

Florida Water Resources Monitoring Council (FWRMC)
Public Meeting (Webinar) of Salinity Network Workgroup – August 8, 2012

Attendees:

Agency	Name
Florida Department of Environmental Protection (DEP)	Rick Copeland
DEP	Stephanie Sunderman
DEP	Jay Silvanima
DEP	Tom Seal
DEP	Terry Frohm
DEP	Juliana Gay
DEP	Pam Novak
Florida Department of Agriculture and Consumer Services (DACS)	John Teem
Northwest Florida Water Management District (NFWMD)	Tony Countryman
Suwannee River Water Management District (SRWMD)	Megan Wetherington
St. Johns River Water Management District (SJRWMD)	Don Boniol
Southwest Florida Water Management District (SWFWMD)	Dave DeWitt
SWFWMD	Granville Kinsman
South Florida Water Management District (SFWMD)	Cindy Bevier
SFWMD	Lucia Baldwin
SFWMD	Ke Feng
SFWMD	Kim Hanes
SFWMD	Ananta Nath
United States Geological Survey (USGS)	Sandy Kinnaman
USGS	Scott Prinos
Alachua County (Co.) Environmental Protection Department	Jim Myles
Broward Co. Water Management Division	Francis Henderson
Miami-Dade Co. Department of Regulatory and Economic Resources	Susan Markley
Lee Co. Natural Resources Division	Sam Lee
Florida LAKEWATCH	Mark Hoyer

Welcome / Introductions / Review

Rick Copeland (RC) welcomed everyone to the Salinity Network Workgroup (SNW) meeting and reviewed the agenda for the meeting.

Discussion of Miscellaneous Issues:

(Presentation slides can be found in the 2012 archive section of the FWRMC website.)

Decision Making Process

RC reviewed the proposed three-level decision making process, and suggested that SNW participants contact him with questions or requested changes before the next SNW meeting.

- Informal Decision Making - approval of issues is indicated by absence of objections or requests for further discussion
- Formal Decision Making – consensus building and voting if a consensus cannot be reached
 - o Voting is non-binding because SNW has no authority

- o If formal decision is required, SNW will discuss the issue and define differences, then wait until the next SNW meeting so that participants have an opportunity to discuss the issue with others at their organization.
- o Organizations participating in the SNW can choose to be either voting or non-voting members of the SNW. Voting members are limited to one person from each participating organization, and voting members may designate an alternate representative to attend the meeting in their place, if they are unable to attend.
- o Current organizations participating as voting members are: SFWMD (C. Bevier), SWFWMD (G. Kinsman), SJRWMD (D. Boniol), SRWMD (M. Wetherington), DACS (J. Teem), NFWFMD (T. Countryman), Alachua Co (J. Myles), FL LAKEWATCH (M. Hoyer), DEP (J. Silvanima, Watershed Monitoring Section).
- o Current organizations participating as non-voting members are: USGS, U.S. Army Corps of Engineers (USACE), Miami-Dade Co., Escambia Co., Palm Beach Co.
- o To become a member (voting or non-voting) of the SNW, a representative must attend at least one meeting and indicate interest in becoming a member. Membership becomes effective at next (second) SNW meeting.
- o To become a voting member, a representative must attend at least two meetings and then request placement into voting member category. Change becomes effective at next (third) SNW meeting.

Potential New SNW Members

RC indicated that he is compiling a list of organizations that may be monitoring groundwater (GW) and be interested in participating in the SNW. The list currently includes: Leon Co., Bay Co., Duval Co., Volusia Co., Lee Co. (present at today's meeting), Collier Co. Broward Co. (present at today's meeting), Lake Worth, Hallandale, Hillsboro Beach, Stuart, Dania, Florida City, Homestead, Ft. Lauderdale, and Hollywood. RC indicated that he will contact these organizations and invite them to participate in the next SNW meeting.

Susan Markley (SM) indicated that many of the local agencies listed (e.g. Florida City and Homestead) may no longer be conducting GW monitoring, or all of their GW monitoring may be related to regulatory permit conditions (discharge, excavation, etc.).

Tony Countryman (TC) suggested contacting the Southern Regional Water Program. RC indicated that he has contacted them and learned that they do not collect GW data.

Framework Document

RC reviewed the draft preamble, mission, goals, and objectives.

- Dave DeWitt (DD) suggested editing the first sentence of the mission to be more specific, by replacing the text ".....in order to improve monitoring activities." RC asked DD to send him any suggested edits to the mission before the next SNW meeting.
- DD suggested removing the word "main" from the goal statement, so that the first sentence reads: "The goal of the Salinity Network is an ongoing effort to provide scientifically defensible data and information on the chemical, physical, and biological characteristics of water that can be used by the public, policy makers of the state, and the scientific community in order to better understand the status and trends regarding the encroachment of saline water into Florida's fresh water resources."

RC reviewed several potential additional objectives, based on suggestions from Scott Prinos (SP), to be considered at a later date.

- Improve the quality of salinity sampling throughout the state by: (1) evaluating the best sampling methodologies for saline water given its physical properties, (2) developing standard operating procedures to apply these methodologies, and (3) periodically evaluating the quality of the salinity sampling by reviewing salinity methods used throughout the network.
- Evaluate improvements in the technology used for salinity monitoring, and whenever practical, develop standard operating procedures that will be used to implement these advances.

SNW use of terms “encroachment” and “intrusion”

RC suggested that the SNW use the two terms to represent two different concepts, as described below.

- Intrusion – Relatively rapid movement of saltwater that has entered previously fresh portions of an aquifer. This suggests the mechanism is man-induced.
- Encroachment – Relatively gradual movement of saltwater into an aquifer resulting from the lowering of freshwater head in the aquifer. An example is the landward movement of saltwater along the base of an aquifer resulting from the lowering of the head within an aquifer due to a prolonged drought.

DD and TC agreed that the two terms should be used to represent two different concepts / scenarios.

SM suggested using the term “human-induced” instead of “man-induced”.

SP suggested using “intrusion” to refer to every possible process (including, but not limited to human-induced), and using “encroachment” to refer to only the gradual change that occurs along the base of the aquifer, resulting from long-term changes (which may also be human-induced through additional drainage over time). RC asked SP to send him a draft of any suggested changes or additional clarification regarding the definitions, to be discussed at the next SNW.

DD added that when using these two terms, the group should consider whether identifying the cause of the salinity change is part of the SNW’s goals.

SM recommended that the SNW always define the term(s) that they are using when presenting information to an audience other than the workgroup, and DD recommended adding a glossary to SNW products.

GW Monitoring Catalog

- FWRMC will be compiling a catalog of all GW and surface water (SW) monitoring entities and stations in FL.
- SNW is assisting by compiling list of entities that monitor GW. RC has contacted federal, state, WMDs, and volunteer groups, but still needs to contact several counties and cities / utilities.
- SNW will then await guidance from Statewide FWRMC regarding the specific information to be included in the catalog.

DD indicated that much of the local organizations’ data is related to compliance monitoring and would not be of use for SNW projects. RC agreed, but indicated that it is still important to include that information in the catalog as part of the statewide inventory of all water resource monitoring.

Data Possibly Needed for Future SNW Efforts

- Field data - current interest: GW level, specific conductance
- Field data - future interest: spring flow, pH, water temperature
- Laboratory data - future interest: sodium, chloride, total dissolved solids, calcium, magnesium
- Other data - currently available: rainfall and air temperature (SE Regional Climate Center)
- Other data - future interest: GW withdrawal / pumpage, evaporation and evapotranspiration

Status of SNW Pilot Study

RC reviewed the pilot study plan

- Goal is to produce one percentile rank index (PRI) map of GW level during Spring 2010 for the upper Floridan aquifer (UFA)
- Purpose is to see what obstacles are present when attempting to create this product, and to see if the SNW can overcome those obstacles. If the pilot study is successful, the SNW can begin periodically producing percentile rank (PR) maps for all aquifers or other mappable units of interest.
- Possible future projects include producing side-by-side potentiometric maps with PR maps.
- Have collected locations of UFA wells with GW level data with several common periods of record (POR): 1992-2012, 1998-2012, and 2007-2012. The density of wells increases as the POR gets shorter and only includes more recent years (605 wells for 1992-2012, 735 wells for 1998-2012, and

1065 for 2007-2012). Well density is very sparse in areas of the state where UFA is not primarily used (south FL and western panhandle).

- Still need to determine the total number of observations and typical observation frequency during the selected POR to determine observation frequency used for analysis.
- Still need to select appropriate algorithm for calculating PRs.
 - o Simplest algorithm: $PR_{(x)} = [(no\ obs < x) / (n)] * 100$

Megan Wetherington (MW) commented that the wells submitted for the SRWMD are only those that are appropriate for using to create a PR map of water levels. The SRWMD well inventory contains several wells not included on that list (tidally influenced wells, etc). RC agreed that MW's practice is preferable, and asked other data providers to contact him if there are any wells included in their initial inventory that may not be appropriate for the PR map study.

SM indicated that the Biscayne Aquifer (BA), not the UFA, is the aquifer of interest in south FL. The UFA well coverage in south FL is very sparse because the UFA is not being frequently used. For SNW participants in south FL, the statewide UFA analysis will not be helpful for informing management decisions, and the group will instead need to identify management issues in the BA that should be addressed. Additionally, the PR algorithm that is appropriate for other aquifers and other areas of the state may not be appropriate or useful in south FL because the ground elevation and the water table are much closer together and sometimes water table level is greater than ground elevation. The SNW should consult SFWMD and USGS to gain a better understanding of the metrics that they are currently using to address BA issues.

SP agreed that sub-dividing the PR study by aquifers is a good approach because the rate of change may differ between aquifers. Additionally, in some areas, long-term trends must be removed to avoid masking seasonal or more recent changes.

Sam Lee (SL) asked how the study will compensate for the differences in POR and frequency between wells. RC indicated that there have been several solutions proposed, including selecting a frequency, such as a monthly mean, to compare for all wells.

Kim Hanes (KH) asked if the wells would be evaluated at the screen or open-hole interval, to determine if the wells are true indicators of GW level. RC indicated that the data providers will need to evaluate their own data, and only include data that they are confident represents true indicator wells. The SNW may need to discuss this issue further and agree upon a standard open-hole interval. RC reminded the group that every part of the SNW studies will be discussed with the group until an agreement can be reached.

Mark Hoyer (MH) suggested clarifying the scale of analysis for the pilot study. The proposed scale is statewide (spatial-temporal variability over ~1000 wells), and is not focused on site-specific analyses. Several issues that have been proposed may only affect fine scale / site-specific analyses. The proposed coarse scale analysis can help to identify areas of interest for further smaller scale analyses.

Jay Silvanima (JS) summarized the process used to develop the plan for the pilot study, to clarify the project's intent to the group. The pilot study was proposed to see if the SNW could produce a PR map using a subset of the data available, before committing to producing several coarse scale PR maps. Initially, JS suggested using a small study area to limit the amount of data transfer required and increase confidence in the results obtained. However, using a small study area would limit the number of SNW participants involved in the study. Therefore, in order to involve the greatest number of SNW participants, it was suggested that the study area be set to the largest area that could be used to produce a single PR map (the UFA). Even though the UFA was selected for the pilot study, the SNW is very concerned with issues in other aquifers. If the pilot study is successful, the SNW can incorporate analyses for other aquifers into the final set of products.

Potential Modification to SNW Pilot Study

DD presented options for potential modifications to the SNW Pilot Study.

(Presentation slides can be found in the 2012 archive section of the FWRMC website.)

- Goal of pilot study was to see if the SNW could produce a PR map using the data available, and to see if the resulting product would be useful to resource managers and decision makers.
- UFA was initially selected for pilot study because of its wide-spread use and the large amount of data available.
- However, SNW recognizes that there are other important aquifers in FL, and should discuss the feasibility of including them in the pilot study.
 - o Data would need to be separated by aquifer, with separate maps produced for each aquifer
 - o Methods of analysis may need to be different for each aquifer because the aquifers have different hydraulic properties and are in different geographic settings.
 - o Maps would need to have symbology to help readers distinguish between the results for the different aquifers.
- Two candidate areas for inclusion in pilot study: the sand-and gravel aquifer (S&GA) in NFWFMD and the BA in SFWMD
 - o S&GA map would have some overlap with UFA map
 - o S&GA GW level monitoring coverage is primarily in Escambia Co. and Santa Rosa Co.
 - o BA aquifer monitoring coverage is primarily in Miami-Dade Co., Broward Co., and southern Palm Beach Co.
 - o Hydrogeology is more complex in southern peninsula and lower west coast, with several surficial and intermediate aquifer units being used.

Lucia Baldwin (LB) suggested including south FL in the pilot study. There are several important management issues in the BA, and it would be helpful to see if the suggested analysis methods could be used. LB also suggested alternatives for analyses in south Florida, including looking at spatial variability (difference between individual wells) and temporal variability (difference between measurements taken at different dates at the same wells), by calculating moving averages or moving medians. SM agreed that BA issues are important, but indicated that participation in the UFA PR map study would not provide information that would be useful to managers. SP indicated that the PR method is already being used for other aquifers in the southern peninsula, so it may be useful in the BA, as well.

LB suggested a solution for using data from wells with inconsistent frequencies - a study could be conducted to compare hourly, weekly, and monthly averages from nearby wells, to see if data is comparable. SL agreed that the group will need to find a solution to address inconsistent frequencies among wells, as this is a problem that many have encountered at a smaller scale.

TC asked what the intent is after the pilot study's UFA PR map has been produced. RC indicated that it will depend on the results and problems encountered during the pilot study. If the SNW participants are satisfied with the UFA map, then the group could begin producing maps for other aquifers and other time periods. TC expressed concern that the group may still need to explore other analysis methods because others have indicated that the information gained from PR maps may not be useful to managers in areas with smaller surficial aquifers (S&GA and BA).

SNW Data Transfer / Storage

MH proposed a solution to get all data to be potentially used for the pilot study (all GW level data wells appropriate for producing PR maps, through 2012), and make it available as a one-time download so that anyone interested could use the data to calculate PRs and other analyses for their area of interest, and ultimately determine what information would be most helpful to managers of those resources.

JS clarified that the data transfer solution that MH was describing is a data warehouse (flat file), not a database. JS also indicated that the Watershed Information Network (WIN) database under development at DEP will be able to accommodate GW data. However, the estimated data of completion for WIN is at least three years away.

MH indicated that he would be willing to use resources available to him at UF to gather the data files from the SNW participants, and combine them into one file, as long as the SNW could agree on a standard

format and schema for the data files to be submitted. MH also indicated that he would prefer if the data providers submit their data as monthly averages, but if necessary he could use his resources to aid in standardizing the frequencies by calculating monthly averages, etc. JS added further clarification that the data submitted by the SNW participants should be limited to only those wells / records that are appropriate for producing PR maps.

JS reviewed the draft set of data elements that had been distributed before the workgroup meeting, and indicated that each of these elements has associated minimum data standards and metadata requirements that need to be defined and agreed upon:

COLUMN NAME	NORMAL VALUE	DATA TYPE	DATA SIZE
UNIQUE_WELL_ID	Station	VARCHAR2	20
ORGANIZATION_MAINTAINING_WELL	Station	VARCHAR2	50
STATION_NAME	Station	VARCHAR2	100
LATITUDE	Station	VARCHAR2	10
LONGITUDE	Station	VARCHAR2	10
AQUIFER_TAPPED	Station	VARCHAR2	40
MEASURING_PT_ELEVATION	Sample/Result	FLOAT	7,2
WATER_LEVEL_VAL(ft below MP)	Sample/Result	FLOAT	8,2
FIELD_SPECIFIC_COND(μ S/cm@25 °C)_VAL	Sample/Result	FLOAT	8,1
MEASUREMENT_COLLECTION_DATE	Sample/Result	DATE	
AGENCY_COLLECTING_DATA	Sample/Result	VARCHAR2	50

JS also reviewed concerns that SP had presented in response to the list of data elements. SP had indicated that the data elements need to include column for location datum / projection, but JS suggests that all data submitted should be in a standard datum and projection (e.g. WGS84), to minimize pre-processing required before conducting analyses.

SM asked for clarification on the draft data elements, regarding which items would be required for each observation, and what the requested POR would be. JS clarified that only the items listed in the table above would be required (the other tables included in the draft were the data element definitions), but indicated that more detailed instructions would be provided in the next draft of the data elements and spreadsheet. RC clarified that this initial call for data will only be for UFA GW level data.

SM indicated that many agencies will be willing to share the data that they have already collected, but they may not be able to reformat or reenter data, due to limited availability of resources. ***RC asked SM and others that may have a similar problem to contact him with specific details of the hardships encountered by any SNW data requests, so that he can attempt to develop a solution.***

Granville Kinsman (GK) and several others indicated that many agencies do not store GW level data as feet below the measuring point / land surface elevation. Instead, water level is stored as relative to the NGVD 29 datum, and all data will soon be converted to the NAVD 88 datum. RC asked how the data element should be modified. Several SNW members suggested requiring two columns: "water level elevation" and "vertical datum". MW added that this level of detail would be required to produce a potentiometric map, but would not necessarily impact the results of the PR analysis. Sandy Kinnaman agreed that it is necessary to know the vertical datum when producing potentiometric maps. JS indicated that data elements for vertical and horizontal datums were included in an early version of the draft data elements, but were removed in an effort to encourage data providers to agree upon a standard datum to convert their data to before submitting it to the warehouse. JS added that documenting this level of detail is important, to ensure that the data in the warehouse is not misused.

MH asked if the group could agree on a vertical datum, and convert the water level information to that datum before submitting it to the warehouse. SP indicated that NGVD 29 is the standard datum used at USGS. SP indicated that tools are available to convert between the two most commonly used vertical datums (NAVD 88 and NGVD 29). SK added that VERTCON is a vertical datum conversion tool available

from the National Geodetic Survey, but indicated that there are some generalizations in the model used that may lead to inaccuracy in some areas.

DD suggested that the SNW also contact the FWRMC Monitoring Catalog Workgroup and the group responsible for the data warehousing project at the Central Florida Water Initiative (CFWI) to attempt to make the SNW data warehouse compatible with their efforts. Several participants added clarification that these two efforts are only inventories, and are not transferring data.

RC indicated that he and JS will refine the draft set of data elements, including minimum data standards, and send the list out for review with the meeting summary. RC requested that SNW participants send him specific comments / objections / hardships in response to the draft data elements, so that he can start developing revisions and solutions.

Possible Generation of UFA Potentiometric Maps

RC asked USGS to draft a proposal for creating potentiometric maps to display side-by-side with the PR maps created by the SNW.

SK indicated that USGS generated a potentiometric map for a recent UFA water availability study using 800 furnished records from participating agencies. All furnished data had to meet the requirements for inclusion in the NWIS (National Water Information System) database, which are very specific and include many fields not listed in the draft SNW pilot study data elements distributed by JS. Products included the potentiometric map, available online in .pdf format, along with the supporting GIS shapefiles and 508 compliant metadata.

GK indicated that SWFWMD would not be able to provide any resources towards this project because they have undergone budget reductions and eliminated their previous potentiometric mapping project with the USGS. Several other participants agreed that they may not be able to provide any resources, but are interested in seeing the final cost estimate. RC indicated that the cost is approximately \$50,000, with potential for cost sharing up to 40%. Tom Seal (TS) asked if the WMDs that are not able to participate in the project with USGS are currently making their own potentiometric maps.

Possible Development of a Water Quality Index for Saline Indicators

RC asked SP to postpone most of his water quality index presentation until the next SNW meeting because there was not enough time remaining to discuss the issue at this meeting.

SP presented a subset of his presentation, focusing on water level frequency analyses.

- Comparison of US Drought Monitor and USGS stream flow: USGS stream flow data is compiled from sources with a variety of frequencies, while US Drought Monitor only includes data collected at greater frequencies. For USGS stream flow data, short-term changes can be lost or masked in areas where most measurements are collected infrequently.
- Separating data by aquifer is useful for analyses because aquifers can change at different rates. These analyses can help to determine the aquifers of greatest importance / use.
- Long-term trends can also affect frequency analyses. Long-term trends must be removed in order to isolate and analyze short-term changes.

Closing Issues

RC suggested that SNW meetings be regularly scheduled every three months, on the first Wednesday of the month, and proposed that ***the next SNW webinar meeting be held on Wednesday, November 7th from 1:00PM – 3:00PM.***