Salinity Network Workgroup (SNW) Special Meeting/Webinar

June 15, 2017

Chair: Rick Copeland (FDEP)

SNW Agenda

- Roll Call (RC)
- GWL PRI – Status and Modifications (RC)
- Discussion (Group)
- Adjournment

RC - Rick Copeland: DEP

Objectives of SNW to be Discussed Today

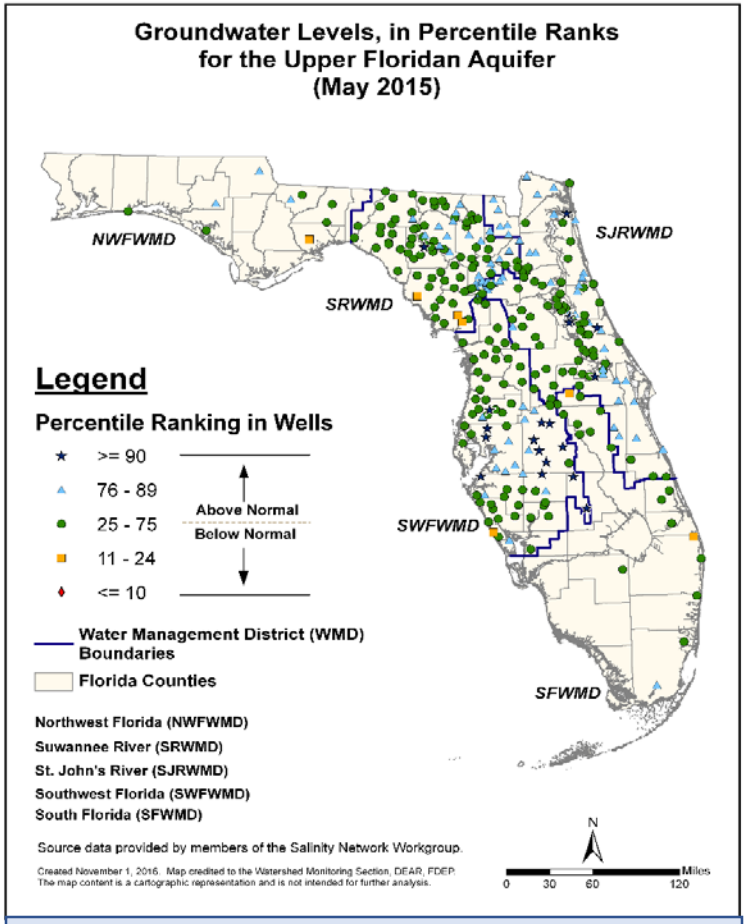
- **Periodic Production of a Groundwater Level(GWL) Percentile Ranking Index (PRI) for the Upper Floridan Aquifer (UFA)**

GWL Percentile Ranking Index

- Periodically create **composite** statewide PRI maps, along with explanatory text

- Commence (2015) production twice/year
  - May (LOW GWLs) and September (HIGH GWLs)

Current Inconsistencies with PRI Map



SR- SRWMD
SJ- SJRWMD
SW- SWFWMD

- PRI map is composite
  - Inconsistent
    - Well Densities per WMD
    - Methodologies

- For PRI map
  - Over time, possibly decrease density of wells in SR, SJ, & SW?
  - **Can we can adopt a "Standardized" method?**

Next Several Slides Modified From

Comments Regarding the Ground Water Level (GWL) Percentile Ranking Index

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FWRMC Salinity Network Workshop
November 9, 2016

Percentile Rank **Functions** in Excel

Array
21
22
22
23
23
24
25
28
37
45
48
67

What percentage of the data has values under 23?

(#obs < x = 3; n = 12)

PERCENTRANK (array, 23) = 27%

Excel 2007

PERCENTRANK.INC (array, 23) = 27%

PERCENTRANK.EXC (array, 23) = 31%

Excel 2010, 2013, 2016, ….

.INC function = [(# obs < x) / (n-1)] • 100

Value (x) we want to rank

- X is a GWL value representative for May/Sept of each year
  - Monthly median of max daily values – SFWMD
  - Value registered nearest 15th of the month – NWFWMD
  - Daily mean on the 27th of the month – SRWMD

Option for Choosing the Array / Data Set Against Which Value x Is Ranked

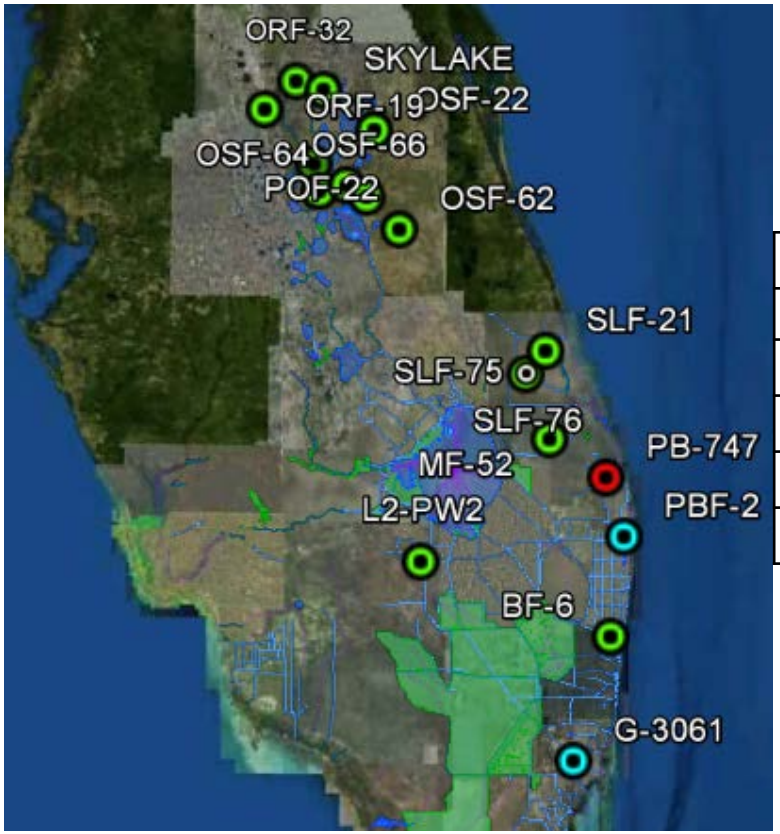
- All similar values registered for entire period of record
- Similar values registered during the same month (or same week), or season, for the POR

Percentile Rank of Median GWL for September 2015

Station	Vrs All GWL	Vrs Sept GWL
BF-6	69.6	38.6
G-3061	93.1	69.4
L2-PW2	75.6	34.4
MF-52	74.9	36.0
ORF-19	98.1	88.4
ORF-32	92.6	83.4
OSF-102	88.8	79.2
OSF-22	84.8	61.8
OSF-62	82.3	59.7

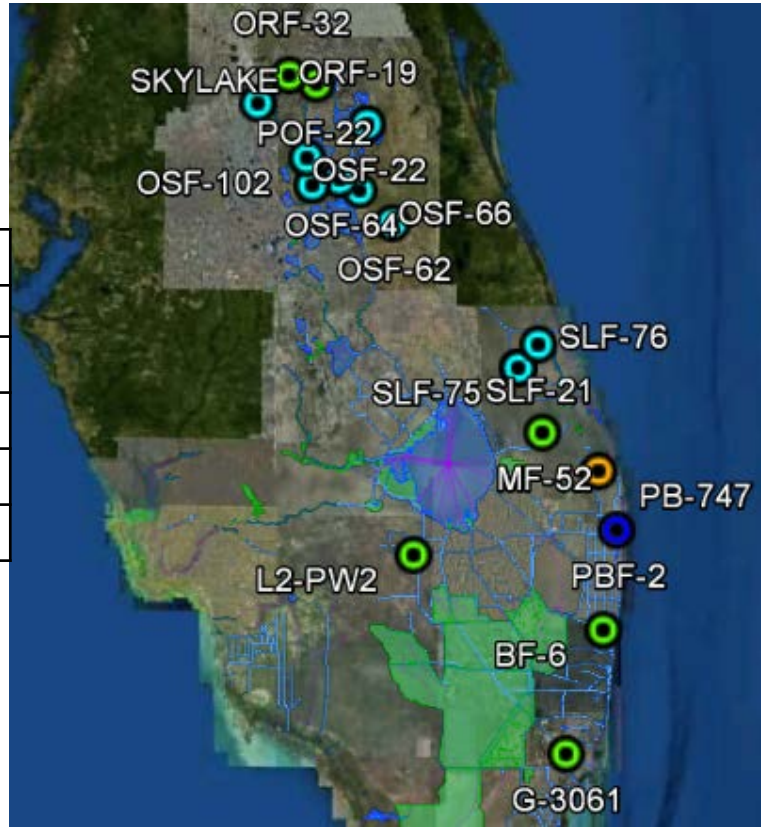
Mapped GWL Percentile Ranks of SFWMD Stations

PRs of May 2016 Median vs. All Daily Values



Legend	
	> = 90 %
	76 - 89 %
	25 - 75 %
	11 - 24 %
	< = 10%

PRs of May 2016 Median vs. May Daily Values



Back to Current Discussion

Differences in Methodologies

1. In equations used by participating agencies,
   - divide either by (n-1) or (n)
   - As n increases, differences variability decreases.

2. The value (x) we want to rank is inconsistent among, but consistent within, agencies.
   - As long as agencies do not change their own definition of (x), the effect of having a non-standardized definition is minimal regarding the statewide GWL PRI map.

3. Period of Record (POR) is inconsistent among agencies
   - As agency PORs increases in length, the probability of catching the max and min values of (x) increases.
   - Nevertheless, <u>expect inconsistent PORs to remain an issue</u>

Differences in Methodologies

4. Data set against which value (x) is ranked

Very Significant Issue

Since Nov 2016, attempts have been made for all participants to use a more "Standardized" array

(a) All similar values registered by week, month, "season" for entire POR

(b) All similar values registered for entire POR

- **Participants have disagreements**
  - At current time, **array issue** not resolved

PRI Equation by Agency

Agency	PRI Equation: PRI =	For each well, Value (x) we want to rank	Data Set against which value (x) is ranked	Beginning of Period of Record
DEP	[(# obs < x) / (n-1)]• 100	x = monthly median of representative month (May or Sept)	All similar Q or M x values for entire POR	1991
NWFWMD	PERCENTRANK.INC (Excel™ 2010 Formula)	x = value nearest 15th of representative month	All similar Q or M values for entire POR	Variable, Earliest 1936
SRWMD	[(# obs < x) / (n)] • 100	x = daily mean on 27th of representative month	All similar monthly median values of x for entire POR	1976
Ala Co	[(# obs < x) / (n-1)] • 100	x = monthly median of representative month	All similar monthly values of x for entire POR	1990
SJRWMD	[(# obs < x) / (n-1)] • 100	x = monthly median of representative month	All similar monthly values of x for entire POR	1998
SWFWMD	[(# obs < x) / (n-1)] • 100	x = median daily maximum value of last week of representative month	All similar values of last week of representative month for entire POR	1989
SFWMD	PERCENTRANK.INC (Excel™ 2016 Formula)	x = maximum daily value of representative month	All similar registered values for entire POR	2004

Differences in Methodologies

- Can SNW adopt a “Standardized” array?
  - Should SNW?
    - Select one method?
      - Compare x to all of POR
      - Compare x to “seasonally” adjusted POR
        - E.G. May to all previous May representative values
    - Use both methods?
    - Cease efforts to produce statewide PRI maps and text?
    - Other ideas?
- Other issues? “Let’s get everything on the table”

Proposal

- Each Entity send data to DEP
  - Need Array/Data set for each well
- DEP calculate GWL PRI using **both** methods
- DEP to include in explanatory text, for review
  - Indicate the two methods produce different results
  - How the two methods are different
  - Reasons for using both methods
  - Some WMDs produce their own version for their internal needs
- Questions About the Proposal?

Should SNW?

1. Select one method?
   a. Compare x to all of POR
   b. Compare x to “seasonally” adjusted POR
      E.G. May to all previous May representative values

2. Use both methods?
   Need to send array data to DEP

3. Cease efforts to produce statewide PRI maps and text?

4. Other Ideas?

- **Next Regular SNW Meeting/Webinar**

Wednesday, November 8, 1:00 - 3:00 PM

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