LICAP
Long Island Commission for Aquifer Protection

Plastic Waste

LICAP
Long Island Commission for Aquifer Protection

The rising cost to protect our aquifer

STATE OF THE AQUIFER

2024 UPDATE

LICAP MEMBERS

Voting Members And The Organizations Or Offices They Represent

Jason Belle
Chairman
Nassua-Suffolk Water Commission Association

Jeffrey Szabo
Vice-Chairman
Suffolk County Water Authority

Paul Granger
Long Island Water Conference

John Sohngen
Suffolk County Commissioner of Health

Angela Pettinelli
Nassau County Commissioner of Health

Jennifer Juengst
Suffolk County Executive

(Vacant)
Nassau County Executive

Chris Ostuni
Nassau County Legislature Presiding Officer

Michael White
Suffolk County Legislature Presiding Officer

Brian Culhane
Suffolk County Soil and Water Conservation District

Derek Betts
Nassau County Soil and Water Conservation District

Ex Officio Members And The Offices They Represent

Richard Groh
Suffolk County Legislature Minority Leader

Sarah Meyland
Nassau County Legislature Minority Leader

Brian Schneider
U.S. Geological Survey
Long Island Program Office

Chris Engelhardt
New York State Department of
Environmental Conservation

Vacant Positions

Suffolk County Commissioner of Public Works

Suffolk County Commissioner of Parks,
Recreation and Conservation

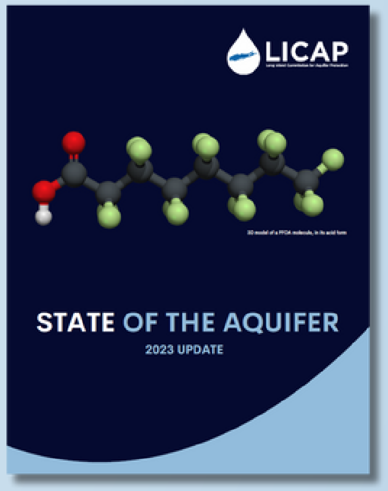
Nassau County Commissioner of Parks

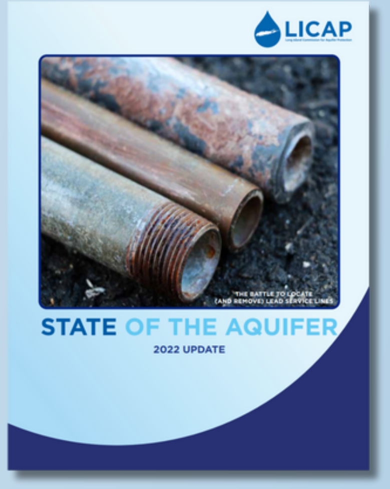
Nassau County Planning Commission

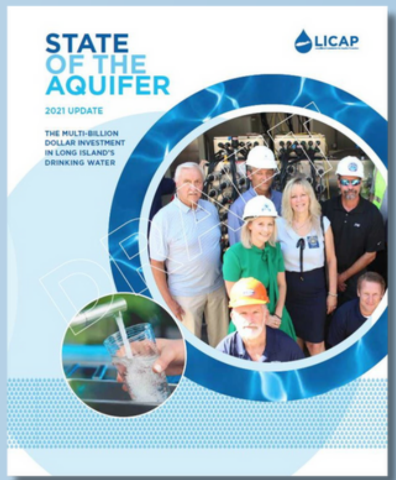
LIGRI (Long Island Groundwater Research Institute)

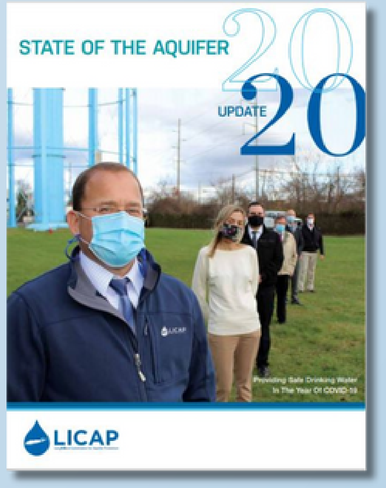
SUNY Stony Brook: School of Marine
and Atmospheric Sciences

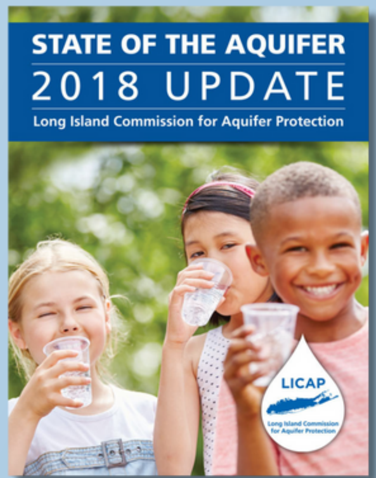
STATE OF THE AQUIFER THROUGH THE YEARS

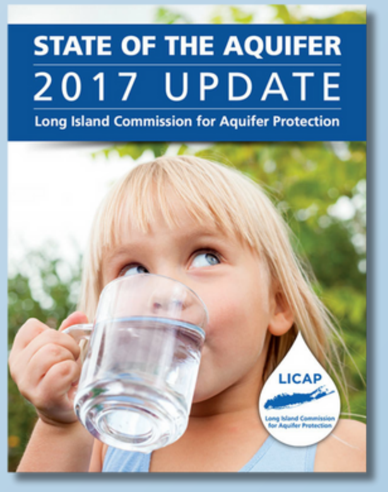












Previous LICAP State of the Aquifer Reports Available at https://licaponline.com/reports/

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MESSAGE FROM THE CHAIRMAN

The following update to the Long Island Commission for Aquifer Protection's (LICAP) State of the Aquifer report covers many of the topics integral to our understanding of the sole source aquifer that provides 100% of Long Island's drinking water, including groundwater pumpage, hydrologic conditions and groundwater monitoring.

As we reflect on the past year, we are reminded of the significant strides made in our mission to protect Long Island's aquifer system, which remains the sole source of drinking water for millions. The challenges we face continue to evolve, but so does our commitment to ensuring the safety and sustainability of this precious resource. In 2024, emerging contaminants, such as perfluoroalkyl substances (PFAS), remain at the forefront of our concerns, alongside the ongoing impacts of climate change on water quantity and quality. The deadline for the public water systems to submit their Lead and Copper Rule service line inventories were due in 2024. This is a critical first step in the long-term goal to replace all lead service lines nationwide within 10 years. This year's report provides a comprehensive look at these critical issues and the solutions we are implementing to safeguard our water supply.

As we continue to tackle the challenges facing our aquifer, the rising costs of protecting this vital resource have become increasingly evident. Continued commitment from federal and state agencies will be crucial in the years to come. We also emphasize the need for expanded research to not only better understand these challenges but also to advance and refine the solutions we currently have, ensuring the long-term sustainability of our aquifer system.

Our report highlights the growing concern around microplastic contamination in our environment and the threat it may have on our aquifers. In addition, the report details advancements in treatment technologies, such as the installation of advanced filtration systems to meet new and proposed state and federal standards for PFAS and 1,4-dioxane. These contaminants have brought new challenges, but the response from water suppliers and local agencies has been steadfast, ensuring Long Islanders continue to have access to clean, safe drinking water.

Additionally, this report delves into the federal, state and county funding and legislative efforts, such as the Clean Water Infrastructure Act and the Suffolk County Water Quality Restoration Act, both of which are crucial for funding the infrastructure upgrades necessary to meet the island's growing demands. The continued investment in upgrading outdated septic systems and expanding sewer infrastructure is paramount to ensuring the highest quality within aquifer system.

As always, we aim to provide a clear and transparent update on the state of our aquifer. It is our hope that this report deepens your understanding of the challenges we face, and the tireless efforts being made to ensure that Long Island's aquifer continues to provide for generations to come.

JASON BELLE

2024 Chairman,
Long Island Commission for Aquifer Protection

The State of the Aquifer

In 2024, the State of the Aquifer Report highlights a year of significant developments and challenges concerning Long Island's sole-source aquifer. Central to the report are pressing concerns over microplastics, aging wastewater infrastructure, and emerging contaminants such as PFAS. A new era of research and legislative action is shaping the future of water quality and sustainability on Long Island, as local, state, and federal stakeholders collaborate to address evolving threats to this critical resource.

Microplastics have emerged as a hidden concern, infiltrating marine and freshwater ecosystems and, potentially groundwater systems. Early studies show these particles, which often evade traditional water treatment processes, have the potential to enter the aquifer through runoff, septic systems, and wastewater effluent. Although advanced treatment technologies offer potential solutions, their high cost and limited adoption pose challenges. The growing recognition of microplastics' impact on ecosystems and public health highlights the need for more research, technological innovation, and coordinated efforts to combat this emerging threat.

The Clean Water Infrastructure Act (CWIA) continues to play a pivotal role in upgrading Long Island's water systems, with over $5 billion allocated statewide to address aging infrastructure and contaminants like PFAS and 1,4-dioxane. While the act has supported numerous local projects, including sewer extensions and nitrogen pollution control measures, significant funding gaps remain, particularly for Suffolk County's expansive sewer infrastructure needs. Enhanced transparency and streamlined processes are critical for the effective allocation of resources, ensuring that shovel-ready projects are promptly funded and implemented.

Emerging contaminants such as PFAS continue to present unique challenges, with expanded federal monitoring requirements under the Unregulated Contaminant Monitoring Rule (UCMR 5) driving local actions. Nassau and Suffolk Counties have intensified testing and treatment efforts, although private wells and smaller systems remain areas of concern. Comprehensive policy solutions and federal-state coordination are vital to safeguarding Long Island's drinking water supplies.

Finally, efforts to address nitrogen pollution and aging wastewater infrastructure have accelerated with initiatives such as Suffolk County's Clean Water Plan. Recent voter approval of the Water Quality Restoration Fund and the creation of a Countywide Wastewater Management District mark significant progress. Sewer projects and advanced septic system installations are reducing environmental impacts, while collaborative research is advancing the understanding of contaminant removal technologies. These combined efforts reflect a growing commitment to preserving Long Island's aquifer system for future generations, with ongoing monitoring, innovation, and community engagement at the forefront of sustainable water management.

Mission

To advance a coordinated, regional approach to the protection of Long Island's sole source aquifer through the preparation of a State of the Aquifer report, updated annually, and a Groundwater Resources Management Plan.

LICAP
Long Island Commission for Aquifer Protection

Founded

By unanimous votes of the Suffolk County and Nassau County Legislatures in 2013. Reauthorized in 2018 and 2023.

Members

LICAP has 11 voting members. The Suffolk County Water Authority, the Long Island Water Conference, the Nassau-Suffolk Water Commissioners Association and the Nassau and Suffolk Departments of Health are permanent members. Additionally, the Nassau County and Suffolk County Executives each appoint one member, as do the Presiding Officers of the Nassau and Suffolk Legislatures and the Nassau and Suffolk Soil and Water Conservation Districts. There are also ex officio members with no voting power.

Commitee Structure

LICAP maintains two standing subcommittees:
The 2050 Drinking Water Report Committee identifies long-term challenges to groundwater resources. The Conservation Subcommittee develops strategies to educate Long Islanders about the importance of conserving our groundwater.

Meetings

LICAP is required to meet at least quarterly and hold one public hearing in each county annually.

Microplastics: A Hidden Environmental Concern

Microplastics, defined as plastic particles smaller than 5 millimeters, have emerged as a significant global environmental and public health concern. Formed primarily through the breakdown of larger plastics, these particles are now widespread in marine, freshwater, and atmospheric environments. Research links microplastic pollution to ecosystem disruption, contamination of food and water sources, and potential human health risks, including respiratory, cardiovascular, and neurological impacts. Despite growing awareness, efforts to reduce plastic pollution remain inadequate, and microplastics continue to accumulate in vital ecosystems, such as the Long Island Sound and water systems worldwide. Groundwater contamination is an emerging concern, especially for Long Island's aquifer, the sole source of the region's drinking water. Early studies suggest that microplastics can infiltrate aquifers via stormwater runoff, septic systems, and wastewater effluent. While wastewater treatment plants can capture some microplastics, smaller particles often escape into natural water systems. Although advanced removal technologies such as Membrane Bioreactors show promise, they remain costly. Future research and stronger regulations are essential to mitigate the rising threat of microplastics to human health and environmental stability.

Recommendation:

- Comprehensive research into microplastic contamination of groundwater, development of standardized sampling and analysis protocols, and implementation of stricter regulations to reduce plastic pollution. Investment in advanced water and wastewater treatment technologies and collaborative efforts among governmental agencies, researchers, and local stakeholders.

Clean Water Infrastructure Act Analysis

The Clean Water Infrastructure Act (CWIA), launched in 2017, is a key initiative to address New York’s aging water infrastructure and emerging contaminants like PFAS and 1,4-dioxane. With over $5 billion allocated through state budgets and bond acts, the CWIA has significantly benefited Long Island through grants for drinking water improvements, wastewater treatment upgrades, and nitrogen pollution control. Voter support for environmental initiatives remains strong, evidenced by the 2022 Environmental Bond Act's overwhelming approval in both counties. In November 2024, Suffolk County voters approved an eighth-of-a-percent sales tax increase dedicated to funding water quality improvement projects and creation of a water quality restoration fund. Key programs under CWIA, such as the Water Infrastructure Improvement Act (WIIA), Water Quality Improvement Program (WQIP), and Septic System Replacement Program (SSRP), have provided funding to Nassau and Suffolk Counties to address water quality challenges. Despite progress, both Nassau and Suffolk Counties face substantial water infrastructure needs, particularly for expanding sewer infrastructure in Suffolk County. Greater transparency, increased funding, and improved processes are needed to meet the growing demand for water projects across Long Island.

Transparency in fund allocation is also a concern. Limited detailed reporting makes it challenging to assess the full impact of CWIA funds on Long Island and to identify areas needing additional investment.

Recommendations:

- Increase WIIA Funding for Wastewater Infrastructure: Address Suffolk County's $2 billion in pending sewer projects by boosting funding allocations and adjusting grant limitations.
- Accelerate Fund Distribution: Streamline application processes and remove structural barriers to enable timely access to funds for shovel-ready projects.
- Improve Transparency: Implement detailed, county-level tracking of fund distribution to ensure resources are effectively utilized and areas needing additional investment are identified.

Lead and Copper Inventories: Methods, Challenges, and Looking Ahead

Water suppliers recently completed their Lead and Copper Rule (LCR) inventories using a mix of strategies, including reviewing historical records, conducting physical inspections, and engaging customers through outreach and online portals. Despite these efforts, they faced significant challenges in collecting complete and accurate data, coordinating customer responses, and meeting tight deadlines to avoid non-compliance penalties. Looking ahead, the new Lead and Copper Rule Improvements (LCRI) introduce stricter regulations that will increase demands on water suppliers. Key elements include notifying customers with lead or unknown service lines, developing full lead service line replacement plans by 2027, and replacing 100% of lead service lines in ten years. The LCRI also lowers the lead action level to 10 ppb (parts per billion) and expands monitoring to schools and childcare facilities. Aligning federal and state regulations will be crucial to avoid confusion and ensure effective protection of public health. New York State already has a program that surpasses LCRI requirements in terms of public-school sampling locations and testing, but does not currently cover daycare facilities or private institutions.

2024 State of the Aquifer Executive Summary
(CONTINUED)

With adjustments, New York's program could fully align with LCRI, ensuring clear communication and effective management of corrective actions.

Recommendation:

- The New York State Department of Health should align state lead testing regulations with the new federal LCRI requirements by expanding existing programs to include daycare facilities and private institutions. This alignment will prevent confusion, enhance communication with parents and guardians, and ensure that vulnerable populations like children receive the highest level of protection against lead exposure.

PFAS and Monitoring Developments

The U.S. Environmental Protection Agency's (EPA) Unregulated Contaminant Monitoring Rule (UCMR) program monitors emerging contaminants in drinking water every five years to safeguard public health. The Unregulated Contaminant Monitoring Rule implemented from 2023 to 2025 (UCMR 5), expands monitoring requirements to include additional PFAS contaminants, and expands monitoring requirements to all public water systems serving 3,300 or more people, with the collected data informing future regulatory standards. The EPA has recently set new Maximum Contaminant Levels (MCLs) for PFAS, lowering the allowable levels of PFOA and PFOS while introducing limits for other chemicals. Water suppliers must comply with these new regulations by 2029. Locally, Nassau County's Department of Health has mandated early testing and treatment for PFAS and 1,4-dioxane, with several public water systems receiving deferrals for treatment upgrades. Recent monitoring indicates increased detection of PFAS in public water systems, necessitating further action. Suffolk County has also expanded PFAS testing capabilities and monitoring public and private water supplies and conducting groundwater and surface water investigations. While major public water suppliers comply with currently enforced PFAS standards, some private wells have shown contamination, leading to state-supported remediation efforts.

Recommendation:

- The currently regulated long chain PFAS compounds are successfully removed by granular activated carbon (GAC). However short chain PFAS compounds are not. As state and federal regulators continue to expand the regulation of PFAS compounds that will include short chain compounds, research must be accelerated for the evaluation of viable treatment options.

Addressing Nitrogen and Other Pollutants from Aging Wastewater Infrastructure

Aging cesspools and outdated sanitary systems in Suffolk County have impacted groundwater and surface waters and pose environmental and public health risks. To combat this, the Subwatersheds Wastewater Plan, also known as the Clean Water Plan (CWP), was developed to provide a science-based roadmap for upgrading wastewater infrastructure. The CWP outlines strategies to replace approximately 380,000 sewage disposal systems with advanced wastewater treatment technologies. In 2023 and 2024, significant legislative actions were taken to advance the CWP with the approval of the Suffolk County Water Quality Restoration Act (CWRA). The CWRA permits the creation of a Countywide Wastewater Management District (CWMD) and establishes a new Water Quality Restoration Fund (WQRF), which includes a proposed 1/8 of one percent sales tax dedicated to funding the proposed wastewater upgrades outlined in the CWP. This act also extends the existing county drinking water protection fund through 2060. The implementation of the CWRA aims to create a governance structure and funding source to make wastewater upgrades affordable for residents. The establishment of the WQRF was approved by voters in the November 2024 referendum. Funding from the WQRF is anticipated to be available for qualifying projects in 2026. While the WQRF will provide a major source of funding for the wastewater upgrades proposed in the CWP, Suffolk County has been advancing interim measures to reverse pollution from failing onsite septic systems for last several years. Notable efforts include the initiation of several sewer extension projects and the implementation of the Suffolk County Septic Improvement Program (SIP) and the New York State Septic System Replacement Program (NYS SSRP). The SIP and NY SSRP have provided grants to homeowners for the installation of nitrogen-removing septic systems, resulting in over 2,100 advanced onsite treatment systems being installed to date. The sewer extension projects are projected to result in an additional 5,200 homes being connected to advanced wastewater treatment, with additional sewer extension projects currently in the planning stages. Specifically, under the Suffolk County Coastal Resiliency Initiative (SCCRI), substantial progress has been made on critical sewer extension projects. The Carlls River Watershed Sewer Project and the Forge River Watershed Sewer Project are initiatives aiming to connect thousands of properties to sewer systems and significantly reduce nitrogen pollution in priority watersheds. Additionally, SCCRI funds have been used to connect over 1,500 unsewered parcels to Sewer District Number 3, further mitigating environmental impacts. Other sewer projects currently under construction include extensions for Kings Park and Central Islip, with additional projects in Oakdale, Huntington Station, and Holbrook nearing construction or seeking funding. Finally, understanding the fate, transformation, and removal of contaminants of emerging concern (CECs) in wastewater is also a recommendation of the CWP. Collaborative efforts among the Suffolk County Department of Health Services (SCDHS), New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), U.S. Geological Survey (USGS), and the New York State Center for Clean Water Technology (NYS CCWT) have been initiated to study the presence and treatment of CECs, including PFAS, 1,4-dioxane, pharmaceuticals, and microplastics. Research indicates that advanced treatment systems like Nitrogen Removing Biofilters (NRBs) may have the ability remove many of these contaminants.

2024 State of the Aquifer Executive Summary
(CONTINUED)

Recommendations:

- Continue to develop an integrated monitoring strategy to evaluate the efficacy of existing Innovative/Alternative Onsite Wastewater Treatment Systems (I/A OWTS) and Sewage Treatment Plants (STPs) for Contaminants of Emerging Concern (CEC) removal, building upon current collaboration with Suffolk County Department of Health Services, Stony Brook University, United States Geological Survey, and New York State Department of Environmental Conservation.
- Develop new technologies to enhance removal of CECS that resist degradation and persist in the environment.

Groundwater Study at Long Island Mines

The New York State Department of Environmental Conservation (NYSDEC), in collaboration with the Department of Health (DOH), is leading a comprehensive Groundwater Study at Long Island Mines to assess the potential impacts of sand and gravel mining on groundwater quality. Initiated with a finalized work plan in June 2022, the study involves collecting high-quality, representative groundwater samples from four participating mines in Suffolk County. These samples are analyzed for a wide range of compounds, including volatile organic compounds (VOCs), semi-VOCs, dissolved and total metals, radionuclides, 1,4-dioxane, and per- and polyfluoroalkyl substances (PFAS). To date, six out of twelve planned quarterly monitoring and sampling events have been completed under DEC oversight, with ongoing data submissions and reviews ensuring continuous assessment. Upon completion of the final sampling event in June 2026, DEC will prepare a comprehensive report summarizing the results and findings. This report will evaluate data quality, compare findings to background levels, identify potential trends, and assess the impact of sand and gravel mining on groundwater quality. DEC will also provide recommendations and may initiate permit condition adjustments as necessary to ensure that existing permit and monitoring requirements adequately protect Long Island's sole source aquifer.

Website URL: https://dec.ny.gov/environmental-protection/mining-reclamation/long-island-mining#work.

Long Island Groundwater Sustainability Project

The completion of Phase 1 of the 2024 Long Island Groundwater Sustainability Project (LIGWSP), a collaboration between the US Geological Survey (USGS) and the New York State Department of Environmental Conservation (NYSDEC), marks a major milestone in managing Long Island's aquifer system. The study, initiated in 2016, developed an advanced groundwater flow model to assess water levels, streamflows, and the saltwater interface under various stresses. Findings reveal that the boundary between fresh and saline groundwater is closer to the shoreline than previously estimated, and saltwater intrusion in Brooklyn and Queens has persisted despite halting groundwater withdrawals in the 1990s. However, while the groundwater modeling analysis indicates that saltwater intrusion is an important concern for some coastal Long Island communities, only minor changes in the regional freshwater volume of the island have occurred since predevelopment conditions. Climate change-related factors, such as sea-level rise and increased recharge, pose potential groundwater flooding risks in low-lying areas. NYSDEC will continue working with local water suppliers to address these challenges as the project progresses.

Website URL: https://www.usgs.gov/centers/new-york-water-science-center/science/groundwater-sustainability-long-island-aquifer-system

Long Island Sound Study: Launching the Resilience Resource Hub

The Long Island Sound Resilience Resource Hub is a comprehensive online resource, offering tools, information, guidance, and inspiration to support the sustainability and resilience of Long Island Sound communities. Developed in response to stakeholder needs, this hub is a one-stop-shop for resources related to climate resilience planning and project implementation.

Website URL: https://www.lisresilience.org/

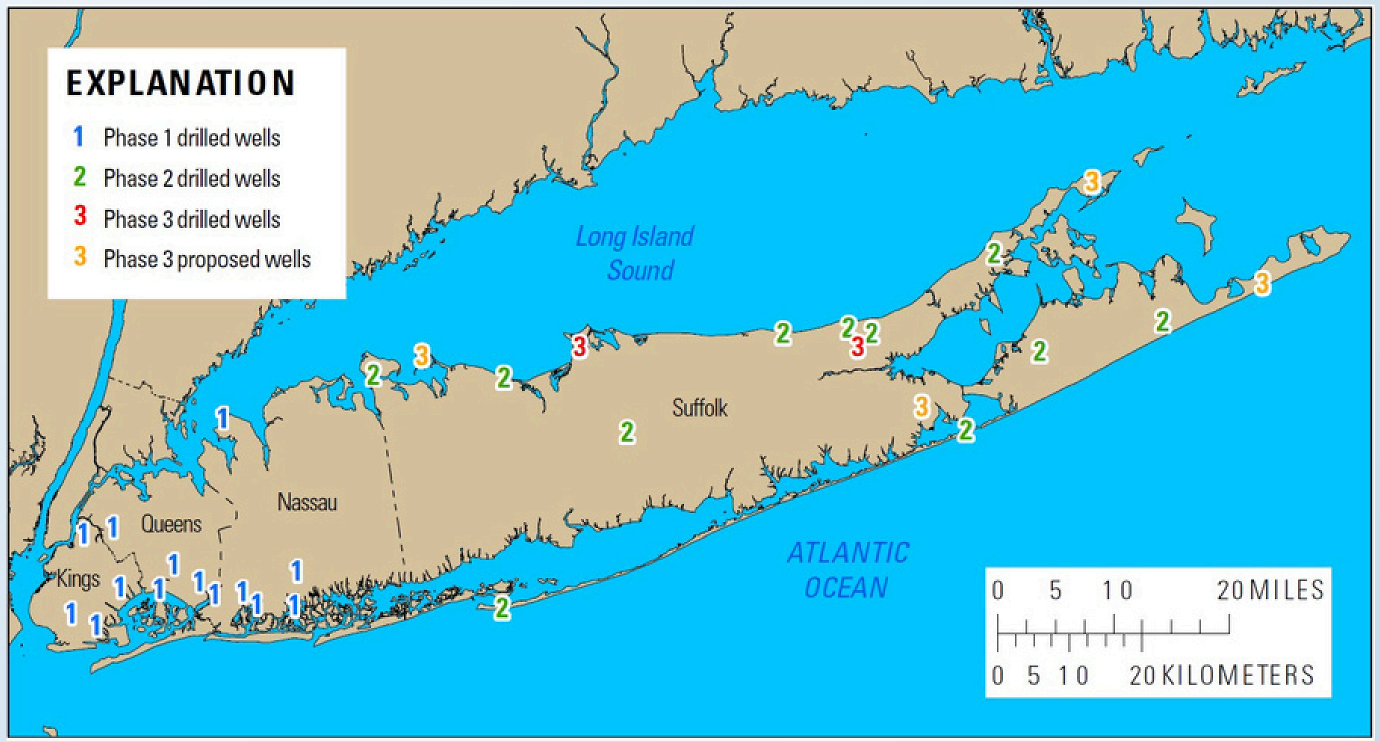
Long Island Action Agenda

In 2024, the New York State Department of Environmental Conservation (NYSDEC) launched the Long Island Action Agenda, with plans to address Long Island's water resource challenges. Building on the Long Island Nitrogen Action Plan (LINAP), the agenda expands its focus beyond to water quality to include water quantity, aquatic habitats, and public education. The agenda sets forth actions for water conservation at both local and regional levels. Following a public comment period, the plan is expected to be finalized by mid-2025, with implementation beginning shortly thereafter.

EXECUTIVE SUMMARY NOTES

EXECUTIVE SUMMARY NOTES

LONG ISLAND GROUNDWATER SUSTAINABILITY PROJECT (LIGWSP) - 2024 REPORT



In August of 2024, the United States Geological Survey (USGS) released to the public Phase 1 of the Long Island Groundwater Sustainability Project (LIGWSP), a collaborative effort begun in 2016 between the USGS and the New York State Department of Environmental Conservation (NYSDEC). This multi-year investigation included the installation of deep monitoring wells and surface geophysical soundings to improve our understanding of the regional hydrogeology to develop a state-of-the art groundwater-flow model of this complex aquifer system. The open-source model is a tool that will help the DEC and Long Island's water suppliers to better manage its groundwater resources and can simulate how water levels, streamflows, and the position and movement of the boundary between fresh and saline groundwater (saltwater interface) respond to various anthropogenic and natural stresses.

The project approach consisted of three main components: (1) updating hydrogeologic (aquifer sediment) maps, (2) determining the present-day [2019] location of the freshwater/saltwater interface, and (3) developing a regional groundwater-flow model to simulate time-varying changes in groundwater pumping and recharge.

The locations of the groundwater wells were selected by reviewing geologic, hydrologic, and water-quality information from the existing observation network. During and after completion of the newly drilled wells, lithologic core samples were collected and analyzed to improve the understanding of the hydrogeologic framework. Borehole-geophysical logging techniques were also used to provide additional information on the geologic framework and aquifer salinity as part of the saltwater-interface mapping component of the investigation.

These data were used to delineate the seaward extent of freshwater in the Long Island aquifer system. This effort built upon earlier studies conducted at a much coarser scale throughout the Northern Atlantic Coastal Plain aquifer system (Charles 2016).

A two-step modeling approach was used to simulate groundwater-flow conditions throughout the Long Island aquifer system. This included the development of an initial model based on existing information for current (2005–2015) average conditions (Walter and others, 2020) and an updated model based on the new hydrogeologic information developed for this investigation.

LIGWSP - 2024 REPORT
(CONTINUED)

The saltwater-interface mapping component used borehole-geophysical logs collected at existing and newly installed wells and surface-geophysical soundings using Time-Domain Electromagnetic (TDEM) technology (Stumm and others 2021) at selected inland locations considered most susceptible to saltwater intrusion.

This updated model incorporated time-varying pumping and recharge rates to simulate changes in hydrologic conditions from 1900–2019 (Walter and others, 2024). This model also was used to simulate various scenarios developed in collaboration with the NYSDEC and the project Steering Committee at the beginning of the project to predict the most likely outcomes of potential management decisions and changes in environmental conditions and to help manage aquifer sustainability.

These modeling scenarios include:

- Continuation of current pumping and recharge rates with and without 3 ft sea level rise and a 10% increase in natural recharge.
- Increased and decreased pumpage with and without 3 ft sea level rise and a 10% increase in natural recharge.
- Drought.
- Increased precipitation.
- Sea level rise of 3, 6, and 9 ft.
- Reactivation of the New York City Department of Environmental Protection Jamaica Water Supply Wells in Queens.

The Phase 1 release includes the island-wide transient groundwater flow model along with scientific investigation reports for the model and an updated hydrogeologic framework and position of the saltwater interface in western Long Island.

Major findings from the investigation include:

- The location of the boundary between fresh and salty groundwater is much closer to the shoreline than previously thought.
- The historical onshore saltwater intrusion in Brooklyn and Queens has not receded to its predevelopment position, despite the cessation of groundwater withdrawals since the early 1990s. This response is due in part to the limited aquifer recharge in this highly urbanized part of Long Island.
- The groundwater modeling analysis indicates that although saltwater intrusion is an important concern for some coastal communities on Long Island, only minor changes in the regional freshwater volume of the island have occurred since predevelopment conditions.
- Increases in aquifer recharge and sea level in response to climate change can increase groundwater levels and streamflows, raising concerns about groundwater flooding in subterranean infrastructure in low-lying areas where the unsaturated zone is already thin.

The NYSDEC is presently evaluating the results of the Phase 1 scenario outputs, with an initial focus on saltwater intrusion and plans to engage with water suppliers in areas of concern to share and review the results of the study and to begin discussions aimed at ensuring that residents of those communities continue to have access to an adequate supply of clean, safe drinking water.

Other factors, beyond saltwater intrusion, will also need to be considered to sustainably manage Long Island's groundwater resources. These include pumping and other anthropogenic stresses, as well as natural stresses such as those related to climate change, which can impact streamflows, freshwater wetlands, and infrastructure in areas with shallow groundwater.
As the project progresses through Phases 2 and 3, the NYSDEC will continue to assess and build upon its strategies for sustainable aquifer use. This includes updating and recalibrating the model as new data is collected, as well as developing sub-regional inset models in areas where greater model refinement is needed to understand the behavior of the aquifer system. Furthermore, upcoming results may identify new areas or issues of concern that require further examination.
While there are many challenges related to Long Island's water supply, with the release of the model, NYSDEC is excited to have such a powerful new tool to assist it, with the help of Long Island's water suppliers and residents, in its goal of sustainable aquifer management to ensure that Long Islanders have an adequate supply of clean, safe drinking water now and into the future.
Additional information on this groundwater sustainability project can be found on the USGS project website, including the latest publications and an interactive model results viewer:

https://www.usgs.gov/centers/new-york-water-science-center/science/groundwater-sustainability-long-island-aquifer-system

ADDRESSING NITROGEN AND OTHER POLLUTANTS FROM AGING WASTEWATER INFRASTRUCTURE

The 2022 SOTA summarized the recent efforts being implemented to address aging and outdated cesspools and sanitary systems, which have been polluting groundwater and surface waters for decades. These efforts culminated in the publication of the Subwatersheds Wastewater Plan (the "Clean Water Plan"), which provides a science-based wastewater upgrade roadmap, including recommendations on how to replace the estimated 380,000 sewage disposal systems in Suffolk County, with advanced wastewater treatment.

Since 2022, Suffolk County has continued to partner with Federal, State, and local officials to advance the Clean Water Plan including the implementation of several sewer extension projects and the continued success of the Suffolk County and New York State septic system replacement grant programs. In 2023 and 2024, New York State, the Suffolk County Legislature, and County Executive Ed Romaine took historic action by approving the Suffolk County Water Quality Restoration Act (CWRA), which permits the creation of a Countywide Wastewater Management District (CWMD), creation of a new Water Quality Restoration Fund (WQRF), and extends the existing county drinking water protection fund through 2060. Implementation of the CWRA will advance a primary recommendation of the CWP, by creating a governance structure and funding source to make wastewater upgrades affordable to the residents of Suffolk County. The creation of a new WQRF was approved by the residents of Suffolk County, through a mandatory referendum in the November 2024 election. Finally, Suffolk County, the New York State Department of Environmental Conservation, and the NYS Center for Clean Water Technology continued to develop strategies on how to address contaminants of emerging concern in wastewater. A summary of these accomplishments is provided below.

ADDRESSING NITROGEN
(CONTINUED)

SUFFOLK COUNTY WATER QUALITY RESTORATION ACT

The Suffolk County Clean Water Plan calls for the establishment of a County Wastewater Management District and a new stable and recurring source of revenue to make wastewater upgrades and implementation of the Clean Water Plan affordable to homeowners. The Suffolk County WQRA accomplishes these two recommendations and calls for:

- The creation of the CWMD in order to provide an integrated and efficient approach to managing wastewater services.
- The creation of the WQRF, including a new 1/8 of one percent sales tax to fund wastewater upgrades and other projects pursuant to the Clean Water Plan.
- Dedicating 50% of the revenue to individual septic system upgrades and 50% to sewer extensions.
- Extending the existing 1/4 of one percent sales tax utilized to finance the county drinking water protection program until 2060.

The annual revenue from the WQRA could be used to leverage additional State and Federal grant funds, which typically require a 1:1 match from local municipalities.


Making a Splash for Clean Water in Suffolk

PHOTO COURTESY OF THE OFFICE OF NEW YORK STATE GOVERNOR KATHY HOCHUL THROUGH ITS FLICKR ACCOUNT.

| May 23, 2024 | ISSUE: SUFFOLK COUNTY WATER RESTORATION ACT, GROUND AND DRINKING WATER PROTECTION, ENVIRONMENTAL PROTECTION

Governor Hochul signs Sen. Martinez's legislation, giving voters ability to decide water quality funding initiative.

New York Governor Kathy Hochul signs the Suffolk County Water Restoration Act that was sponsored by Senator Monica R. Martinez in room of bill sponsors on May 23, 2024.

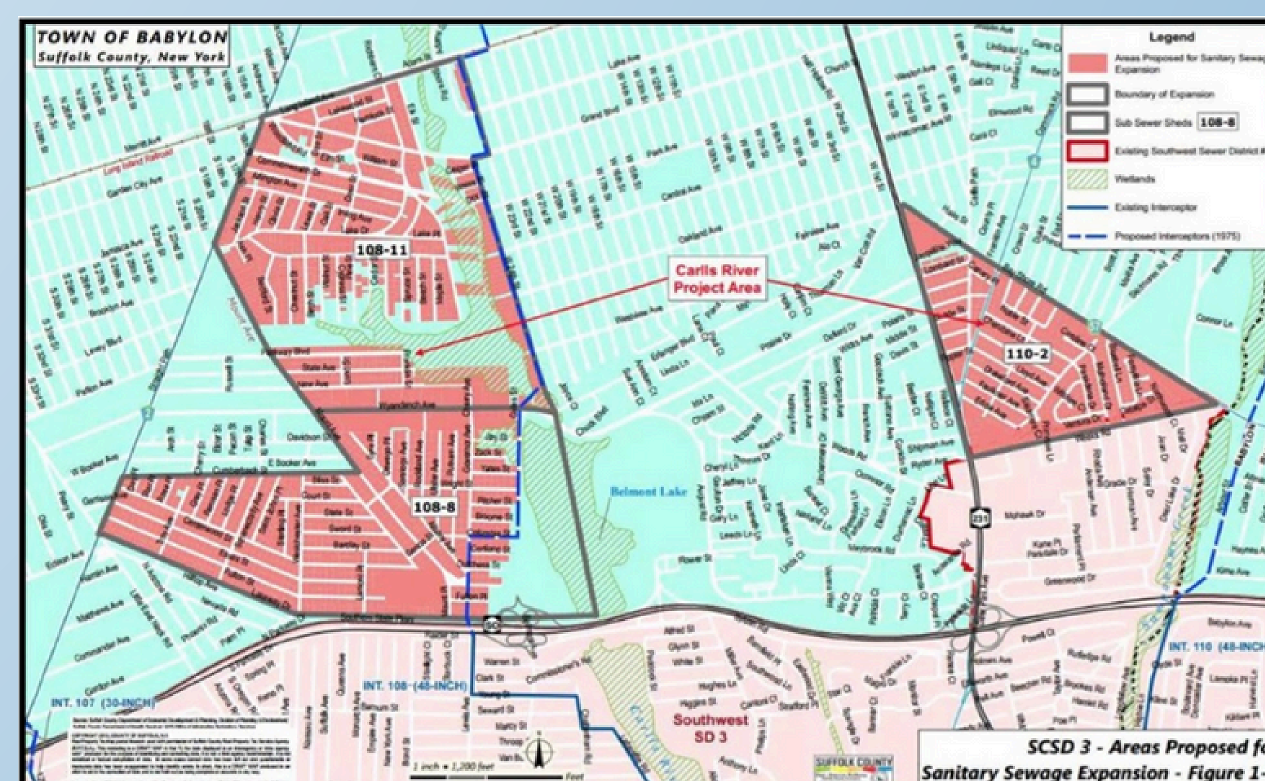
SUFFOLK COUNTY SEWER EXTENSION PROJECTS

Suffolk County has made significant progress in advancing sewer extension projects identified in the Clean Water Plan and as part of the Suffolk County Coastal Resiliency Initiative (SCCRI). The SCCRI includes over $400M obtained primarily through New York State and Federal post-Sandy resiliency funding that was made available through the Governor's Office of Storm Recovery (GOSR) and includes three primary projects: 1) Carlls River Watershed Sewer Project; 2) Forge River Watershed Sewer Project; and, 3) Sewer District #3 connections. The SCCRI will replace an estimated 5,200 aging cesspools and septic systems with sewer connections, representing the largest County sewer project since the construction of Sewer District #3 in the 1980's. The SCCRI will provide the sewer connection, abandonment of existing cesspools, and property restoration to homeowners and no cost.

A summary of these projects is provided below:

Carlls River Watershed Sewer Project

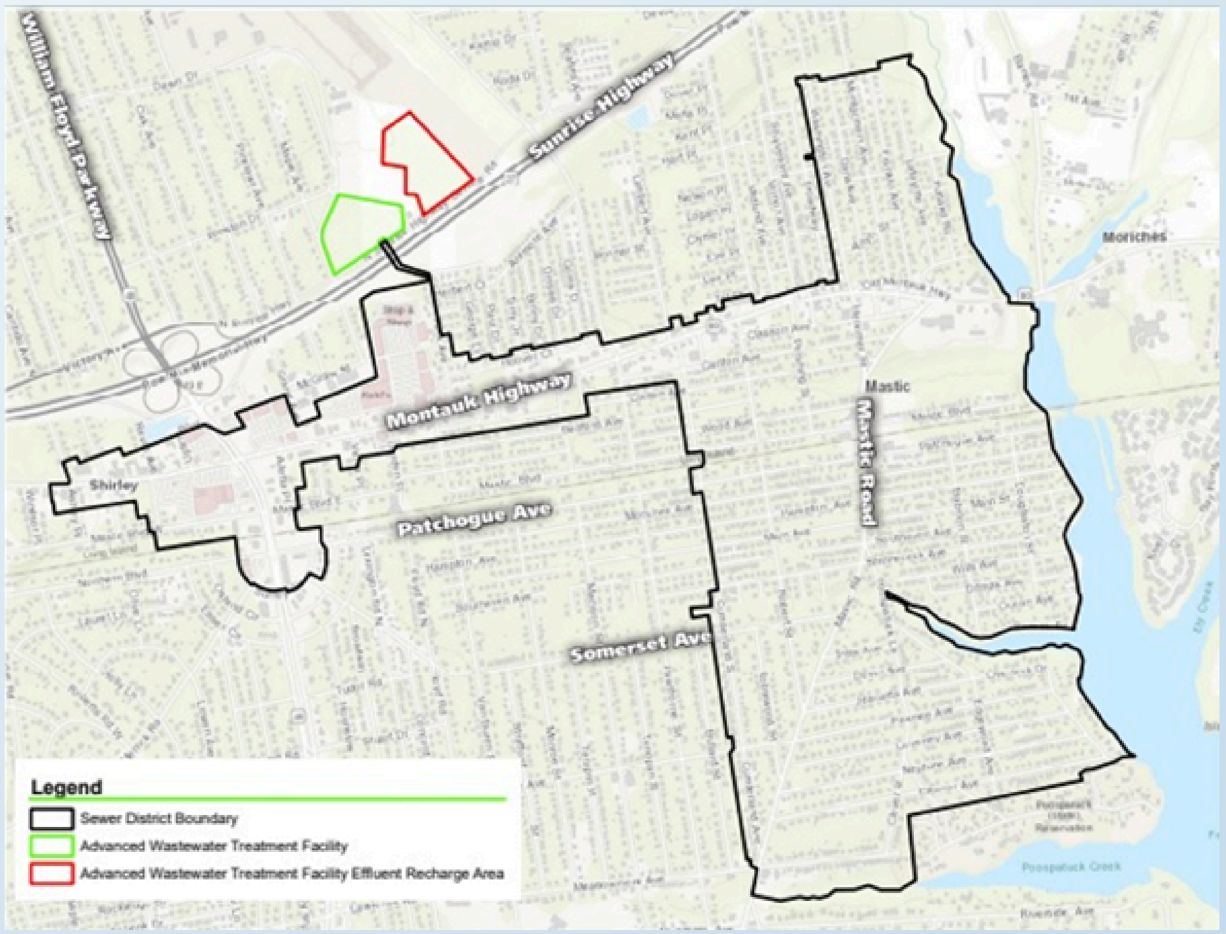
The Carlls River Watershed Sewer Project includes connecting areas in North Babylon, West Babylon and Wyandanch to the Southwest Sewer District (Sewer District #3). Groundbreaking took place in October 2021, with anticipated completion in December 2024.Over 2,100 properties will be connected to sewers as part of this project. This project will significantly reduce nitrogen pollution discharging into the Carlls River while also providing an opportunity for economic growth for local businesses. The Carlls River watershed is a priority rank number 1 (highest priority rank) for wastewater upgrades in the Clean Water Plan.



ADDRESSING NITROGEN
(CONTINUED)

Forge River Watershed Sewer Project

The Forge River Watershed Sewer Project includes the construction of a new state-of-the-art wastewater treatment plant (WWTP) and the connection of over 1,800 parcels to sewers. Groundbreaking took place in January 2022, with anticipated completion in early 2026.This project will significantly reduce nitrogen pollution discharging to the Forge River while also providing an opportunity for economic growth for local businesses. The Forge River watershed is a priority rank number 1 (highest priority rank) for wastewater upgrades in the Clean Water Plan.



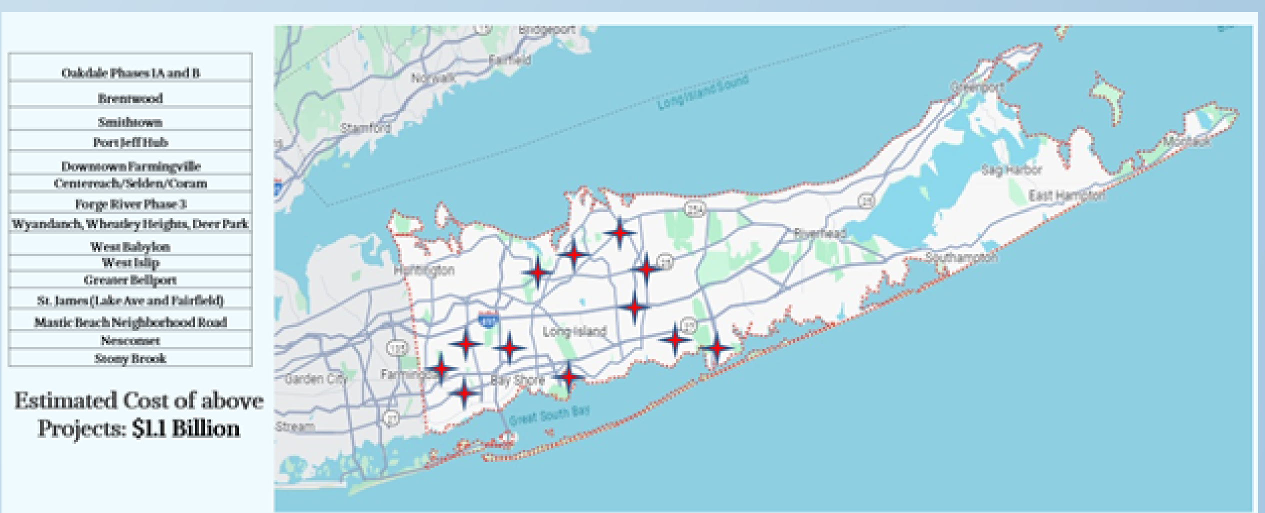
Sewer District Number 3 Connections

Finally, SCCRI funds have been used to connect 1,541 previously unconnected parcels to Southwest Sewer District No. 3. These parcels are located throughout the district boundary, and most are within the Great South Bay watershed, which is a priority rank 1 waterbody in the Clean Water Plan.

SEWER EXTENSIONS, WHAT'S NEXT?

Suffolk County officials continue to work with Federal, State, and local governments to obtain additional funding for the implementation of numerous other sewer extension projects over the next several years. Other sewer projects currently under construction include sewer extensions for Kings Park and Central Islip. Sewer projects that are nearing construction and/or seeking additional funding include projects in Oakdale, Huntington Station, and Holbrook. Other communities have also expressed interest, and the WQRF, approved by the voters in November 2024 can help fund additional sewer extensions.

Additional Communities with Sewer Projects in the Design Phase



SUFFOLK COUNTY SEPTIC IMPROVEMENT PROGRAM AND NEW YORK STATE SEPTIC SYSTEM REPLACEMENT PROGRAM

To make the cost of advanced wastewater treatment systems more affordable for homeowners, Suffolk County launched the Septic Improvement Program (SIP) in 2017, which was then coupled with the New York State Septic System Replacement Program (NYS SSRP) in 2018. Under the SIP and NYS SSRP, homeowners who decide to replace their cesspool or septic system may be eligible for grants toward the purchase and installation of a nitrogen-removing septic system. This funding enables homeowners to replace aging and failing cesspools with state-of-the-art technologies that significantly improve treatment, extend septic system life, and enhance the safety of residents in accordance with the goals of the Clean Water Plan. The program has been an overwhelming success and to date, over 2,100 advanced treatment systems have been installed at homes with grant funding, and over $27 million has been allocated to homeowners in County SIP funding and an additional $28 million has been allocated in NYS SSRP funding.

CONTAMINANTS OF EMERGING CONCERN IN WASTEWATER

Contaminants of Emerging Concern (CECs) were recognized as a growing, but poorly understood threat within the Clean Water Plan. To better understand the fate of CECs in wastewater, the Clean Water Plan recommends a multi-step approach:

1) Continue to develop an integrated monitoring strategy to evaluate the efficacy of existing I/A OWTS and STPs for CEC removal, building upon current collaboration with SCDHS, SBU, USGS and DEC.

2) Develop new technologies to enhance removal of recalcitrant CECS.

Since 2019, SCDHS has participated in a coordinated effort with other agencies to study wastewater as a source of emerging contaminants in Suffolk County. Participating agencies include, but are not limited to SCWA, NYSDEC, NYSDOH, USGS and SBU's Center for Clean Water Technology (NYS CCWT). The group focuses on influent and effluent from STPs, but also from on-site wastewater systems, including I/A OWTS. SCDHS coordinates meetings on a semi-annual basis to share results and guide the ongoing strategy. The objectives are to determine if wastewater is a significant source of emerging contaminants; which site uses are the largest source; and understand the removal efficiencies of different wastewater treatment technologies. The results will be incorporated into the adaptive management strategy of the Clean Water Plan.

In line with these collaborative efforts, NYS CCWT has engaged with SBU's faculty and graduate students to use its analytical capacity to investigate CECs in residential wastewater in Suffolk County. Utilizing advanced in-house analytical instruments, the Center is able to detect over 40 PFAS using the latest EPA-approved methods (533, 537.1, and 1633). The scope of NYS CCWT's research also extends to identifying Pharmaceuticals and Personal Care Products (PPCPs), illicit drugs, opioids, microplastics, pesticides, and tire-related chemicals in various environmental matrices, including wastewater.

In peer-reviewed scientific journals, CCWT researchers reported detecting 23 PPCPs as well as 1, 4 dioxane in residential septic tank effluent in Suffolk County and found that wastewater treated through Nitrogen Removing Biofilters (NRBs), systems initially designed for nitrogen removal, achieved removal rates comparable to, or even exceeding, those of municipal wastewater treatment plants. The combination of extended residence time and multiple redox conditions in NRBs contributed to their effectiveness in removing contaminants. The Center has also highlighted the significant risks posed by PFAS and other organic contaminants, which, due to their mobility, could percolate through soils and enter Long Island's aquifers. Continued research is essential to understand and mitigate these risks.

WHAT'S NEXT?

In the coming years, it will be necessary to continue to collect samples from STPs to enhance our understanding of the treatment and transformation of PFAS compounds, 1,4-Dioxane, and pharmaceutical products, which will guide decisions on the selection of the best treatment technologies. In addition, expanded monitoring of CECs in residential wastewater and evaluation of the effectiveness of I/A OWTS in CEC treatment will be required. It is anticipated that the expanded monitoring strategy will be finalized in 2025, with data and performance results gathered in 2025 and 2026.

The participating agencies will continue to collaborate to:

- Study wastewater as a source of emerging contaminants in Suffolk County.
- Further evaluate removal of PFAS, 1,4-dioxane, PPCPs, and microplastics in both municipal and from on-site treatment systems.
- Develop new technologies aimed at enhancing the removal of CECs from both residential and wastewater.

The goal of these efforts will be to identifying the best practices and technologies for removing CEC's, ensuring that contaminants do not percolate into the aquifers that supply Long Island's drinking water.

PFAS AND MONITORING EFFORTS

To protect public health from emerging contaminants, the United States Environmental Protection Agency (USEPA) developed the Unregulated Contaminant Monitoring Rule (UCMR). This program monitors priority unregulated contaminants in drinking water every five years. While the contaminants selected lack national primary drinking water standards, they are expected to be found in water supplies and must have approved analytical methods. The selection process includes health assessments, usage, occurrence data, and stakeholder input. UCMR 5, the latest version of this rule, requires sample collection for 30 contaminants[1] between 2023 and 2025, including several Per- and Polyfluoroalkyl Substances (PFAS). The data collected will inform future regulations and help develop drinking water standards.

From 2001 to 2006, pursuant to UCMR 1, all public water systems (PWS) serving over 10,000 people were required to monitor for 12 unregulated contaminants. UCMR 5 has expanded this requirement to include all PWS serving 3,300 or more people, along with a representative nationwide sample of smaller systems. New York State's Department of Health (NYSDOH) and the Drinking Water Quality Council (DWQC) used data from UCMR 3 to establish Maximum Contaminant Levels (MCLs) for 1,4-dioxane, perfluorooctanoic acid (PFOA), and perfluorooctane sulfonic acid (PFOS).

On December 18, 2018, the New York State Drinking Water Quality Council (NYSDWQC) recommended MCLs of 10 ng/L (nanograms per liter) for PFOA and PFOS. NYSDOH adopted these MCLs on August 26, 2020, along with new monitoring requirements. At the time Public water systems could apply for deferrals of up to three years for violations, provided they demonstrated proactive monitoring and treatment efforts. If approved for deferral, systems were required to notify the public and develop Remediation Action Plans. Many opted to blend wells to meet MCL compliance. However, Granular Activated Carbon (GAC) filtration remains the best available treatment method for PFOA and PFOS.

[1] 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS), 1H,1H, 2H, 2H-perfluorodecane sulfonic acid (8:2FTS), 1H,1H, 2H, 2H-perfluorohexane sulfonic acid (4:2FTS), 1H,1H, 2H, 2H-perfluorooctane sulfonic acid (6:2FTS), 4,8-dioxa-3H-perfluorononanoic acid (ADONA), 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS), hexafluoropropylene oxide dimer acid (HFPO-DA)(GenX), nonafluoro-3,6-dioxaheptanoic acid (NFDHA), perfluoro (2-ethoxyethane) sulfonic acid (PFEESA), perfluoro-3-methoxypropanoic acid (PFMPA), perfluoro-4-methoxybutanoic acid (PFMBA), perfluorobutanesulfonic acid (PFBS), perfluorobutanoic acid (PFBA), perfluorodecanoic acid (PFDA), perfluorododecanoic acid (PFDoA), perfluoroheptanesulfonic acid (PFHpS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorohexanoic acid (PFHxA), perfluorononanoic acid (PFNA), perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluoropentanesulfonic acid (PFPeS), perfluoropentanoic acid (PFPeA), perfluoroundecanoic acid (PFUnA), N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA), N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA, perfluorotetradecanoic acid (PFTA), perfluorotridecanoic acid (PFTrDA), lithium

UCMR 5
(CONTINUED)

EPA NATIONAL PRIMARY DRINKING WATER REGULATION (NPDWR) AND NEW MCLS

In April 2024, the EPA finalized the National Primary Drinking Water Regulation (NPDWR) for six PFAS chemicals. This regulation lowered the MCLs for PFOA and PFOS from 10 ng/L to 4 ng/L. It also introduced new MCLs of 10 ng/L for perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and hexafluoropropylene oxide dimer acid (HFPO-DA, also known as Gen-X chemicals). Additionally, the regulation established a hazard index of 1, applicable when two or more of these four chemicals are detected in a sample. Water suppliers must complete monitoring for these contaminants by 2027 and install treatment systems by 2029 if the new MCLs are exceeded.

LOCAL RESPONSES AND CHALLENGES

Nassau County Department of Health Response

In anticipation of new MCLs, the Nassau County Department of Health (NCDH) advised all water systems in January 2019 to proactively collect samples from each well for emerging contaminants. This measure helped assess future treatment needs. The treatment for 1,4-dioxane required the development of Advanced Oxidation Process (AOP) technology, which uses hydrogen peroxide and UV light, followed by GAC filtration. PFOA and PFOS, on the other hand, could be treated with GAC filtration alone.

By January 2020, the NCDH mandated that all wells be tested for 1,4-dioxane, PFOA, and PFOS, and that systems begin planning for treatment if any well tested over 50% of the proposed MCLs. Together with the NYSDOH, the NCDH established new monitoring requirements for AOP treatment plants to track the removal of these emerging contaminants and to identify potential chemical by-products generated during the treatment process.

At the start of 2021, 14 public water systems in Nassau County received deferrals from NYSDOH for meeting the newly established MCLs. Six deferrals were granted for 1,4-dioxane, two for PFOA/PFOS, and six for both. All systems were granted one-year deferral renewals in August 2022 due to supply chain delays that affected construction timelines.

By August 2023, four Nassau County water systems had not yet completed construction of required treatment facilities for emerging contaminants. To avoid MCL violations while ensuring sufficient water supply during peak demand, these systems applied for one-year exemptions to complete their projects.

When NYSDOH's new MCLs were first implemented in August 2020, 23% of Nassau County's public water wells had detectable levels of 1,4-dioxane, while 10% showed levels of PFOA and/or PFOS above the set MCLs. As of that time, NYSDOH had approved 11 treatment plants, with 45 more projects under review. By August 2024, water quality monitoring revealed the presence of 1,4-dioxane in 83% of public supply wells, PFOA in 55%, and PFOS in 42%, necessitating further treatment facility construction.

Under the EPA's new April 2024 regulations, 37% of Nassau County's public supply wells now exceed the MCL for PFOA, and 23% exceed the MCL for PFOS.

Suffolk County Department of Health Services PFAS Response

In response to the emerging threat of PFAS, the Suffolk County Department of Health Services (SCDHS) began implementing measures in 2016 to address these and other contaminants. These efforts include:

- Developing in-house PFAS analytical testing capabilities at the County's Public and Environmental Health Laboratory (PEHL).
- Overseeing public water suppliers to ensure compliance with NYSDOH and USEPA standards including requiring continued monitoring of PFAS and other emerging contaminants beginning in 2016.
- Testing private drinking water wells for PFAS and other contaminants under the Private Well Water Testing Program.
- Conducting surveys of private drinking water wells for PFAS based on data from the Private Well Water Testing Program and other special investigations.
- Supporting the New York State Department of Environmental Conservation (NYSDEC) and NYSDOH in groundwater investigations to define the extent of PFAS contamination.
- Sampling surface water for PFAS and other contaminants.

In 2023, Suffolk County expanded its PFAS testing capabilities, using EPA Methods 533 and 537.1 to analyze drinking water samples for 29 PFAS compounds. By 2025, the County plans to expand its testing to include groundwater, surface water, and sludge using EPA Method 1633. This enhanced capacity will improve the County's ability to monitor and address PFAS contamination.

UCMR 5
(CONTINUED)

PUBLIC WATER SYSTEMS AND PRIVATE WELLS

The Suffolk County Department of Health Services (SCDHS) Office of Water Resources ensures that public water systems comply with all drinking water standards. Recent data shows that no major public water suppliers in Suffolk County deliver water exceeding MCLs for PFOS or PFOA. However, a few small systems have detected levels above the MCLs and are working to install treatment systems or connect to larger public water supplies, while providing notices to potential consumers.

Approximately 30,000 properties in Suffolk County rely on private wells as their primary source of drinking water. These wells, often shallower than public water supply wells, are more vulnerable to contamination. Since 2016, SCDHS has conducted over 70 private well surveys, collecting more than 1,900 samples in priority areas with a focus on PFAS. Approximately 20% of these wells have exceeded the NYSDOH MCLs for PFOS and/or PFOA. In response, NYSDOH and NYSDEC have offered alternative water supplies to affected residents in many cases, and several public water main extensions have been completed, with more planned.

In-house PFAS testing at the SCDHS PEHL was quickly integrated into routine private well sampling requests. The current fee for a typical private well test in Suffolk County is $100, covering over 300 contaminants, including PFAS. Residents with PFAS detections exceeding MCLs are advised to contact the SCDHS Office of Water Resources.

GROUNDWATER INVESTIGATIONS AND SURFACE WATER SAMPLING

Since the 1970s, SCDHS has utilized in-house drilling capabilities and sampling staff to monitor the quality of Long Island's aquifer system. The Department has established a network of over 200 permanent monitoring wells to assess the impact of various land uses on the aquifers. In recent years, PFAS monitoring has been integrated into this program, providing valuable data on the temporal changes in PFAS contamination.

In addition to routine monitoring, SCDHS conducts special investigations aimed at identifying sources of contamination and assessing the extent of known releases, including PFAS. The Department has investigated over 17 PFAS contamination sites and continues to support NYSDEC and NYSDOH in defining areas of concern for future remediation efforts. One ongoing investigation involves monitoring contaminants at sewage treatment plants across the county.

SCDHS routinely samples nearly 50 fresh surface water bodies as part of its surface water monitoring program, which now includes PFAS analysis. In some cases, biota such as eels are also tested for PFAS to provide insight into the transport and fate of these chemicals. PFAS analysis is currently conducted through an interim contract, while in-house capability at PEHL is developed. This data will complement the groundwater monitoring program, providing a more comprehensive understanding of PFAS distribution across the county's water resources.

MICROPLASTICS: A HIDDEN ENVIRONMENTAL CONCERN

INTRODUCTION

Microplastics, plastic particles smaller than 5 millimeters, have emerged as a widespread environmental pollutant and potential threat to human health. The use of plastic has surged to astonishing levels, with over 422 million tons being produced annually. Plastic accounts for half of all human related waste with much of it being single use. Contrary to the belief that discarded plastic disappears or biodigrades, it actually accumulates, representing between 60% and 80% of the waste present in the marine environment and 90% of the waste floating on the seas and oceans. While ocean pollution has garnered significant attention, microplastics are also present within our freshwater systems as well as the air we breathe. Microplastics have a lasting environmental impact and can disrupt ecosystems and the food web, exposing humans to further contamination. Microplastics are pervasive across all environments including air, water, and soil.

Groundwater resources are also increasingly at risk of microplastic contamination. As aquifers are a vital source of drinking water for communities, understanding the potential infiltration of microplastics into these underground water reserves is essential. Though research on the prevalence of microplastics in aquifers is still developing, early studies suggest that these contaminants may be transported through soil and sediments, eventually entering aquifer systems. This report delves into what is currently known about microplastic contamination and explores the broader implications for groundwater management and water treatment strategies.

MICROPLASTICS
(CONTINUED)

THE BIRTH OF PLASTICS AND THEIR UNINTENDED CONSEQUENCES

Plastic's history traces back to the 19th century when Alexander Parkes first developed Parkesine, a form of treated cellulose. While his material was not commercially successful, it laid the foundation for future developments, including Bakelite in the early 20th century, the first fully synthetic plastic. Initially praised for its durability, versatility, and affordability, plastics quickly replaced materials like copper and steel, becoming indispensable across various industries, especially during World War II. In the post-war period, plastics quickly found their way into nearly every aspect of modern life, from packaging to construction, and consumer goods.

By the 1960s, scientists and environmentalists were noticing that plastics may have environmental impacts. Marine pollution from large plastic debris posed a growing threat to aquatic wildlife. The 1970s brought further insight into the extent of plastic pollution. Studies suggested an alarming increase in plastic waste washing up on shores, with much of the debris coming from commercial fishing activities. Researchers found plastic fragments in the stomachs of marine birds such as the albatross. The introduction of synthetic fishing gear exacerbated the issue of microplastic pollution in the ocean. In 1973 alone, it was estimated that about 13 million kilograms of fishing nets, lines, and buoys were dumped into the ocean.

Legislative efforts like the U.S. Marine Protection, Research, and Sanctuaries Act, commonly known as the Ocean Dumping Act of 1972 attempted to regulate the dumping of materials that could affect the marine environment. Recycling initiatives, including the introduction of the plastic resin identification code in 1988 helped to identify and sort plastic as part of recycling efforts.

THE EMERGENCE OF MICROPLASTICS

Plastics don't biodegrade, instead, they break into smaller and smaller pieces. In 2004, British marine biologist Richard Thompson coined the term microplastics, after discovering their widespread presence in marine environments. Historically, large plastic waste was the primary concern; however, Thompson's findings shifted the focus to the small particles infiltrating ecosystems.

Sources of microplastics are varied and can be classified as primary or secondary. Secondary microplastics originate from larger plastics degrading over time, while primary microplastics such as microbeads and synthetic fibers are designed and manufactured small. Microplastics have been detected in air, soil, and water samples tested all across the earth, from the deep ocean trenches to Mount Everest. Recent research has even detected microplastics in cloud water at high altitudes, which may impact cloud formation and climate patterns.

In addition to these measures, the Environmental Protection Agency (EPA) launched the Marine Debris Program in 2006, aiming to address the impacts of marine debris on the environment and economy. The program focuses on research, prevention, and removal efforts while raising public awareness about the dangers of plastic pollution in marine ecosystems.

While early legislative actions like the U.S. Marine Protection, Research, and Sanctuaries Act in 1972 and recycling initiatives, introduced in the 1980s, were well intentioned, the vast majority of plastic waste still ends up in landfills or the ocean. The 2008 international workshop on microplastics, organized by U.S. National Oceanographic and Atmospheric Agency (NOAA), marked a turning point in scientific focus, solidifying the definition of microplastics, defining the term to include all particles smaller than 5 millimeters and prompting further research into their impacts. The European Union also responded, introducing the Marine Strategy Framework Directive in 2008, a legislative measure aimed at reducing marine litter.

THE HEALTH IMPACTS OF MICROPLASTICS: A GROWING CONCERN

Recent studies have found microplastics in human lungs, with potential long-term respiratory health risks, including inflammation and possibly cancer. Research on reproductive tissues, both in humans and animals, has shown microplastic contamination in testicular samples, leading to concerns about fertility and reproductive health. The discovery of microplastics within arterial plaques brought forth a disturbing potential connection between microplastics and cardiovascular disease. The presence of these particles was associated with a fourfold increase in the risk of heart attacks, strokes, and death. Although the study stopped short of proving causality, research points to the fact that these particles may exacerbate inflammation in arterial plaques, potentially triggering cardiovascular events.

Researchers have found that these particles may accumulate in brain tissue, with possibly some links to neurodegenerative diseases like Alzheimer's. It's not just adults who are affected by this infiltration. Infants, too, are exposed from their earliest moments. A pilot study analyzed breastmilk samples from 34 women, identifying microplastics in 26 of them. The damage microplastics cause doesn't stop at ingestion. These particles have been shown to cause significant cellular damage, with possible impacts on human tissues and organs. In laboratory studies, microplastics have been found to trigger allergic reactions, disrupt cell membranes, and even cause cell death. Particularly concerning is the discovery that irregularly shaped microplastics, which more closely resemble those found in real-world environments, cause more harm than their spherical counterparts often used in lab studies. Toxins such as phthalates, and bisphenol A (BPA) are often incorporated into plastic products during their manufacturing, and these chemicals can leach into the body once the plastics are consumed.

MICROPLASTICS
(CONTINUED)

MICROPLASTICS IN FOOD AND WATER: A DAILY THREAT

A 2019 report published in Environmental Science and Technology estimated that Americans consume between 39,000 and 52,000 microplastic particles annually through food and beverages. The United Nations Environment Program has identified at least 3,200 chemicals associated with plastic production as hazardous to human health, compounding the risks. Seafood is also considered a major source of microplastic ingestion, as marine animals ingest these particles, which then make their way into human diets through bioaccumulation.

Tap water and bottled water can also contain microplastics. In a 2021 study from the Science of the Total Environment, some tap water samples have been shown to contain microplastics. Bottled water, often marketed as a safer alternative to tap water, tends to contain even higher levels of microplastics than tap. This is likely due to the materials used in packaging and the processes involved in bottling, including the wear and tear of the bottle material, as well as the abrasion that occurs during bottle handling and transportation. Researchers from Columbia University found up to 370,000 particles per liter in certain brands. The researchers analyzed three popular bottled water brands in the United States and found that 90% of the plastic particles detected were nanoplastics. Nanoplastics are less than 1 micrometer in size and can penetrate deep into biological tissues. These particles were comprised of polyethylene terephthalate (PET), which is commonly used in manufacturing plastic bottles, and polyamide, likely originating from filters used during water purification processes.

MICROPLASTICS AND THE ENVIRONMENTAL DEGRADATION OF THE LONG ISLAND SOUND

The Long Island Sound is a vital natural resource, yet it suffers from widespread microplastic contamination. Researchers from Staffordshire University, Central Wyoming College, and the Rozalia Project for a Clean Ocean conducted a comprehensive study by taking water samples every three miles across Long Island Sound. In the study they found that 97% of water samples from the Sound contained microplastics. These particles originate from a variety of everyday sources, including fishing lines, plastic bags, and styrofoam containers. The pollutants accumulate in the Sound's narrower, more urbanized regions, but even remote areas are not spared. One of the most troubling aspects of microplastic contamination in the Long Island Sound is its impact on marine ecosystems. Zooplankton, fish, and other marine species ingest microplastics, which disrupt their normal biological functions and, in turn, threaten the entire food chain. Microplastics are able to adsorb many contaminants such as persistent organic pollutants (POPs), heavy metals, polychlorinated biphenyls (PCBs), antibiotics, endocrines disrupting chemicals (EDCs), bacteria, viruses, and resting stages of potentially hazardous organisms.

GROUNDWATER: MICROPLASTICS, THE HIDDEN THREAT BENEATH LONG ISLAND

Microplastic groundwater contamination is an emerging area of concern, as groundwater supplies nearly all of the island's drinking water. Although research on microplastics in groundwater is still in its early stages, preliminary studies suggest that plastic particles can infiltrate the aquifer system in areas of intense human activity, such as landfill leachate, wastewater effluent, and runoff from mulching materials. Washing clothes made from synthetic materials also contributes to microfiber pollution, as these fibers can enter septic systems and potentially leach into groundwater zones. Microplastics smaller than soil pores can pass through soil layers and potentially reach groundwater, especially in areas where the soil layer is shallow and groundwater levels are high, creating favorable conditions for migration. The complex interplay of soil characteristics, particle size, and water-flow dynamics complicates predictions of microplastic movement underground. Horizontal transport often occurs via surface runoff and wind erosion, while vertical transport is facilitated by microorganisms and earthworms that alter soil structure, making it easier for microplastics to reach deeper layers, including groundwater. From research done throughout the world PE (polyethylene) and PET (polyethylene terephthalate) appear to be the most common types of microplastics found in groundwater, typically appearing in fragment and fiber forms.

MICROPLASTICS
(CONTINUED)

WATER AND WASTEWATER TREATMENT AND MICROPLASTIC REMOVAL

Wastewater treatment plants (WWTPs) play a dual role in both capturing and releasing microplastics. While primary and secondary treatment processes can capture larger particles, smaller microplastics often pass through these systems and re-enter natural water bodies or remain in sludge used as fertilizer. Emerging technologies, such as Electrocoagulation, magnetic extraction and membrane bioreactors (MBRs), show promise in improving microplastic removal. MBRs utilize membranes, typically microfiltration or ultrafiltration, to separate solids from liquids after the biological treatment of wastewater. The combination of biological processing and membrane filtration in a single system allows MBRs to remove microplastics more effectively than conventional wastewater treatment methods. Studies report that MBRs can achieve microplastic removal rates of over 99%, making them significantly more efficient than other wastewater treatment options. Unfortunately, their higher operational costs and infrastructure demands limit their widespread adoption. Also, despite the high removal rates, microplastics trapped in sludge and membranes during treatment can re-enter the environment through disposal processes.

SCIENCE NEEDS, DATA GAPS, AND OPPORTUNITIES FOR MICROPLASTIC RESEARCH

One significant gap in current microplastic research is the need for a deeper understanding of how different environmental sources contribute to the overall microplastic concentrations on land and in aquatic environments. While wastewater-treatment facilities are recognized as a primary pathway, other sources, such as industrial wastewater, stormwater runoff, and agricultural runoff, remain less explored. In terrestrial environments, microplastics can accumulate in soils through biosolids and atmospheric deposition, yet their movement into water bodies or groundwater is not well understood.

A central need in microplastic research is the development of standardized sampling protocols. Current sampling techniques vary across studies, hindering comparisons and limiting the generation of robust, transferable data. Developing consistent, nationally recognized protocols would allow for more reliable data collection and analysis. In parallel, advancements in analytical methods, particularly in the characterization of microplastic particles and their chemical properties, are critical. Tools such as Raman spectroscopy and mass spectrometry offer promising avenues for identifying the polymer types of microplastics and their associated contaminants.

The U.S. Geological Survey (USGS) is contributing significantly to this area of research. As a longstanding partner with local and national stakeholders, the USGS is working with Federal, state, and university stakeholders throughout the Nation to develop methods for collecting and analyzing water, soils, and sediment for microplastics. In the recently (2024) published Integrated science for the study of microplastics in the environment—A strategic science vision for the U.S. Geological Survey, a state-of-the-science summary is provided along with a list of science gaps and goals for building capabilities and capacity that will help partners determine how to collect unbiased and reproducible samples, understand sources (such as, wastewater and stormwater runoff) that typically affect groundwater quality, and evaluate the potential for microplastics to enter our sole-source aquifer.

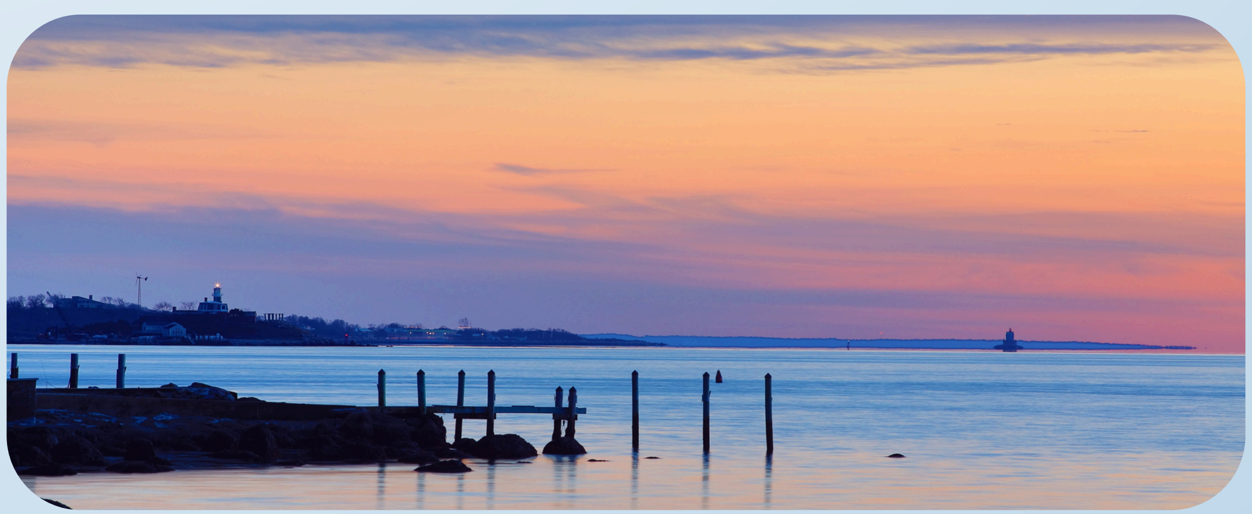
Coordination between USGS and local stakeholder laboratories is critical for providing the type of data needed to understand potential human impacts of microplastics contamination in water supplies. One key gap identified in the USGS Strategic Science Vision is an understanding of microplastics in groundwater systems, particularly in sandy aquifers. Current methods for sampling, processing, and analyzing microplastics in the environment vary greatly, and there is a concerted effort by Federal and academic stakeholders to standardize key components of these methods to ensure data can be compared across studies. The nature of Long Island's groundwater coupled with an extensive network of groundwater wells across Long Island offers a unique opportunity to assess conditions throughout the entire aquifer system and correlate with decades of water-chemistry data that has already been used to track the influence of urbanization and agriculture. Coupling results from past studies collecting representative groundwater samples for microplastics, and leveraging existing water-quality and quantity monitoring by the Suffolk County Water Authority, Suffolk County Department of Health Services, Nassau Department of Public Works, and USGS, can provide data to develop microplastic particle transport models; understand the conditions by which microplastics enter the water systems through cesspool, storm drains, and precipitation; and describe potential co-occurrence with other contaminants.

MICROPLASTICS
(CONTINUED)

A CALL FOR ACTION

The future health of our oceans and ecosystems is at risk due to the rise of plastic pollution. While public awareness and scientific research are advancing, meaningful action to curb plastic production and pollution remains insufficient. The need for sustainable alternatives, stricter regulations, and global cooperation is urgent. While the Long Island Sound Study, a state and federal partnership established to protect the Sound, has made strides in improving water quality, the issue of microplastics remains under-addressed. Efforts to reduce plastic pollution through state legislation, such as banning single-use plastics, are only a step in the right direction. Prevention measures through national policy are also needed. One example of successful legislation is the Microbead-Free Waters Act of 2015, which prohibits the manufacturing, packaging, and distribution of rinse-off cosmetics containing plastic microbeads. Greater emphasis also needs to be placed on advanced research into microplastics, including the development of more sophisticated sampling techniques and treatment technologies and broader public-awareness campaigns.

Governments, corporations, and individuals all have a role to play in addressing the microplastic pollution issue. As plastic production continues to rise, doubling every 10 to 15 years, the consequences of inaction will be catastrophic for both the environment and human health. Action must be taken to reduce plastic pollution and embrace sustainable practices to avoid irreversible damage to our planet and future generations.



LONG ISLAND ACTION AGENDA

ACTION AGENDA
(CONTINUED)

In 2024, New York State Department of Environmental Conservation (NYSDEC) began a strategic planning process, called the Long Island Action Agenda, to organize efforts across the Island to protect our water resources. The Action Agenda will be a continuation of the successful Long Island Nitrogen Action Plan (LINAP), which focused efforts on reducing the sources of nitrogen entering surface waters and groundwater. The Action Agenda is expanding outside of water quality and includes water quantity, aquatic habitats, and public education and outreach as goals of the plan.

An Implementation Committee, comprised of federal, state, and local stakeholders, including the Long Island Commission for Aquifer Protection, has been working in coordination with NYSDEC to develop the framework of the Action Agenda. The four main goals developed for the plan include Clean Water, Sustainable Groundwater Resources, Healthy Habitats, and Inspired & Engaged Public. The water resources of the aquifer will be considered in the Sustainable Groundwater Resources category and include implementation actions to conserve water on local and regional scales. The Action Agenda will also look into various outreach opportunities to educate the public on how they can take make a difference in conserving water.

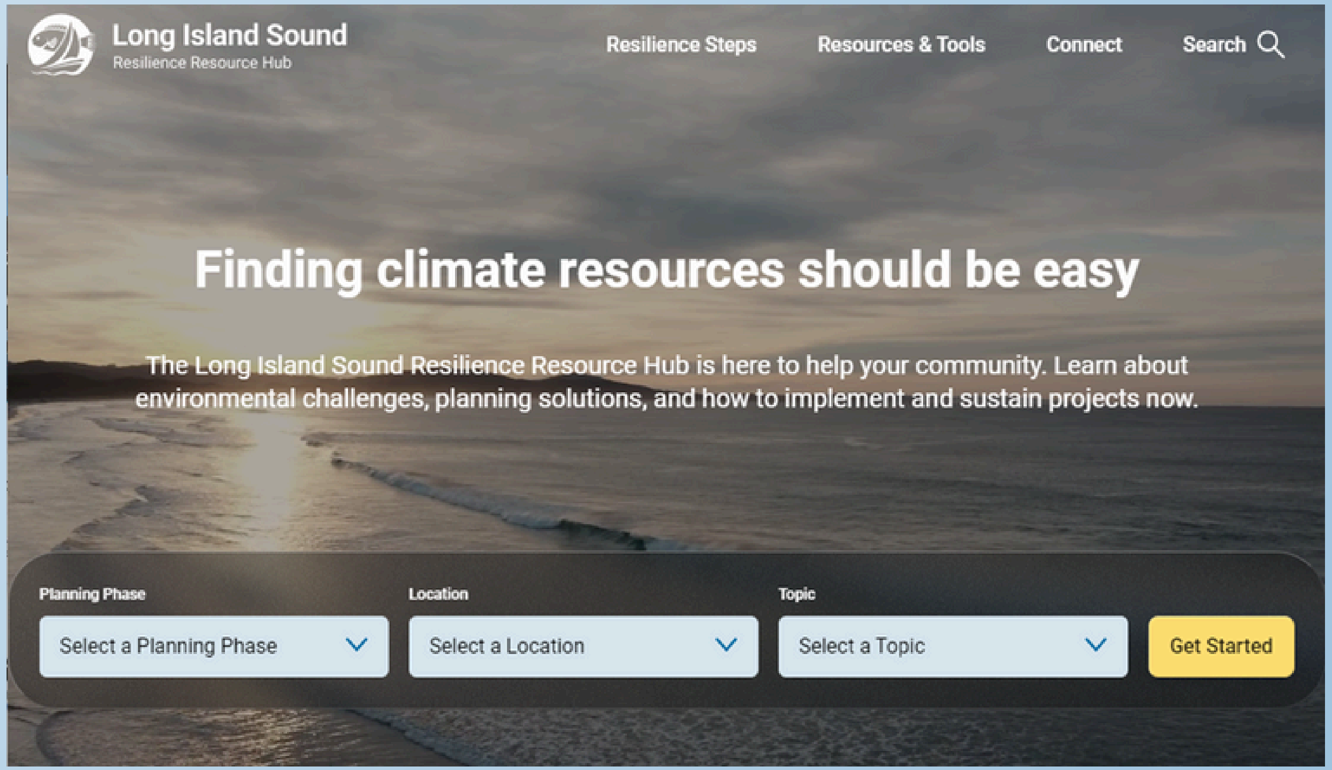
The Long Island Action Agenda will go through a public comment process late 2024 and into 2025. The strategic plan is expected to be published in mid-2025 and the implementation of the plan will begin soon after.

LONG ISLAND SOUND STUDY LAUNCHES NEW RESILIENCE RESOURCE HUB WEBSITE

The Long Island Sound watershed is a critical environmental system, covering over 16,000 square miles across six states, with a key role in draining water from rivers, streams, and groundwater sources into Long Island Sound. The groundwater in Long Island, particularly from its aquifer system, is tightly connected to the Sound. Long Island's aquifer is the sole source of fresh water for residents, and it feeds streams and coastal waters through natural groundwater discharge.

The Long Island Sound Resilience Resource Hub is a comprehensive online resource, offering tools, information, guidance, and inspiration to support the sustainability and resilience of Long Island Sound communities. Developed in response to stakeholder needs, this hub is a one-stop-shop for resources related to climate resilience planning and project implementation.

Website URL: lisresilience.org



LONG ISLAND SOUND STUDY
(CONTINUED)

Key Features

- Curated resources organized by location, topic, and project planning phase.
- Funding Database: access an up-to-date database of resilience-related funding opportunities to support projects and initiatives.
- Resilience Planning Guide: navigate through eight key criteria to guide sustainable and resilient project development.
- Trainings and Events: stay informed about upcoming workshops and trainings focused on building community resilience, and access recordings and materials from past events.
- Case Studies: explore an interactive map that showcases recent resilience initiatives.

BACKGROUND

The Long Island Sound Study (LISS) is a collaborative bi-state partnership established by the EPA, New York, and Connecticut, which brings together federal and state agencies, user groups, concerned organizations, and individuals dedicated to restoring and protecting Long Island Sound. LISS's Sustainable and Resilient Communities Work Group is supported by a team of five Extension Professionals working through Connecticut Sea Grant and New York Sea Grant, who are strategically located in Nassau, Suffolk, and Westchester Counties in New York, and in eastern and western Connecticut.

A Needs Assessment by the Sustainable and Resilient Communities Work Group identified the need for guidance to support LISS partners and stakeholders in identifying the most suitable resources and approaches for various aspects of resilience planning. The Long Island Sound Resilience Resource Hub is designed to help people easily locate relevant tools and resources tailored to their needs. By providing training and tools, such as the LIS Resilience Resource Hub, the Extension Professionals are helping empower Long Island Sound decision makers with enhanced knowledge and skills, ultimately boosting the implementation of sustainable and resilient projects throughout the region.

Long Island Sound Study
A Partnership to Restore and Protect the Sound

Sea Grant NEW YORK

Sea Grant CONNECTICUT

LEAD AND COPPER INVENTORIES: METHODS, CHALLENGES, AND LOOKING AHEAD

INTRODUCTION

With the submission of Lead and Copper Rule inventories now complete, it's a good time to reflect on the different strategies water suppliers used to meet these regulatory requirements, along with the obstacles they encountered during the process. Additionally, we will examine the evolving regulatory landscape, particularly the recently finalized Lead and Copper Rule Improvements (LCRI), and their future implications for water providers and the public. The LCRI is part of a nationwide commitment to identify and replace lead pipes within 10 years, offering stricter rules for water systems and enhanced protection against lead exposure in drinking water.

APPROACHES TO INVENTORY CREATION

Most water suppliers used a variety of methods to compile their inventories. One of the most common approaches was reviewing historical records, such as installation and tap cards, which helped identify the materials used in service lines. Luckily, many suppliers had kept these records up to date, allowing them to determine service line materials across much of their service areas. Another useful source of information came from meter change-out records. In some districts, policies were in place to avoid changing meters in homes with lead service lines because of the material's fragility. In other cases, suppliers had photos of meter replacements, which gave them a visual record of the service line material at the time of the change. In addition to relying on records, many suppliers reached out directly to customers, sending letters and emails to request access to homes for service line inspections. For those customers who didn't respond or couldn't be reached, some suppliers developed online portals where homeowners could upload photos or "self-certify" the materials of their service lines. This multi-layered approach helped water suppliers meet the October 16, 2024, deadline for submitting their inventories. For added quality control, the EPA requires that all water systems validate non-lead service lines are accurately classified through visual inspection of a sample set of non-lead service lines.

CHALLENGES IN MEETING THE DEADLINE

Despite these strategies, the process was not without challenges. For many suppliers, gathering complete and accurate data in time was a demanding task. They had to pull together information from various sources, physically inspect service lines in many cases, and coordinate responses from customers. There was also added pressure due to the consequences of non-compliance. Suppliers who failed to submit their inventories on time would face Tier 2 violations, requiring a water supplier to issue a public notice within 60 days. Those who submitted incomplete or late inventories risked Tier 3 violations, which would result in a report in the system's annual water quality report. After a 21-day period for late inventories and the 60-day period of missing inventories, the department of health will compile a list of non-compliant systems and send it to the Environmental Protection Agency (EPA) Region 2 for enforcement. This urgency pushed suppliers to use every available method to gather the necessary information.

THE LEAD AND COPPER RULE IMPROVEMENTS (LCRI)

Looking ahead, the recently introduced Lead and Copper Rule Improvements (LCRI) bring new regulatory requirements that will increase the demands on water suppliers. The LCRI focuses on more stringent regulations for outreach, public notifications, and expanded sampling programs. One key element of the LCRI is the requirement for water suppliers to notify customers who have lead or galvanized lines that require replacement, as well as those with unknown service line materials. This outreach is critical to keeping the public informed about potential risks and necessary corrective actions. Under the LCRI, water systems will be required to have a full lead service line replacement plan in place by the end of 2027. After that systems must replace at least 10% of their lead service lines per year for 10 years, based on the total number of lead lines identified in their inventory. One of the critical elements of the LCRI is the lowered lead action level, now set at 0.010 mg/L (down from 0.015 mg/L), which requires water systems to take action more quickly when lead levels exceed this threshold. This includes improving corrosion control treatment and expanding tap sampling protocols. Water systems must now collect first- and fifth-liter tap samples at sites with lead service lines and use the higher of the two results to determine compliance. In addition, the LCRI mandates a 24-hour public notice when action levels for lead or copper are exceeded. This change, along with recently lowered action levels for both contaminants, puts additional pressure on suppliers to monitor and respond more quickly when there are issues with water quality. The LCRI also expands the scope of monitoring by requiring community water systems to implement new sampling and public education programs in schools and childcare facilities. These new requirements are designed to protect children, a group particularly vulnerable to the harmful effects of lead exposure.

OPPORTUNITIES FOR GREATER IMPROVEMENT

The LCRI also includes provisions that allow existing state programs to replace the federal requirements if they are at least as stringent. For instance, New York State already has a program that surpasses LCRI requirements in terms of the number of locations sampled and the frequency of testing at public schools. However, New York's program does not currently cover day care facilities or private institutions. Schools contract with private laboratories for testing, and the program is managed by the New York State Department of Health (NYSDOH). With some adjustments, New York's program could fully align with LCRI, helping to avoid confusion and overlap while ensuring that parents and guardians receive clear information and that corrective actions are effectively managed.

FINAL THOUGHTS

Developing the required Lead and Copper Rule inventories was a significant task for water suppliers, and they had to employ a variety of methods to meet the deadline. As the regulatory landscape shifts with the introduction of the LCRI, water suppliers will face new challenges, particularly in relation to stricter requirements for outreach, faster public notifications, and more extensive sampling programs. Aligning federal and state regulations will be key to avoiding confusion and ensuring that the public, especially vulnerable populations such as children, are protected.

HYDROLOGIC CONDITIONS IN NASSAU AND SUFFOLK COUNTIES

This section of the SOTA provides a snapshot of current hydrologic conditions on Long Island. The analysis was compiled by reviewing published National Oceanographic and Atmospheric Administration (NOAA) precipitation records and U.S. Geological Survey (USGS) groundwater and streamflow records from key stations located in Nassau and Suffolk Counties.
Precipitation is the only natural means by which water enters Long Island's aquifers. Approximately half of all precipitation that falls recharges the aquifers; roughly one million gallons of water per day for each square mile of land. Most recharge on Long Island generally occurs during the non-growing season (October to May); from June through September, aquifer recharge is minimal.

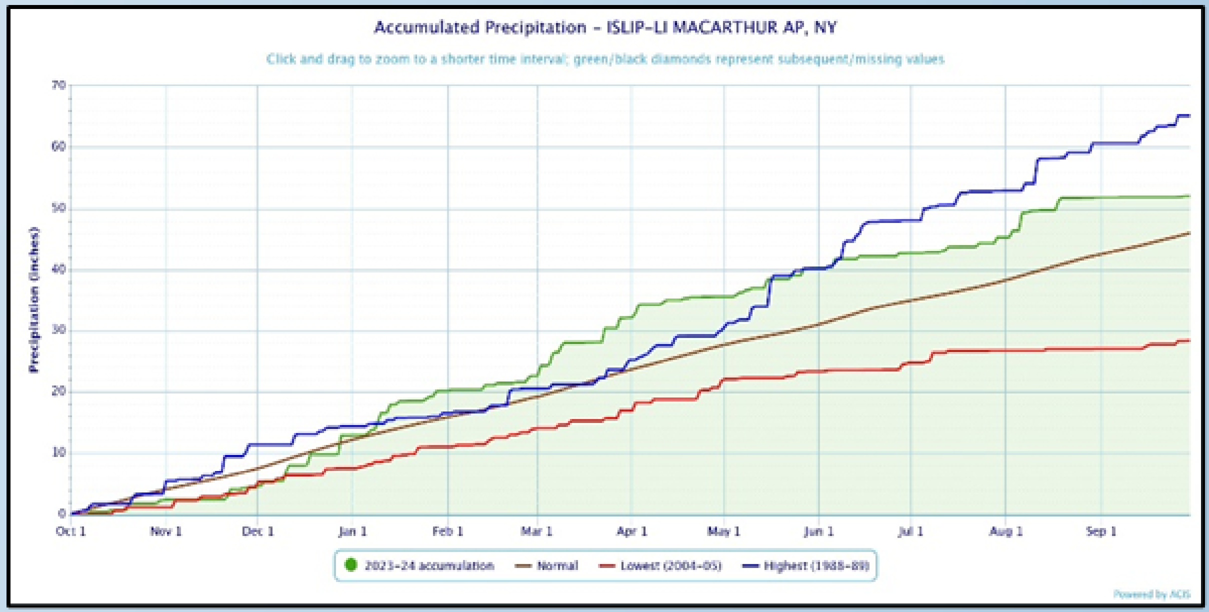
PRECIPITATION IN RECENT YEARS

Normal, or long-term average precipitation for a given site, is calculated based on weather statistics from the previous three decades (climatic normal). These statistics are updated at the beginning of each new decade. For example, current normal precipitation levels are the average values from calendar years 1991 to 2020. In this manner, changing climatic patterns are accounted for, but do not skew the data excessively for any given decadal period. The current value for normal annual (calendar year) precipitation reported by the National Weather Service (NWS) for Islip-Long Island MacArthur Airport (MacArthur Airport), located in central Suffolk County, NY is 45.99 inches.

For the SOTA update, rather than utilizing calendar years, precipitation records from MacArthur Airport were examined in one-year increments for the period October 1 to September 30 for each year, or the water year. A water year is defined as the 12-month period October 1, for any given year through September 30, of the following year. The water year is designated by the calendar year in which it ends, and which includes 9 of the 12 months. MacArthur Airport precipitation data was downloaded from the National Centers for Environmental Information (NCEI) website at www.ncei.noaa.gov.

Precipitation at MacArthur Airport for the 2024 water year was 51.99 inches, compared to the two prior water years of 2023 (49.58 inches) and 2022 (36.23 inches). While these values are not directly comparable to the 30-year climatic normal of 45.99 inches calculated for the calendar year, they can be used to indicate general periods of above- or below-normal precipitation. The data presented above indicates that water years 2024 and 2023 were wetter than normal, and water year 2022 was drier than normal.

The figure below shows an accumulated precipitation graph at MacArthur Airport for water year 2024 (October 1, 2023 to September 30, 2024). This graph shows the annual accumulated precipitation (green) in relation to climatic normal conditions (brown) and the historical years with the highest accumulated precipitation (blue) and lowest accumulated precipitation (red) for the station. The MacArthur Airport station has 61 years of record.

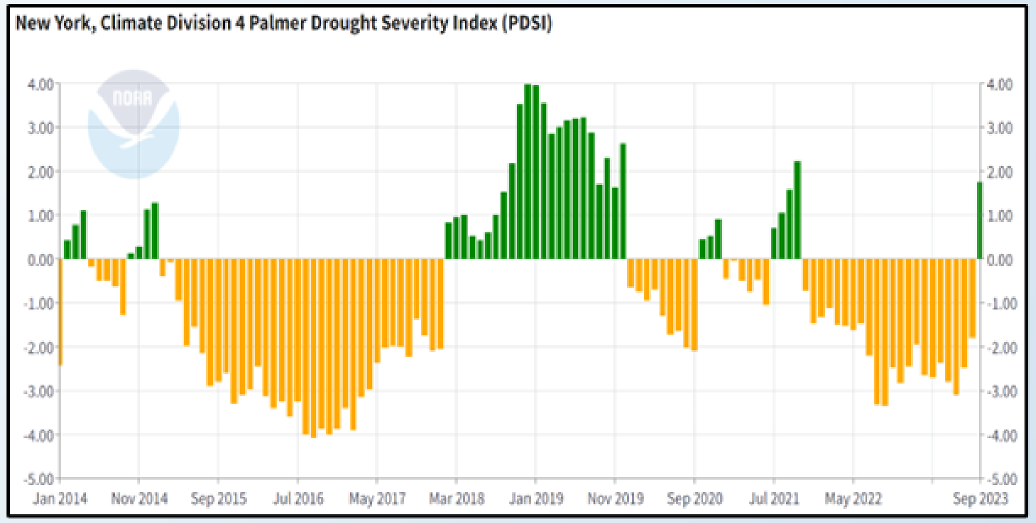


Source: Northeast Regional Climate Center, CLIMOD 2 Data Access, http:/climod2.nrcc.cornell.edu

During the 2024 water year, accumulated precipitation at MacArthur Airport was generally near or below normal from the beginning of the water year until early January when a precipitation surplus began. The precipitation surplus continued throughout the remainder of the water year, with a maximum precipitation surplus of 10 inches above normal in early April. Then a period of little precipitation, beginning in mid-August and lasting through September, brought the annual accumulated precipitation closer to normal.

The figure below shows the Palmer Drought Severity Index (PDSI) for approximately the past 10 years (January 1, 2015 to October 31, 2024) for the coastal region of New York State (Climate Division 4). This index is commonly used for monitoring drought and uses precipitation and temperature data to estimate moisture supply based on a supply-and-demand model of soil moisture. A PDSI around zero is normal; with positive numbers indicating moist conditions and negative numbers indicating dry conditions. Since 2015, Long Island has been in 3 periods of unusually moist conditions or greater (PDSI +2.0 or above) in 2018-19, 2021, and 2023-24 and 3 periods of moderate drought or greater (PDSI -2.0 or below) in 2015-17, 2020, and 2022-23). Some moderate drought conditions are also indicated in October 2024.

HYDROLOGIC CONDITIONS (CONTINUED)



Source: NOAA National Centers for Environmental Information, Climate at a Glance: Divisional Time Series, https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/divisional/time-series

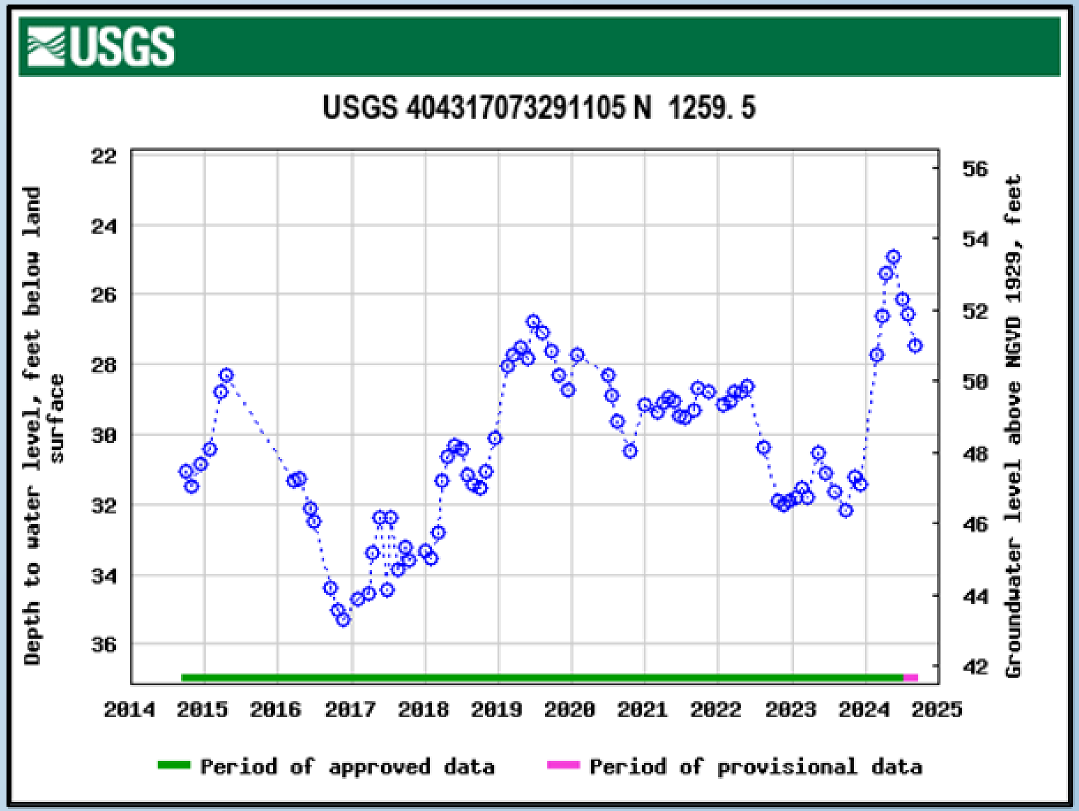
GROUNDWATER LEVELS

Background information pertaining to specific wells and streamflow gauges represented in this section can be obtained from the USGS report entitled "Statistical Analysis of Long-Term Hydrologic Records for Selection of Drought-Monitoring Sites on Long Island, New York," accessible at the following web address: https://pubs.er.usgs.gov/publication/sir20045152.

Aquifer levels on Long Island have fluctuated historically due to human influences such as pumping and sewering, and fluctuate seasonally due to precipitation, recharge, and evapotranspiration. Regardless of these stresses, groundwater levels beneath most of Long Island are usually highest in March, April, and May and lowest in September, October, and November. The following is a snapshot of hydrologic conditions in the aquifer system of Long Island, with the focus being on the 10-year period from October 1, 2014 to September 30, 2024.

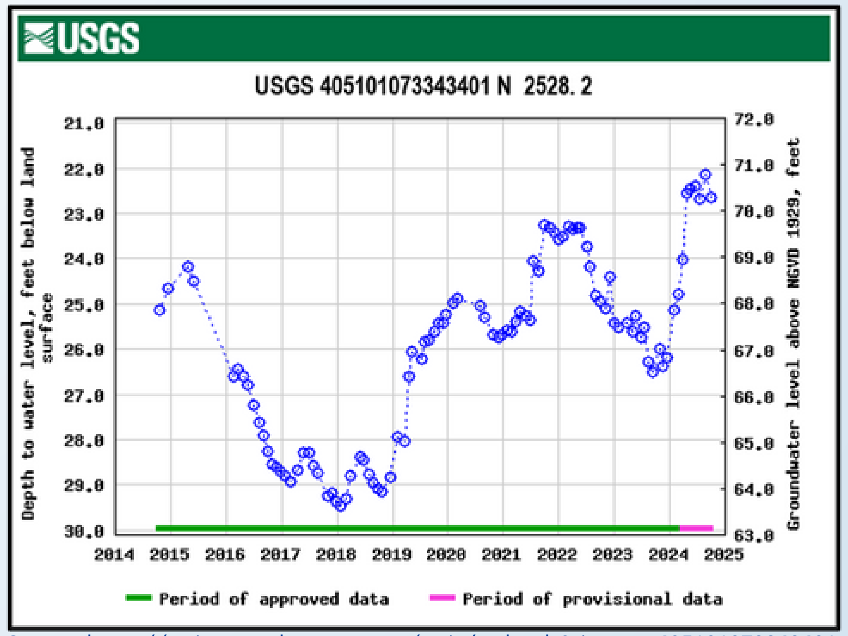
Generally, groundwater levels and streamflows have declined from highs reached in 2019 after a period of well above normal precipitation, to more average levels during 2020 to early 2022, and then to below average levels from late 2022 through 2023 in response to a period of below average precipitation. Starting in 2024, groundwater levels and streamflow increased to average to above average levels in response to increased precipitation. A more detailed look at these trends are shown in the figures on the following pages.

The 10-year hydrograph below shows that water levels at well N1259.5, located in Plainedge in southeastern Nassau County, and screened in the upper glacial aquifer (41 ft deep) increased sharply to above normal levels in 2019 from the lows reached in late 2017. This was in response to higher-than-normal precipitation during 2018 and 2019 after a 3-year period of well below normal precipitation. Water levels returned to more normal levels in 2020 as precipitation totals for 2020 through early 2022 were closer to average. A sharp decline in water levels began later in 2022 as conditions became drier. Water levels sharply increased in early 2024 to the highest levels in the 10-year period as the result of well above normal precipitation. Water levels began to decline again in mid-2024 as conditions became drier.



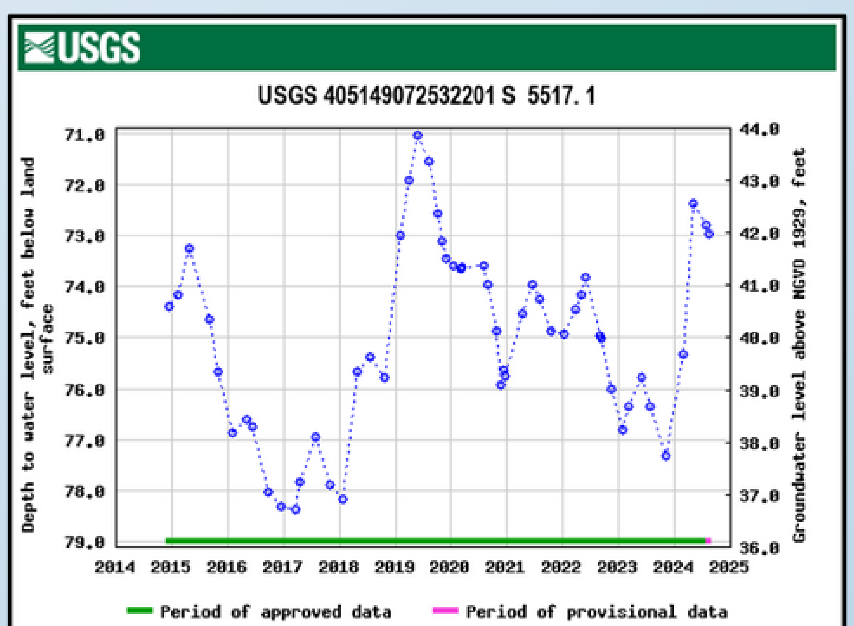
Source: https://nwis.waterdata.usgs.gov/usa/nwis/gwlevels/?site_no=404317073291105

The 10-year hydrograph below shows that water levels at well N2528.2, located in Old Brookville in northeastern Nassau County, and screened in the Magothy aquifer (328 ft deep) increased sharply to more normal levels in 2020 from the lows reached in early 2018. This was in response to higher-than-normal precipitation during 2018 and 2019 after a 3-year period of well below normal precipitation. Water levels sharply increased in 2021, probably due to changes in local groundwater pumpage, and remained at these levels through early 2022. A sharp decline in water levels began later in 2022 as conditions became drier and local groundwater pumpage increased, and continued to decline through most of the 2023 water year. Water levels sharply increased in early 2024 to the highest levels in the 10-year period as the result of well above normal precipitation.



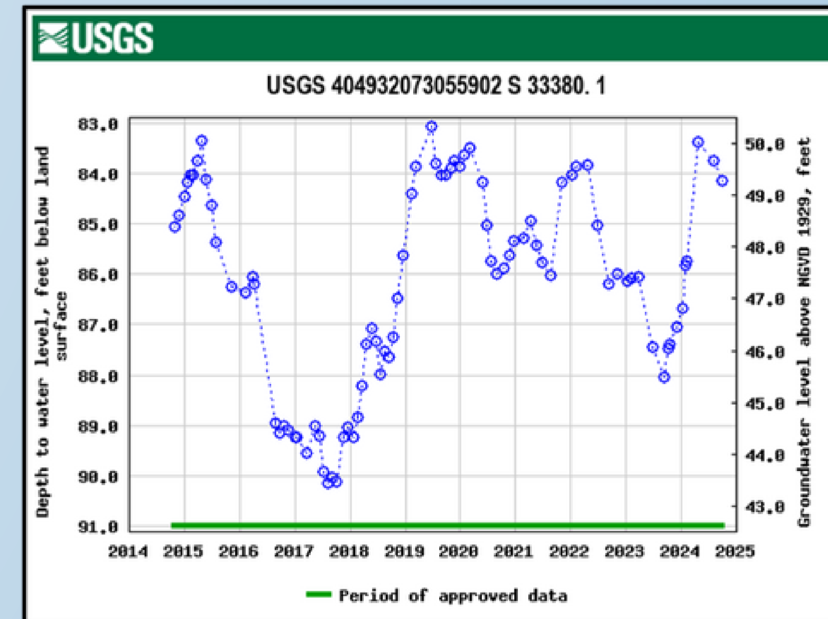
Source: https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=405101073343401

Similar to the wells in Nassau County, the 10-year hydrograph below shows that water levels at well S5517.1, located at Brookhaven National Laboratory in east-central Suffolk County, and screened in the upper glacial aquifer (91 ft deep) increased sharply to above normal levels in 2019 from the lows reached in late 2017. This was in response to higher-than-normal precipitation during 2018 and 2019 after a 3-year period of well below normal precipitation. One difference to the wells in Nassau County is the large decline in water levels in late 2020 that is related to much drier conditions on the east end during that year. Water levels then varied seasonally through early 2022, during a period of relatively average precipitation, but began a sharp decline later in 2022 as conditions became drier, recovered somewhat in early 2023, then began to decline for the remainder of the water year. Water levels sharply increased in early 2024 as the result of well above normal precipitation. Water levels began to decline again in mid-2024 as conditions became drier.



Source: https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=405149072532201

Similar to the other hydrographs shown above, the 10-year hydrograph below shows that water levels at well S33380.1, located in Ronkonkoma in central Suffolk County, and screened in the Magothy aquifer (855 ft deep) increased sharply to more normal levels in 2019 from the lows reached in late 2017. This was in response to higher-than-normal precipitation during 2018 and 2019 after a 3-year period of well below normal precipitation. Water levels varied seasonally with changes in precipitation and groundwater pumpage through early 2022. A sharp decline in water levels began later in 2022 as conditions became drier and local groundwater pumpage increased, then leveled off in early 2023, then began to decline sharply for the remainder of the water year. Water levels sharply increased in early 2024 as the result of well above normal precipitation. Water levels began to decline again in mid-2024 as conditions became drier.



Source: https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=404932073055902

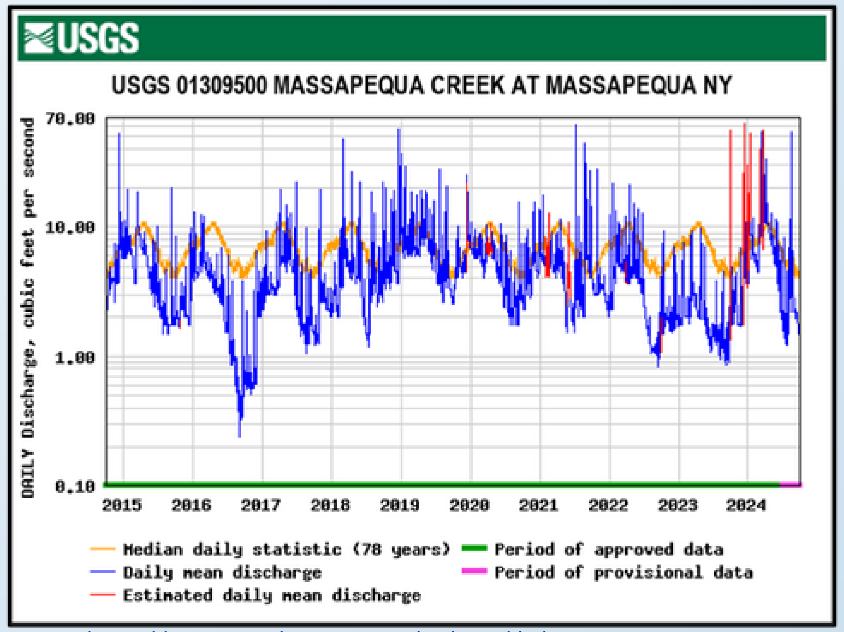
STREAMFLOWS

Since all of Long Island's streams are in direct hydraulic contact with the upper glacial aquifer, their flows closely reflect changes in the water-table altitude. As with groundwater levels, streamflow (stream discharge) fluctuates throughout the year, from their highs in the spring to their lows in late summer. For each of the hydrographs shown below, the orange line represents the historical median stream discharge for each day (or the middle value for the period of record), and the blue line represents the daily mean discharge for each day (or measured daily average), a red line indicates that the daily mean discharge for that day was estimated. The three streams shown below are reflective of different conditions of development or urbanization, with Massapequa Creek being located in the most highly developed area, Connetquot River located in an area of intermediate development, and the Peconic River located in the most minimally developed area.

Massapequa Creek: Streamflow at most Nassau County streams, including Massapequa Creek, reflect the long-term effects of significant human impacts from sewering and pumping on water levels within the upper glacial and deeper aquifers. Discharges in most steams in Nassau County have decreased markedly since the 1960s and have not recovered due to these impacts.

HYDROLOGIC CONDITIONS
(CONTINUED)

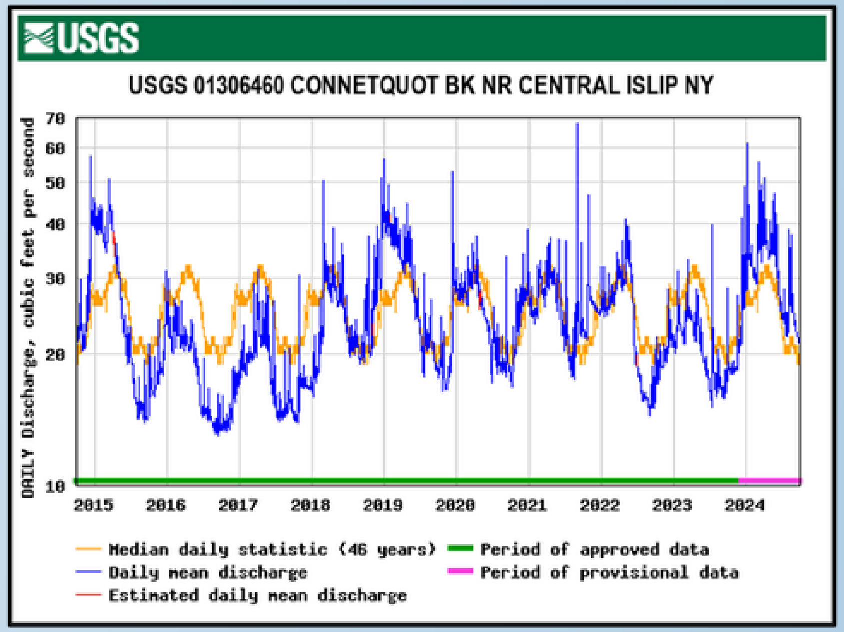
The 10-year hydrograph below shows that stream discharge at Massapequa Creek prior to 2016 fluctuated around the long-term average, with a few more pronounced periods of above or below median discharge related to changes in precipitation. However, in response to the 3-year period of well-below-normal precipitation during 2015, 2016, and 2017, stream discharge declined over that period reaching a low in late 2016. Since that time, stream discharge increased to above normal in 2019, and then remained near the long-term median until mid-2022, when stream discharge declined sharply to well-below normal in response to below-normal precipitation. Stream discharge remained below to well-below normal throughout most of the 2023 water year. Stream discharge returned to near median conditions in 2024 with some variations due to changes in precipitation, then began a sharp decline near the end of the water year.



Source: https://nwis.waterdata.usgs.gov/ny/nwis/dv/?site_no=01309500

Connetquot River: This stream located in south-central Suffolk County borders areas showing significant human impacts (to its west) and minimal human impacts (to its east). Therefore, it is a good stream to use as a comparison to the more urbanized streams to the west and less human impacted streams to the east.

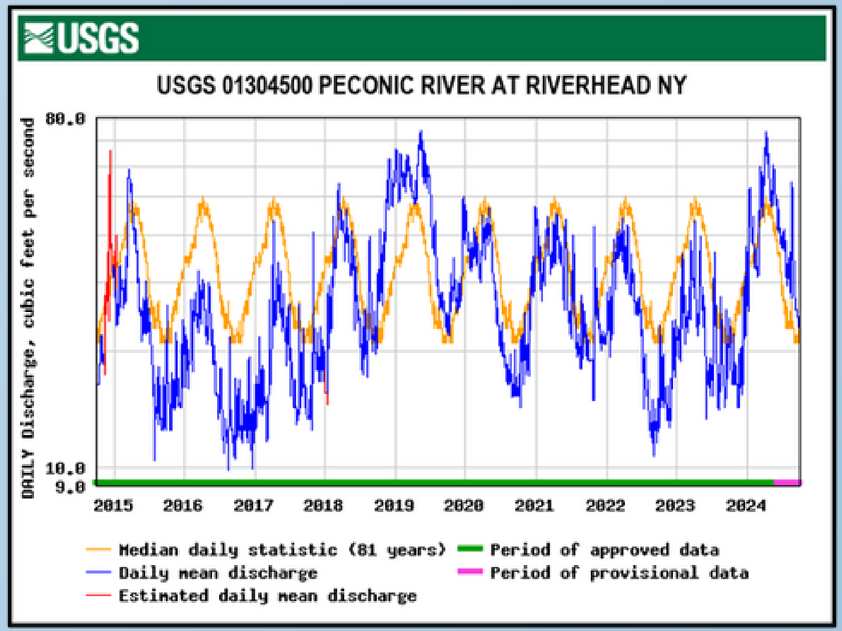
Similar to Massapequa Creek, the 10-year hydrograph below shows that stream discharge at Connetquot Brook prior to 2016 fluctuated around the long-term median discharge, with a few more pronounced periods of above or below normal conditions related to changes in precipitation. However, in response to the 3-year period of well-below-normal precipitation during 2015, 2016, and 2017, stream discharge declined over that period reaching a low in late 2016. Since that time, stream discharge increased to above normal in 2019, and then remained near the long-term median until mid-2022, when stream discharge declined sharply to well-below normal in response to below-normal precipitation. Stream discharge remained below to well-below normal throughout most of the 2023 water year. Stream discharge then increased to normal to above normal conditions for most of 2024 during a period of above average precipitation.



Source: https://nwis.waterdata.usgs.gov/ny/nwis/dv/?site_no=01306460

Peconic River: This stream located in eastern Suffolk County is situated in an area with minimal human impact. It is also the one major stream on Long Island that flows from west to east, discharging into the Peconic Bay. Most other streams on Long Island flow north or south, depending on what side of the groundwater divide they are situated.

Similar to the other two streams, the 10-year hydrograph above shows that stream discharge at Peconic River prior to 2016 fluctuated around the long-term median discharge, with a few more pronounced periods of above or below normal conditions related to changes in precipitation. However, in response to the 3-year period of well-below-normal precipitation during 2015, 2016, and 2017, which was somewhat more pronounced in eastern parts of Long Island, stream discharge declined over that period reaching a low in late 2016. Since that time, stream discharge increased to above normal in 2019, and then remained near the long-term median until mid-2022, when stream discharge declined sharply to well-below normal in response to below-normal precipitation. Stream discharge remained below to well-below normal throughout most of the 2023 water year. Stream discharge then increased to normal to above normal conditions for most of 2024 during a period of above average precipitation.



Source: https://nwis.waterdata.usgs.gov/ny/nwis/dv/?site_no=01304500

HYDROLOGIC CONDITIONS
(CONTINUED)

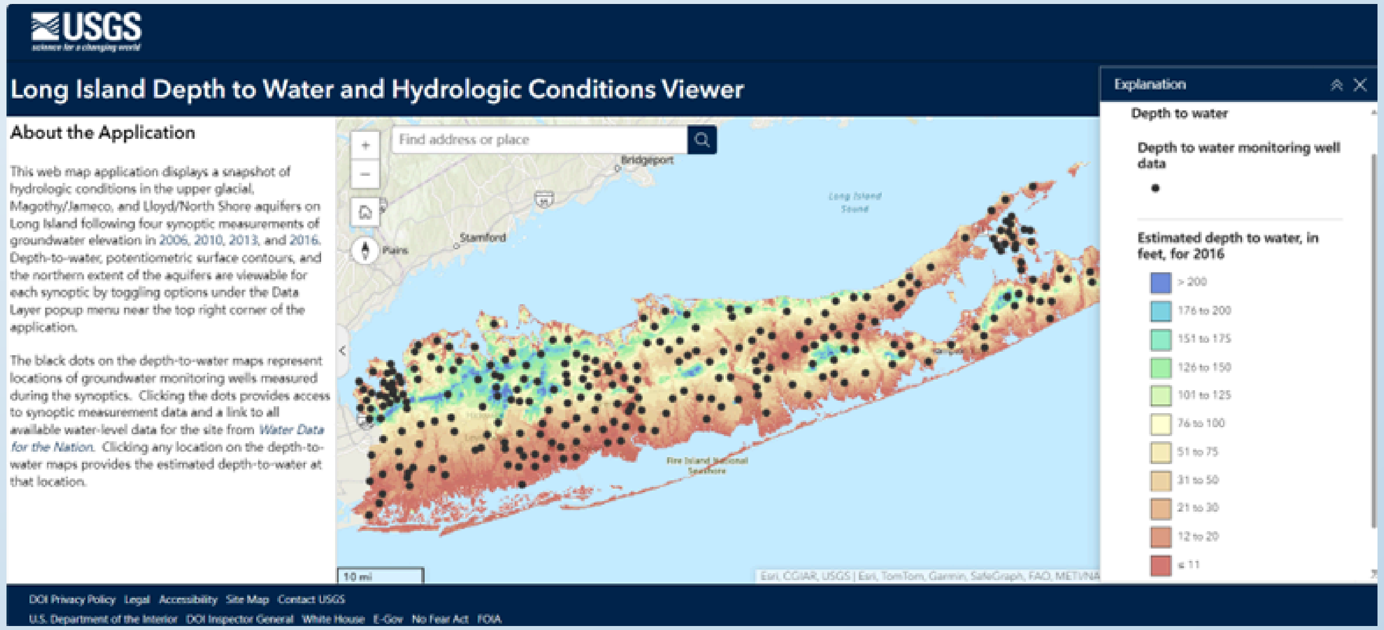
The data displayed in the hydrographs in this section show that Long Island has experienced the full range of hydrologic conditions in a very short time frame, from record or near-record lows as recently as 2017 and 2023 to generally above to well above normal conditions in 2019 and 2024. The abundance of groundwater and surface-water data collected by the USGS and other agencies over a long period of time ensures that water suppliers, regulatory agencies, and the public are well informed about groundwater and surface-water conditions at any given time. This data is an invaluable aid in making decisions to protect both public health and the health of the environment.

HOW CAN I FIND OUT MORE INFORMATION ON LONG ISLAND'S HYDROLOGIC CONDITIONS?

The USGS has a website providing data and resources from their ongoing cooperative groundwater and surface-water hydrologic monitoring program on Long Island that can be accessed at:

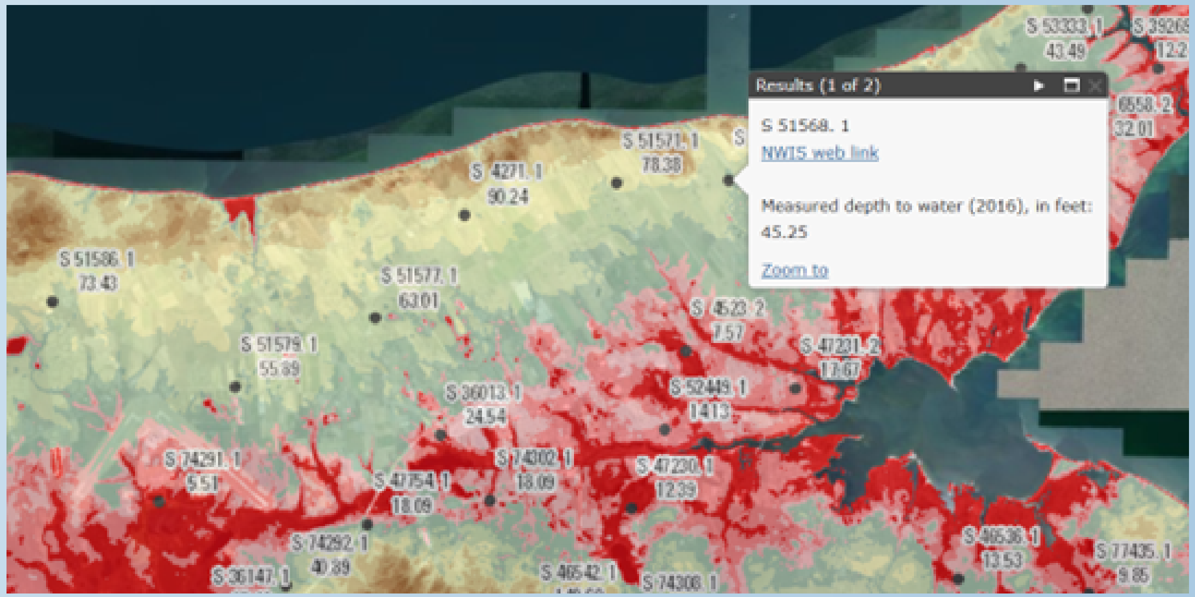
https://www.usgs.gov/centers/ny-water/science/us-geological-survey-hydrologic-monitoring-long-island-new-york.

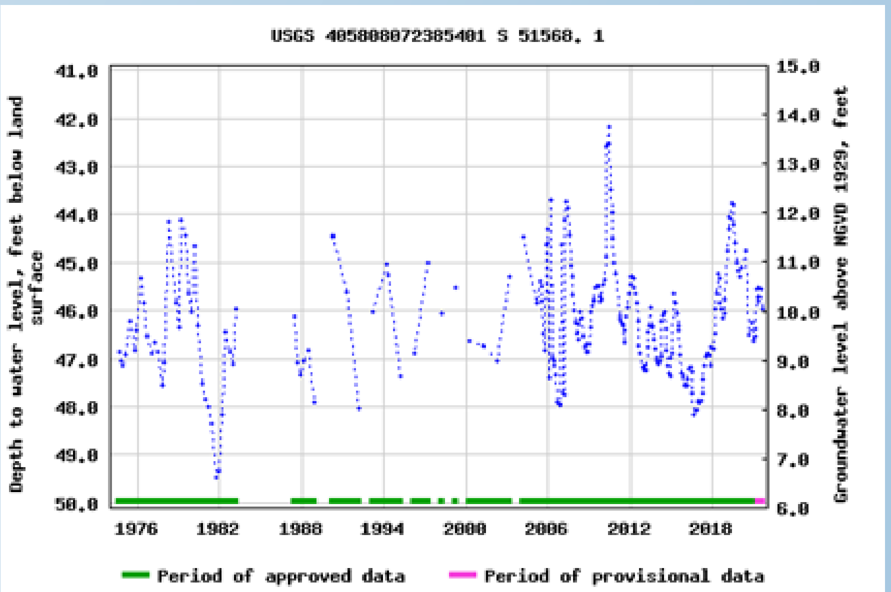
The USGS also maintains a depth-to-water map for Nassau and Suffolk Counties. The map is shown below, with the color-coded intervals to its right. Each color represents an interval of depth below land surface, below which groundwater will be encountered. Also shown below (as black dots) are the locations of USGS monitoring wells that were utilized in creating the map.



The map is fully interactive and available at the following web address: https://ny.water.usgs.gov/maps/li-dtw.

Below is an example of a close up of the depth to water in eastern Suffolk County. When the user clicks on a particular monitoring well (in this case well number S-15568.1), its information is displayed, including a link to its historical water-level record. Clicking on the "NWIS web link" will display the hydrograph shown to the right of the figure. The user can then specify a particular time period for which data is desired and see a graph of water levels within that time period.





By utilizing this and other publicly-available websites and web tools, anyone can obtain instant information on hydrologic conditions anywhere in Nassau and Suffolk Counties and compare current data with past trends.

GROUNDWATER PUMPAGE

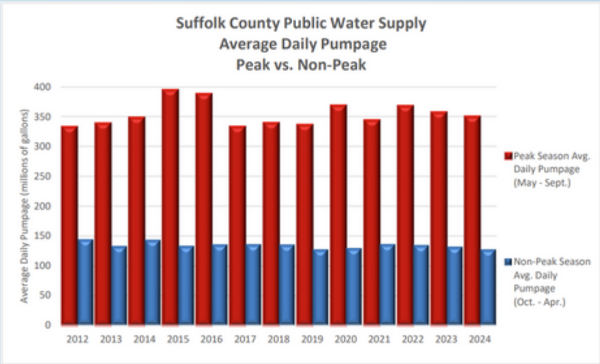
In 2024, the average daily pumpage for Nassau and Suffolk Counties was approximately 170 million gallons per day (mgd) and 221 mgd, respectively, and their respective 2012 to 2023 averages were 182 mgd and 227 mgd. Yearly pumpage estimates are provided from October through September, so the 2024 reporting year contains data from October 2023 through September 2024. The 2024 Nassau County average daily pumpage was approximately 12 mgd below the 2012 to 2023 average while the 2024 Suffolk County average daily pumpage was approximately 6 mgd below the 2012 to 2023 average. Peak season average daily pumpage (May -September) is approximately 100 – 200 mgd more than non-peak season average daily pumpage (October -April). In 2024, the peak season average daily pumpage for Nassau and Suffolk Counties was approximately 238 mgd and 351 mgd, respectively, and their respective 2012 to 2023 averages were 250 mgd and 354 mgd. The 2024 Nassau County peak season average daily pumpage was approximately 12 mgd below the 2012 to 2023 average and the Suffolk County peak season average daily pumpage was approximately 3 mgd below the 2012 to 2023 average.

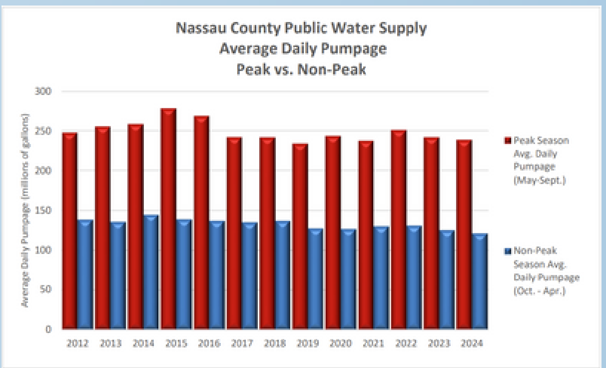
	Nassau County Public Water Supply Non-Peak Season Avg. Daily Pumpage (mgd)	Nassau County Public Water Supply Peak Season Avg. Daily Pumpage (mgd)	Nassau County Public Water Supply Avg. Daily Pumpage (mgd)
Year*	Oct.-April	May-Sept.	All months
2012	137.91	247.43	183.69
2013	135.22	255.12	185.48
2014	144.49	258.11	192.12
2015	138.26	277.61	196.67
2016	136.46	268.21	191.54
2017	134.69	241.89	179.63
2018	136.46	241.47	180.48
2019	127.09	233.66	171.77
2020	126.26	243.32**	175.20**
2021	129.70	237.18	174.75
2022	130.50	250.68	180.88
2023	124.89	241.61	173.82
2024	120.77	238.48	169.98
Avg.	132.52	248.83	181.23

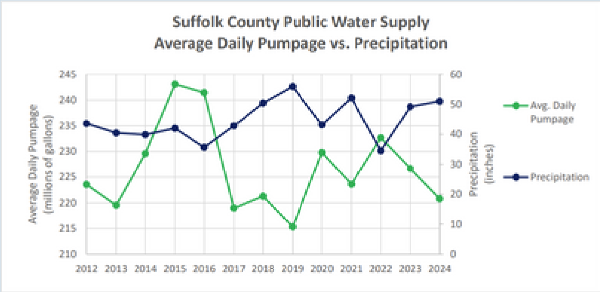
*Yearly pumpage estimates are provided from October – September (i.e. 2012 reporting year contains data from October 2011 through September 2012).
**Updated from last year's SOTA report based on data corrections and newly submitted public water supply pumpage reports.

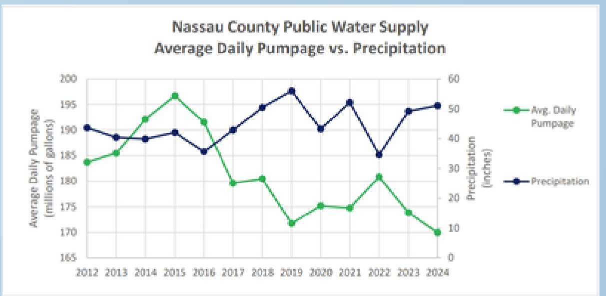
	Suffolk County Public Water Supply Non-Peak Season Avg. Daily Pumpage (mgd)	Suffolk County Public Water Supply Peak Season Avg. Daily Pumpage (mgd)	Suffolk County Public Water Supply Avg. Daily Pumpage (mgd)
Year*	Oct.-April	May-Sept.	All months
2012	144.66	333.38	223.55
2013	133.31	339.08	219.56
2014	143.57	348.74	229.57
2015	133.52	394.83	243.05
2016	135.98	388.23	241.43
2017	136.33	333.51	218.99
2018	135.72	339.83	221.28
2019	127.67	336.75	215.31
2020	129.83	368.96	229.79
2021	136.55	344.25	223.61
2022	134.80	368.26	232.66
2023	132.13	357.70	226.68
2024	127.61	350.58	220.82
Avg.	134.74	354.16	226.64

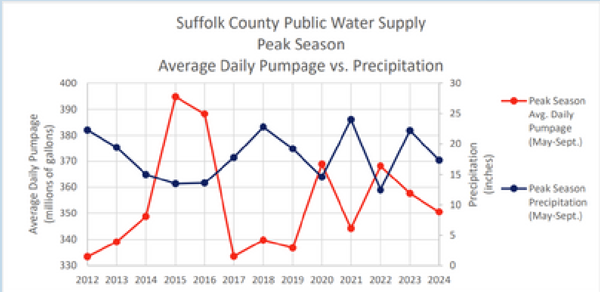
*Yearly pumpage estimates are provided from October – September (i.e. 2012 reporting year contains data from October 2011 through September 2012).

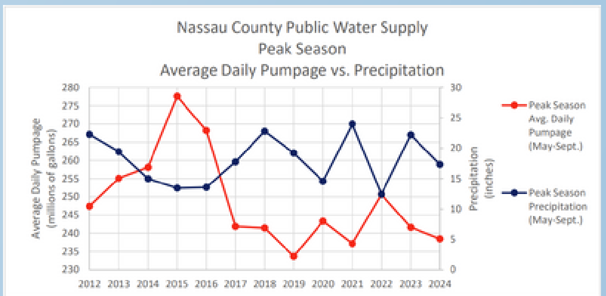


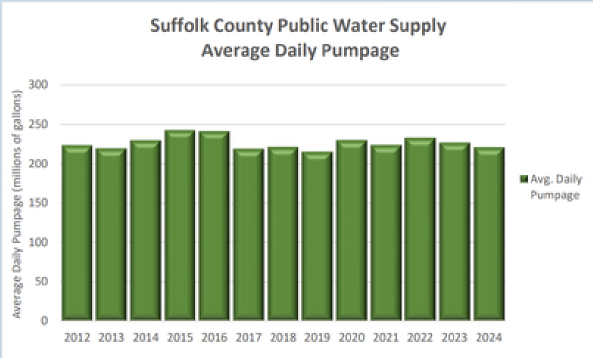


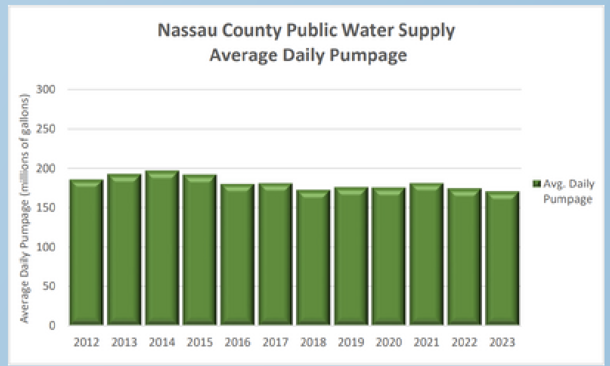












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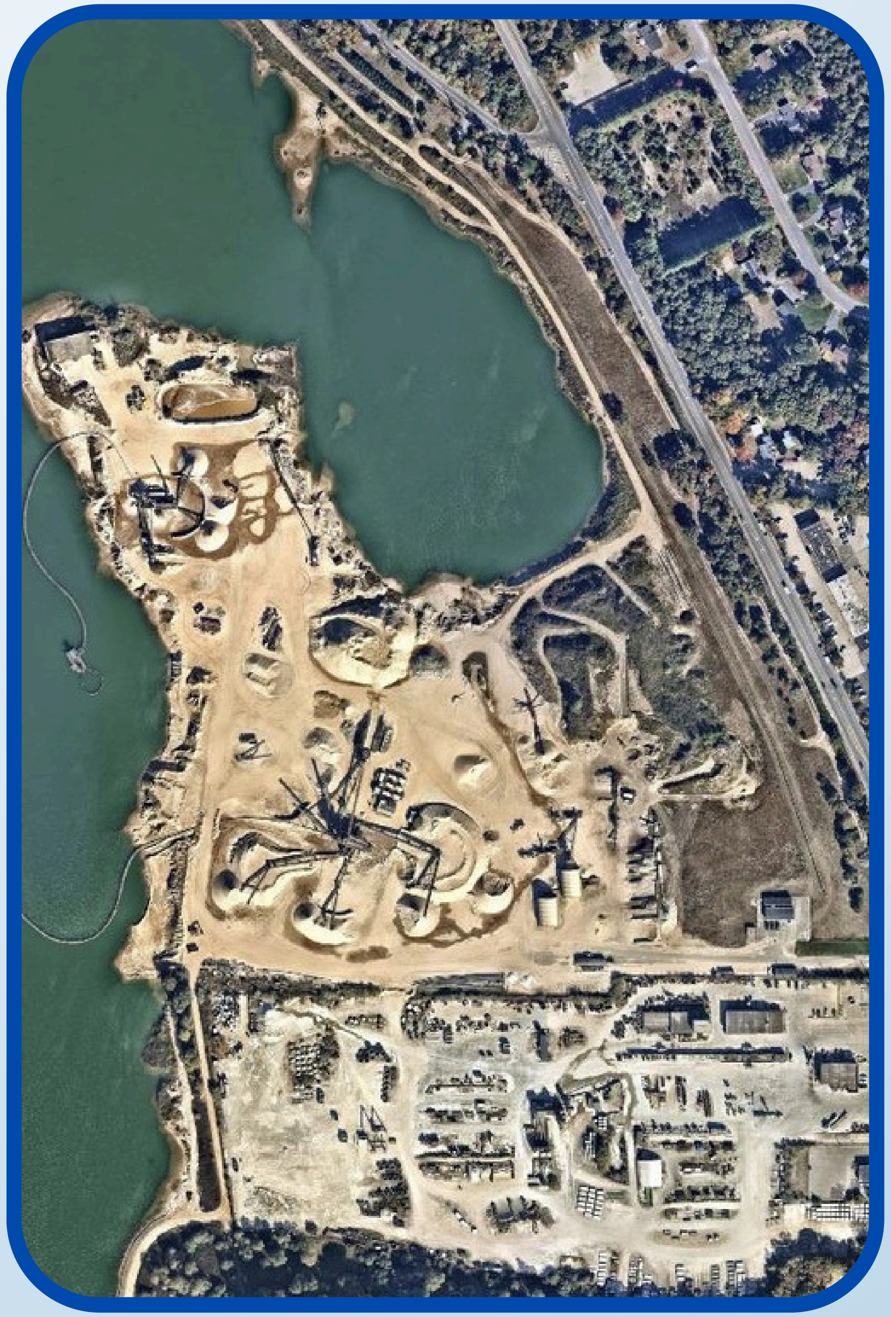
GROUNDWATER STUDY AT LONG ISLAND MINES



ASSESSING IMPACT

To assess the potential impacts of sand and gravel mining on groundwater quality, the New York State Department of Environmental Conservation (DEC), in consultation with the New York State Department of Health (DOH), is leading a comprehensive Groundwater Study at Long Island Mines (LIM Study). A work plan to guide the LIM Study was finalized in June 2022 with input provided by DOH and other stakeholders. It was designed to ensure that, among other things, high-quality, representative groundwater samples are collected for analysis of a wide range of compounds, including, but not limited to volatile organic compounds (VOCs), semi-VOCs, dissolved and total metals, radionuclides, 1,4-dioxane, and a new class of compounds called per- and polyfluoroalkyl substances (PFAS). Currently, four mines, all located in Suffolk County, have volunteered to participate in the LIM Study.

Each of the participating mines submitted a site-specific work plan to DEC that conforms to DEC's guiding work plan. To date, six out of twelve planned quarterly groundwater monitoring and sampling events have been completed with oversight by DEC. Following completion of each quarterly monitoring event, electronic data and reports are submitted to DEC for review, ensuring ongoing assessment of the collected information. Upon completion of the final sampling event in June 2026, DEC will prepare a comprehensive report summarizing the results and findings, which will be made available to the public and stakeholders. This final report will, among other things, consider the quality of the data gathered, compare the data to available background data, review the data for any potential trends, and evaluate the potential impact of sand and gravel mining on groundwater quality. DEC will also provide recommendations and initiate permit condition adjustments as needed, based on the study results, to ensure that existing permit and monitoring requirements are protective of Long Island's sole source aquifer.To follow the progress of the LIM Study and obtain the quarterly reports for each participating mine, please visit DEC's Mining on Long Island website at https://dec.ny.gov/environmental-protection/mining-reclamation/long-island-mining#work.

NEW YORK'S CLEAN WATER INFRASTRUCTURE ACT AND LONG ISLAND

INTRODUCTION

Long Island faces significant challenges to its aquifer and drinking water, driven by aging infrastructure, outdated septic systems, and emerging contaminants such as PFAS (Per- and polyfluoroalkyl substances) and 1,4-dioxane. While the work to develop and install the technologies needed to address these threats is underway, there are substantial financial hurdles.

A 2017 NYS Department of Health report on the drinking water infrastructure needs of New York State estimated the cost of repairing, replacing, and updating New York's drinking water infrastructure at $38.7 billion over the next 20 years. A 2008 report on wastewater infrastructure estimated a $36.2 billion need. These figures likely underestimate the actual need, as they do not account for emerging challenges, such as new federal drinking water regulations, and the replacement of an estimated 500,000 lead service lines across the state.

CLEAN WATER INFRASTRUCTURE ACT (CWIA) BACKGROUND:

Following numerous water crises throughout the State, the CWIA was created in 2017. The State's 2017 budget included $2.5 billion in appropriations for the program. In 2019 former Governor Cuomo doubled the CWIA funding with an additional $2.5 billion over the next 5 years- bringing program funds to $5 billion. Since 2019, $500 million for the CWIA programs have been included in each State budget.

CWIA and Long Island:

With 17 programs funded by CWIA, the following programs have been the greatest benefit to Long Island:

1) Water Infrastructure Improvement Act (WIIA): Provides essential financial assistance to municipalities to improve drinking water and wastewater infrastructure. Through grants, it supports local governments in addressing aging infrastructure, water quality concerns, and environmental protection. Since 2017, CWIA has allocated $2.1 billion on WIIA-IMG statewide. According to the New York State Environmental Facilities Corporation (EFC), over $500 million was awarded to Nassau County from 2017 to 2024. In Suffolk County, more than $100 million went towards drinking water projects. Notably, over 90% of WIIA awards have focused on drinking water improvements.

2) Water Quality Improvement Program (WQIP): Targets improvements in wastewater systems and land acquisition for water source protection. Eligible projects include wastewater treatment improvements, nonpoint source pollution abatement, land acquisition for source water protection, road salt reduction and storage, and habitat restoration. Since 2017, CWIA has awarded $504.4 million on WQIP statewide, with over $103 million in funding awarded to projects across Long Island.

3) Septic System Replacement Program (SSRP): A program that aids in replacing failing septic systems, especially in Suffolk County, where nitrogen pollution is a critical concern. Since 2017, CWIA has awarded or spent $90 million on SSRP statewide. Since 2018, the County of Suffolk has received $60,130,000 from NYS EFC for the SSRP Program. Nassau County received $6,030,000.

4) Land Acquisition for Source Water Protection (LASWP): A program that provides funding to acquire land or conservation easements to safeguard critical water sources, protecting groundwater and other drinking water supplies from contamination and overuse. CWIA has awarded or spent $30 million on LASWP statewide, with approximately $10 million allocated to Suffolk County projects. In 2021, $4 million was awarded to Suffolk for acquiring land in the Calverton Special Groundwater Protection Area.

CLEAN WATER INFRASTRUCTURE ACT (CONTINUED)

While there are many programs funded through CWIA, the analysis and recommendations in this report center on those that directly contribute to solving the region's most pressing issues: emerging contaminants, wastewater infrastructure, drinking water safety, and nitrogen pollution. The programs selected for inclusion provide the most significant financial support and have the greatest potential to shape the future of Long Island's water systems. The Green Innovation Grant Program and Road Salt storage Storage and Reduction initiatives are both acknowledged for their potential to impact Long Island's aquifer; however, their overall significance financially is relatively minor compared to the primary programs analyzed. The hazardous waste remediation program has also been excluded from this report's analysis due to its distinct funding mechanisms and lack of alignment with the objectives of this study, which focuses on grant-based programs under the CWIA. Unlike programs such as the Septic System Replacement Program (SSRP), hazardous waste remediation is not funded through direct grants to municipalities. Instead, cleanups are funded by a responsible party or parties under DEC oversight or, in instances where the responsible parties are unknown, unable or unwilling, by the state, who will receive reimbursement from the responsible parties later.

VOTER SUPPORT AND THE ENVIRONMENTAL BOND ACT

The **Clean Water, Clean Air, and Green Jobs Environmental Bond Act of 2022** provided significant financial support to the Clean Water Infrastructure Act (CWIA). By authorizing $4.2 billion for environmental and infrastructure projects, the Bond Act expanded funding for water quality improvements, wastewater upgrades, and emerging contaminant mitigation. This initiative was overwhelmingly supported by voters in both Nassau and Suffolk Counties:

- Suffolk County: 64% approval
- Nassau County: 68% approval

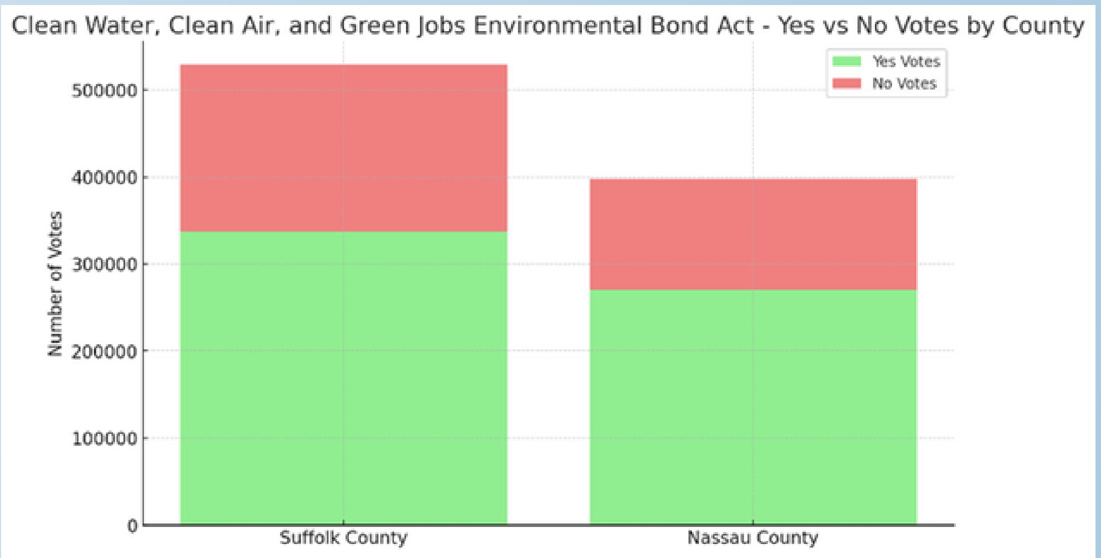


Figure 1 Comparison of Yes vs No Votes by County - Clean Water, Clean Air, and Green Jobs Environmental Bond Act

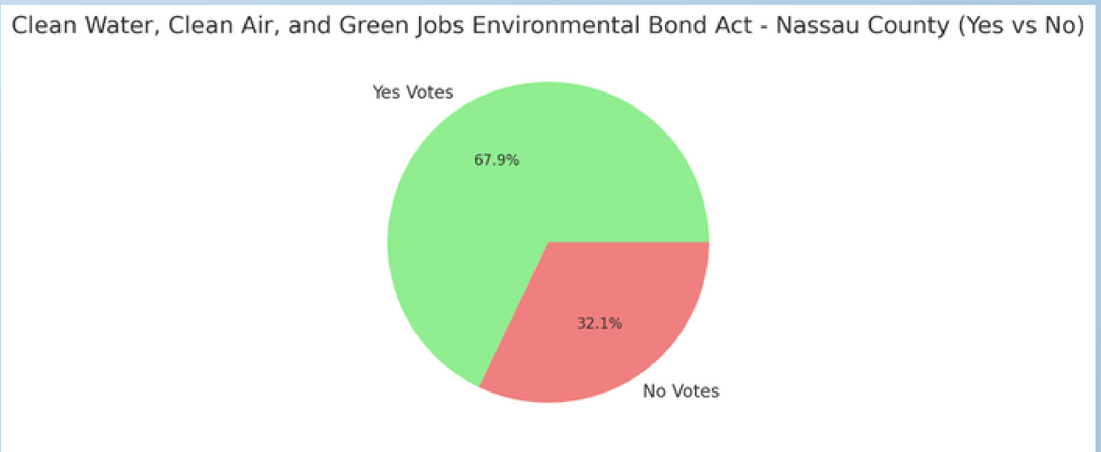


Figure 2 Yes vs No Votes for Nassau County - Clean Water, Clean Air, and Green Jobs Environmental Bond Act

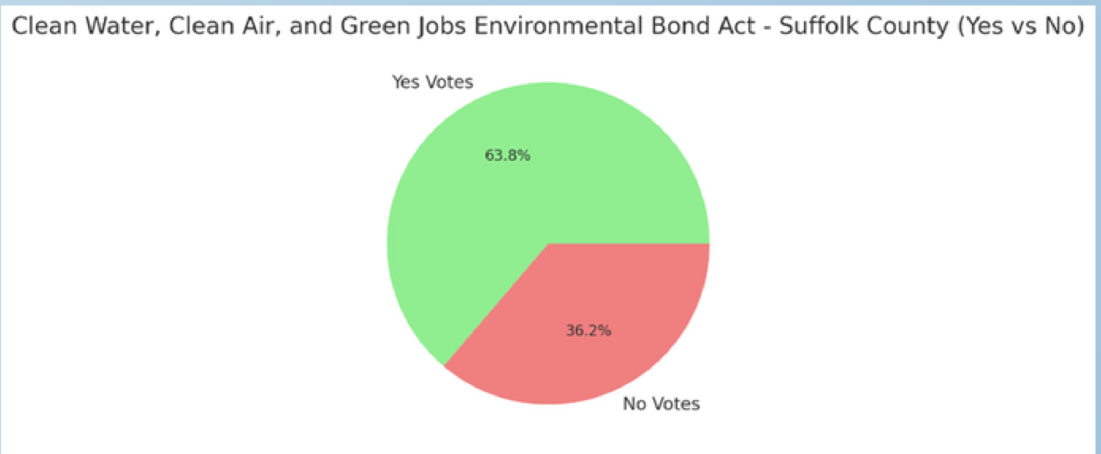


Figure 3 Yes vs No Votes for Nassau County - Clean Water, Clean Air, and Green Jobs Environmental Bond Act

CLEAN WATER INFRASTRUCTURE ACT
(CONTINUED)

WATER QUALITY NEEDS:

Statewide, the Water Infrastructure Improvement Act (WIIA-IMG) and Water Quality Improvement Program (WQIP) have collectively received 76% of Clean Water Infrastructure Act (CWIA) funds. Both Nassau and Suffolk Counties face significant water infrastructure needs, though their challenges vary due to differences in existing systems and local priorities.
In Nassau County, the focus is primarily on upgrading wastewater infrastructure and mitigating contamination from industrial pollutants, particularly emerging contaminants like PFAS and 1,4-dioxane. WIIA grants have supported the installation of advanced filtration systems to address these contaminants.

Suffolk County, on the other hand, has concentrated its efforts on expanding sewer infrastructure and replacing outdated cesspools with modern, innovative septic systems. While much of the WIIA funding has been allocated to drinking water projects, benefiting ratepayers, the annual $5 million limit for sewer project grants falls short of covering Suffolk's substantial wastewater infrastructure needs. With over $2 billion required for sewer system upgrades alone, increasing the proportion of WIIA funds dedicated to clean water projects would enable a more comprehensive approach to addressing Suffolk's water quality concerns.

The Environmental Bond Act of 2022, which was strongly supported by voters on Long Island, provided additional funding to the WIIA program. Moving forward, the state should continue addressing drinking water needs while increasing financial support for clean water projects. As noted in the 2023 Environmental Advocates report, 225 shovel-ready projects, totaling $556 million, did not receive funding that year. For example, Suffolk County applied for funding for two sewer projects in 2023, neither of which were awarded funds.

Despite $1.6 billion of CWIA's appropriated $5 billion remaining unawarded or unspent (approximately 32%), many urgent water quality projects remain unfunded. Every unspent dollar represents a missed opportunity to safeguard clean water. Failure to fully utilize available funds delays essential projects and undermines the state's efforts to protect water quality.
For broader context, a 2024 report by NYS Comptroller Thomas DiNapoli highlighted that nearly $17.9 billion in clean water projects and $8.3 billion in drinking water projects are currently awaiting funding statewide.

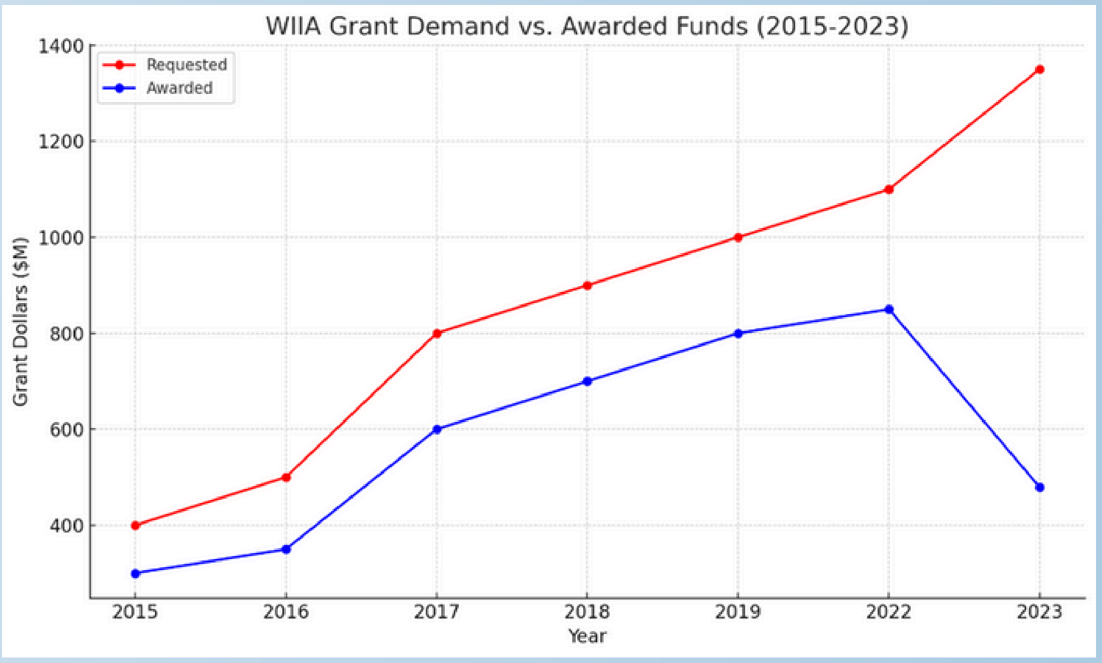


Figure 4 Demand for WIIA grants compared to how much was awarded each year

CWIA STATEWIDE VIEW:

According to the Environmental Advocates' report, "The Long Island and Mid-Hudson regions have received especially high percentages of CWIA funding, given the clean water challenges left behind by those area's industrial legacies." The chart below, found in the report, provides the funding levels for 9 regions throughout the state. It is clear that the CWIA is investing in the water quality needs of Long Island.

Region	Minimum Amount of Investment, 2017 - 2024	Minimum Amount of EJ Investment, 2017 - 2024	Minimum Number of Projects/Sites Funded	Minimum Number of EJ Projects/ Sites Funded
Capital Region	$248.2 million	$58.7 million	216	28
Central NY	$190.6 million	$31.7 million	180	17
Finger Lakes	$295.5 million	$56.5 million	275	36
Long Island	$778.4 million	$116.5 million	298	47
Mid-Hudson	$563.9 million	$253.8 million	341	84
Mohawk Valley	$207.6 million	$27 million	158	20
New York City	$229.8 million	$16.8 million	8	3
Southern Tier	$220.3 million	$49.1 million	182	28
Western NY	$317.9 million	$77.7 million	234	34

Figure 3

Figure 5 Total CWIA amount awarded or spent across key programs

CLEAN WATER INFRASTRUCTURE ACT
(CONTINUED)

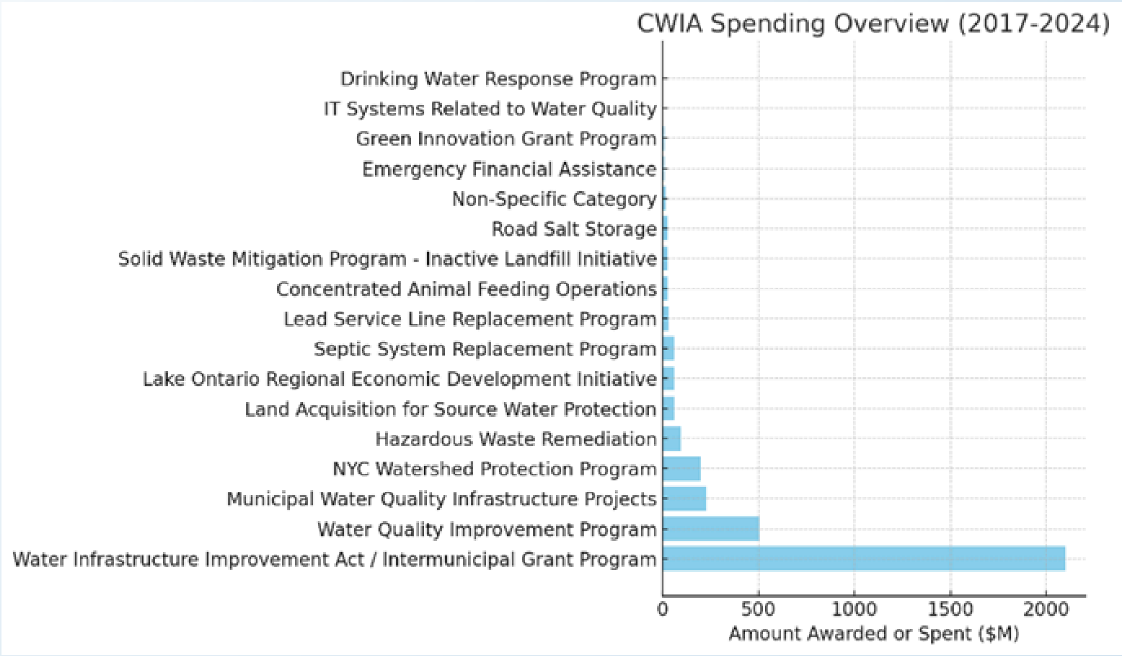


Figure 6 Total CWIA amount awarded or spent across key programs

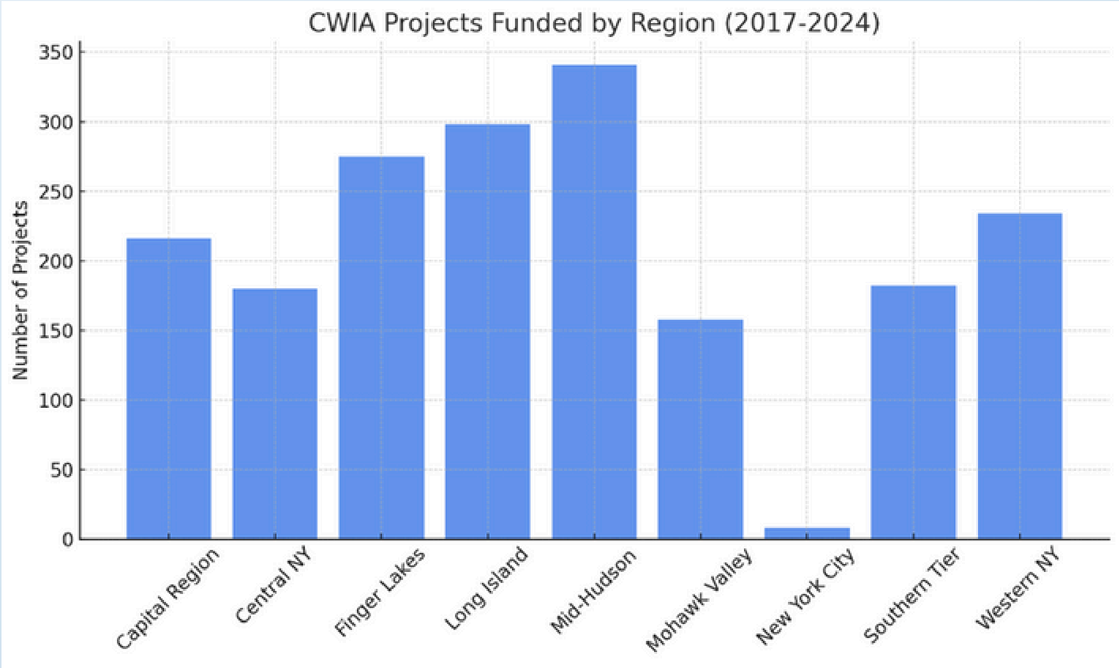


Figure 7 Number of projects were funded across New York's regions.

NOTABLE PROJECTS:

Hicksville Water District (2023): Received $3 million through WIIA to install treatment for PFAS, PFOA, and 1,4-dioxane at Plant 6.

Village of Farmingdale (2023): Received $4.6 million through WIIA to upgrade treatment at Wells 2-2 and 2-3, including an Advanced Oxidation Process (AOP) and Granular Activated Carbon (GAC) systems for PFAS removal.

Water Authority of Western Nassau (2023): Received $5 million through WIIA to install PFAS treatment at Station No. 15.

Town of Hempstead (2022): Received $8.18 million through WIIA to install PFAS treatment at Bowling Green Wells 1 and 2

Suffolk County Water Authority (2021): Received $2.7 million through WIIA IMG for extension of water main in Manorville.

Village of Westhampton Beach (2019): Received $1.78 million through WIIA for Sewer system upgrades aimed at improving stormwater management and water quality improvements.

Suffolk County (2018): Received $5 million through WQIP for coastal resiliency initiative aimed at improving wastewater management and water quality improvements.

Peconic Land Trust (2018): Received $3 million through LASWP for the Regional Aquifer Protection Land Acquisition Program Phase II aimed at preserving 49 acres for source water protection.

The City of Long Beach (2017): Awarded $4.5 million through WIIA for wastewater treatment plant upgrades aimed at improving water quality.

AREAS FOR IMPROVEMENT

Several key issues and opportunities for improvement exist in the allocation and tracking of CWIA funds, particularly regarding how Nassau and Suffolk Counties are served by the program.

One major challenge is Suffolk County's difficulty in accessing funding for expanding its sewer infrastructure, which contrasts with Nassau County's more developed wastewater systems. Suffolk faces unique hurdles due to the high cost of its sewer projects and the limited $5 million cap on WIIA grants for such projects. Typical sewer projects in Suffolk often require significantly larger investments, with Smithtown, for example, estimated to cost over $115 million.

Transparency in fund allocation is another area where improvements could benefit both local governments and residents. Providing more granular tracking of all CWIA grant funds on a county-by-county basis would enhance public understanding of how resources are being utilized and identify areas requiring additional support. This information is crucial for ensuring that future shovel-ready projects can succeed.

CLEAN WATER INFRASTRUCTURE ACT (CONTINUED)

Suffolk County also faces structural barriers in the WIIA grant application process. The requirement to provide contractor details and contract numbers during the application phase, before sewer districts have been formally extended or formed, creates an insurmountable obstacle for many projects still in the design phase. Moreover, Suffolk cannot finalize contracts until the sewer districts are approved by the Office of the State Comptroller (OSC). However, the OSC requires a complete financial plan that includes secured grant funding, which creates a catch-22. Relying solely on bonds would result in prohibitively high rates for property owners, likely leading to rejection by the OSC.

To address these issues, increasing funding for infrastructure expansion and revising application requirements are essential steps toward improving both the equity and efficiency of the CWIA program.

RECENT DEVELOPMENTS IN WATER QUALITY FUNDING

On November 1, 2024, Governor Kathy Hochul announced $435 million in grants for 102 critical water infrastructure projects across New York State through the WIIA and Intermunicipal Grant programs. Several notable approved projects on Long Island include the City of Glen Cove, which received $5 million for PFAS treatment at the Nancy Court Well Station, and the Hampton Bays Water District which was awarded approximately $4.7 million for PFAS removal at Plant No. 3. Suffolk County secured over $21 million for the Smithtown Business District Sewer Extension Project. Also In November 2024, Suffolk County voters approved the Suffolk County Water Quality Restoration act, which institutes an eighth-of-a-percent sales tax increase aimed at funding water quality improvement projects. This initiative will create a dedicated Water Quality Restoration Fund, with half of the funds allocated for sewer projects and the other half for upgrading outdated septic systems and will generate $4 billion to modernize wastewater infrastructure and protect Long Island's waters from nitrogen pollution and $2 billion to protect clean drinking water by conserving open space and wildlife habitats.

RECOMMENDATIONS

Increase WIIA Funding for Wastewater Infrastructure: Given Suffolk County's $2 billion in pending sewer projects, increasing the portion of WIIA funds allocated to wastewater infrastructure is critical. This would help balance efforts to address both drinking water and wastewater challenges, particularly in areas where nitrogen pollution and outdated systems threaten water quality.

Accelerate Fund Distribution: Delays in distributing CWIA funds hinder the timely completion of essential projects. Revising the application requirements, such as the need for contractor details before sewer districts are formed, would allow Suffolk County and other regions to access funds more efficiently. Streamlining the process would ensure that shovel-ready projects move forward without unnecessary delays.

Improve Transparency: Enhancing transparency in how CWIA funds are allocated would provide local governments and residents with a clearer understanding of where resources are being directed. Detailed, county-by-county tracking of fund distribution for all CWIA grant programs, would allow stakeholders to assess progress and identify areas where additional investment is needed.

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