and offers some suggestions for tuning going forward.

Water Supply

WWALS applauds the water supply projects involving reuse or stormwater in [Appendix K: Water Supply Development Project Options](#). We note they seem to be mostly in Duval or Alachua Counties, which addresses the problem at its origin, in Jacksonville and Gainesville. WWALS applauds that.

Aquifer Recharge

Any plan that puts water back into the aquifer is worthy of study, including for cost vs benefit. Among the projects in [Appendix J: Water Resource Development Project Option](#), we must single out the Falling Creek project, described in the table in that appendix as:

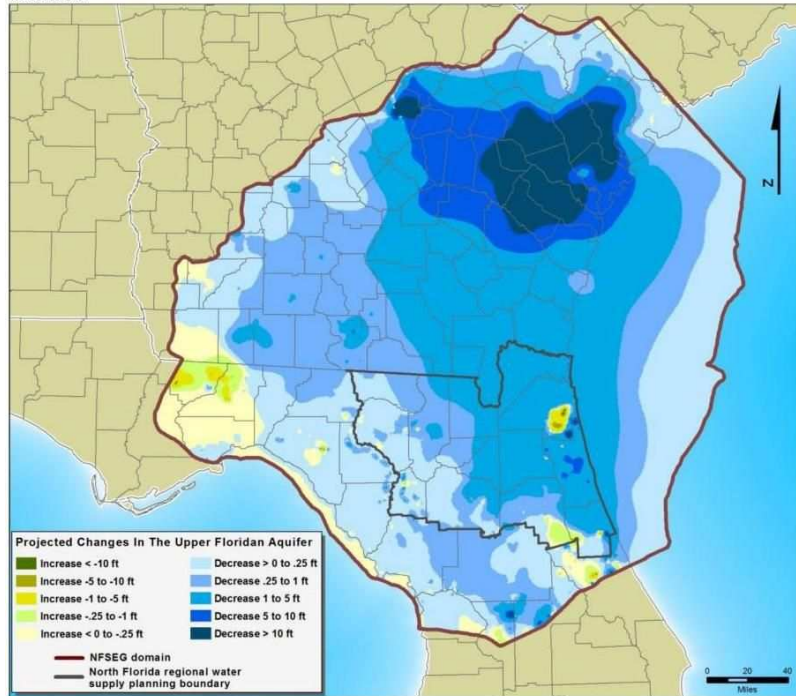
“This project involves a maximum daily capacity from the Upper Suwannee River to Falling Creek Falls, recharging the aquifer.”

The Falling Creek project has very large up-front expense, involves environmental risk in running a large-diameter pipe through wetlands, and has high maintenance cost. In addition it only benefits the Ichetucknee Springs watershed. It is seasonal, for instance at the water levels now in the Suwannee, there is no water to pump to Falling Creek.

The maps in the plan, including Figure C3 on page 3 of [Appendix C: Simulated Change in the Potentiometric Surface within the North Florida-Southeast Georgia Regional Groundwater Flow Model Area](#), show that the area that is losing water to the Atlantic coast of south Georgia and north Florida has lost 20 or more feet of aquifer levels.

None of the projects address that problem in any significant way. Much of the area in Florida that has lost that water in the Floridan is below Columbia, Hamilton, and Baker Counties. Overpumping is not the only reason for this loss: silviculture management has something to do with it as well, for example. WWALS recommends the much more practical and cost-effective plan Dennis J. Price P.G. has already submitted to SRWMD and NFRWSP. His plan is appended to this letter.

Figure C3: Change in Upper Floridan aquifer from 2035 withdrawals within the NFSEG domain.



Threats to the Aquifer and to the Rivers

In the Falling Creek watershed is a pipe yard with Sabal Trail pipeline pipe apparently sitting on fill in wetlands. The filling in the wetland was started several years before the pipes were placed there, yet the owner has not been sent a notice of violation. The U.S. Army Corps of Engineers (USACE) when asked by WWALS was unsure whether that pipe yard is in jurisdictional wetlands. All of USACE, DEP, and SRWMD, DEP, declined to do anything about that pipe yard or those wetlands, even though the Federal Energy Regulatory Commission never approved Sabal Trail use of it, as far as WWALS can find.





Aerial photograph above Falling Creek watershed to pipe yard by WWALS on Southwings flight November 23rd 2016

As I write, Sabal Trail is drilling under the Suwannee and Santa Fe Rivers and over Falmouth Cathedral Cavern, in the core NFRWSP area. In very similar karst geography in the NFSEG area at the Withlacoochee River US 84 crossing in Georgia, Sabal Trail has caused a frac-out of drilling mud up into the river and a sinkhole near the drilling site,¹ and Sabal Trail has caused several sinkholes in Florida, including one in the roadway of CR 49 in Suwannee County.

Just south of the NFSEG area, Strom, Inc., a Florida corporation with its principal place of business in Tampa, Florida, has received authorization from the United States Department of Energy Office of Fossil Energy (FE) to export domestically-produced Liquefied Natural Gas by ISO containers on vessels from the company's Project at 6700 N. Tallahassee Road, Crystal River, Florida. The volume authorized is equivalent to approximately 28.21 Bcf/yr of natural gas for a 25-year term. Strom states the natural gas to be liquefied at the Project will come from natural gas produced from shale deposits and that the "Source of Natural Gas" in the future will come from the proposed Sabal Trail Transmission Pipeline.² Sabal Trail runs through the heart of the NFSEG study area, in the Springs Heartland of Florida. Strom and at least one other LNG exporter (in Martin County) also have FE permission for Florida East Coast Railway to pick up LNG and ship it as far south as Miami, and as far north as Jacksonville, which is certainly in

¹ "Sinkhole, Sabal Trail HDD, Lowndes County, GA 2016-12-02," John S. Quarterman, WWALS Watershed Coalition, December 2, 2016, <http://www.wwals.net/?p=27600>

² United States Department of Energy, FE Docket No. 14-56-LNG, DOE/FE Order No. 3537 dated October 21, 2014: "Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas in ISO Containers Loaded at the Proposed Strom LNG Terminal in Crystal River, Florida, and Exported to Free Trade Agreement Nations."

NFSEG territory. Florida Gas Transmission (FGT) has received permission from the Federal Energy Regulatory Commission to expand its pipeline from Sabal Trail in Suwannee County to Jacksonville, and FGT has an open season now for bids to expand its main pipeline through the panhandle and the NFSEG territory down to Martin County, both involving new construction and trenching in water-containing karst limestone.

Yet there is no mention of pipelines as threats to the Rivers and to the Floridan Aquifer, nor of similar threats such as fracking. These omissions need to be remedied.

Peer Review

In a letter to Drew Bartlett, Florida Springs Council (FSC) President Dan Hilliard emphasized the importance of peer review, and the apparent lack thereof for the NFRWSP.³ The peer review described in the draft plan in section 2.2 on page 14 dates from two years before that letter. In Chapter 6 on page 61 there is an additional note:

“The projects provided in this water supply plan were developed as a planning level assessment to show that sufficient options are available to address potential water resource impacts in the NFRWSP area. These assessments were developed using available information and the NFSEG, which has yet to be peer reviewed, so limitations are inherent in the analysis as discussed in Chapter 4.”

Presumably that is the not-yet-conducted peer review referred to back in Chapter 4, page 24:

“NFSEG version 1.0 meets the requirements to be used in water supply planning in the NEFSEG domain. Version 1.0 of the model will not be utilized in regulatory evaluations or in the establishment of MFLs. However, the model may be used to determine the status of MFLs. NFSEG version 1.0 does not meet the requirements outlined in Rule 62-42.300(1)(e), Florida Administrative Code (F.A.C.), requiring the re-evaluation of the established LSF1 MFLs that will occur prior to the end of 2019. It is anticipated that the peer reviewed version of the model will be used in planning, regulatory and MFLs programs.”

Please clarify the text on page 24 to say that peer review has not been done yet and to invite peer reviewers, as well as public comment, beyond the present public comment deadline.

Regarding specific peer reviewers, FSC’s suggestion of Todd Kincaid seems a very good one.

WWALS would also like to suggest as NFRWSP and especially NFSEG peer reviewers Dennis J. Price P.G. of SE Environmental Geology LLC, White Springs, Florida, and Can Denizman, Ph,D Associate Professor of Geosciences, PhD in Geology from the University of Florida.

³ "NFSEG model may not be adequately peer-reviewed before it is implemented," letter to Drew Bartlett, Deputy Secretary for Ecological Preservation, FDEP, from Dan Hilliard, President, Florida Springs Council, April 20th, 2016, <http://springsforever.org/wp-content/uploads/2015/02/2016.04-28-FSC-Letter-to-Drew-Bartlett-Re-NFSEG-Model.pdf>

Data Availability and Model Calibration

The Floridan aquifer is a karst aquifer. Therefore, it is heterogeneous and anisotropic with turbulent groundwater flow unlike conventional aquifers that could be assumed homogeneous and isotropic with laminar flow. That means standard groundwater models based on Darcian flow of homogeneous and isotropic conditions are not realistic in karst environments.

The draft NFRWSP does not seem to include any specific information as to the groundwater models used. If they are standard Darcian groundwater flow models like they have always used, it is very unlikely that their forecasts vis a vis MFL would be accurate.

Groundwater models in karst aquifers should accommodate the dual porosity of the aquifer, i.e., the flow within the matrix and within the conduits. That requires incorporating into the model cave and conduit systems delineated by dye tracing experiments and/or cave surveys by cave divers.

More basic than peer review is the availability of suitable data to calibrate and validate the model. Performance metrics are needed across several validation periods (e.g., those including predominantly wet and dry years). Please see "Model Evaluation Guidelines for Systematic Quantification of Accuracy in Watershed Simulations," D.N. Moriasi et al.⁴ for some insight into the need for this and the types of "statistics" that are commonly used to evaluate hydrologic models.

Modeling is important for future developments, especially for issuing agriculture water use permits. Please add in the NFRWSP or in a further document an explanation on how drawdown when a new water user applies for a permit will be modeled, especially the most common scenario of every agricultural user turning on their pumps at the same time for months on end during the growing season during a drought.

It is also essential that uncertainty in predictions be quantified in varying climate/hydrologic scenarios, as Daggupati, et al. note:⁵

"...model developers and practitioners have the responsibility to ensure that the essential characteristics and processes of the real world are simulated appropriately and that the model performs adequately for a given purpose. One important step in model applications is the comparison of model results to observed data through calibration and validation (C/V)".

Modeling can and should involve "Monte Carlo" simulations where each of the model parameters is evaluated across their distributional range. These are big tasks, but essential, especially for the NFSEG.

No doubt SRWMD and SJRWMD are aware of the political difficulties of using a Monte Carlo model, due to the recent use of one in the Florida Environmental Regulation Commission (ERC) decision to raise toxicity levels for Florida waters. WWALS is a co-signatory of a letter from all the Waterkeepers of

⁴ "Model Evaluation Guidelines for Systematic Quantification of Accuracy in Watershed Simulations," D.N. Moriasi et al., Transactions of the American Society of Agricultural and Biological Engineers (ASABE), 2007, Vol. 50(3): 885-900, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.532.2506&rep=rep1&type=pdf>

⁵ "A recommended calibration and validation strategy for hydrologic and water quality models," P. Daggupati, N. Pai, S. Ale, K. R. Douglas-Mankin, R. W. Zeckoski, J. Jeong, P. B. Parajuli, D. Saraswat, M. A. Youssef, American Society of Agricultural and Biological Engineers (ASABE), Transactions, 2015, Vol. 58(6): 1705-1719, DOI 10.13031/trans.58.10712, http://agrilife.org/vernon/files/2012/11/36_Daggupati_et_al_2015_TransASABE.pdf

Florida criticising that ERC Monte Carlo modeling for leaving native Floridians who eat a lot of fish as outliers especially susceptible to cancer and other ill effects of water contaminants. Thus any use of a Monte Carlo model (or any other model) must be done so as to not leave such outliers and must be clearly defended against such a possibility. Such defense should include robust peer review, especially by critics of the ERC's decision, including WWALS and other Florida (and Georgia) Waterkeepers.

Expand the area of peer review and public comment

The area mapped in Figure 2: North Florida Regional Water Supply Planning Partnership on page 3 is far too constrained. The potentiometric simulations in Appendix C go all the way to the Gulf and South Carolina and show most pronounced effects not only around Jacksonville, but also as far away as Savannah. Many of the projects items in [Appendix J: Water Resource Development Project Options](#), including some in progress or completed, are outside the nominal Partnership area, to the west of the Suwannee and Withlacoochee Rivers, in Madison, Lafayette, and Dixie Counties, Florida. Peer review and public comment need to extend at least as far as those simulations go, which would be at least as far as NFSEG Domain of Figure 15 on page 25.

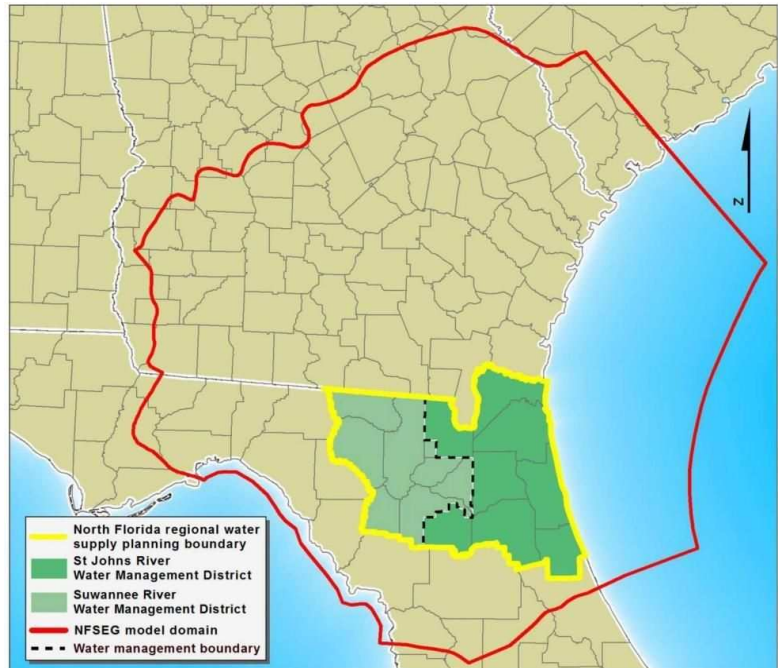


Figure 15: NFSEG Domain

There are two regional forces working on the Floridan aquifer in the NFSEG:

1. Under the Okefenokee/Osceola area. The limited recharge is reduced even further by forestry methods of dewatering the wetlands. Before Jacksonville became a major water user, the big culprits of drawdown under the Okefenokee and Osceola were the paper mills and other large users along the South Georgia coast. The drawdown in the Floridan was mainly South Georgia pulling water from the aquifer; there are many geologic-enforced boundaries that cause this to occur.
2. In the Withlacoochee and Alapaha basins, it is agricultural water use in south Georgia and north Florida that needs to be studied. This is where modeling to determine issuing water use permits needs to be explained in the NFRWSP for the NFSEG. There have been hundreds of large water use permits issued to agricultural users in the last 5 years in north Florida alone. The permitting situation in south Georgia is different, but does not seem to be addressed yet in the NFRWSP.

Involving Georgia

Nick Porter's slides, "July 2015 Update On North Florida Water Resource and Planning Issues,"⁶ provide a useful summary of the process to that date, and conclude with two hanging questions:

- What portion of impacts come from Georgia withdrawals?
- How will Georgia be incorporated into process?

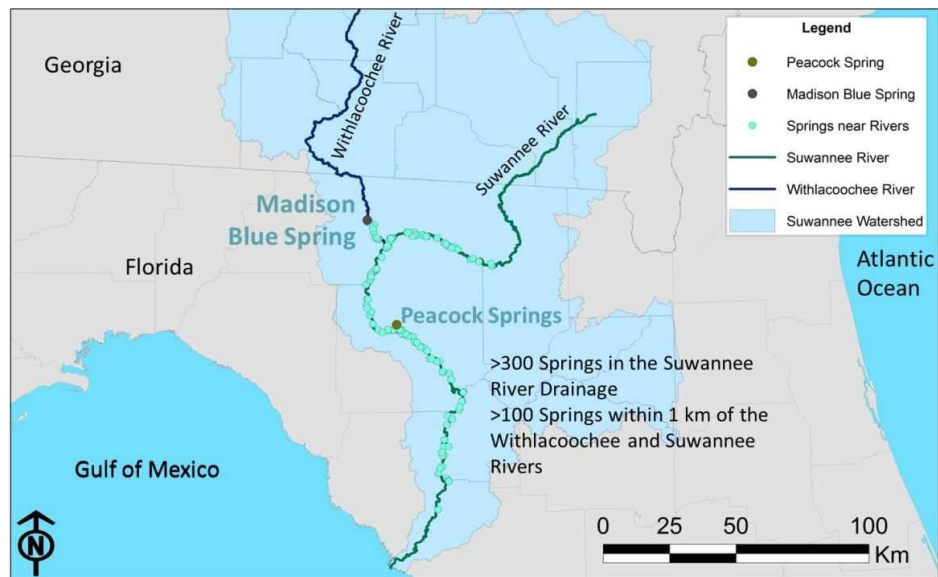
I would add a third Georgia question between those two:

- What effect will Florida withdrawals have on Georgia?

For many years there has been concern in south Georgia about the effect of water use by Gainesville, Orlando, and Jacksonville on the Floridan Aquifer in south Georgia. The development of the NFSEG is a good start towards addressing those issues.

There is no mention in the draft plan of the Georgia Suwannee-Satilla Regional Water Council, which is currently finalizing a similar plan for the Georgia watersheds (Suwannee, Satilla, and St Marys) north of the nominal Partnership area. Nor is there any mention of the other Georgia Regional Water Councils, such as the ones for the Atlantic coast watersheds, which all recently held two joint meetings with Suwannee-Satilla. Better cross-state-line coordination is needed.

Amy Brown's slides on Groundwater-surface water interaction in Florida's karst springs⁷ provide an excellent overview of the subject, especially on the Suwannee River downstream of White Springs and on the Withlacoochee River from Madison Blue Spring downstream on the Withlacoochee River, as in the map on her slide 3 (see right).



⁶ "July 2015 Update On North Florida Water Resource and Planning Issues", Nick Porter, July 2015, <http://floridaenr.com/wp-content/uploads/2015/08/NP-North-Fla-ESS-Pres1.pdf>

⁷ "Groundwater-surface water interaction in Florida's karst springs: Tropical storms and spring floods", Amy Brown et al., apparently 2013, http://www.alachuacounty.us/Depts/epd/WaterResources/GroundwaterAndSprings/SFRSBWG%20Presentations/140725-Groundwater-Surface%20Water%20Interactions_Brown.pdf

Yet there are springs on the Alapaha River, including some in Georgia, and there are springs upstream on the Withlacoochee River, including three second-magnitude springs between Valdosta and the GA-FL line: Wade (Blue) Spring just south of US 84,⁸ and McIntyre and Arnold Springs⁹ closer to the state line. McIntyre Spring has been explored by cave divers for 4,610 feet underground.¹⁰ There appears to be no mention of any of those three second magnitude Withlacoochee River springs in the NFRWSP. Nor for that matter, any mention of springs not directly on rivers, such as Adams Spring in Hamilton County.¹¹ The NFRWSP will affect all these other springs, and they should be taken into account.

Minimum Flow Levels (MFLs)

The one area indicated in the draft plan for new MFLs in 2017 is in WWALS territory. See Appendix H, Technical Memorandum, page 1 of 2:

“Results

"The Alapaha, and the Upper Suwannee Rivers and Stevenson Springs, did not show predicted flow reductions greater than 10 percent at 2035 conditions within the NFRWSP area or at 2035 conditions within the entire NFSEG domain. Alapaha Rise did not show predicted flow reduction greater than 10 percent at 2035 conditions within the NFRWSP area, however, flow reductions exceeded 10 percent under 2035 conditions within the entire NFSEG domain. Holton Creek Rise, Unnamed spring (SUW1017972), Suwannee Spring, and White Spring predicted flow reductions exceeded 10 percent under both 2035 pumping scenarios. Per the SRWMD priority list, MFLs will be set on the Upper Suwannee River and associated priority springs in 2017."

WWALS plans to be involved in setting those MFLs.

Regular River Water Quality Monitoring

The NFRWSP does not seem to mention the recent massive consolidation of agricultural lands into the hands of a few owners, on both sides of the state line. SRWMD has told WWALS they are talking to the landowners about possible agricultural runoff issues. This topic of water quality as well as quantity should be addressed in the plan.

In addition to the water quality monitoring using wells mentioned on pages 1, 3, and 7, there needs to be regular, frequent river water quality monitoring on the Withlacoochee, Alapaha, and Suwannee Rivers in both Florida and Georgia. Such monitoring will help distinguish sources of contamination, such as the chronic Valdosta wastewater overflows now mostly solved,¹² excretions of wild, farmed, or domestic

⁸ "Blue Spring and McIntyre Spring, Withlacoochee River, Brooks County, GA, 1903-11," John S. Quarterman, WWALS Watershed Coalition, April 2, 2016, <http://www.wwals.net/?p=19299>

⁹ "Arnold Springs," Points, Withlacoochee and Little River Water Trail, WWALS Watershed Coalition, 2016, <http://www.wwals.net/maps/withlacoochee-river-water-trail/wrwt-map/wrwt-points/#Arnold-Springs>

¹⁰ "McIntyre Spring", Guy Bryant, A Cave Diving History of Little Known Springs, April 19, 2016, <https://guybryantcavedivingblog.wordpress.com/2016/04/19/mcintyre-spring/>

¹¹ "Bill Gates land purchases, Florida Springs Council, and Adams Spring," by John S. Quarterman, WWALS Watershed Coalition, August 14, 2015, <http://www.wwals.net/?p=10285>

¹² Valdosta Wastewater, WWALS Watershed Coalition, <http://www.wwals.net/issues/vww/>

animals or humans, or agricultural fertilizer or pesticides. Such contaminants of river water affect surface water and aquifer water, and should be used in the modeling and calibration.

The NFRWSP should advocate for adequate funding for and its agency participants should implement such regular, frequent river water quality monitoring.

Thank You

Thanks to all involved for putting together the North Florida Water Supply Plan. WWALS looks forward to being involved ongoing.

Sincerely,

[/s]

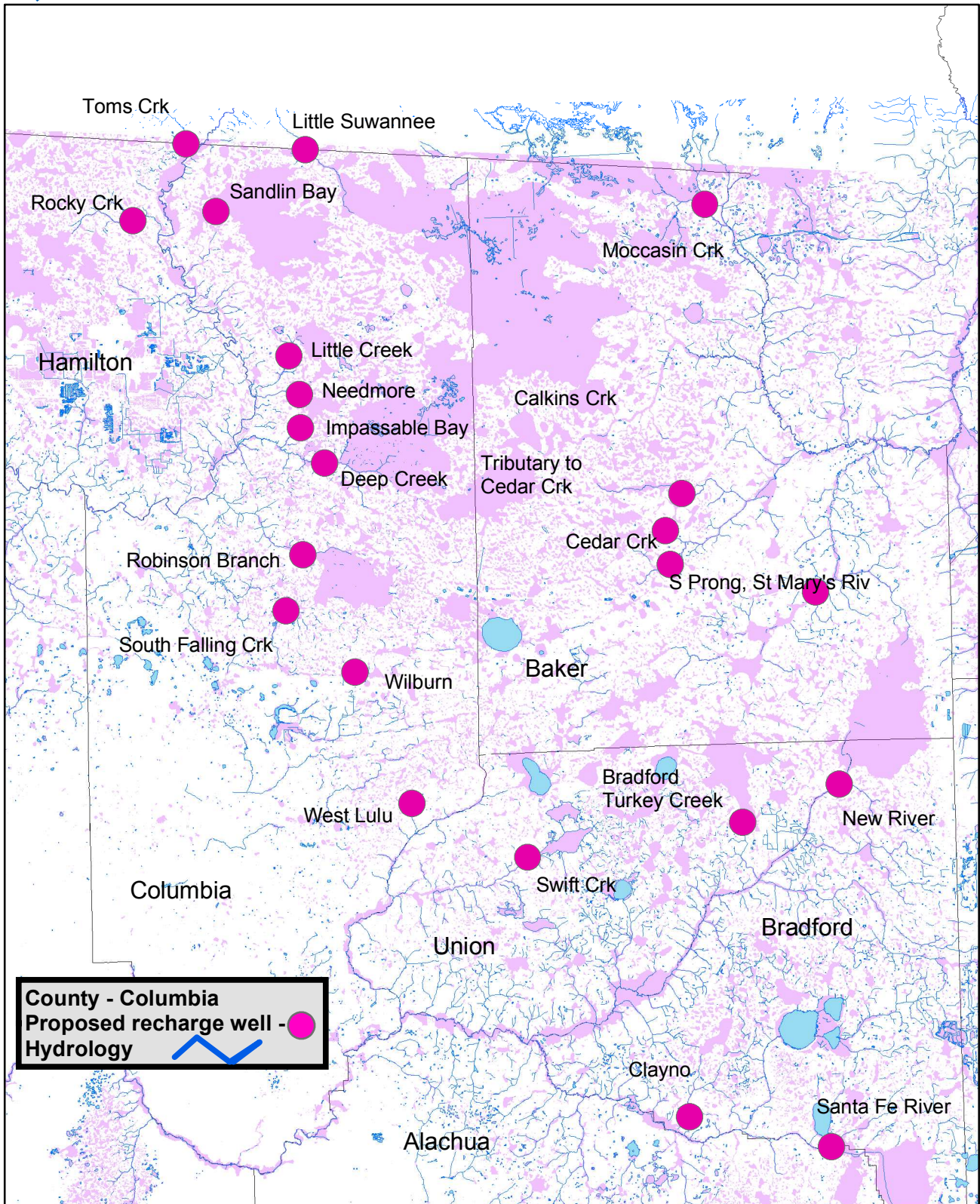
John S. Quarterman, President

Attachment: Flatwoods aquifer recharge proposal by Dennis J. Price P.G.¹³

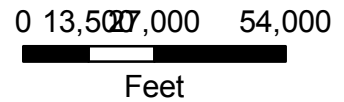
WWALS Watershed Coalition advocates for conservation and stewardship of the Withlacoochee, Willacoochee, Alapaha, Little, and Upper Suwannee River watersheds in south Georgia and north Florida through education, awareness, environmental monitoring, and citizen activities



¹³ "Proposal for the recharge of the upper Floridan Aquifer in the north Florida flatwoods environment, Hamilton, Columbia, Union, Baker and Alachua Counties," Dennis J. Price P.G., SE Environmental Geology, to North Florida Regional Water Supply Partnership, 14 November 2016.



UPPER FLORIDAN
 RECHARGE PROJECT



Flatwoods recharge wells with names of basins or creeks,
 located upstream of stream entrenchment, at discharge
 from larger basin, upstream of, but on, roads

1:473,689

SE ENVIRONMENTAL GEOLOGY
DENNIS J. PRICE, P.G.
P.O. BOX 45
WHITE SPRINGS, FL 32096
cell 362-8189, den1@windstream.net

November 14, 2016

North Florida Regional Water Supply Partnership

RE: PROPOSAL FOR THE RECHARGE OF THE UPPER FLORIAN AQUIFER IN THE NORTH FLORIDA FLATWOODS ENVIRONMENT, HAMILTON, COLUMBIA, UNION, BAKER AND ALACHUA COUNTIES.

My proposal is directed towards those areas in the SRWMD and the SJRWMD that are underlain by the Hawthorn formation resulting in extensive areas containing a surficial aquifer and the intermediate aquifers that exist in the Hawthorn. Recharge to the Floridan is retarded by the presence of the clay layers in the Hawthorn. Very large wetland systems are common in these areas.

Water balance studies were produced twice that I am aware of in the SRWMD, one by Dave Fisk of the SRWMD and one for the Environmental Impact Statement regarding Phosphate Mining in Columbia County in the Osceola National Forest, in the 1970's. Both studies resulted in an estimated recharge to the Florida of about 4" per year \pm . All water balance studies were done after the majority of the wetland drainage systems were constructed and therefore do not take into account the natural recharge that occurred prior to ditching.

Starting in the late 1800's and continuing through the 1950's-1970's when planted pine plantations started, much of our large wetlands systems have been drained purposefully in order to harvest the cypress out of the wetlands and to dry up marginal wetlands around these wetlands to create more acres of pine plantations.

I have been working in the North Florida Flatwoods as a geologist for the last 42 years, starting as an exploration geologist, mapping the ore body in Columbia and Hamilton counties, for what is now PCS phosphate in Hamilton County. I have walked hundreds of miles through the Flatwoods, including my time with the FDEP and the SRWMD. I have spent the last 20 years working for myself as a licensed well driller and wetlands/geologist consultant. Most recently I spent 4 years permitting a wetlands mitigation bank, Bayfield Mitigation Bank, a few miles south of Sandlin Bay in Columbia County. I rarely go into wetlands that have not been ditched.

Through all this time I have discovered that all the road side ditches, pine plantation planting beds, wetland ditching and interior ditching has drained the wetlands of most of the water from significant rainfall events, especially during the winter months when most recharge to the aquifer happens.

Plugging ditches on the Bayfield Mitigation Bank site flooded the adjacent pine plantations and ruined the interior roads so it is difficult to travel on them. Plugging ditches to rehydrate swamps to increase recharge would never be allowed by landowners because it makes the land to wet. Plugging ditches may be a good tool on public lands. Pre and post hydrographs from piezometers installed in wetlands and the surficial aquifer on the Bayfield Mitigation Bank site clearly demonstrate the significant increase in water retention and length of time water remains in the wetlands in between rain events.

Consequently this proposal for recharging the Floridan was created. The assumption is that the drainage referenced above does occur. The area proposed for this project is located over the Floridan where significant lowering of groundwater levels have occurred over a very large area. The most efficient way to recharge large areas is by constructing drainage wells. In the attached map, the major wetland systems have a drainage-well constructed in a location that is accessible and, is located, where the wetland system begins to narrow down.

Top of casing elevations can be set at an elevation where they capture water during high flow conditions that occur after large rainfall events and during the winter months, both times of higher recharge to the Floridan.

The wells are intended to capture a portion of the flow from the system. The entire plan could be constructed for less money than the plan calling for pumping water from the Suwannee River over to Falling Creek in Columbia County and the recharge would benefit more areas than the Falling Creek site and still include the Ichetucknee Springs basin.

It is a passive system depending on gravity, maintenance costs are minimal and changing the desired invert elevation is as simple as cutting and welding or a spillway.

All the wetlands depicted on the plans are important and they should be purchased with Amendment 1 money, directed towards buying environmental sensitive lands. For those opposed to recharging swamp water into the aquifer, this water still recharges naturally all along the Suwannee through springs, vents and siphons and into the numerous stream to sink areas in the District.

Out of professional respect, if people have misgivings about the plan, please allow me to discuss my thoughts with them. This is not a comprehensive scientific study, it is just a proposal based on experience.

Sincerely,

Dennis J. Price, P.G.
SE Environmental Geology