

MEMORANDUM

To: Groundwater Advisory Council
From: H. Bokuniewicz
Re: Minutes of the meeting of 17 October 2011
Date: October 18, 2011

PRESENT

N. Bartilucci
H. Bokuniewicz
R. Busciolano
B Christenson
S. Colabufo
M. Scorca
W. Spitz
L. Swanson
S. Terracciano

REGRETS

M. Alarcon
S. Jones
L. Koppelman
R. Liebe
R. Mazza
M. Nofi
D. Paquette
A. Rapiejko
K. Roberts

1. There were no comments on the minutes of the last meeting (September 19, 2011).
2. Dr. Beth Christensen addressed the council concerning research being done at Adelphi University. Beth has spoken to the EPA last spring and Rob Alvey suggested that she also meet with us.

Adelphi continues to build their program in Environmental Studies. Fifty percent of the faculty joined the program in the last ten years. Beth studies marine geology and has been at Adelphi for seven years. The educational program is designed for vocational training so that graduates have the best chance of finding jobs in the environmental field. Courses include GIS and hydrogeology. Beth and her colleagues are always interested in arranging student internships and other opportunities for students to participate in projects. It was pointed out that the Suffolk County Vector Control Program (Dominick Ninivaggi) is looking for student assistants.

Important study sites are in the South Shore Estuary Reserve. Some research has been in collaboration with "SPLASH" in the Freeport Area. SPLASH (Stop Pollution Littering and Save our Harbors) is a volunteer group that removes debris and has provided boat-time for researchers from Adelphi studying, for example, sediment, invasive species and heavy metals.

Jonna Coombs is a microbiologist studying remediation. She works on microbial community composition to determine their response to pollutants, such as pesticides, solvents and metals in sediment. Some microbes, for example, develop a resistance to heavy metals; this strategy might be useful in the design of the remediation of contaminated sites.

Jessica Dutton is examining levels of heavy metals (Hg, As, Cd, Cr and Zn) in water, sediment and organisms including the higher trophic levels (fish). With Aaron Freeman, she is also investigating the impacts of heavy metal contamination on interactions between native and invasive species. Other research on heavy metals is being done by Matthias Foellmer on salt-marsh invertebrates and vegetations exposed to heavy metals.

Andrea Ward is a biologist specializing in evolution and development. She has been conducting experiments on the development of fish in elevated temperatures. Such research is relevant to issues of climate change.

Beth Christensen has studied salt marsh loss in the western bays of the south shore of Long Island. Between 1926 and the last 20th century about 50% of marshland was lost primarily to filling at the shoreline and the dredging of navigation channels. Some like Ingraham Hassock have also suffered progressive shoreline retreat, perhaps due to boat wakes. We believe that the DEC also did a study of marsh loss although nothing has been published.

Recently, she has also worked with the EPA to examine the impact of offshore sewage outfalls off Jones Beach. The EPA work is done with Mark Riess and Doug Pabst of EPA Region 2.

In other Adelphi departments, John Dooher of Physics has active research continuing in coals and biomass technologies. Field work has also been done to search for the impacts of hurricanes on the marshland immediately north of Lido Beach. Initial sampling must be considered as unsuccessful; coring could not go below 2m and no obvious “events” were found. Dr. Chris Famer at Hofstra is continuing this work.

3. Larry Swanson reviewed research being done in Hempstead Bay. Coring information provided by Beth has been very helpful in this study also. The DOS has designated the Western Bays as “impaired water bodies”. At Stony Brook University, a study is underway to review water quality information, generate new bathymetry, to do hydrodynamic modeling, to study water-column processes, to document sediment contamination, to examine marsh accretion and subsidence, and to investigate impacts to winter flounder. Long Beach itself is largely artificial. In the last 1900’s the western end of Long Beach was a series of island. Mr. Reynolds dredged the Channel around 1910 and used the sand to create Long Beach.

Water quality had been measured at thirty sites since 1975. All measurements were made at a depth on one meter and there are significant gaps in the data, in addition to some concerns about the data quality. Ammonia most heavily impacts the water quality in the vicinity of the Bay Park outfall. The northern reaches of the Bay may go hypoxic in the summer; D.O. is only a problem in Hewlett Bay where the water is 40 to 50 feet deep. It would be perhaps enlightening to look at water quality in the early 1950’s, if possible, before sewerage. By 1954 there was a problem with settling.

The water temperature shows a seasonal variability primarily controlled by the inlets in the summer. In the winter, warmer water is found in the east of the Bay while the most cooling and, consequently, the coldest water is found in the west. Salinity is dominated by the inlets although fresher water can be found north of the Bay Park outfall. Algal blooms have been documented in Hewlett Bay as well as near the outfall.

Quaternary Ammonium Compounds, QACs, are indicators of sewage inputs. Elevated concentrations are found near the Bay Park outfall as well as to the north.

The first chart was done in about 1935. New bathymetry is available now for the channels. It is used in hydrodynamic modeling which show that impacted water from the Bay Park outfall tends to be retained in the Bay. It is difficult for this water to exit the system through either East Rockaway or Jones Inlet, and at least some tends to penetrate the Bay northward.

The tidal range has changed over time, apparently, in response to cycles of dredging and subsequent shoaling. In 1935, the mean tidal range at Bay Park was 3.6 feet. After the channels were dredged, the mean tidal range, in 1975, increased to 5.1 feet. Then in 2010, it had decreased to 4.5 feet, presumably in response to shoaling in the channels. NOAA charts are available from 1929 and the Corps of Engineers has records of the volumes of sediment removed and changes in the controlling depth.

The study of winter flounder just started this past summer.

The data assembled by the study is to be considered by the DEC for setting TMDL's. There may also be recommendations concerning the Bay park Sewage Outfall. The STP's do not have enough room for denitrification plants. So the question arises whether the outfall should be relocated in the Bay? . . . diffused throughout the Bay? . . . diverted to the ocean? Bay Park was found to be non-compliant by the DEC. The consent order to resolve the non-compliance required a feasibility study (\$500,000) to explore moving the discharge offshore. A company has not yet been chosen to implement this study. (Maybe by the next meeting). Cedar Lake and Lawrence STP's are slated to go to the Bay Park STP.

Ulva or "greenberg"s, remain a problem there has been a question about who has jurisdiction (responsibility) for the *Ulva* problem among the Town County or State. One solution would be to adjust the beach near Jones Inlet so that *Ulva* doesn't accumulate. It has filled in naturally in that area. High nitrate has been measured on an incoming tide; the community there is unsewered and septic systems may be a source.

4. Ron Busciolano discussed the status of the USGS program in Nassau County. County funding for the cooperative stream flow and groundwater monitoring program was stopped about a year ago. They now have some funding from the Jericho Water District (Peter Login) which is in the process of drilling new wells. The drilling logs will be shared with the USGS for inclusion in the GIS. The EPS/USGS integrated GIS screening tool may be expanded into Suffolk County. Cooperative work is also being done with the EPA on the Grumman-Navy plume. The Tetra Tech consulting firm has monitoring wells in the Massapequa Water District and geophysical logging will be done; an observation well is planned.

The USGS met with the Water Conference on 26 September. On Long Island they maintain a network of 615 observation wells, 25 stream flow stations, five lake stations and 11 in estuaries are on-line for public use. Other products, like the depth-to-water maps are also available, although the depth-to-water maps was last done in 2006 and we've had wet years since then. In Nassau County, there were 53 monitoring wells, some of which have records back to the early 1900's and six stream flow stations recording

freshwater flow into the southern bay. Only one well is monitored now with funding from the DEC. Re-establishing monitoring at these would cost about \$150,000.

Nassau County has the highest percentage (200 MGD) along the northeast coast with Suffolk being a close second. In Nassau, about two-thirds of the annual recharge is pumped. In the 1950's and 1960's there was about a 20-foot decline in water levels in Nassau. It recovered somewhat after the drought years in the 1960's but not back to predrought levels. Water table elevations stabilized about 15 feet below pre-war conditions. In Suffolk, almost 30% of the county is sewerred, but neither groundwater quantity nor quality is an issue for the Water Authority.

Salt water intrusion continues to be an issue in places like Sands Point and Manhasset Neck where there appeared to be increased intrusion between 1994 and 2005 even above the screened depths of supply wells. On the south shore, the salt front moved about 150 feet per year between 1958 and 1988. There were both a shallow and a deep salt wedge. It is not known where the front is now. The cessation of pumping in Queens may have halted its progress. According to modeling done by Paul Misut in Brooklyn and Queens, sea level rise in driving the salt water wedge landward.

The USGS cannot solicit support but it is hoped that other water districts in the Water Conference will make contributions to maintain the program. In the absence of a Nassau County Water Authority the Conference has some history of working in concert and, perhaps, a sustainable program can be revived.

5. Lawn watering in the summer continues to create a major imbalance in demand. The Jericho Water District uses 24 wells in the summer months but only needs five for the basic winter demand. Jericho has unsewered areas as well as farmland. The population of Nassau has remained relatively stable, but, with an aging population, the "empty nest" syndrome is expected to alter water demand. In the summer demand is three or four times the winter usage. A demand of 137 MGD in the winter might reach 258 MGD in the summer with peak demand approaching ten times that value. In susceptible areas such spikes in demand could aggravate salt water intrusion. Winter use has actually decreased in Nassau due at least in part, to conservation efforts. Some of the newer community sprinkler systems are on separate lines that can be controlled or shut off centrally by the District. Although the availability of sewer systems tends to increase household use (presumably because the family not concerned with overloading a private septic system). When Oyster Bay was sewerred in the 1980's water use increased 15 to 20%. The Jericho Water District now uses reverse rates where rates increase with use.

Water Districts cannot make a profit and their goal is to meet the demand of their population. A wet summer when sprinkling demand is reduced is a "dry summer" to the water suppliers; demand is down and problems with the rates may result. Simply stretching out the peak demand during the day would help, but conservation should be encouraged to avoid further infrastructure development costs.

Unfortunately, the conventional wisdom unnecessarily eschews watering overnight to avoid fungal growth. Clam beds are automatically closed by State law after a heavy rain; perhaps lawn-watering can be similarly curtailed. This is more of an infrastructure issue rather than a resource issue. The responsibility for conservation should not be on the shoulders of the water purveyors. State law regulates plumbing fixtures. Perhaps, a state law is needed to regulate sprinkler systems. There are, of course, water-use ordinances

on the books, but they are not enforced, reasonably enough by local police. A State law would shift enforcement to DEC police. The biggest abusers would seem to be industrial parks.

We will put this topic on the agenda for the next meeting. Perhaps, some public relations efforts can be mounted in the spring. Would media “Public Service” announcements help?

6. The next meeting will be on **Monday, November 21, 2011** at the offices of the SCWA in Oakdale 9:30 – 11 AM.

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