

HEARING ON WATER QUALITY AND CONTAMINATION

HELD BY
NYS SENATE STANDING COMMITTEES ON HEALTH AND ENVIRONMENTAL CONSERVATION
AND
NYS ASSEMBLY STANDING COMMITTEES ON ENVIRONMENTAL CONSERVATION AND HEALTH

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STATEMENT BY

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INTRODUCTION

It has been 38 years since the *Long Island 208 Study* was released to the public in 1978.¹ At the time, the study dismissed groundwater quantity concerns claiming we were not in need of a tunnel to bring water down from upstate. But, it did ask the question, how can we preserve *water quality*? In the opening message Harold Gleason, the LI Regional Planning Board Chairman, wrote: “This stern challenge must be met by the courage of government supported by an informed constituency, sensitive to parochial interests, yet **willing to override them for the common good.**”²

The Study contained many warnings about groundwater and coastal water conditions on Long Island including:

- Wastewater discharges could pollute both groundwater and coastal waters;
- Nitrogen from its many sources must be addressed;
- VOCs from industrial activities pose a serious threat to groundwater;
- Population Impacts and Land use need to be addressed;
- Wastewater collection and treatment is needed;
- Pesticides are polluting groundwater;
- Non-Point Source Pollution and Stormwater runoff affect groundwater and surface water; and
- Coastal water conditions (closed beaches, wetland losses, hypoxia) are deteriorating.

A significant outcome of the *LI 208 Study* was the identification of the **Deep Recharge** and **Shallow Recharge** zones that have helped guide land use and groundwater protection decisions for over three decades. Gleason warned, “It would be extremely shortsighted to view this plan as just another study – its pages like leaves on trees, deciduous and gone, once fallen to the ground. Its direct value is in its use as a working document, important to the life-styles of future generations and business growth.”³

¹ *Long Island Comprehensive Waste Treatment Management Plan*, Long Island Regional Planning Board, June 1978.

² *Ibid.* pg. xi.

³ *Ibid.*

While the *LI 208 Study* was prophetic, it was not implemented as intended. And, it was followed by at least 10 other studies and reports since 1978 that examined the problems of groundwater and/or surface water but resulted in less action than we might have hoped. (See Appendix A for a list of significant studies.) There have been state laws also directed at groundwater protection and management that likewise, have not seen the type of follow through we expected. (See Appendix C for a list of state statutes that have not achieved their intended purpose.)

In spite of Chairman Gleason's warning, Long Island has been very sensitive to parochial interests and unwilling to override them for the common good. This unwillingness to buck the *status quo* is shocking in its scope and persistence, 38 years later.

Although the *LI 208 Study* was a call for action, it was not enough to overcome the general public's passiveness and lack of awareness about groundwater. As evidence has mounted that our drinking water supply is developing problems, the message to the public has frequently been one of reassurance that all is well. It is hoped that today's hearing will end the decades of accepting the *status quo* and we will finally be moved to find and implement solutions to our groundwater problems. We are up to this task if we do as Harold Gleason asked: **override parochial interests for the common good of us all.**

The comments submitted to you today will address the following issues in dire need of not only attention, but also action and solutions.

- VOC contamination
- NO₃ (nitrate) contamination
- Superfund sites and remediation
- Water Quality Standards: drinking water, ambient water standards, discharge standards
- Water Treatment
- Water Quantity
- Water Quality & Quantity Monitoring
- Enforcement
- The *status quo* and the future of water on Long Island's water

WATER QUALITY AND WATER QUANTITY

The hearing today addresses water quality but in the case of groundwater, water *quality* and water *quantity* issues are **inseparable**. Many of the on-going groundwater problems are a consequence of how we use and abuse our groundwater supply. We must not lose sight of this relationship.

GROUNDWATER QUALITY PROBLEMS

To begin with, both Nassau and Suffolk County are experiencing water quality problems that are similar but at different stages of severity.

Table 1 summaries groundwater pollutants by county and level of impact.

Table 1: GROUNDWATER POLLUTANTS IN NASSAU & SUFFOLK COUNTIES NEW YORK

| NASSAU COUNTY POLLUTANTS | SUFFOLK COUNTY POLLUTANTS |
|--|---|
| 1. Volatile Organic Compounds (VOCs) ⁴ | 1. Volatile Organic Compounds (VOCs) |
| 2. Spills from Gasoline and other storage tanks (BTEX, MTBE, Freon, others) | 2. Nitrogen-based compounds |
| 3. Superfund Site pollutants (VOCs, heavy metals, PCBs, radioactive chemicals, pesticides) | 3. Pesticides |
| 4. Nitrates | 4. Superfund site pollution |
| 5. Perchlorate | 5. Sewage treatment plant discharges to GW |
| 6. Unregulated Chemicals (1,4-dioxane, PFOA, BHT) | 6. Perchlorate |
| 7. Saltwater | 7. Industrial chemical discharges |
| 8. Industrial chemical discharges, such as Manufactured Gas Plants | 8. Unregulated Chemicals (PFOA, PFOS, PPCPs, 1,4-dioxane) |

1. WATER QUALITY INVOLVING VOCs

VOCs: Volatile Organic Compounds

Nassau County

VOCs constitute the group of compounds typically thought of as carcinogenic. These chemicals have had a dramatic and serious impact on groundwater wells in Nassau County, where nearly **25% of all the approximately 400 drinking water wells** require treatment prior to use.⁵ Treatment technology includes Granular Activated Carbon (GAC), Air Stripping (AS) or both. Much of the VOC contamination is in the deeper Magothy aquifer which provides approximately 85% of all drinking water in the county. Another **25% of all drinking water wells** have detectable levels of VOCs that may not yet require treatment but it is probably only a matter of time before they too will be treated. By way of comparison, in 1999 less than 22% of public supply wells had detectable levels of VOCs.⁶ Today, about 50% of all drinking water wells are impacted to some degree by VOCs.

Nassau County Department of Public Works (DPW) reported in 2005 on a trend of gradual improvement in VOC contamination of the shallow groundwater (Upper Glacial aquifer) based on samples from the 500 monitoring wells in the County.⁷ It also reported on the frequent detection of an unregulated chemical, *Butylated hydroxytoluene* (BHT). This chemical is widely used in consumer products. Fifty-five percent (55%) of the 42 wells tested for this compound found detectable amounts.⁸ Due to budgetary concerns, more recent data on the presence of this chemical has not been reported.

No other major population center in New York State has experienced a similar pattern of VOC impact on their drinking water supply. Much of the pollution problem in Nassau County is legacy pollution.

⁴ The most common VOCs being found in groundwater in both counties are: PCE (tetrachloroethene); TCE (trichloroethene); and TCA (1,1,1-trichloroethane) along with MTBE (Methyl Tertiary Butyl Ether), a gasoline additive .

⁵ Approximately 122 drinking water wells require treatment for VOC removal in Nassau County, according to the Nassau County Department of Health. 11-2-2015.

⁶ According to *Groundwater and Public Water Supply Facts for Nassau County, New York, 1999*, Nassau County Department of Health, Bureau of Environmental Protection, pg. 48.

⁷ *Nassau County Groundwater Monitoring Program, 2000-2003; 2005*, Nassau County Department of Public Works, pg. ii.

⁸ Note: BHT is used as an antioxidant in food products, synthetic rubber and plastic, animal and vegetable oils and soaps.

The large number of superfund sites (154+) reflects the chemical handling practices of the past. Nevertheless, the County is confronted with the consequences today.

Suffolk County

For Suffolk County, the detection of VOCs in groundwater and drinking water wells is increasing over time but has not yet reached the degree of impact already present in Nassau County. For now, Suffolk County has the option in many cases to drill deeper into the aquifers to find high-quality groundwater not yet affected by VOCs. The consequence of this practice, however, is to pull shallow contamination deeper into the aquifers, impairing more groundwater over time. Nassau County demonstrates the results of this process in its groundwater problems today. Is this really the best way to protect the cleanest groundwater left in the aquifers?

According to the Suffolk County Department of Health Services, **only 2 %** of approximately 600 drinking water wells **exceed the drinking water standard of 5µg/L for PCE**. Only 8% of all drinking water wells have a detectable level of PCE in them. A similar trend is evident for TCE in Suffolk County wells. TCA and MTBE levels in wells in Suffolk County have declined from 1987 to 2013 due to bans on these chemicals in consumer products (cesspool cleans in 1980 for TCA and gasoline additives in 2004 for MTBE).⁹

2. WATER QUALITY INVOLVING NITRATES

NO₃: Nitrates

Nassau County

In Nassau County, 90% of the County has been served by central sewer systems with ocean/coastal discharges since the 1980s. This has reduced on-going nitrogen loading to the groundwater system but has not prevented the earlier nitrate discharges from slowly migrating to the deeper Magothy aquifer. Nitrate levels in shallow groundwater and streams have modestly improved over the years. For drinking water wells, however, nitrate is being detected in the Magothy aquifer requiring various types of treatment. **Eleven (11) drinking water wells** are receiving nitrate removal treatment and another **10 wells are being blended** with 10 clean wells to dilute nitrate levels below 10 mg/L as allowed by Health Department regulations. That makes a **total of 21 drinking water wells directly impacted by nitrate pollution**.

The reduction of nitrates in shallow groundwater and stream flow conditions in Nassau has been noted in a USGS study examining nitrogen discharges to Long Island Sound.¹⁰ The study compared loading from streams in Suffolk and Nassau Counties into the Sound. It found that the Nissequogue River in Suffolk County contributed 3 to 6 time more nitrogen to Long Island Sound than did three streams along Nassau County's north shore. A similar result was found in groundwater discharges. Groundwater from the deeper aquifer released 89 tons/year of nitrogen from Nassau into the Sound, compared with 265 tons/year for a similar area in Suffolk County.

Other nitrogen loading studies such as those conducted by The Nature Conservancy have shown that septic system discharges near the coastline are still affecting surface water quality along Nassau County's north shore. (See Appendix B)

⁹ According to the *Suffolk County Comprehensive Water Resources Management Plan*, Executive Summary, 2015, pg. 25-28.

¹⁰ Scorca, Michael and Jack Monti, 2001, *Estimates of Nitrogen Loading Entering Long Island Sound from Groundwater and Streams on Long Island, New York, 1985-1996*. USGS Water Resources Investigations Report 00-4196.

Suffolk County

Suffolk County has noted a disturbing trend in nitrate levels in groundwater conditions from 1987 to 2013. *The Comprehensive Water Resources Management Plan (2015)* documented an average increase in nitrogen levels in the **Upper Glacial aquifer** from **3.12 mg/L to 4.34 mg/L** between 1987 and 2005; **a change of 28%**. Average nitrogen levels in the **Magothy aquifer** increased over the same period from 1.14 mg/L to 3.43 mg/L; **a change of 66%**.

Private water wells in Suffolk County also showed a greater degree of nitrogen impact. Although nitrogen levels increased, 75% of private wells were still at or below 6 mg/L but **10% exceeded the drinking water standard of 10 mg/L**. From a public health perspective, this is a point of concern because private wells are tested far less frequently than public water supply wells. Less than 1% of public drinking water wells in Suffolk County exceed the nitrate standard which would make the number of wells affected by nitrates **less than 5**.¹¹

Contrary to the nitrogen impact on groundwater, discharges from groundwater and runoff into coastal waters continue to show a major impact on coastal water quality and ecological conditions. Some notable studies have documented the sources of nitrogen in groundwater and runoff into coastal waters. See Appendix B for the studies.

When speaking about nitrogen pollution, the complicating factor is that aquatic life and ecosystems are 100 times more sensitive to nitrogen than are human populations using the current drinking water standard of 10 ppm. **Thus, the way that nitrogen is regulated in groundwater should be changed to reflect this higher sensitivity among aquatic systems.**

3. SPILLS, SUPERFUND SITES and ILLEGAL DUMPING

It is well-documented that Long Island has the largest number (250+) of listed Superfund sites (State and Federal) of any area of New York State. The presence of so many sites in a densely populated suburban region totally dependent on groundwater should set off major alarm bells for officials and regulators at all levels of government. Yet, it is usually only the directly affected communities that have voiced the strongest concern for the impacts of highly contaminated sites. Sites at Bethpage-Grumman and Northrup-Grumman in Lake Success are two examples of long-term advocacy to clean up contaminated groundwater. Local water suppliers, community leaders and their elected officials have quickly found that they and their constituents are often alone when it comes to fighting for scientifically credible and effective solutions and cleanup of dangerous sites. **This situation must change.**

Superfund and Brownfield sites are exclusively the domain of the NYS DEC or the US EPA with local tracking by the County Health Departments. The slow pace of remediation along with the migration of contamination plumes increases the vulnerability of the remaining groundwater beneath Long Island. After over 20 years of experience with these two programs, it is fair to say that they generally have not produced the positive improvements the citizens on Long Island had hoped for and today, all impacted communities are looking for better results.

The problem is not only that it takes so long to physically clean up contaminated groundwater. Equally at issue is the slow pace of regulatory actions and decisions that cause unnecessary delays.

¹¹ *Suffolk County Comprehensive Water Resources Management Plan, 2015, Executive Summary, pg. 26*

Long Island contains sites that represent virtually every type of pollution problem found around the nation – all right here in one small region of New York State. Groundwater and soils can be contaminated from: heavy metals, PAHs, PCBs, VOCs, SOCs, perchlorate, radioactive materials, pesticides, industrial chemicals, asbestos, C&D materials, PFOA, and highly concentrated minerals.

One notable aspect to this problem is that currently there is **no apparent overall coordination in responding to polluted sites – each site seems to be addressed on a case-by-case basis**. Thus, every community must go through the process of educating themselves and trying to advocate for themselves against both the environmental officials and the responsible parties. This does not seem right.

For Superfund cleanup, there are other issues that need attention and change. They include:

- Leaving serious pollution in the ground and groundwater is not a good or sustainable approach above a Sole Source Aquifer. A classic example of this approach is the Fulton Ave. (Garden City Park, Nassau County) plume that has already impacted at least 18 public water supply wells. The wells are being treated but the plume is not being cleaned up. The 4-mile long plume has been left in the groundwater, unremediated for decades.
- Allowing drinking water wells to become remediation strategies is opposed by the County Health Departments and is against state health department policy but it is advocated by the DEC. **We need a better policy and a resolution to this disagreement because this situation will continue to occur.**
- Dragging out the time for the review and approval of cleanup plans by state officials makes projects more expensive, longer, and is discouraging to the public. DEC needs more staff to conduct its review and response to the process. **It would be very helpful if DEC had remediation staff here on Long Island to be more accessible and responsive to the needs of Long Island.**
- For NYS superfund sites, New York should change its approach for cleaning up contaminated sites. **Rather than delaying enforcement if responsible parties refuse to act, New York must aggressively approach remediation as a first option, not the last.**
- Allowing responsible parties to promote “natural attenuation” in a Sole Source Aquifer is tantamount to permission to destroy the groundwater resource. Long Island cannot afford to write off sections of its aquifers due to toxic pollution. New York City would not tolerate such an impact on its drinking water – why should Long Island? **Natural Attenuation should not be a remediation option on Long Island.**
- Promoting cleanup strategies such as the Bethpage remediation plan to treat 19 MGD of groundwater and then dump it into the ocean rather than recharging it back to groundwater makes no sense and undermines efforts to use groundwater sustainably. In Nassau County, such waste is not tolerable. Annual water pumpage already exceeds safe withdrawal levels by at least 15% in Nassau. **Remediation programs must interact with water programs to find sustainable solutions.**

- It does not appear that the comprehensive Superfund cleanup strategy mandated by state law¹² had been completed. **A plan, leadership and funding are all necessary to help Long Island recover from the legacy of pollution that is damaging our groundwater.**
- The State Superfund program has been in effect for over 20 years and technology has improved considerably. Yet, there are still **no comprehensive maps of superfund sites and their respective plumes** in either county. This situation is shocking to most people. Certainly, it is time to show everyone what this problem looks like even if it is not pretty. There is a duty to protect critical resources, embodied in the Public Trust Doctrine. We should honor that responsibility.
- One last point on Superfund sites. Many superfund sites are former or active **dry cleaning establishments**, using organic solvents in their operations. Why has the use of these chemicals for such a purpose not been outlawed?

4. BETHPAGE/GRUMMAN SUPERFUND SITE AND ITS CLEAN UP

The size and extent of the groundwater contamination from the Grumman/Navy site in Bethpage, New York is massive. Allowed to linger for decades, the Responsible Parties and the State are now confronted with a remediation project of historic proportions on Long Island. The site and plumes cover 5 square miles and some plumes have reached a depth of 800 feet. CVOCs (chlorinated volatile organic compounds) are at levels of more than 5,000 ppb. By law, the site must now consider the remediation approach known as **Hydraulic Capture** to prevent the leading edge of the plume from traveling further south/southwest and impact additional public water supply wells.¹³ However, the 19MGD of treated groundwater has nowhere to go but the ocean, according to the *Remediation Options Report* (July 2016). This water must not be wasted. A beneficial reuse for this water must be found. A net gain of groundwater for the overstressed aquifer system in Nassau County is needed. This will require leadership and cooperation between the DEC and the State Health Department that have conflicting policies about groundwater reuse from remediation sites. DEC promotes drinking water wells to be used for remediation and the DOH does not. A middle ground is needed for extreme cases so that treated groundwater is not discharged to waste as is the practice today.

One note for future consideration: The *Remediation Options Report* said that D-NAPLs¹⁴ were not present in the plume being remediated in the study. There is been little discussion of the presence of D-NAPLs. Certainly in a site such as Bethpage, D-NAPLs could be expected to be present. Thus the question is *where are they?* It is not clear if a focused effort has been made to locate D-NAPLs which would be expected to be collecting at the bottom of the Magothy aquifer, along the top of the Raritan Clay.

5. DRINKING WATER & GROUNDWATER STANDARDS IN NEW YORK

There are many aspects of water quality affected by the New York State standards for drinking water, groundwater and coastal/surface waters. The New York State Department of Health is responsible for

¹² See ECL, Title 31, §15-3107 (Groundwater Information Management) and §15-3109 (Groundwater Remediation Strategy).

¹³ *Remedial Options Report* on Grumman Aerospace Bethpage Facility, NYS DEC, July 2016.

¹⁴ D-NAPL is the abbreviation for the term, Dense Non-Aqueous Phase Liquids. Such chemicals are denser than fresh water and sink to the bottom of aquifer formations, becoming separated from other plumes that are flowing with groundwater.

adopting (via the State Board of Health) drinking water standards. The NYS Department of Environmental Conservation (with the approval of the Environmental Review Board) adopts and implements ambient surface and coastal water standards and groundwater standards.

The policies related water standards is a much longer discussion that we can address today, so my comments go directly to the key issues.

Drinking water standards

The drinking water standards in use today in New York need to be re-evaluated for their adequacy in protecting public health. Many toxic chemicals are evaluated only for their potential to cause cancer, but today, we know much more about the subtle yet harder to determine impacts on the immune system, fetal development, mental health, and conditions such as asthma, skin conditions, and even autism.

A. Health impact studies on exposure to VOCs and CVOCs need to be updated. Health risks need to be evaluated at the “one-in-a-million risk” rather than the one-in-ten-thousand risk. Environmental health professionals know that the one-in-a-million risk as applied is frequently in name only. New York State should move ahead on this, even if the US EPA does not.

B. When it comes to VOCs and related chemicals in drinking water, the cumulative standard needs to be revised. Presently, we allow a higher level of exposure to multiple chemicals that are individually below the drinking water standard; going from a standard of 5 ppb for a single chemical to a multi- chemical standard of 50 ppb. This makes no sense for chemicals that have very similar chemical composition and/or similar health impacts. **The multiple-chemical exposure standard should be lowered.**

For example, at the Bethpage site, a number of the CVOC compounds are very similar chemically. They include:

- 1,1,1-TCA = 1,1,1-Trichloroethane
- 1,1,-DCA = 1,1-Dichloroethane
- 1,1,-DCE = 1,1-Dichloroethene
- 1,1,2-TCA = 1,1,2-Trichloroethane
- 1,2 – DCE = cis-1,2-Dichloroethene
- 1,2-DCA = 1,2-Dichloroethene

It should be noted that many of these chemicals are the same ones found in raw groundwater tested throughout Nassau County. (See Section 8 (VOCs) of these comments.)

C. **Disinfection by-products (DBPs) and Trihalomethanes (THMs)** have been a concern for years and the US-EPA has worked to improve drinking water standards for these chemicals created by the use of chlorine as a disinfectant. Public health officials often believe that groundwater-sourced drinking water is immune from DBP problems. But in both Nassau and Suffolk County, **chloroform** (a THM) is routinely detected in raw groundwater samples. You will see in a later portion of my statement, that chloroform was found in 25% of the groundwater samples from monitoring wells in Nassau County from 1990-1998 and 15% of the samples from 2000-2003. The standard for chloroform is 80 ppb. The presence of chloroform in raw groundwater needs to be addressed, to determine if the standard is right and to uncover the source of such extensive contamination. The common response to this issue is

that the chloroform is a result of testing contamination in the lab. Brushing off this issue is not in the best interests of public health protection for the residents of Long Island.

In addition, the use of chlorine in general as a safe disinfectant is being called into question by studies in the US and around the world. New York State should take a look as well.

D. Setting standards, even interim standards, for **unregulated chemicals** found in New York State drinking water needs to be a higher priority. An example of a standard that was very slow to be adopted is **perchlorate**. It is found around the country, including Nassau and Suffolk, yet New York was slow in moving ahead even with a guideline for perchlorate.

PFOA and PFOS are another case where other states adopted standards for these chemicals but New York held back. Now that the US-EPA has recommended a limit of 7 parts per trillion as a guidance level, New York needs to enact its own standard as soon as possible.

6. WATER TREATMENT FOR DRINKING WATER

Nassau County

Nassau County Department of Public Works (DPW) reported in 2005 that in addition to public water supply wells being treated for VOC or nitrates, other treatment approaches included:

- Corrosion Control (95%)
- Chlorination (89%)
- Iron removal/control (35%).¹⁵

VOC treatment for drinking water in Nassau County usually involves Air Stripping towers, but some GAC (granular activated carbon) is used as well. In Suffolk County, GAC is used almost exclusively for VOC removal.

7. GROUNDWATER QUANTITY CONCERNS

Significant overpumping of groundwater is occurring in Nassau County. This is impacting water quality on both the north shore and south shore of the County, in all three main aquifer formations. Although the drinking water standard for chloride is 250 ppm, there are a number of instances where the chloride level has already reached 50 ppm. It is the view of the USGS that once a section of the aquifer reaches 50 ppm of chloride, the saltwater front is actively moving landward and full intrusion is almost inevitable. Wells on the north shore of Nassau County have already been closed due to high chloride levels. Some water suppliers such as the Water Authority of Great Neck North and the Port Washington Water District have had to shift much of their water production inland, away from coastal wells. The Sands Point Water District has no inland area to retreat to and they are at serious risk from saltwater intrusion.

On the south shore of Nassau County, the City of Long Beach is 100% dependent on the Lloyd Aquifer for its water supply. Saltwater intrusion appears to be progressing beneath Long Beach Island. Action is needed now to reduce and rebalance groundwater extraction to a level that does not cause further damage to water quality along the coastal margins. The Magothy aquifer along the south shore is already intruded far inland due to overpumping and further intrusion is expected - - especially as sea level rises.

¹⁵ Nassau County Groundwater Monitoring Program, 2000-2003; 2005, Nassau County DPW, pg. 13.

Overpumping the aquifer has several damaging consequences. These include:

- Destabilizing the interface between fresh groundwater and saline ocean water;
- Reducing the amount of groundwater outflow results in saltwater intrusion;
- Spreading polluted groundwater deeper and wider through the aquifer system, thus polluting more groundwater over time; and
- Lowering the water table so that surface water features such as ponds and streams may dry up.

There needs to be a strong response to these conditions from New York State. Waiting for the results from the newly authorized USGS Quantity Study before working to bring down pumpage is a delay we cannot afford.

8. WATER QUALITY AND QUANTITY MONITORING

Nassau County

The Nassau County Department of Public Works (DPW) reports it has a groundwater monitoring well network of 620 wells. Of these, 500 wells are considered usable for data collection. They include:

- 366 wells in the Upper Glacial aquifer
- 167 wells in the Magothy aquifer
- 66 wells in the Lloyd aquifer
- 8 wells in the Jameco aquifer and 13 wells in the North Shore aquifer.

VOCs: From this network, DPW found a complex picture of water quality in the different aquifers from 1985 to 2003. It found:

- **Total VOCs:** The percentage of Total VOC samples that exceeded the 5 µg/L standard in the **Upper Glacial** aquifer was 12% in 2003, down from 28% in 1992; for the **Magothy** aquifer, detection was at 12% but **showed an increasing trend since 1995**; and in the **Lloyd** aquifer, detections of TVOCS were at 4% with **an increasing trend since 1993**.

The comparison of TVOCs found in monitoring wells in 2000-2003 vs. 1990-1999, reinforces the view that VOCs contamination continues to be a serious concern for groundwater and a risk for the future quality of drinking water. Pumping practices are causing the downward migration of pollution into the deep aquifer at an accelerated rate.

Table 1. Changes in Detection Frequency for VOC Compounds Found in Groundwater Monitoring Wells Over a 13-Year Period In Nassau County, N.Y.¹⁶

Table 1-A.

2000 - 2003

| Compound | Frequency (%) |
|---|----------------------|
| Tetrachloroethene | 62% |
| Trichloroethene | 43 |
| c-1,2-Dichloroethene & 2,2-Dichloropropane | 32 |
| 1,1,-Dichloroethane | 30 |
| 1,1,1-Trichloroethane | 26 |
| Methyl Tertiary Butyl Ether | 22 |
| 1,1-Dichloroethene | 19 |
| Chloroform | 15 |

¹⁶ Nassau County Groundwater Monitoring Program, 2000-2003, pg. 75

Table 1-B.

1990 - 1999

| Compound | Frequency (%) |
|---|----------------------|
| 1,1,1-Trichloroethane | 41 |
| Tetrachloroethene | 38 |
| Trichloroethene | 37 |
| Chloroform | 25 |
| 1,1-Dichloroethane | 25 |
| c-1,2-Dichloroethene & 2,2-Dichloropropane | 16 |
| 1,1-Dichloroethene | 15 |
| Methyl Tertiary Butyl Ether | 5 |

Nassau County is encouraged that groundwater quality shows improvement since the early monitoring in the 1980s. The DPW report states:

“During the mid-1980s, 50% of raw groundwater quality samples from Upper Glacial monitoring wells and 50% of samples from Magothy monitoring wells exhibited TVOC contamination in excess of 5 ppb. At present, only 20 years later, approximately 15% of samples in each of these aquifers exhibit VOC impacts.”

The sewerage of 90% of Nassau County is credited for this improvement.

There is more to the story. More drinking water wells (mainly Magothy wells) are being affected by VOCs and more wells require treatment than ever before. For years, water suppliers have used the strategy to avoid shallow pollution by drilling wells ever-deeper into the aquifer where the clean water can be found. At this point, there is really nowhere else to run, now that the Lloyd Moratorium stopped the use of the Lloyd aquifer for this purpose. So, it is only a matter of time before additional Magothy wells are affected.

Monitoring is Ending

Nassau County last sampled its monitoring well network in 2011. Work by the USGS to monitor aquifer and stream conditions has received intermittent funding since 2000. The USGS is now funded for two years (2015 & 2016) but further funding from the County is very unlikely. The State has relied on local communities to underwrite regular groundwater monitoring. **It is now time for the State to support the annual USGS data collection that is essential to an understanding of groundwater conditions. This funding should also be expended to include water quality as well as water quantity data.**

In Suffolk County, the work of the USGS is mainly underwritten by the Suffolk County Water Authority.

9. GOVERNMENTAL RESPONSE AND ENFORCEMENT

The evidence shows that groundwater conditions are not significantly improving. More drinking water wells are becoming contaminated and in need of treatment than ever before. **The groundwater goal for the future must be to halt the further degradation and take the actions necessary to have higher quality recharge entering the aquifers. To improve water quality, action is needed on both water quality and water quantity management.**

Some of the actions that can be taken to promote such a goal:

A. Stronger oversight and enforcement of SPDES discharges to groundwater.

For Suffolk County, polluting activities from wastewater discharges involve more than municipal wastewater. It includes such activities as: Laundromats, industrial discharges, pharmaceutical companies, manufacturing, repair shops, shopping centers, hotels, hospitals, commercial businesses. Discharges may be from large septic systems or from “package plants.”

As of 2012, there were approximately 194 sewer systems in Suffolk County.

- o 24 municipal sewer systems operated by Suffolk County
- o 2 community college systems
- o 3 operated by the Town of Brookhaven
- o 2 operated by the Town of Riverhead
- o 2 operated by the Town of Huntington
- o 5 operated by Villages
- o 4 operated by the federal government
- o 152 privately operated system
- o The total number of NY State-operated systems has not been reported.

The private systems usually use “package plant” treatment technology that discharges to groundwater. The compliance history of package plant systems is spotty. To ensure better groundwater quality, enforcement must be more rigorous, effective and demand treatment improvement.

B. Another aspect of SPDES enforcement needing attention is to set standards that require compliance at the point of discharge for groundwater. Along with this, the ambient groundwater standard for nitrogen/nitrate needs to be reduced to **6 mg/L** or less, especially where discharges are closer to the shoreline. Along with this, a practice used in other states is to set an “action level.” The **action level for groundwater quality for nitrates could be 2 mg/L**. This would trigger a strong regulatory response when ambient conditions exceed the action level.

C. Contaminated site remediation must not be allowed to languish, waiting for a responsible party to cooperate and pay up. New York State has a history of preserving its cleanup funds and delaying cleanup if the responsible party is identified but unwilling to pay for cleanup. The Grumman Bethpage facility is a perfect example. Decades were wasted waiting for the federal government to cooperate with a cleanup plan. The Roosevelt Field Shopping Center site is another example of long-delayed cleanup involving a government agency.

Concerning cleanup at Brownfield sites, the state assumes the role of cleaning up contaminated groundwater while remediation of soil pollution proceeds in a timely manner to get the property back into productive use. The groundwater remediation does not get the same priority and attention and is delayed, sometimes indefinitely.

D. The Long Island Well Permit Program needs to be revamped and used to implement and enforce issues around groundwater quantity management. There are a number of issues involved here. They include:

- Reorganizing the permit numbering system to identify the type of well that is permitted, such as irrigation wells, industrial wells, private home-owner wells, golf course wells, drinking water wells, geothermal wells, etc.
- Ensure proper reporting on monthly pumping reports. A surprising number of well owners do not know how to read the well meter and report quantity pumped in gallons.
- Use the data collected from pumping reports to improve our knowledge of pumpage impacts and amounts for better groundwater management.
- Use well permit conditions to manage water pumpage during peak periods in the summer.
- Under the ECL Article 15, Title 15§1501, the state was to initiate a well permitting program for water withdrawals greater than 100,000 gallons per day that included the posting of reported information to the public. However, DEC exempted Long Island wells permits from the law. Annual reporting to the DEC is still required but the public reporting aspect is not required for Long Island wells. There should be annual public reporting by the State on groundwater withdrawals such as: total water pumped, pumpage by aquifer and by county, peak pumpage, amount used consumptively and amounts by category of use such as irrigation, public water supply, industrial use, etc.
- **Overall, the well permit program should be used to help reduce the risk of saltwater intrusion into the coastal portions of the aquifer system.**

E. Public Information and Education needs to be supported with better and timely information. A good example of helpful information was the annual publication on groundwater conditions, published by the Nassau County Department of Health. The yearly report known as the *Ground Water and Public Water Supply Facts for Nassau County, New York*, contained a valuable amount of basic information about the groundwater and public water supply systems in the County. It did not interpret data but simply provided the facts for others to use as they needed. The publication ended in 1999 but it was treasured by all water suppliers, agency staff, consultants, academics, officials and the general public. Nassau County has declined all efforts to have the publication resumed, even though the cost was only around \$50,000 of staff time. If Nassau County is unable to produce such a document, then the State or a water management entity should assume this task. The template is already created. **This publication should be revived.**

- Mapping contaminated areas of groundwater by pollutant, aquifer, and depth is technically feasible but has not been undertaken since 1980. Such an effort is needed.

10. THE STATUS QUO AND THE FUTURE OF WATER ON LONG ISLAND

Long Island and its water resources, both surface water, coastal waters and groundwater, are all at a tipping point. The one resource we all share that originates here on Long Island is our **drinking water**. Still, it is the one resource essential to life that we take for granted, abuse, neglect, pretend is infinite, and complain about its cost although it is the cheapest commodity we buy.

The days when our drinking water can be neglected and polluted by our casual disregard must come to an end. We are running out of time to set in place a workable, practical, affordable and proven approach to managing this essential resource. If we can solve our groundwater problems, it will also take us far toward protecting coastal water resources as well.

The state agencies, Department of Health and the DEC, are experienced in working with regional water management entities, although in the rest of the state, the resource is surface water, not groundwater. Long Island could truly benefit from a regional management entity to perform the same functions already being performed for decades for the Delaware and Susquehanna River systems. We need an equally effect, dedicated entity using science-based principles and policies to manage a shared water resource for all of us who rely on and use the groundwater of Long Island. It is evident that what we have been doing for the past four decades needs to be revised. Let us collectively begin to discuss how we can do better, as Harold Gleason urged, for the benefit of all.

Thank you.
This concludes my testimony.

APPENDICES

APPENDIX A.

Studies on drinking water, groundwater, water quality and quantity, since the 1978 208 Study:

- *Nassau County Mater Water Plan*, 1980, Nassau County Water Resources Board
- *Long Island Segment of the National Urban Runoff Program*, 1982, Long Island Regional Planning Board
- *Long Island Groundwater Management Plan*, 1986, NYS DEC
- *New York State Water Resources Plan, Long Island*, 1987, NYS Water Resources Council
- *Suffolk County Comprehensive Water Resources Management Plan*, 1987, Suffolk County Department of Health Services
- *Nassau County Comprehensive Water Management Plan*, 1989, Nassau County Department of Public Works
- *Progress Reports*, New York State Legislative Commission on Water Resource Needs of Long Island, 1980 – 1989
- *Nassau County 1998 Groundwater Study*, 1998, Nassau Department of Public Works and CDM
- *Nassau County Groundwater and Public Water Supply Facts for Nassau County, New York*, 1984 – 1999, Nassau County Department of Health
- *Long Island Source Water Assessment Program (SWAP) Report*, 2003, NYS Department of Health, CDM and Nassau County Department of Health, Nassau County Department of Public Works, and Suffolk County Department of Health Services
- *Nassau County Groundwater Monitoring Program*, 2000-2003, 2005, Nassau County Department of Public Works
- *Suffolk County Comprehensive Water Resources Management Plan*, 2015, Suffolk County Department of Health Services
- Numerous studies by the USGS on aspects of the groundwater system of Long Island

APPENDIX B.

Helpful studies of Nitrogen loading to coastal waters:

- Monti, Jack and Michael Scorca, *Trends in Nitrogen Concentration and Nitrogen Loads Entering the South Shore Estuary Reserve from Streams and Ground-Water Discharge in Nassau and Suffolk Counties, Long Island, New York, 1952-97*, 2003, USGS Water Resources Investigation Report 02-4255.
- Scorca, Michael and Jack Monti, *Estimates of Nitrogen Loads Entering Long Island Sound from Ground Water and Streams on Long Island, New York, 1985-96*, 2001, USGS, Water Resources Investigations Report 00-4196
- Stephen Lloyd, Carl LoBue, Gillian Mollod, and Marian Lindberg, *Modeling Nitrogen Sources on the North Shore of Long Island*, 2016, The Nature Conservancy.
- Stephen Lloyd, *Nitrogen load Modeling to forty-three subwatersheds of the Peconic Estuary*, 2014, The Nature Conservancy and the Peconic Estuary Program.
- Stephen Lloyd, *Nitrogen Loading Sources: Oyster Bay and Huntington*, Presentation to the Water Quality Symposium, LIU-Post, 2014.

APPENDIX C.

A partial list of NYS laws that affect Long Island groundwater and are in need of implementation:

- ECL Article 15 Title 15, §15-0514, Incompatible Uses
- ECL Article 15 Title 15, §15-1527, Stressed Aquifer Segments on Long Island
- ECL Article 15 Title 15, §15-1528, Lloyd Moratorium
- ECL Article 15 Title 29: §15-2901, Water Resources Management Strategy
- ECL Article 15 Title 31: §15-3107 and 3109: Groundwater Protection and Remediation Program; Groundwater Remediation Strategy
- ECL Article 17 Title 8: §17-0826: Notification of Discharges Affecting Groundwater
- ECL Article 17 Title 8: §17-0828: Discharges Affecting Groundwaters

