



Understanding and Addressing Salt Water Intrusion in Big Cypress Basin

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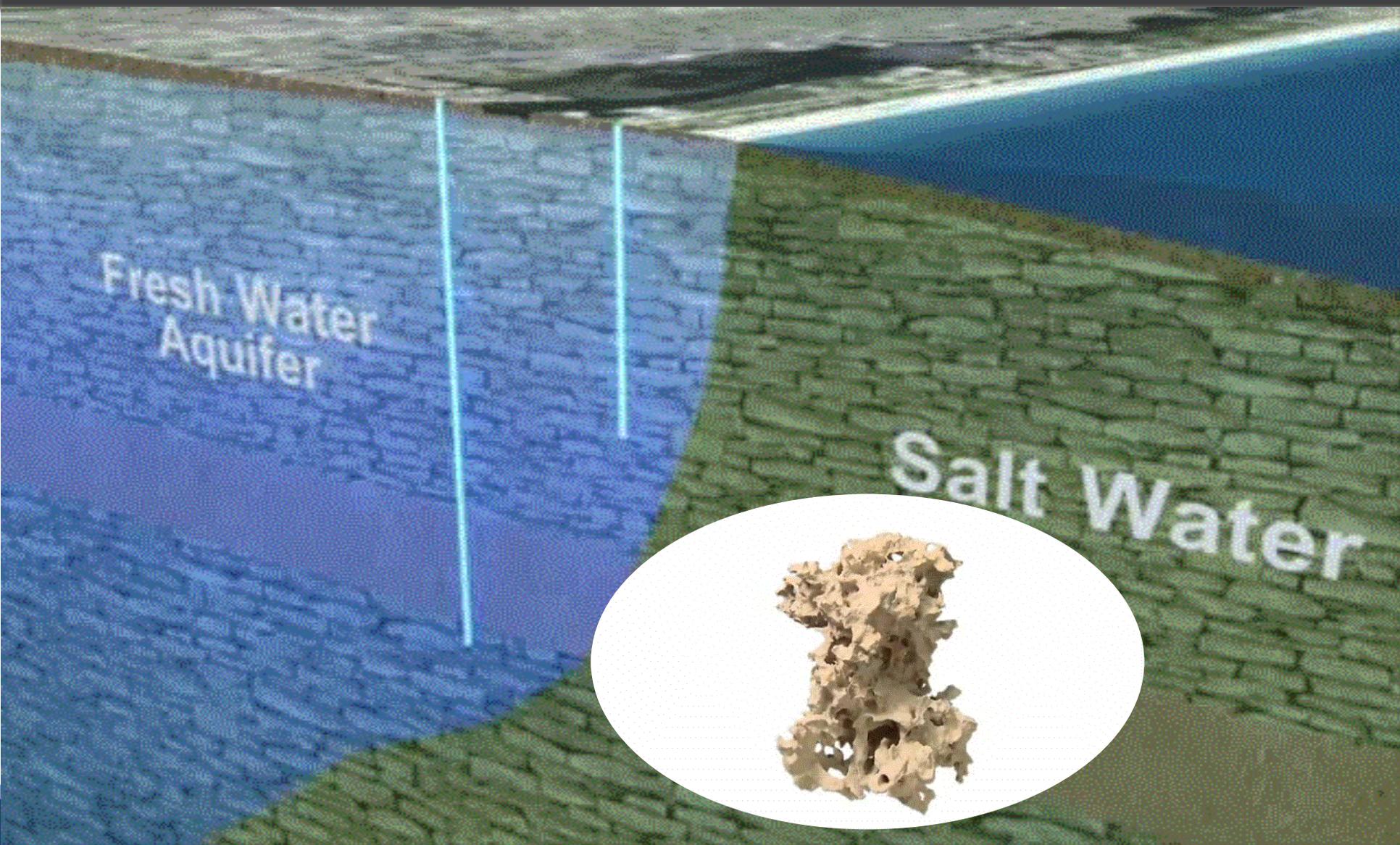
Big Cypress Basin Board Meeting

February 18, 2014

Salt Water Intrusion

- The risk of encroachment of saline water into fresh water aquifers used to provide public water supply and agriculture is an issue of concern in all of coastal Florida including here in the Big Cypress Basin
- The risk could be a result of such factors as pumping from the aquifers, canals that bring salt water inland, excessive drainage, or rising sea level

Rising Seas - Water Supply Impacts from Saltwater Intrusion



Salt Water Intrusion

- The risk unaddressed could limit the use of current sources of drinking water and result in high costs to modify and introduce new treatment technologies or corrective strategies
- It is important to understand the risk and develop and implement a strategy to minimize it

Approach

A three part strategy is being implemented

- Map the current location of the salt water interface using best available data
- Understand and identify the limitations of the existing monitoring network and resulting data
- Develop an approach for projecting forward and assessing strategies to mitigate or prevent the encroachment of salt water into aquifers used for water supply

Saltwater Intrusion Monitoring Network Evaluation

An assessment of the salinity monitoring network along the Southwest Coast was completed by the USGS in 2013.

“Saltwater Intrusion in the Surficial Aquifer System of the Big Cypress Basin, Southwest Florida, and a Proposed Plan for Improved Salinity Monitoring”

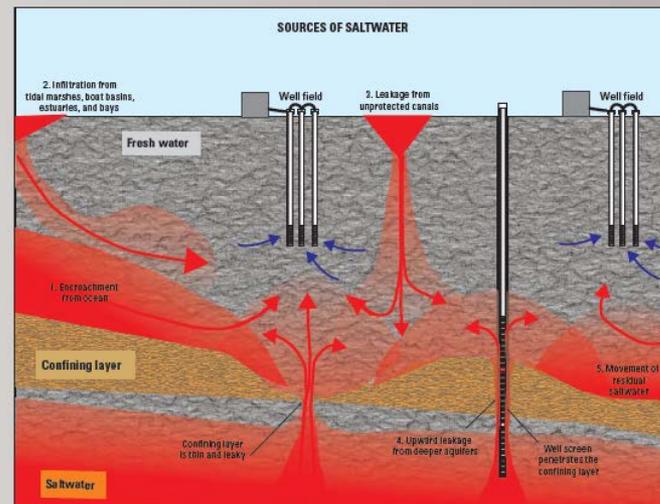
Scott T. Prinos

USGS Open-File Report 2013-1088



Prepared in cooperation with the South Florida Water Management District

Saltwater Intrusion in the Surficial Aquifer System of the Big Cypress Basin, Southwest Florida, and a Proposed Plan for Improved Salinity Monitoring



Open-File Report 2013-1088

U.S. Department of the Interior
U.S. Geological Survey

Modeling Saltwater Intrusion

- A variable density groundwater flow and solute transport model using the USGS SEAWAT Model for the surficial aquifer system in the western (coastal areas) of Collier County was completed in 2010
- Work was funded by BCB and completed by Schlumberger Water Services
- The effort provided some preliminary assessment of different scenarios and identified the need for improved salinity data

Salt Water Intrusion and Network Evaluation Study

- Collaborative effort with the United States Geological Survey (USGS) to evaluate and make recommendations on existing monitoring network (2011 - 2013)
- BCB Expenditure \$49K FY11 and \$35K FY12
- USGS in-kind contribution \$66.5K
- USGS provided technical expertise including principal investigator and technical review for published report

Summary of Existing Network

- Data is being collected from approximately 1,600 sites
- The majority of the network consists of water supply wells or wells within 100 feet
- Many of the wells have long open intervals
- Some wells are damaged or obstructed
- The network is dense in some areas and sparse in others

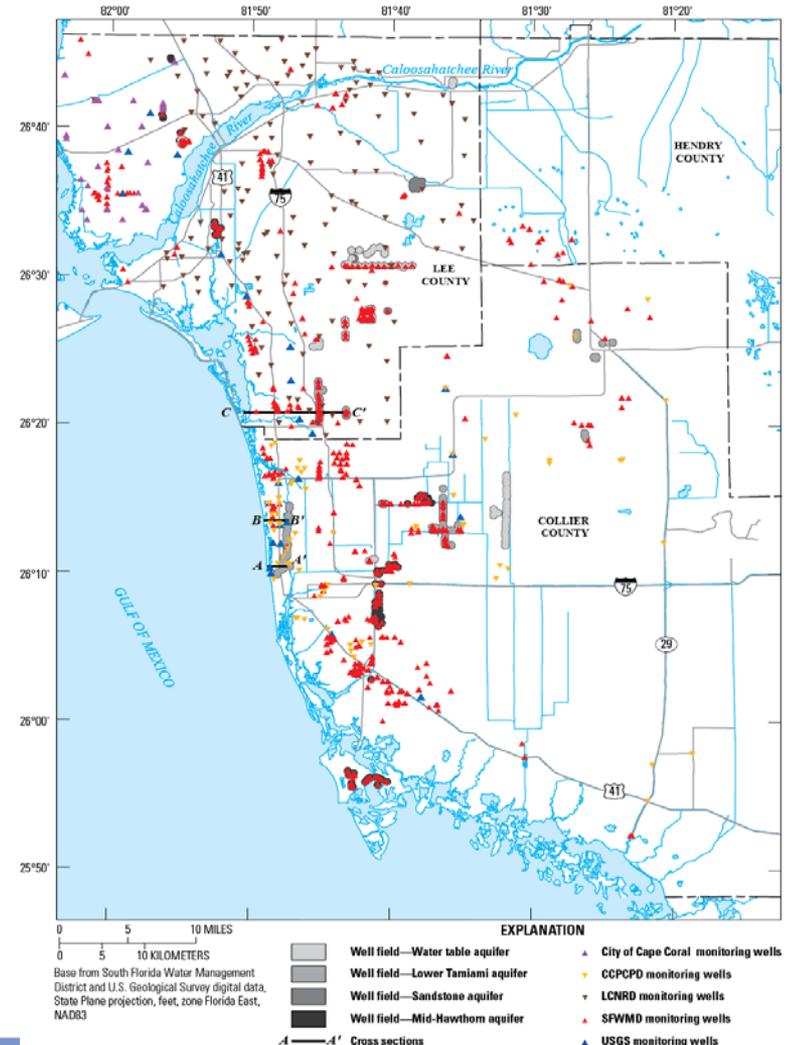


Figure 7. Map showing the Joint Saltwater Intrusion Monitoring (JSWIM) Network in southwest Florida.

Summary of Existing Network

- Many wells were not designed for water quality sampling
- Some wells may be assigned to the incorrect aquifer, depending on which hydrostratigraphic framework is used
- It is difficult to differentiate between sources of saltwater, given the information being collected
- The network does not precisely locate the leading edge of encroaching seawater in the Tamiami Aquifer
- Data cannot be fully relied upon because of imprecisions that may result from sampling techniques, well design, and well condition

Suggested Network Improvements

- Develop standard operating procedures (SOPs) designed for salinity sampling in existing network wells
- Develop a network quality-assurance plan
- Evaluate and address known well condition or missing information issues
- Establish training
- Drill test wells or collect surface geophysical measurements to determine the optimum locations for new monitoring wells
- Collect geochemical samples to evaluate sources of saltwater

Suggested Network Improvements

- Install new wells to provide improved monitoring and delineation of saltwater intrusion
- Collect detailed hydrostratigraphic and geophysical data during well installation
- Collect time series electromagnetic induction log (TSEMIL) datasets from new wells
- Improve data dissemination
- Determine a schedule for periodic reevaluations of the network to track improvements and evaluate where changes are needed

Summary

- The salinity monitoring study identified gaps and limitations in the existing monitoring network, identified possible improvements, and suggested a prioritization for the improvements as part of a proposed plan to improve saltwater intrusion monitoring in Southwest Florida
- The report is published as USGS Open-File Report 2013-1088
- Available at <http://pubs.usgs.gov/of/2013/1088/>

Next Steps

- SFWMD has initiated the formation of a project on Sea Level Rise and Climate Resilience to coordinate district-wide efforts on Sea Level Rise, Saltwater Intrusion and Climate Science
- Coordinate efforts with other Water Management Districts and the Department of Environmental Protection
- Collaborate with local governments on saltwater intrusion modeling
- Establish baseline saltwater intrusion maps and update on regular intervals
- Explore funding opportunities to investigate saltwater intrusion in coastal areas such as BCB



Questions and Discussion