

INTRODUCTION

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This document contains pertinent information for discussion during the May 10, 2017, Salinity Monitoring Workgroup meeting.

BACKGROUND INFORMATION

During the November 2016 meeting, Dr. Lucia Baldwin of the SFWMD gave a presentation to the SNW. She noted inconsistencies in the use of the Groundwater Level Percentile Ranking Index (GWL PRI) among the participating agencies. She broke down the inconsistencies into four categories: (1) equation used to produce the PRI, (2) value of (x) used for the ranking, (3), data set against which the value of (x) is ranked, and (4) the period of record used for the index. Based on her presentation, it was noted that clarifications in the final report of the SNW Pilot study ("Groundwater Level Conditions for the Upper Floridan Aquifer based on Percentile Ranks Pilot Study for May 2010") were needed. The Pilot Study report was sent to you in a PDF document (SNWGWLPRIPilotFinal).

To assist in addressing the inconsistencies, I produced draft table for inclusion into a modification of the Pilot Study report mentioned above. The table (DRAFT Table A) was sent to the organizations that produce GWL PRIs for the SNW. I asked them to review and correct the table as necessary. After receiving comments, I discussed the production of the GWL PRI with many individuals. As it turns out, since November, some of the participating agencies have agreed to modify their method of producing the GWL PRI for the SNW. Based on the conversations, I produced a second table (DRAFT Table A2). It is displayed below. For agencies producing the GWL PRI, if you find errors in the table, let me know. I will make necessary changes.

DRAFT Table 2A includes the proposed modifications for producing the GWL PRI. We will discuss the table during the May 10 meeting. Then, at a future date, the final revised version of the table will be inserted into a revision of the pilot study. For those agencies producing the PRI, please review the row of the table that pertains to your agency.

Because the revisions pertain to what we plan to do in the future, and not what we did in the past, the Pilot Study report will need to be revised. In addition, for agencies producing the PRI, because the methodology that your organization now uses may be different from the past, I may ask your agency to re-submit its percentile ranking for the pilot study and for the maps produced during 2015. I will elaborate on these modifications during the May 10 SNW meeting.

Note that in addition to the table, modifications to the reports appendices are needed. Regarding these latter modifications, we can discuss them during the meeting.

Besides GWL PRI related questions, questions regarding: (1) the Coastal Salinity Monitoring Network, and (2) Sampling protocols for monitoring the freshwater/saltwater interface are presented.

DRAFT Table 2A. Important Information for Generating GWL PRIs for the Upper Floridan Aquifer

Agency	PRI Equation: PRI =	For each well, Value (x) to be ranked¹	Data Set Against which value (x) is ranked¹	Beginning of Period of Record (POR)¹
NWFWMD²	PERCENRANK.INC ³ (Excel 2010)	Registered (x) is value nearest 15 th of representative month ²	All similar Q or M values registered for entire POR ²	Variable ² , must include 1986
SRWMD⁴	$[(\# \text{ OBS} < X) / (n)] \cdot 100^5$	Registered (x) is daily mean on 27 th of representative month ⁴	All monthly median values registered for entire POR ⁴	Variable, Generally 1976 ⁴
SJRWMD⁶	$[(\# \text{ OBS} < X) / (n-1)] \cdot 100$	Registered (x) is monthly median value of representative month ⁶	All similar values registered for entire POR ⁶	1998
SWFWMD⁷	$[(\# \text{ OBS} < X) / (n-1)] \cdot 100$	For most wells, registered (x) is median daily maximum value of representative month ⁷	All similar values registered for the entire POR ⁷	1989
SFWMD⁸	PERCENRANK.INC ⁸ (Excel 2010)	Registered (x) is maximum daily value of representative month ⁸	All similar values registered for entire POR ⁸	2004
Alachua⁹	$[(\# \text{ OBS} < X) / (n-1)] \cdot 100$	Registered (x) is monthly median of representative month ⁹	All similar values registered for entire POR ⁹	1990
DEP¹⁰	$[(\# \text{ OBS} < X) / (n-1)] \cdot 100$	Registered (x) is monthly median of representative month ¹⁰	All similar Q or M values registered for entire POR ¹⁰	1991

¹For most or a significant number of wells within agency borders.

²Refer to Appendix B1. Northwest Florida Water Management District.

³Statistical formula function in Microsoft™ Excel: PRI = $[(\# \text{ OBS} < X) / (n-1)] \cdot 100$.

⁴Most wells gave continuous recorders (CRs). Refer to Appendix B2. Suwannee River Water Management District.

⁵Correct equation, but process is more complex than formula. Refer to Appendix B2.

⁶All wells have CRs. Refer to Appendix B3. St. Johns River Water Management District.

⁷Most wells have CRs. Refer to Appendix B4. Southwest Florida Water Management District.

⁸Refer to Appendix B5. South Florida Water Management District.

⁹Refer to Appendix B6. Alachua County Environmental Protection Department.

¹⁰Refer to Appendix B7. Florida Department of Environmental Protection.

QUESTIONS FOR MAY 10, 2017 SALINITY MONITORING WORKGROUP MEETING

GWL PRI

- (1) Are there any additional changes needed to DRAFT Table A2?
- (2) Are there any changes needed in your agency's respective appendix in "Groundwater Level Conditions for the Upper Floridan Aquifer based on Percentile Ranks Pilot Study for May 2010"? If so, would you be willing to modify the appendix corresponding to your agency's efforts?
- (3) For those agencies that have made modification for producing the GWL PRI for the Salinity Network Workgroup, if necessary, would your agency agree to recalculate your organization's previous Index calculations (i.e. May 2010, May 2015, and September 2015) with the revised methodology?

COASTAL SALINITY MONITORING NETWORK

- (1) Is it time to add surface water sites to the Coastal Salinity Monitoring Network (CSMN)? If so, what types of sites should be considered?

SAMPLING PROTOCOLS FOR MONITORING WELLS THAT ARE COMPLETED CLOSE TO THE FRESHWATER / SALTWATER INTERFACE

Wells are often used to monitor potential saltwater intrusion and/or the corresponding movement of the freshwater/saltwater (FW/SW) interface. We do not want the interface position to be altered during the process of sampling groundwater from the well. Recall that current statewide, groundwater quality sampling protocols have three methods that can be used:

- a. If well screen (or open hole) ≤ 10 feet and portable pump is placed in screened / open interval.
- b. If well screen (or open hole) > 10 feet and portable pump is placed within top foot of water column.
- c. If well has in-place plumbing.

Some SNW members have voiced concern that using method b.) for a well with screen (or open hole) > 10 ft may not be suitable for collecting groundwater quality data in wells which are completed "close" to the freshwater / saltwater interface. One solution to this potential problem is to develop a special sampling protocol.

If the SNW is to develop a special sampling protocols, they will only apply if a well has >10 ft of screen (or open hole) and no in-place plumbing for wells completed "close" to the interface. That is: a well with its screen or open hole located "close" to the interface. The reason for the concern is the possibility of drawing saline water into the well during sampling. Note the term "close" is subjective.

(1) Does your agency monitors groundwater quality wells completed “close” to the FW/SW interface?

(1b) If your agency monitors potential changes in the freshwater/saltwater interface, do the wells include those which have greater than 10 ft screen (or open hole)?

(1c) If the answer to 1b is yes, does it monitor wells with > 10 ft screen (or open hole) that are completed “close” to the FW/SW interface, what procedures do you follow? (Provide link to online version of SOPs or cite specific SOPs and / or authors).

(2) Does your agency support the development of a special DEP-approved Standard Operating Procedure (SOP) for monitoring the freshwater/saltwater interface in wells with >10 ft of screen (or open hole) and no in-place plumbing?

(3) Please review the proposed SOP (F2200_adddition_SWFWInterface_10212016). What general concerns do you have, if any, for using the proposed SOP.

(4) If the SNW were to proceed further with the development of a special SOP for monitoring wells with >10 ft of screen (or open hole) and no in-place plumbing, does it prefer:

- a. Develop a “White Paper” to be sent to DEP, outlining the background and need for the development and inclusion of a special SOP into the DEP Quality Assurance rule, F.A.C 62-160 (DEP SOPs for field activities are incorporated by reference into this rule).
- b. Develop an alternative to the DEP-approved, groundwater sampling SOPs for use by SNW participants for sampling wells completed “close” to the freshwater / saltwater interface. Note if this method is preferred, SNW members will be required to follow DEP procedures for alternative and modified field procedure approval.

Both “a” and “b” will be discussed in detail during the May 10 SNW meeting. Note that both options require presenting data demonstrating that the proposed SOP exceeds the performance of the current DEP SOPs.