

MEMORANDUM

To: Groundwater Advisory Council
From: H. Bokuniewicz
Re: Minutes of the meeting of September 21, 2015
Date: September 28, 2015

PRESENT

H. Bokuniewicz
S. Colabufo
D. Paquette
J. Pilewski
R. Price
M. Scorca
J. Tamborski
S. Terracciano

REGRETS

M. Alarcon
N. Bartilucci
P. Granger
L. Koppelman
R. Liebe
R. Mazza
M. Nofi
A. Rapiejko

1. There were not comments on the minutes of the last meeting (June 1, 2015).
2. Geothermal units were briefly discussed. Geothermal systems are becoming more popular. It seems that some houses and facilities, especially out east, are using the public water supply to circulate through open-loop geothermal systems. The water should be recharged to the aquifers through diffusion wells but may be just dumped to the ground or into the wastewater streams. Open systems using public water would probably be most prevalent near the shore where shallow private wells would likely be contaminated with salt.

The USGS had looked into the issue in 2009 and one of our Hydrogeology students researched geothermal systems on Long Island in 2009. The DEC and SCDHS had considered revisions to regulations on geothermal systems six or seven years ago but we believe that new rules were not made and existing criteria consist of setbacks like those for septic systems. There is some question concerning the chemical impact of such a practice. Potable water is, of course, not necessary for these systems. Using the public supply can be done inexpensively on Long Island, however, running hot water through the household plumbing may add dissolved copper or other chemicals to the wastewater.

Modeling and monitoring of some representative systems may be an appropriate project for Stony Brook's College of Engineering.

3. Joe Tamborski discussed his Ph.D. research on the application of thermal infrared imagery to detect groundwater seepage. Submarine groundwater discharge is the flow of groundwater under the shoreline into marine water but groundwater discharge also feeds lakes and streams, carrying contaminants like nitrate into open water. Because groundwater tends to stay at the average annual temperature (55°F) it can be detected by thermal infrared imaging if the surface waters are much warmer (or cooler) than average, as they are expected to be for example in August (or February).

Experiments have been done using an FLIR Systems' T640 TIR camera operating at wavelengths between 7.8 and 14 μm capable of detecting differences in temperature of 0.1K. Images taken from a helicopter at an altitude of 1800 m have a spatial resolution of 1.2 m. Satellite and ground based images were also examined. A series of stations were taken along the north shore, around Smithtown Bay, in Port Jefferson Harbor and in the Forge River. Detectable thermal anomalies tended to extend about 50m offshore in areas of high SGD. The distribution along shore was patchy on the scale of about 100m. In the Forge River, SGD was detected in various caves along the shore and around pilings that apparently pierce shallow confining layers. Satellite TIR imagery has a resolution of about 60m and is unable to resolve these features. The thermal anomalies depend on the discharge mostly of fresh groundwater. SGD of sea water can still be occurring at shorelines without a thermal signature.

These sites were sampled nutrients and radiometric tracers; RA and Rn were used to quantify the groundwater (SGD) input. It appears that the size of the cool water anomalies for images taken in the summer can be linearly correlated to total SGD (in m^3/day).

Satellite data can be gotten on-line from LANDSAT or ASTOR including TIR at a 60m resolution.

Significant freshwater in the SGD was correlated with "high" (about 5 mg/L) nitrate. It was pointed out that the Suffolk County Department of Health Services had sampled monitoring wells at the Forge River shoreline as well as using ultrasonic flow meters and resistivity surveys to examine the connection between the aquifer and the open river water. We believe they did not find any flow across the deeper stream floor which was capped by mud. Shallow stratigraphy, especially local confining layers may exert a significant influence on the SGD. Detailed stratigraphy at Superfund Sites show a heterogeneous layering of local aquitards with low permeability sediments infilling buried channel systems. Clues to these anomalies might be found in the surface (LIDAR) topography.

The USGS and DEC are working jointly on modeling many streams on Long Island and their groundwater-fed nutrient loading.

4. Roy Price, a scientist at Stony Brook, is the Research Coordinator for the Center for Clean Water Technology. Funding for the CCWT has just been put in place and they are pursuing collaborative research with George Holdenfelds' Septic System Testing Center in Cape Cod, MA. The initiative in MA. Started early to address the need to meet TMDL's in surface water. This facility has been field testing denitrification systems for over twenty years.

We were reminded that there is a long history of attention to this topic on Long Island also including recognition of the need to balance efficiency with installation and maintenance cost. Joe Baier (now at Dvirka and Bartilucci) had suggested, as an alternative to new system, a "sewage tax" that would allow the government to pump-out household systems, like garbage collection in order to maintain them in good working order.

5. I'm embarrassed, but not apologetic, to report that I have made no further progress on the issue of data basing. (In June, we had started work on a flow diagram of data types and existing systems). LICAP now has an ad hoc working group on Water Quality led by Tom Schneider (SCWA) and Ty Fuller discussing the issue. One fundamental question is the purpose. Is it to be publically accessible or just for interagency use? What data is to be in it? . . . all information or only a few representative analysts? It may be wise to start with a limited, narrowly focused product perhaps, surrogates for (shallow) water quality like chloride and nitrate but not organic data from spills.

Dissolved oxygen and temperature would be nice but not routinely measured. In addition to groundwater data, WQX has vapor, soil and other data sets in a searchable format. What would be the standard formats for sample locations and well design etc.?

A broad spectrum of data is now going into the (publically accessible WQX system Water Quality Exchange) incorporating STORET. The SCWA intends for their data to go into EQuIS.

6. The Hydrogeology Program was briefly discussed. We had looked at the new proposed curriculum last year. I thought the plan had been approved but I have since learned that the approval process for that plan is still ongoing. Steve Colabufo and some other alums of the Hydro Program had met with Gil Hanson and others earlier to discuss revisions. The consensus was that the program still is needed on Long Island to provide the professional workforce (Environmental Science is not a substitute). We expect that interest will be renewed when the NYS Professional Geologist licensing begins (November 2016?)

We recognize the loss of faculty in Geosciences has hampered their ability to provide a suite of courses but stability and consistency in the require curriculum is essential. Adjuncts are probably only stop-gap measures and subject to funding. Perhaps, the Department should look to partnering with SoMAS, Sustainability and Engineering to deliver the curriculum.

A while ago (quite a while ago) Martin Schoonen has presented a plan for transitioning the program to on-line. This seemed like a positive direction in order to make it accessible to working professionals. In addition, there seemed to be little or no advertisement of the program. It seems pretty much forgotten in the professional community.

7. The next meeting will be on Monday, October 26.