

# WATER CONSUMPTION IN THE TOWN OF SOUTHOLD

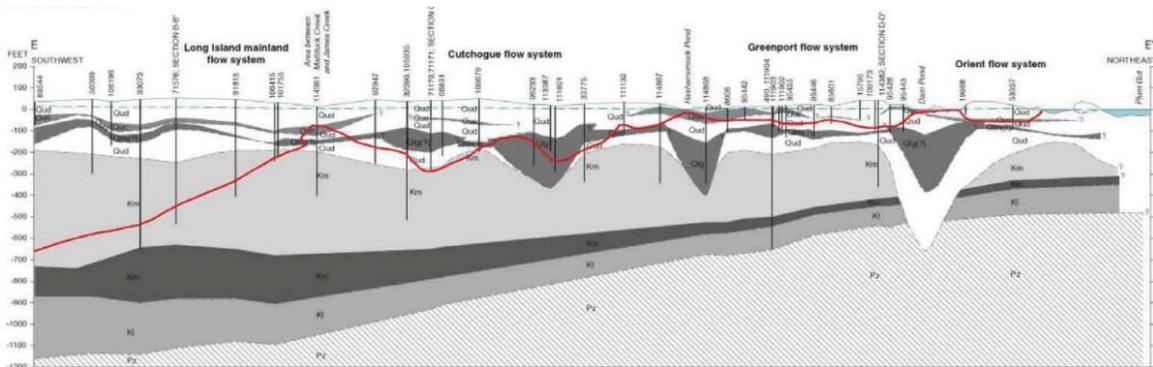
## Executive Summary

7/6/2018

The Town of Southold is currently consuming water at an unsustainable level if the town wishes to rely on its own freshwater aquifer supplies. This study was executed by Peconic Green Growth, Inc., a not-for-profit organization, with a grant from the Long Island Community Foundation. Simultaneously, the town created a water conservation committee to guide education and recommend actions to the Town Board, informed by this report. The need for action was sparked by Suffolk County Water Authority (SCWA) presentations on the strain fluctuating demands on the water supply have on delivery and increased awareness of saltwater intrusion in freshwater aquifers. What we discovered is that we are already pumping at levels that could damage the existing resources. Simultaneously, the Town of Southold is facing pressures from development that caters to intense tourist and agrarian economies, as well as supporting a marine culture. Reductions in existing water use and a zero-sum strategy for future water use, where overall water consumption is not increased, are needed. While the need for water conservation is felt throughout Long Island, it is particularly critical in Southold, which relies on shallow aquifers that are susceptible to drought and contamination.

### 1. A fragile freshwater source

The Town of Southold relies mostly on water from four underground, separated segments of the Upper Glacial Aquifer. The freshwater floats above saline waters or a confining soil layer. Usually every foot of elevation represents approximately 40 feet of depth. Because the aquifers act more like flexible bubbles than buckets, excessive pumping impacts the viability of the underground reservoirs, reducing their size and causing contamination through saltwater infiltration. The groundwater is dynamic. It travels ten feet horizontally for every foot it sinks vertically. The groundwater eventually feeds the bays and Long Island Sound. Local water consumption, if uncontrolled, can significantly degrade the quality and available quantity of water in Southold's aquifers, as well as deplete flows to surface waters impacting aquatic life and habitat. While there is an expectation that groundwater levels will be elevated due to rising seas, the opposite is occurring. In just six years, the Orient and East Marion five-foot groundwater contours have disappeared from a 2016 map documenting groundwater elevation, the deep section of the Cutchogue aquifer is not showing, and the deeper contours west of Mattituck Creek have pulled back from both the coast and the east.



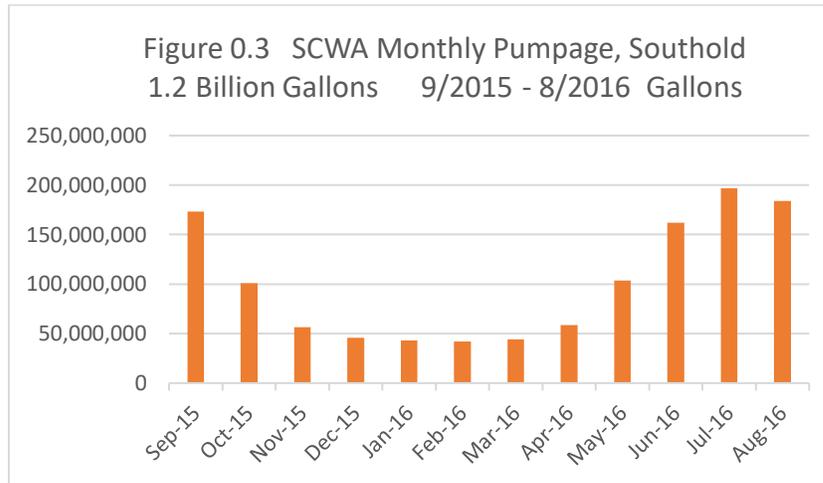
modified from USGS WRIR 02-4284

Figure 0.1 Section through the North Fork sourced from USGS WRIR 02-4284 with modifications by CDM.

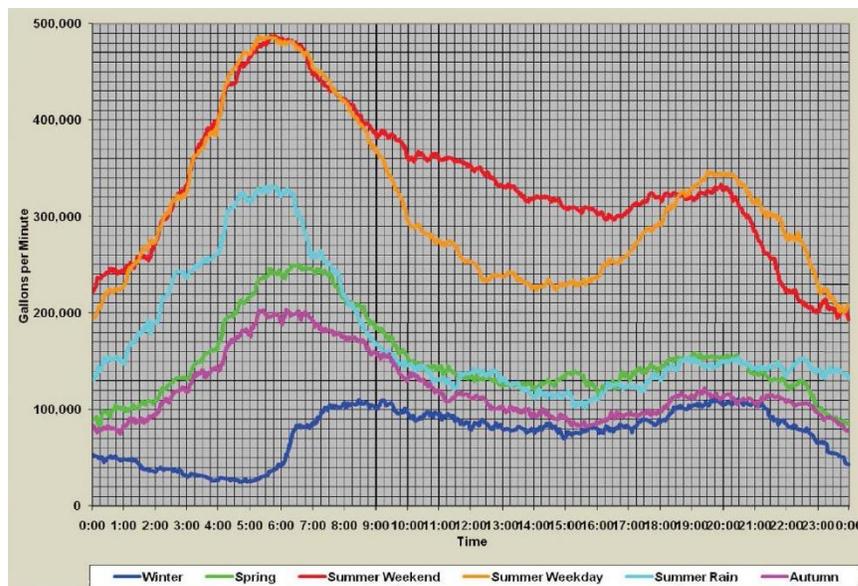


### 3. Peaking

It is not just the average quantity of water pumped that impacts the water supply, but also when it is pumped. The Town's consumption is tied to both agricultural and tourist economies, which have extreme demands during the summer months when rainfall is at its lowest, and evapotranspiration rates are high. The chart below shows SCWA monthly variations in pumpage.



A 2011 presentation by CDM Smith (CDM) noted that in 2008 Southhold had a peaking factor of 4.52 in summer. The peaking factor compares the peak pumping rate in gallons per minute to the average daily demand. If this peak factor is not reduced to 3, CDM estimated that the aquifer would be shallower by 40 feet and wetland habitats impacted by the year 2030 if water was sourced locally. Volumes of withdrawal are already 24% higher in 2016 than those CDM projected for 2030.





Daily peaking needs are also an issue relative to the cost of delivery. The Suffolk County Water Authority (SCWA) is finding that summer demand from 5-6 AM is a strain on their delivery system, requiring the installation of additional wells and storage tanks to handle the simultaneous demand triggered by automatic sprinkler systems. Their pumping rate is already close to double the Water Application Supply volumes of their wells as identified by NYS Department of Environmental Conservation records. The peak demands cause the SCWA to install more infrastructure than would normally be needed for a more consistent use pattern and to treat water to potable standards when the use is for outdoor purposes. The simultaneous, heavy draw on the delivery system reduces pressure just when people are waking up and need water for domestic purposes.

#### **4. Water Consumption in the Town of Southold**

Just under half of the parcels in the Town of Southold are serviced by the SCWA, the other half are on wells. To evaluate consumption patterns Peconic Green Growth (PGG) analyzed 38,035 raw usage data records received from the SCWA for the period September 2015 - through August 2016. After relating these records to Town data, consumption levels relative to season, land use type, lot size and home values are presented. Forty-six percent of the SCWA water consumption occurs during the summer and another 31% in the autumn. The focus of the analysis is on residential properties, due to the sizable data set available. Other use types are also evaluated, but the numbers are too low to be statistically reliable. Extensive outreach is needed to refine estimated consumption rates so that they are reliably applicable to facilities using onsite wells.

#### **5. Median vs. Average Use**

SCWA residential accounts represent 95% of the customer base and consume 81% of delivered public water. Average summer use is 559 gallons per day for single-family homes. This is 2.4 times the national average using Southold's household occupancy rate of 2.33. But median summer use is 247 gpd, being just over the 240 gpd national equivalent. Since the average is so significantly higher than median use, heavy water consumption by a significant portion of households impacts demand, and ultimately the cost of water delivery and the viability of its source. Thirty-nine percent of the households consume water at a rate that is 150% of the national average. This means that people who are conservative in their water use are subsidizing the heavy users, as water rates are flat.

#### **6. How is water used?**

With a focus on summer consumption, the expected plateaus in usage data reflective of irrigation are not evident in the data set. Instead a continuous curve rises to high excesses. This is likely due to the complexities of a tourist and second-home economy. Occupancies in summer can increase dramatically due to visitors and the use of residences for seasonal income. The accoutrements of a resort area, such as swimming pools, hot tubs, 16-gallon-a-minute showers, and boat maintenance gobble up more water. Age and gender can impact water use habits. Irrigation and other outdoor uses can consume as much as 50% of domestic water use. There is a rough correlation between home value and water use. We found the average gpd ranging from 253 for homes worth less than 332,000 to 2,511 gpd for homes valued at over two million dollars.

Incentive programs will be a harder sell for the wealthier users, where regulation might be the only way to dampen use.

## **7. Uses other than homes**

Among other users, Peconic Landing, a life-care community, and a local nursing home are the highest consumers, followed by resort-type uses, such as motels, marinas, golf courses and food service. Funeral homes also consume water at a significant rate. The beverage industry is not documented in the SCWA data, but the growing number of breweries and distilleries will likely tax water resources. Amid this is the need to protect water for food production. It may be advisable to zone certain crops, such as sod farms, nurseries, or livestock facilities, to protect vulnerable locations. The value-added nature of current farming is also adding to water stresses. While vineyards are known as having lower irrigation needs, this survey data shows a higher consumption rate for vineyards, likely due to the tasting rooms, which function as event halls hosting weddings and concerts. Further research is needed to distinguish water consumption by clubhouses and tasting rooms from irrigation uses for agriculture and recreation.

## **8. Conservation Goals**

While the SCWA is tasked by NYS DEC to reduce peak demand by 15% by 2020, it appears that this goal is inadequate for the Town of Southold. This peak reduction needs to be 33% if a peak factor of 3 is to be attained. The Greenport/East Marion aquifer system is the most stressed and should aim for an even higher goal. Consumption is estimated to be 132% of the recommended maximum level of use if applying a limit that is 30% of recharge. SCWA seems to have tapped 154 million gallons from outside the local aquifer boundaries during the studied time frame to meet Greenport's water needs. The Village of Greenport operates the only sewage treatment plant (STP) in the Town of Southold, this means that 100% of the water use within the STP district, which includes Peconic Landing, is lost, as nothing recharges. Conservation goals for the Greenport/East Marion hamlets could be as high as 45%. An even more aggressive conservation goal, accounting for the horizontal movement of the aquifers recharging the bays and Long Island Sound, should be considered to protect wetlands and surface water quality. These goals need to be applied to those properties accessing onsite wells, as well as those using public supplies, as the source is shared.

## **9. Action**

Due to bountiful rainfall and a history of well-being amid environmental beauty, most people have no awareness of water shortage or contamination issues. The threats are not felt viscerally, as they are in drier climates. Yet the danger is real and immediate action needed if a sustainable water supply is to be protected within the Town of Southold. A sampling of action items includes:

### *1. Education coupled with pilot installations and incentives for water conservation*

Education is a key component of any program as it prepares people for the need for conservation. But this education should be immediately coupled with incentives and proactive efforts, as the situation is potentially dire. Information on how people use water, water-wise landscaping, incentives and how to conduct a water audit are sample topics. Sessions with landscape, irrigation and farming professionals could help outreach, with best

practices showcased. Incentive programs should focus on both exterior and interior water conservation improvements. A suggested budget for incentives:

- \$600,000 for town upgrades/pilots for Town Properties and incentives for people using SCWA (This is the cost of one SCWA well)
- \$600,000 for incentives for people on wells (include a water meter program)

2. *Tiered pricing for both SCWA customers and people using onsite wells, based on water consumption*

Not only will behavior be influenced by increases in cost, but the additional funds raised from a tiered pricing program should be dedicated to conservation incentives and demonstration projects.

Of issue is how to handle people on individual wells. A temporary fee structure could be linked to building value, to be superseded by meter data. If the SCWA does not mirror a tiered pricing program, water use fees could be extended to their customers as well. A town-wide water protection district may be needed to assess fees.

3. *Meter program*

Incentives and possible requirements for the installation of working meters on all onsite wells. This needs to be coordinated with NYSDEC, Suffolk County, and the agricultural community.

4. *Annual Data and Reporting to the Town and Public*

Annual reporting on the effectiveness and costs of conservation, town-wide usage, and evidence of saltwater intrusion should be required. There is an accompanying need for more easily accessible data and cooperation between the Town, County, NYSDEC, and the SCWA to tackle the water issues, as well as more extensive metering. Studies that document changes to the saltwater interface and lead to the development of a water budget should be undertaken.

5. *Regulation*

Ultimately a series of planning strategies and regulation may be needed to curb excessive water use. Regulations permitting and controlling landscape irrigation, water sourcing for outdoor uses, and indoor fixtures may be necessary and cost effective.

Actions should balance a business approach to water supply with environmental health in a manner that also considers the protection of onsite well functions. With the intensification of use that Southold has been experiencing due to its growing popularity as a tourist destination and the renown of its vineyards, there is a need to account for water use in building and planning practices. Southold needs a zero-sum strategy when addressing water consumption from new development, expansions, or intensifications of use.