

Development of Coastal Salinity Monitoring Network

- Coastal Salinity Monitoring Network (CSMN)
 - “Ring around the state”
- **Governor’s Office Supports CSN**
- Secretary’s Office supports CSN
- Office of Water Policy supports CSN
- FDEP Coastal Office supports CSN
- A network-of-existing networks
- Add wells in future as needed
- Add surface water sites in future

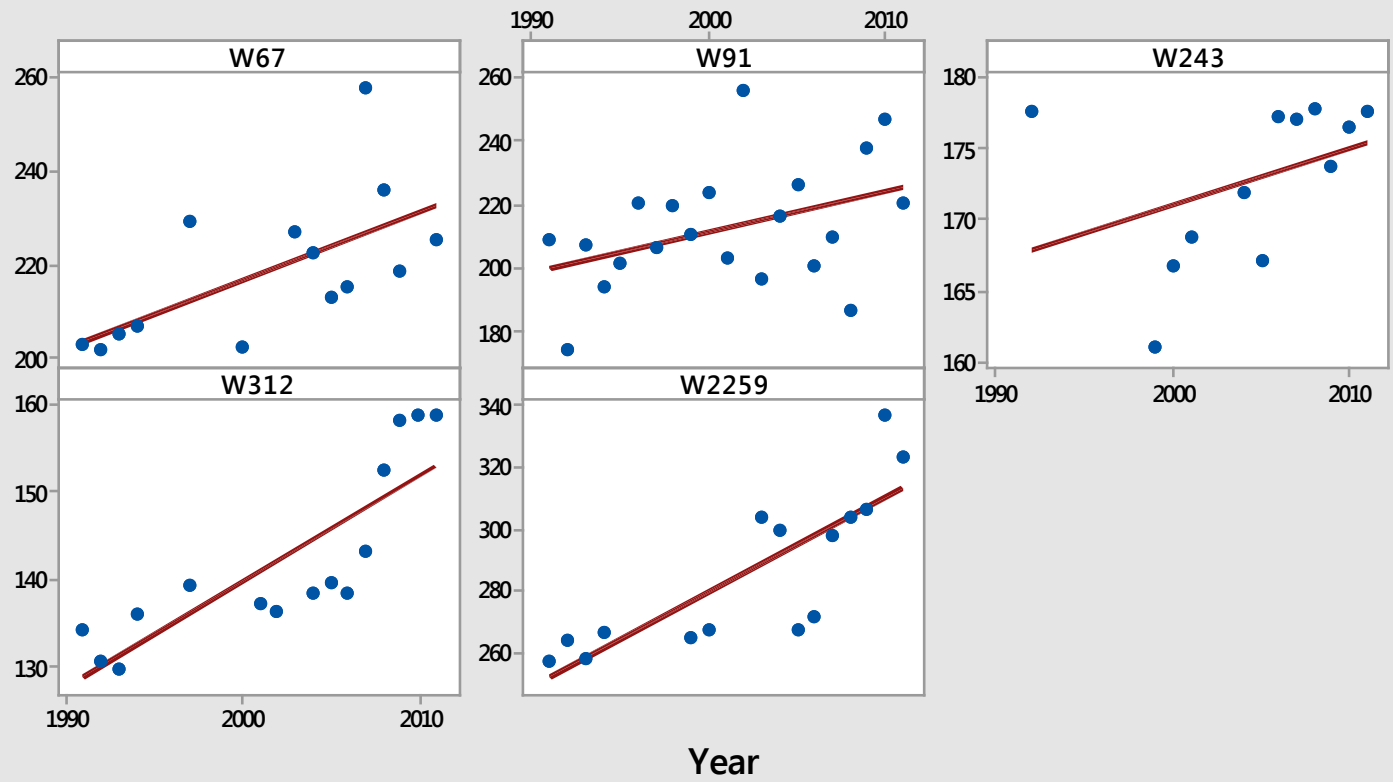
Development of CSMN

- Question(s) to address
- Geographic areas to monitor
- Aquifers to monitor
- Wells to monitor
- Analyte(s) to monitor
- Period of record
- Frequency of monitoring
- Analyses and reporting

Question(s) to address

Annual Median TDS Concentrations in Selected Wells (1991-2011)

TDS (Total Dissolved Solids) in mg/L



Question(s) to address

- Are salinity indicator concentrations changing over time?
 - Are salinity indicator concentrations degrading over time?
 - Between Date 1 and Date 2, has the concentration of TDS significantly ↑
 - If so, over what area/ what aquifer?
-
- Not a network to delineate SW / FW interface, as in South FL

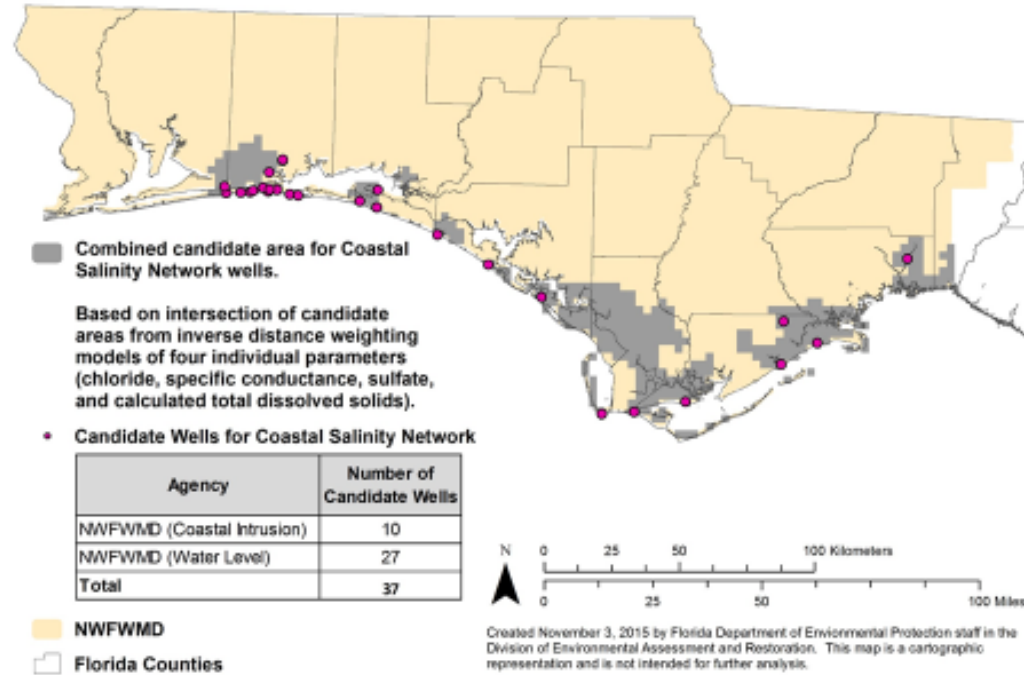
Question(s)

- Can **SC** act as a surrogate to TDS? If so,
 - SNW/WMDs can potentially use wells in areas previously displayed (or other WMD selected areas), and monitor SC to track changes in TDS (or Cl, or SO₄?) in aquifers along Florida's coast.

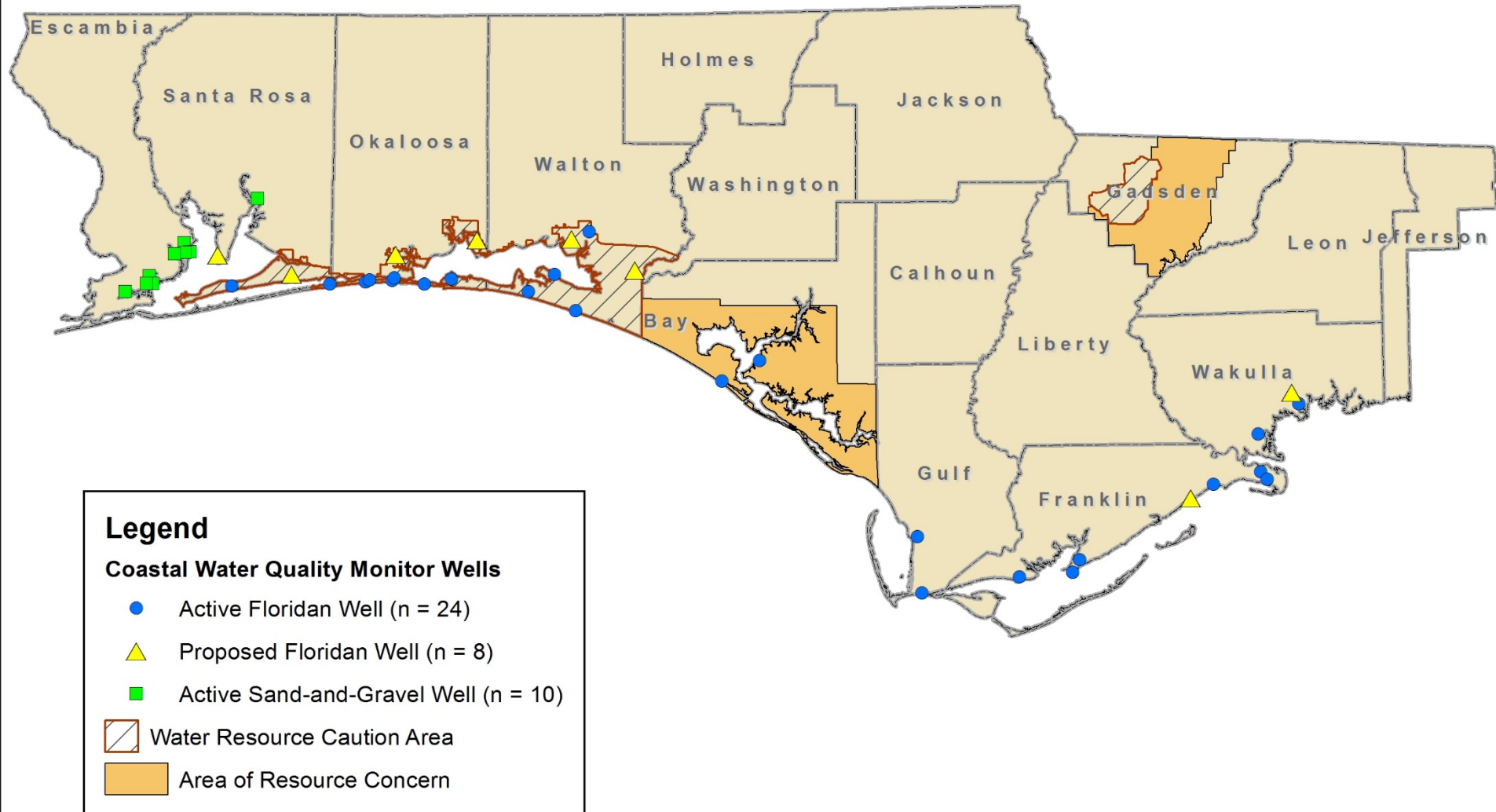
Question(s)

- Areas
 - Use areas prev. displayed, or by **WMD**
- Aquifers
 - Those with significant GW withdrawals
- Wells
 - **WMDs** select that can be sampled
 - (Suggest 5-10 per aquifer per WMD)
 - Prefer long-term period of record

**Candidate Coastal Salinity Network Wells in NFWWMD
Based on Combined Modeled Data
(Chloride, Specific Conductance, Sulfate, Calculated TDS)**



Coastal Water Quality Monitoring Network Upper Floridan and Sand-and-Gravel Aquifers



**Candidate Coastal Salinity Network Wells in SRWMD
Based on Combined Modeled Data
(Chloride, Specific Conductance, Sulfate, Calculated TDS)**

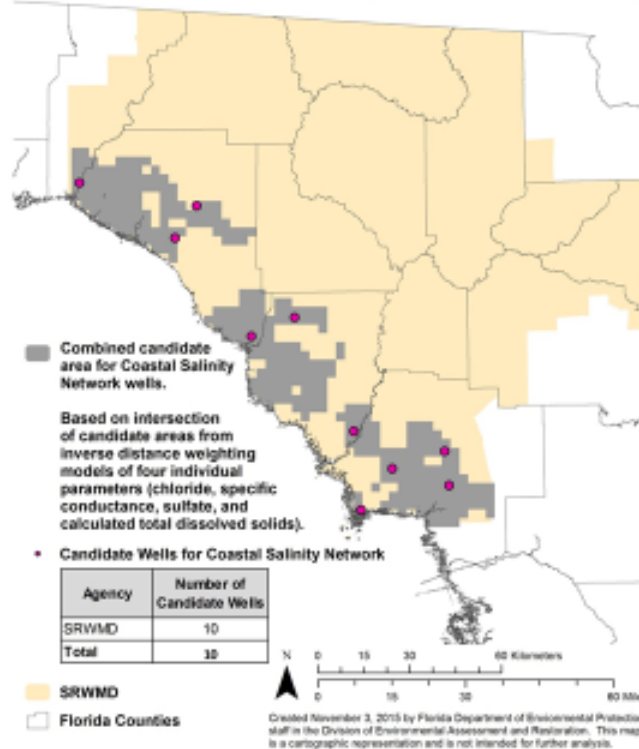
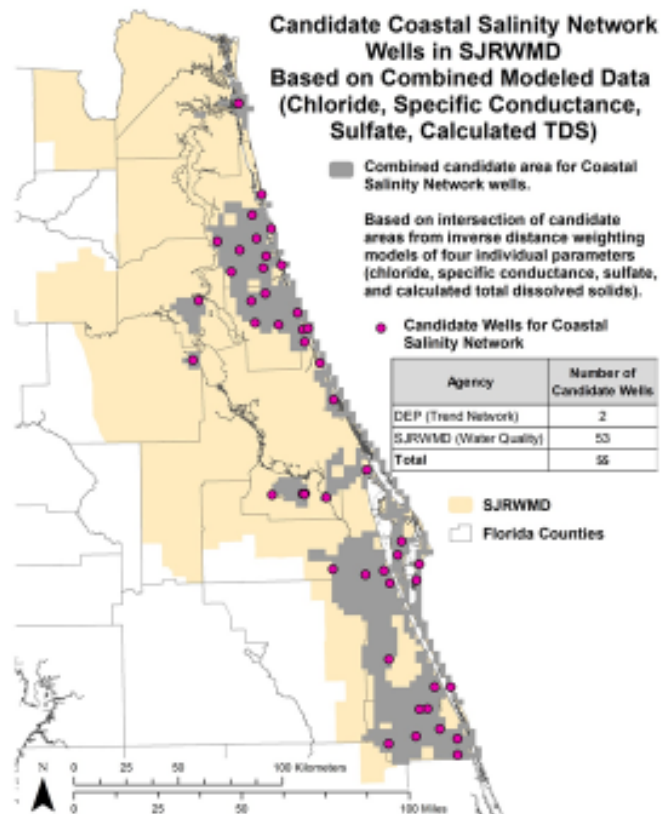




Figure 4. Comparison of Cluster II Sodium, Chloride, Sulfate, Ammonia, Specific Conductivity, and Potassium Type Groundwater with the Gulf of Mexico.



Figure 5. Comparison of Cluster Water with the Gulf of Mexico.

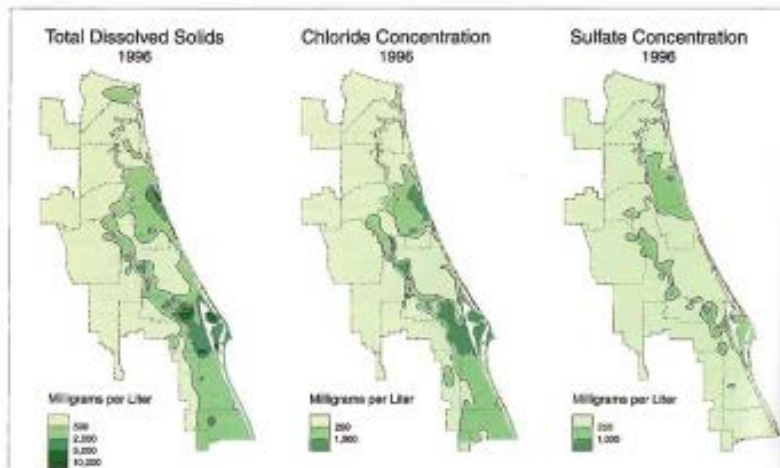


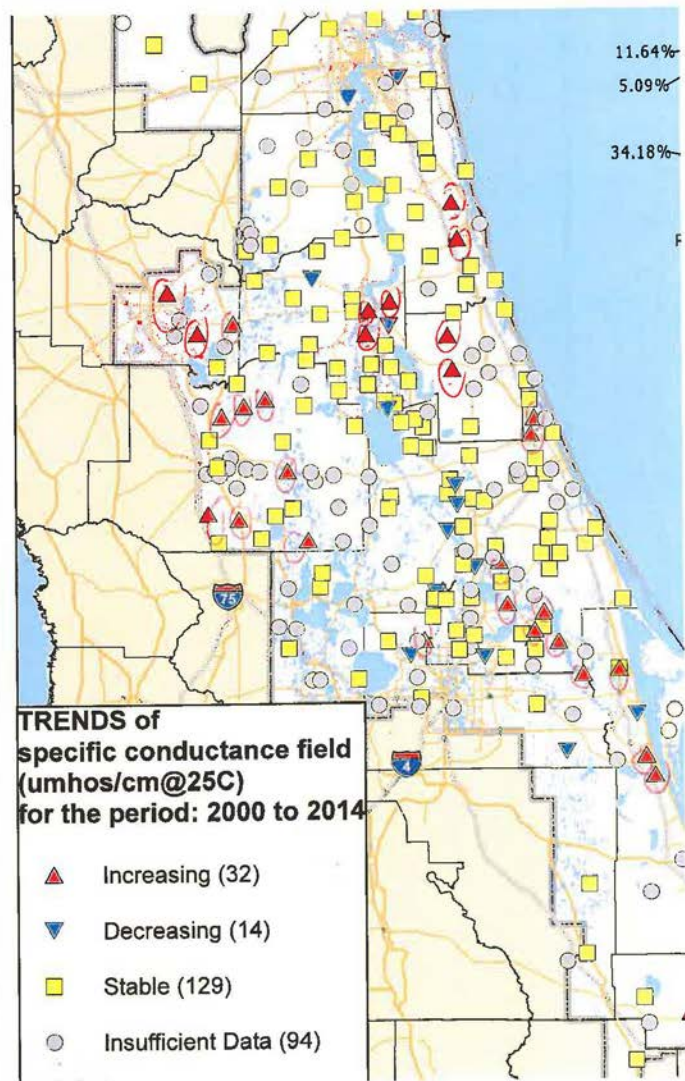
Created November 3, 2015 by Florida Department of Environmental Protection staff in the Division of Environmental Assessment and Restoration. This map is a cartographic representation and is not intended for further analysis.

THE INVASIVELY GROWING, WHITE BARKED REDTIGER, OR ALI, OF
Johns, Flagler, Brevard, and Indian River counties, in most of
Nassau and Duval counties, in eastern Clay and Volusia coun-
ties, and in areas bordering the St. Johns River in Putnam,
Marion, Lake, Volusia, Seminole, Orange and Osceola coun-
ties (Sprinkle 1989).

Other lands
Background network wells
Very intensive study area

230





Candidate Coastal Salinity Network Wells in SWFWMD Based on Combined Modeled Data (Chloride, Specific Conductance, Sulfate, Calculated TDS)

Combined candidate area for Coastal Salinity Network wells.

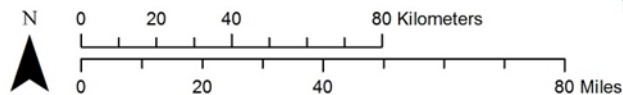
Based on intersection of candidate areas from inverse distance weighting models of four individual parameters (chloride, specific conductance, sulfate, and calculated total dissolved solids).

Candidate Wells for Coastal Salinity Network

Agency	Number of Candidate Wells
DEP (Trend Network)	2
SWFWMD	335
Total	337

SWFWMD

Florida Counties



Created November 3, 2015 by Florida Department of Environmental Protection staff in the Division of Environmental Assessment and Restoration. This map is a cartographic representation and is not intended for further analysis.

lids from saltwater intrusion.

ers can be exceedingly rare, is the appropriate ellhead protection program of known ces are the major in-supply of high quality

quality is protected aggressive proactive monitoring programs, permitting, managing plugging and capping ners withdrawing that

1983 initiated a coop- of Environmental Pro- districts to determine aquifers of Florida. A Coastal Monitor Well or Well Network and k were established.

ity of its groundwater ls by constructing ad- nioring sites are used nges to the groundwa- activity with surface

d over the past 30 years l through analysis of tly affect the district's grams. For example, permitting process to his information is also revent them from one- in areas surrounding

and
18

groundwater withdrawals. If these impacts do occur, the district can respond by imposing regulatory fines or other actions.

Constructing new monitor wells also provides valuable technical information, recorded as the core is recovered from various depths (e.g., lithology, water quality, and potentiometric levels). From these data, aquifers and confining units are delineated, the freshwater-saltwater interface is determined, and water quality within aquifers is characterized. For the next few years most long-term monitoring wells will be installed in Water Resource Caution Areas.

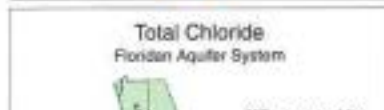
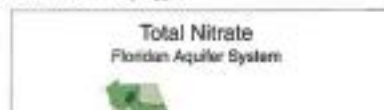
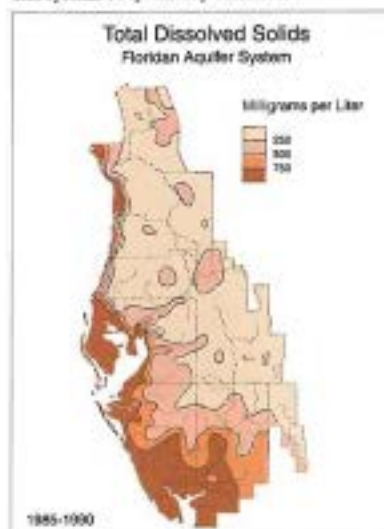
Well construction permitting is one of the primary regulatory means by which the district protects groundwater (and surface water) from degradation while protecting the quality of water for potable uses. District rules on well construction practices and water well contractor licensing are contained in Chapter 40D-3, F.A.C.

The district also regulates well construction in "delineated areas" (known as areas of contamination) on behalf of the Department of Environmental Protection. This program assures appropriate well construction techniques to protect public health and safety while containing interaquifer contamination.

The Quality of Water Improvement Project (QWIP) was established in 1974 through Chapter 373, Florida Statutes (F.S.), to restore groundwater conditions altered by well drilling. QWIP's primary goal is to preserve groundwater and surface-water resources through proper well abandonment. Plugging abandoned artesian wells eliminates the waste of water at the surface and the degradation of groundwater from interaquifer contamination. Wells constructed before current well construction standards are often deficient in casing and expose several aquifers of varying water quality to one common wellbore. These wells are estimated to exist by the thousands and allow potable water supplies to be contaminated with mineralized water from deeper exposed aquifers. Contaminated water and potable water are allowed to flow to the surface, wasting potable water and contaminating surface water from the flow of mineralized water. Section 373.207, F.S., requires that all abandoned artesian wells be plugged.

Plugging wells consists of pumping cement from the abandoned well's total depth back to the surface. Confinement is thus reestablished, and mixing of varying water qualities and free-flowing are stopped. Prior to plugging, an abandoned well is geophysically logged to determine the proper plugging method and to provide background water quality and geologic data for inclusion in the district's data base. The district uses these data to determine changes in water quality since the well was constructed.

The emphasis of this program is in the southern half of the SWFWMD, where intact confining layers are pressurized, creating an artesian effect. Chapter 373, F.S., requires that artesian systems be specifically addressed.



Distribution of monitoring wells

- 215 wells in the CGWQMN
- 152 wells in the WUPNet
(Southern Water Use Caution Area)

Distribution by aquifer

249 wells, Upper Floridan aquifer

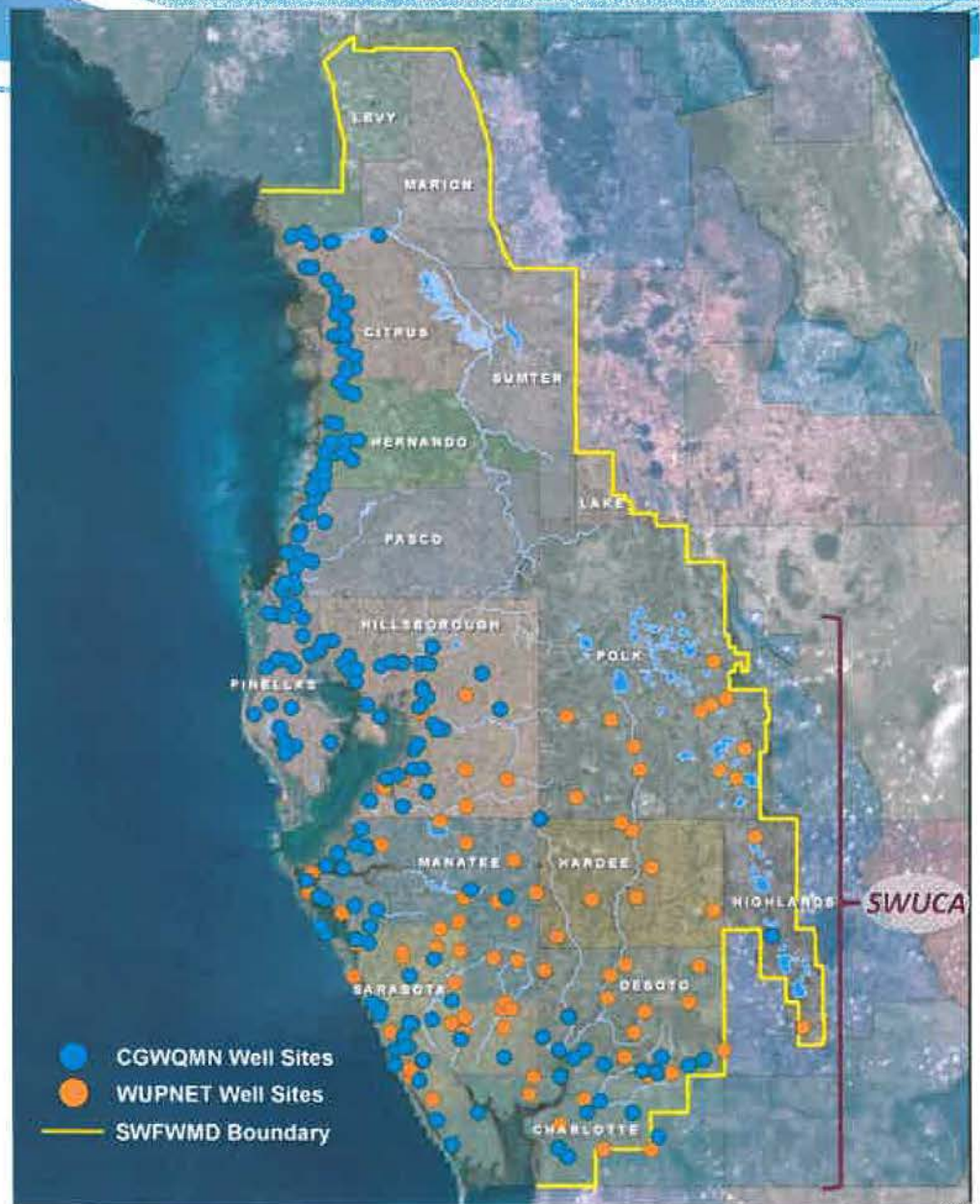
- 139 Tampa/Suwannee wells
- 110 Ocala/Avon Park wells

106 wells, intermediate aquifers

12 surficial aquifer wells *

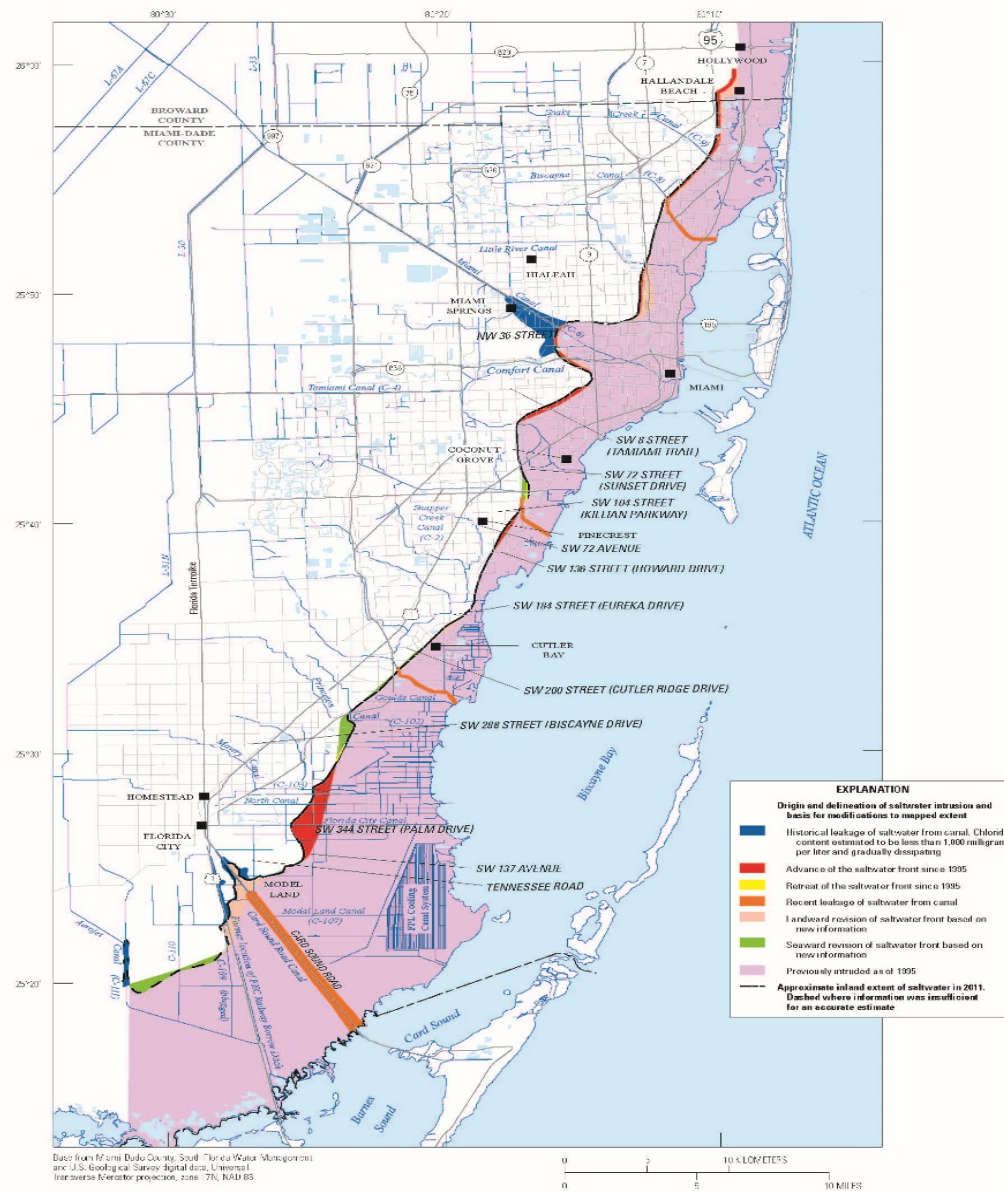
2 Lower Floridan aquifer wells *

* not included in statistical analysis





SFWMD area



SFWMD area Maps

http://my.sfwmd.gov/portal/pls/portal/portal_apps.repository_lib_pkg.repository_browse?p_keywords=saltwaterinterface&p_thumbnails=no

Next Steps

- RC prepare a written proposal
 - Solicit assistance from WMDs to:
 - Select geographic regions for CSMN sites
 - Select WQ wells to be included in CSMN
 - Could be subset of other WMD networks
 - Suggest 5-10 coastal wells per aquifer or aq. system
 - Could SC be used as the analyte to monitor?

Questions?

- Rick.copeland@dep.state.fl.us
- (80) 245-8503
- Next SNW meeting/webinar
 - May 2, 2016