

Salinity Network Workgroup Webinar/Meeting

May 9, 2018

Rick Copeland (RC) (FL DEP)

Dan Dourte (DD) (Balmoral Group)

Scott Prinos (SP) (USGS)

Agenda

- Roll Call and Introduction (RC and DD)
- Coastal Salinity Monitoring Network – Update (RC)
- Water Level - Salinity Analysis Mapper; USGS Update
Webpage Update (SP)
- GWL Percentile Ranking Index - Update (RC)
Loading GWL data into WIN – Update (DD)
Comparison of Two GWL PRI Methodologies (RC)
- Extent of Salt Water Intrusion Line (RC and SP)
- Revision of GW Sampling Protocols (RC)
- Salinity GW Quality Index – Discussion (RC)
- Additional Topics for Future and General Discussion (All)

- Next SNW Meeting **November 14** from 1:00 – 3:00

Meeting Objectives

- Figure out next steps for getting groundwater data into WIN
- Evaluate the role of this group in developing a dynamic, statewide coastal salinity monitoring product
- Assess the need for the development of Special Sampling Protocols

Roll Call

- Dan Dourte, Ph.D.
 - Balmoral Group

ddourte@balmoralgroup.us

407-629-2185 x 113

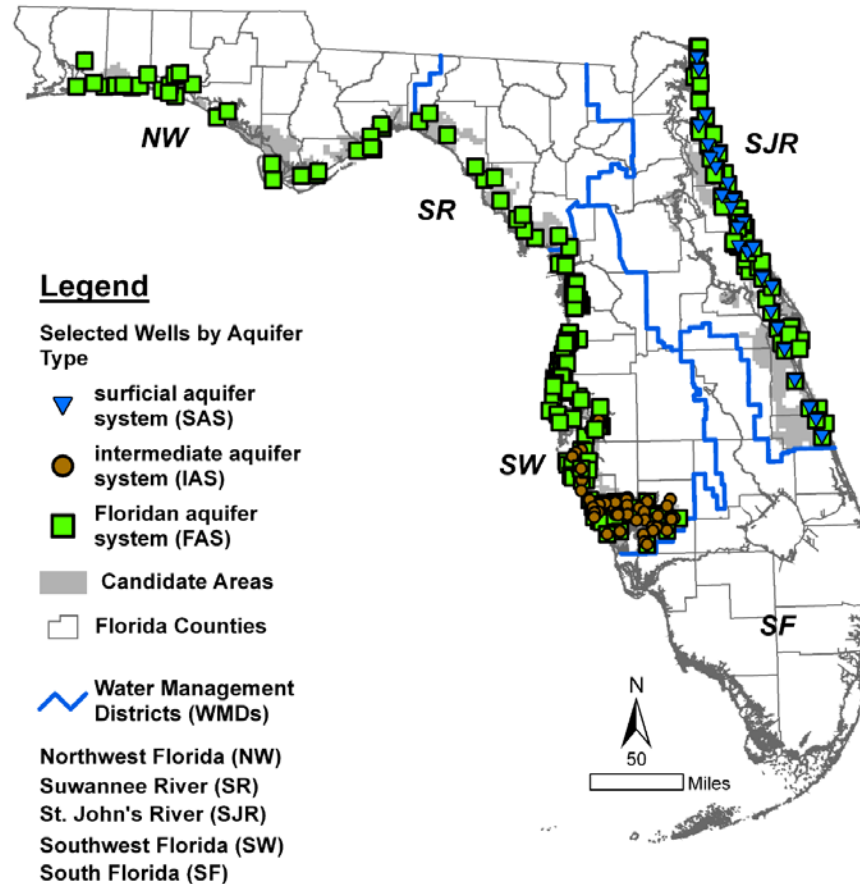
Introduction

Status of SNW's Four Primary Issues (RC)

- 1. Periodic Production of a Groundwater Level (GWL) Percentile Ranking Index (PRI) for the Upper Floridan Aquifer (UFA)**
- 2. Development of Coastal Salinity Monitoring Network**
- 3. Development of a Salinity GW Quality Index**
- 4. Revision of Sampling Protocols of Wells for the Purpose of Monitoring the Fresh-water/Salt-water interface**

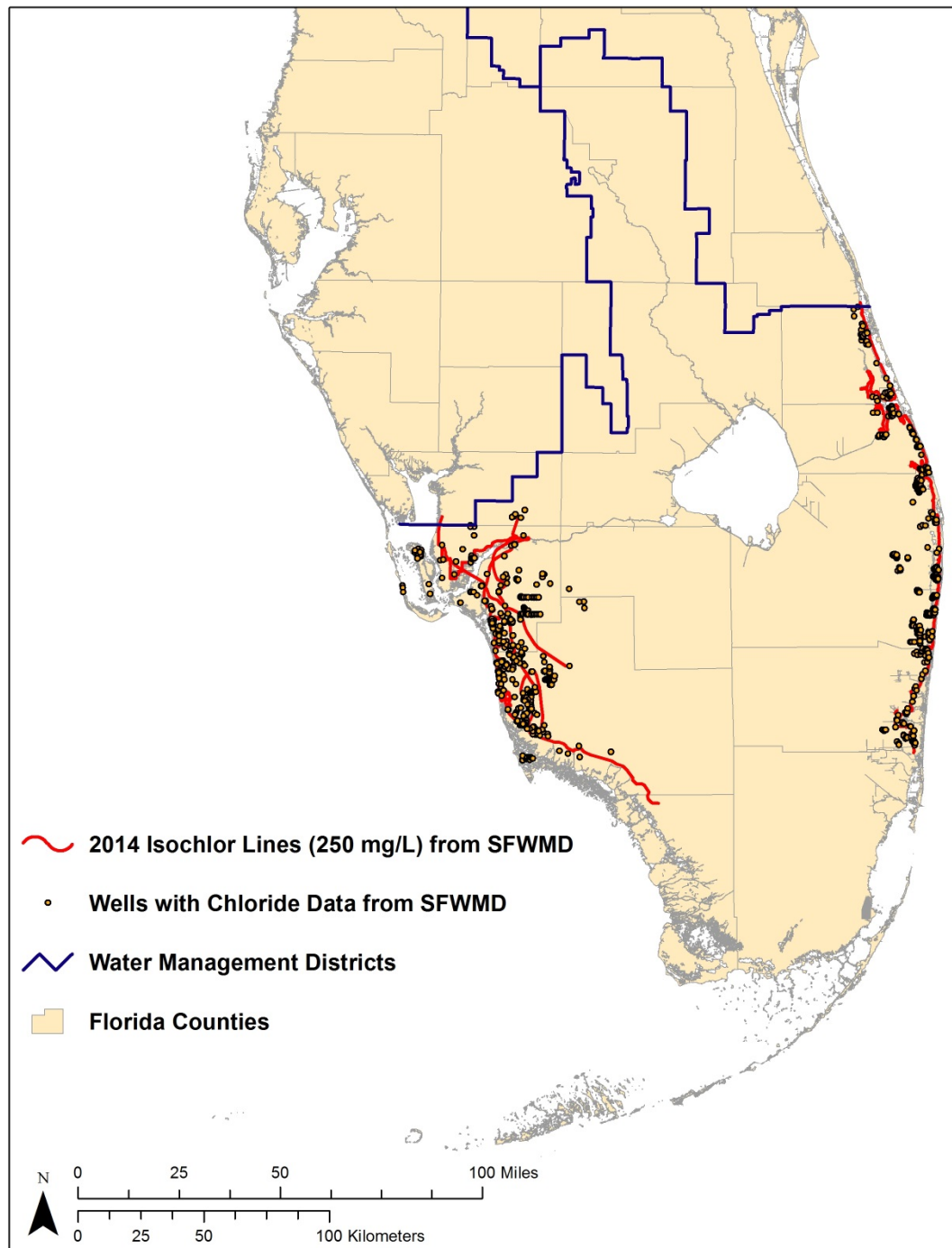
Coastal Salinity Monitoring Network

Final Selection Coastal Salinity Network Wells Chloride, Specific Conductance, Sulfate, Calculated TDS



Created October 12, 2016 by Andy Woeber, DEAR, DEP.
The map is a cartographic representation and is not
intended for further analysis.

**Example of 250 mg/L
isochlor maps for
various aquifers in
south Florida**



**Example of 250 mg/L
isochlor map, and more,
of Biscayne aquifer in
Miami-Dade County, FL**

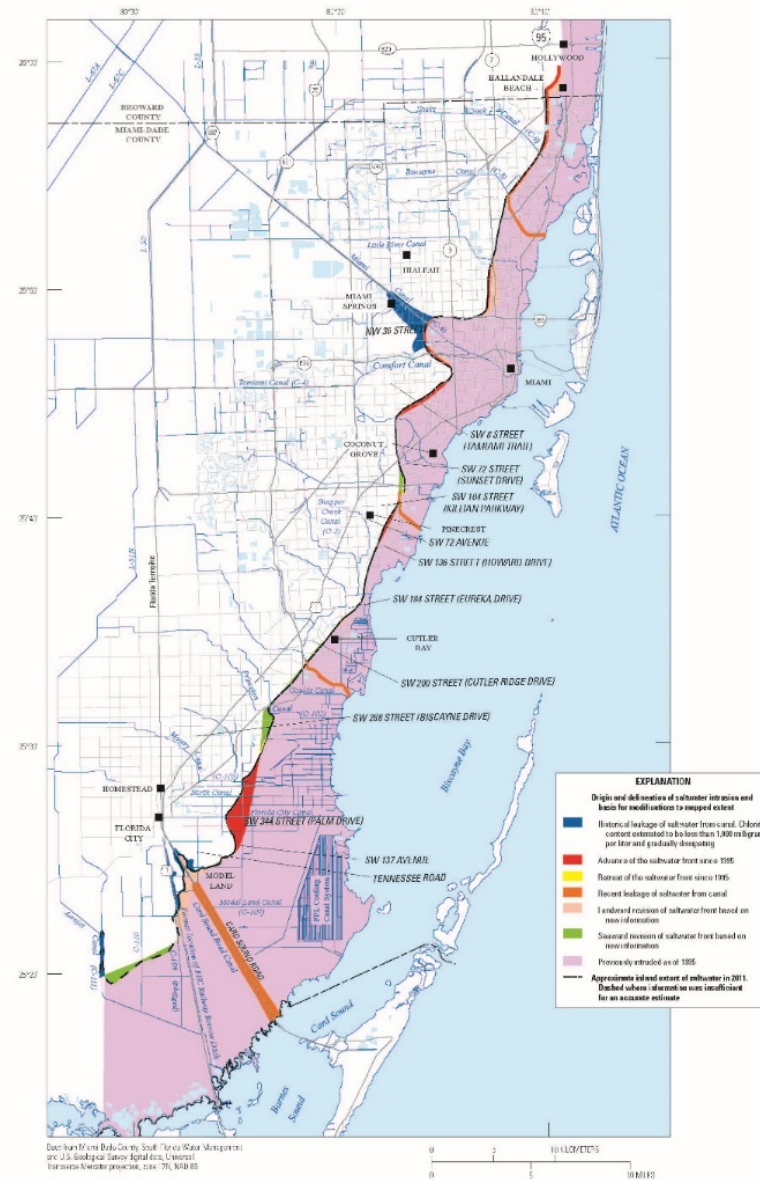


Figure 17. Map showing the origin and delineation of saltwater intrusion in the Biscayne aquifer and the basis for modifications to its mapped extent.

Water Level and Salinity Analysis Mapper

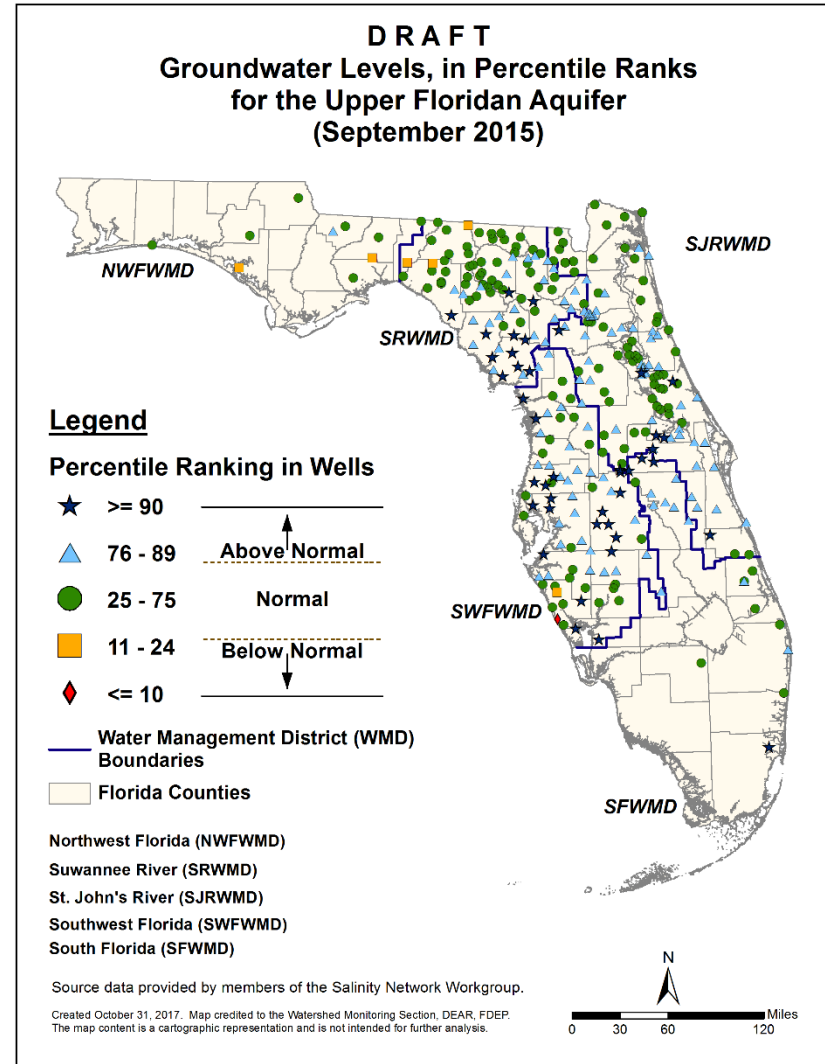
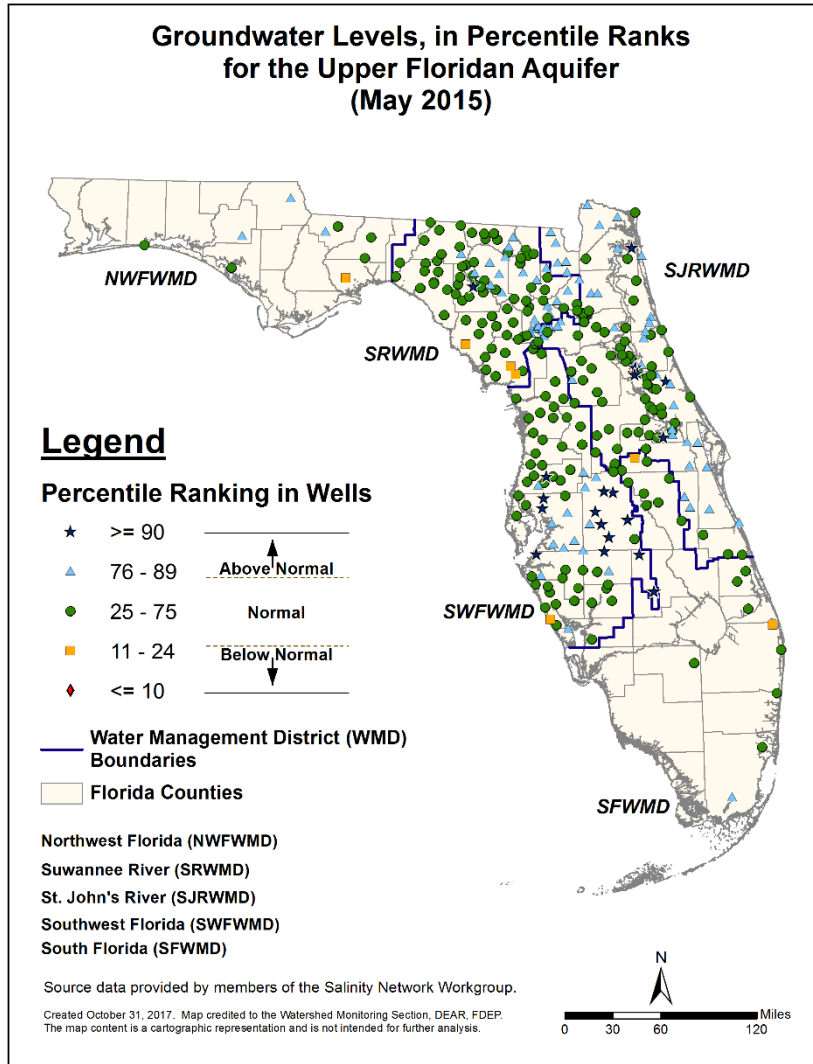
A USGS DRAFT Webpage

Scott Prinos – USGS

GWL Percentile Ranking Index Status and Modifications (RC)

- Periodically create **composite** statewide PRI maps, along with explanatory text
- Commence (2015) production twice/year
 - May (LOW GWLs) and September (HIGH GWLs)

Draft PRI maps: May and September 2015



Neither map published

Inconsistent Methodologies:

Representative Monthly Values

- **Array:** Data Set of GWLs against which value x is compared
- What is x? The representative monthly value (RMV) of GWLs
- We compare the RMV of interest to previous RMVs in the period of record (POR)
 - RMV definition is inconsistent among entities, but consistent within agencies
 - As long RMV within agency does not change, the effect on the statewide GWL PRI maps is minimal

Inconsistent Methodologies

- To assist in decreasing inconsistencies, SNW to do the following:
- SNW entities to eventually transfer all RMVs groundwater levels for POR for all wells to DEP's Water Information Network (Database) (WIN)
- DEP will generate GWL PRIs and text
 - SNW entities will then review
 - Final product on DEP web page

Loading Data to WIN: Update (DD)

Agency	RMV for each well	Update
ACEPD	Median value of month	Plan to upload in near future
DEP	Median value of month	Plan to upload in near future
NWFWMD	With CR: Max value of 15 th of month Without CR: value nearest 15 th	Presently: Insufficient time/staff for WIN uploads
SRWMD	With CR: mean value of 27 th Without CR: Generally a single value from first two weeks of month	Interface software being developed
SJRWMD	Median value of month	Testing completed; bugs being worked out; uploads expected soon
SFWMD	Median value of month	Likely will not transfer data
SWFWMD	Internal purposes: Interpolated max daily value for same week of each year For WIN: Med max daily value of month	Data uploads progressing

Inconsistent Methodologies

Two Methodologies for generating GWL PRIs

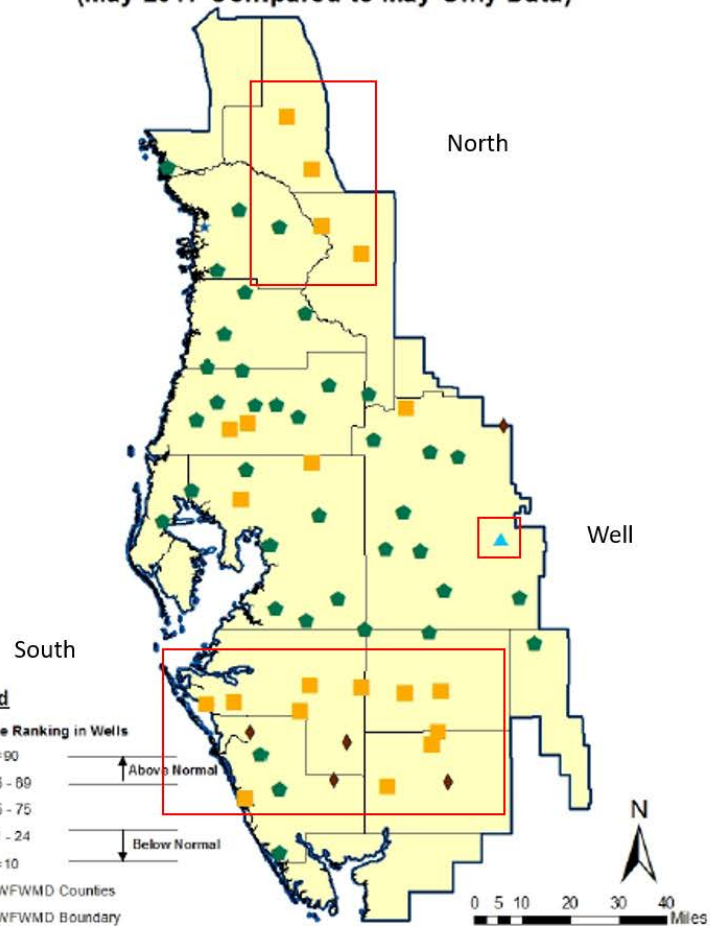
- **A.** Compare May (or September) RMV to all previous RMVs
 - Not adjusted for seasonality: **non-adjusted**
- **B.** Compare May (or September) RMV to all previous May (or September) RMVs
 - Adjusted for seasonality (e.g. Month): **seasonally-adjusted**
- The non-adjusted method that has been used in previous SNW exercises
- Recently, SNW decided to periodically generate both

Inconsistent Methodologies

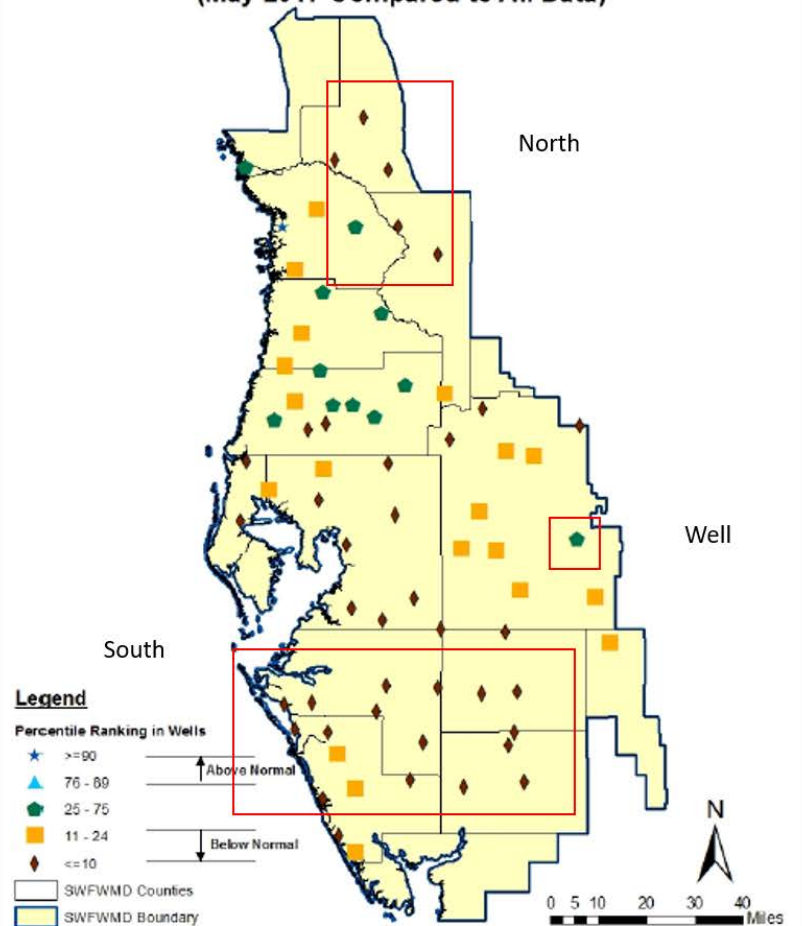
Two Methodologies for generating GWL PRIs

- SNW entities recommended the production of a document that compares the differences in the two methodologies
- RC drafted a document
 - It is going through a preliminary review now
 - When preliminary review is complete, it will be sent to all participants for further review
- A comparison will be presented at next SNW meeting

**Groundwater Levels, in Percentile Ranks,
for the Upper Floridan Aquifer
(May 2017 Compared to May Only Data)**



**Groundwater Levels, in Percentile Ranks,
for the Upper Floridan Aquifer
(May 2017 Compared to All Data)**



Inconsistent Methodologies

- DEP will generate both seasonally-adjusted and non-adjusted maps and text
 - SNW entities will review prior to publication
 - Final product to be placed on DEP web page
- Note, because of insufficient data, few if any wells, are available in the NFWFMD for the seasonally-adjusted maps

Approximate Extent of Salt Water Intrusion Line

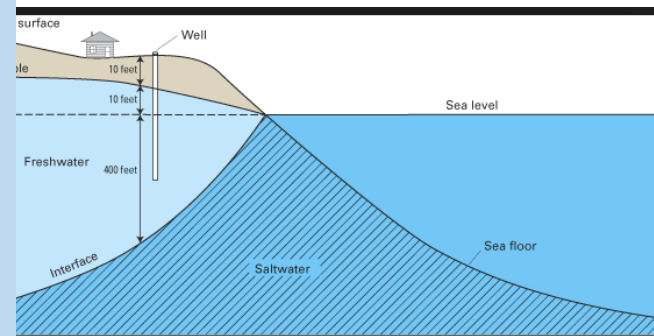
Rick Copeland and Scott Prinos

From
Mapper
Webpage

Need for
special GW
sampling
protocols



250 mg/L
isochlor



Proposed Methods for sampling saltwater/freshwater interface

- Revisions to FDEP Standard Operating Procedures for Sample Collection

**Where purpose is to monitor the
Freshwater/Saltwater Interface in wells
completed “close” to the interface**

- Want sample of maximum salinity
- Purging may move FW/SW interface position

Current SOPs

- If well has in-place plumbing
 - Use current SOPs
- If well has ≤ 10 ft of screen or open hole
 - Use current SOPs

Proposed changes to SOPs

If well has >10 ft of screen (or open hole)
and no in-place plumbing

- **1.** Micro-purging (low-flow purging)
 - Conduct Specific Conductance (SC) profile down well
 - Afterwards, lower pump
(≤ 2 cm/sec to target depth)
 - Place pump at point of max SC or
 - Within 5 ft of bottom of wells screen (or open hole)
 - Purge < 500 mL/min for a minimum of 1 equip volume
 - Commence stabilization/sampling procedures
 - Use same pump for purging and sampling

Proposed changes to SOPs

If well has >10 ft of screen (or open hole)
and no in-place plumbing

- **2.** No purging: Use non-isokineic thief sampler, such as double check-valve bailer, or Kemmerer sampler

- Conduct SC profile down well
- Afterwards, lower device (≤ 2 cm/sec to target depth)
- Trigger the device to close, according to manufacturer's instructions
- Retrieve sample (≤ 2 cm/sec to surface)



Note sampler may shut at incorrect depth

- Check SC from a small portion of sample
- If it is anomalous from previous data, obtain another sample

Proposed Changes to Rule

- Will need comments about proposed rule change by SNW participants
 - Date undermined at this time
- Revisions will be synthesized and forwarded to appropriate DEP staff for possible inclusion as DEP rule revision

Questions to be Addressed

- (1) Does your agency Sample/Monitor GW quality in wells completed close to the FW/SW interface?
 - (1b) If your agency monitors potential change in the FW/SW interface, do the wells include those which have > 10 ft of screen (or open hole), and no in-place plumbing?
 - If answer to (1b) is yes, what sampling procedures do you follow, and specifics

Questions

- (2) Does your agency support the development of a special DEP-approved SOP for monitoring the FW/SW interface in wells with > 10 ft screen (or open hole) and no in-place plumbing?
- (3) Regarding the proposed SOP (sent to you earlier), what general concerns do you have, if any, for using the proposed SOP?

Questions

- (4) If the SNW were to proceed further with the development of a special SOP for sampling wells with > 10 ft screen/open hole, and no in-place plumbing, does your agency prefer...
 - a. Develop a “White Paper” to be sent to DEP, outlining the background and the need for the development and inclusion of a special SOP into the DEP Quality Assurance Rule?
 - b. Develop an alternative to the DEP-approved sampling SOP than the one just described?
 - Both a. and b. require presenting data demonstrating that the proposed SOP exceeds the performance of current DEP SOPs

Salinity GW Quality Index

Rick Copeland and Scott Prinos

From Mapper Webpage

Sites Map Base Map

Search

Real-Time Sites

Real-Time water level conditions

Water level conditions for all sites

CL Water Salinity

☐ Mid-Hawthorn aquifer

☐ Sandstone aquifer

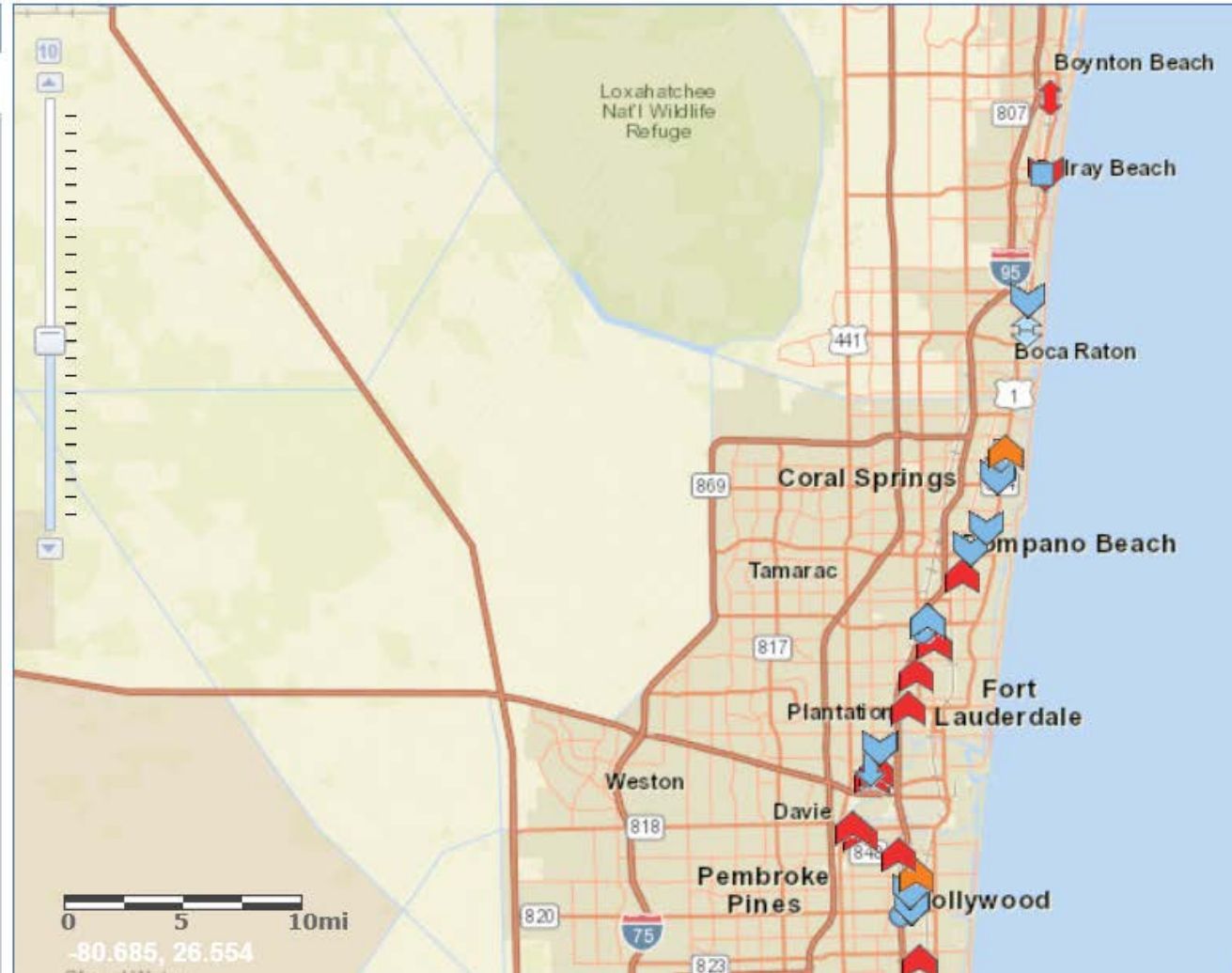
Explanation: Water salinity

Symbol colors based on chloride concentration, in mg/L

Red	$\geq 1,000$ (salty)
Orange	≥ 250 and $< 1,000$ (brackish)
Blue	< 250 (fresh)

Symbol shapes based on changes in chloride concentration

Up arrow	Up trend - past 5 years
Down arrow	Down trend - past 5 years



Salinity GW Quality Index

- Suggest SNW develop an index
- Start with **Chloride**

Concentration (mg/L)	Name
< 250	Fresh
≥ 250 – <1,000	Brackish
≥ 1,000	Salty

- Other indicators at another time
- E.G. Na, SO₄, TDS

General Discussions

- Important issues not being addressed
 - Adding surface water sites?
 - Begin with Estuaries?
- Comment or Questions?

Next SNW Meeting

Wednesday, November 14, 2018 1:00-3:00 PM

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http://publicfiles.dep.state.fl.us/DEAR/DEARweb/FWRMC/FWRMC%20Salnet_document_SNWGWLPRIPIlotFinal_cv%20ada%203-27-15.pdf