

The Revised US Geological Survey Floridan Aquifer System (FAS) Framework Study (Williams & Kuniansky, 2015): Potential Issues for Florida's Water Regulators

Introduction

On April 21, 2015 the United States Geological Survey (USGS) released a report entitled: Revised hydrogeologic framework of the Floridan aquifer system (FAS) in Florida and parts of Georgia, Alabama and South Carolina. The report was authored by USGS geologists Lester Williams and Eve Kuniansky. This report is an update to the 1986 USGS Professional Paper 1403-B, authored by USGS geologist Jim Miller, which defined the hydrogeologic framework of the FAS. Miller's report has served as the foundation upon which water managers and hydrogeologists in Florida built the current regulatory and management schemes. It also allowed geologists and hydrologists to communicate with one another using a standardized nomenclature. As more geologic and hydrogeologic data have accumulated since Miller's 1986 report, it became necessary to revise the FAS framework. However, this 2015 revision has the potential to cause some issues within various state regulatory agencies that have relied upon the old framework. The authors of the revised report have abandoned many of the hydrostratigraphic units erected by Miller and created a number of new hydrostratigraphic units without using an accepted and standardized methodology. Below is a list outlining some potential problems, from the perspective of hydrogeologists within Florida's water management districts and other affected agencies, this new revised framework report could cause.

- The Williams report does include a paragraph outlining the intended use of the revised framework:

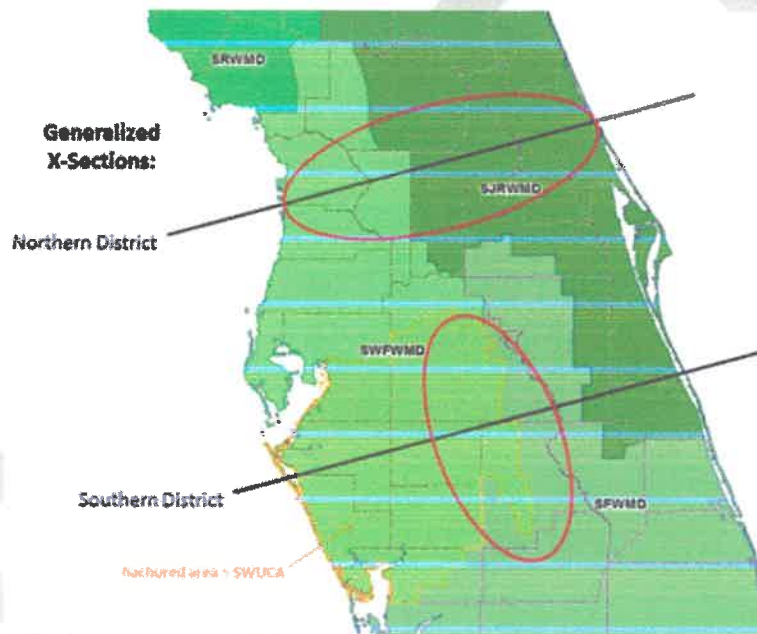
"This report describes a revised hydrogeologic framework of the Floridan aquifer system for Florida, and parts of Georgia, Alabama, and South Carolina. The revised framework is considered regional in scope and its intended use is for investigations covering over 10,000 mi². Caution should be exercised in using the revised regional framework for site-scale investigations related to regulatory water-management and water-quality issues. For site-scale investigations, local water-resource, geologic, and other data and associated information should be obtained to supplement the information contained in this report."

Potential Issues for WMD's: It should be noted that both NFWMD and SFWMD did not anticipate many, if any, issues related to the revised FAS framework report.

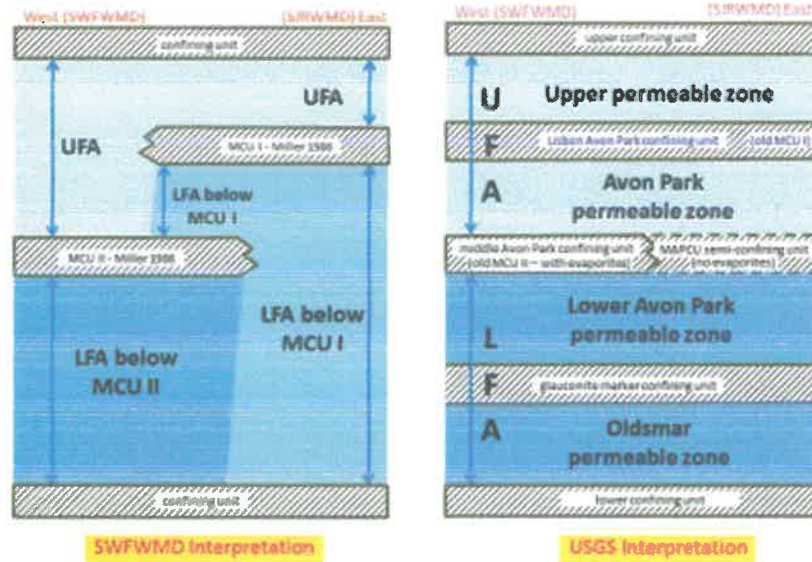
- There are significant differences in interpretation regarding the hydrogeology of the Upper and Lower Floridan aquifers.
- It would be an opportunity to exploit "perceived" inaccuracies of the District models and potentially affect our (WMD) evaluation of water supply availability in the Northern District and CFWI areas.
- Design criteria for well construction permitting in certain areas of the District may require significant modification.

- Will require re-assessment of groundwater data collection sites to determine if some monitors require re-assignment based on new unit definitions.
- The idea presented by the USGS that this framework is a high-level report that can differ from local WMD interpretations potentially adds a new layer of confusion to information sharing. Having multiple regional interpretations does not address the need for universal understanding and would seem to work against consistent data collection efforts.

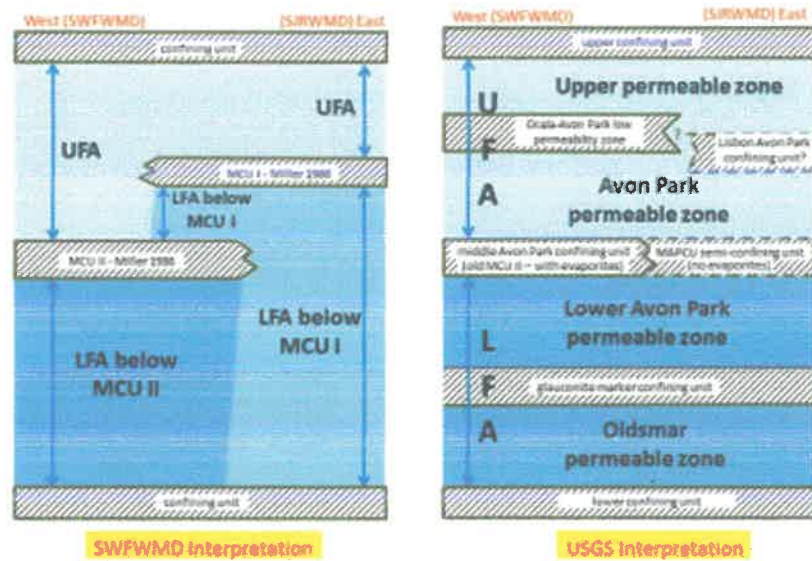
Figures below illustrate how the new FAS framework is different from currently used framework in central Florida:



Northern District



Southern District



- Existing middle confining units I-VII of the Floridan aquifer system by Miller (1986) have been abandoned, remapped, or re-assigned, to a newly introduced ambiguous 'composite unit' that does not conform to established USGS and other aquifer nomenclature guidelines. From the abstract: *"Although the term "confining unit" is not totally abandoned within the revised framework, a new term "composite unit" is introduced for lithostratigraphic units that cannot be defined as either a confining or aquifer unit over their entire extent."*

- If it can't be defined as an aquifer or confining unit, it is fundamentally not a hydrostratigraphic unit
 - Lithostratigraphic units should not be defined by hydrostratigraphic units; boundaries of each are independent of the other
 - You can't make up your own new units without due diligence to published literature and existing hierarchy
 - Lumping all MCUs with different origins, lithologies, elevations, and hydraulic characteristics (as Miller delineated and our data supports) into a single composite unit seems to be a de-evolution of our understanding of the true system
 - There was nothing wrong (or incorrect) with Miller's delineation of the discontinuous sub-regional MCUs. This represents reality we see in data, and is not difficult for people to conceptualize
 - This new framework seems to blur the true structure of the MCUs, and then over-complicate the aquifers with ambiguous 'zonation' terminology. It also needlessly and redundantly identifies permeable zones of aquifers.
- Quoted from the abstract in the revised FAS framework report:

"The composite units were delineated through the use of borehole geophysical logs and lithologic logs rather than relying on hydraulic testing or lithologic description alone. A composite unit is defined herein as a narrow lithostratigraphic interval within the middle part of the Floridan aquifer system that is composed of lower permeability units over much of its extent, but can be confining, semiconfining, or have permeability within the same order of magnitude as the Upper or Lower Floridan aquifers".

 - So basically this new unit can be a confining unit, a semi-confining, or even an aquifer?
 - Confining unit boundaries appear to extend past actual confinement so they follow rock-strata that can be mapped easier with geophysical markers and without abrupt structural changes? (which actually do exist).
 - Although this report significantly revises established USGS (and others) hydrostratigraphic unit definitions and ignores fundamental principles of NASC, none of the existing literature are cited (North American Stratigraphic Code, ASTM D 6106-97 Standard Guide for Establishing Nomenclature of Groundwater Aquifers, USGS Aquifer Nomenclature Guidelines OFR 86-534, or Suggestions to Authors of USGS-Guidelines for Naming aquifers).
 - Unfortunately, it does cite several older ROMP reports and FGS Bulletin 68 (SWFWMD) in defense of terms they use (like Suwannee PZ) that we repeatedly communicated to them we have acknowledged as incorrect and have adopted new terminology District-wide since 2008 that adheres to nomenclature guidelines. I have yet to find any mention of this point.

· Report defends their zonation approach by citing ROMP's (correct) use of OCAP_{lpz} and APh_{lpz} units. Not the same.

- This report violates hydrostratigraphic fundamentals by delineating major confining units that divide aquifers into upper and lower zones of the same aquifer, for instance, the UFA (Lisbon-Avon Park confining unit) and in the LFA (Glauconite confining unit). This cannot be. Confining units 'confine', meaning they cause different heads in the permeable rocks above and below them = different aquifers. You can't pass through a confining unit (like MCU_I) and still be in the UFA.

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