

Time to Think About Water

Michael Clark

Water Management in North Kingstown:

In the summer of 2005, it became clear to the North Kingstown water department that water use in the town was unsustainable. It was a time of prolonged drought. Water use skyrocketed, and in August demand exceeded the capacity of the water distribution system. The town gets its water from wells, some of which are located in the watershed of the Hunt River, which paid a price that summer as well: sections of it were completely dry. Pictures from the time show only dirt where the river once flowed.

Peak demands, which typically occur in the summer months due to excessive lawn watering, threatened the town's infrastructure and public health, as well the environment. These peak demands, should they exceed system capacity, may dangerously reduce system pressure to levels that would compromise water quality and the ability fight fires, which requires very high system pressures. Also, the August 2005 peak demand made it clear that the system may not be sufficient to supply water for future growth.

Since 2005, North Kingstown has taken steps to reduce peak demand during the summer. An inclining block rate structure, where customers pay more for each marginal unit used, was implemented to drive down demand by increasing costs. New subdivision regulations aimed at reducing outdoor water use were written, including a ban on in-ground irrigation systems for new development, minimum soil depth requirements, and requirements for drought tolerant landscaping.

Additional measures were taken last year after an ambitious plan to redevelop Post Road was put on hold by the town council due to concerns over water supply. A consultant found that the additional water demand created by new development would potentially result in unsustainably high water demands similar to 2005. The town council required additional conservation measures. Permanent twice per week outdoor watering restrictions were passed and a fourth tier was added to the inclining block rate system. The town's water supplier has been busy replacing old meters, which required manual reading, with automatic meter reading (AMR) systems. The AMR systems beam data to receivers, eliminating time consuming manual meter reading. This allows North Kingstown's water supply to quickly detect leaks, and facilitate faster billing cycles which provide timely water use data to customers.

The town's actions have paid off. The proposal was approved and demand has reduced 30 percent. The sluggish economy and rainfall are intervening factors when assessing water demand, but what is clear is that the town hasn't hit 2005 water use levels since implementing their water conservation strategies. The purpose of the measures are simply to reduce excessive outdoor water use, which is typically attributable to lawn watering. By doing so, the town was able to avoid expensive system upgrades or the development of alternative supplies, while using water for public health purposes



Lawn irrigation is the culprit behind high summer water demand that is maxing out some water distribution systems, impeding growth and damaging water resources. The Hunt River stopped flowing over the dam in the summer of 2007. Photo: Meg Kerr.

and development that would have otherwise been used for lawn irrigation. Also, customers reduce water costs and the Hunt River is allowed to keep a bit of water.

But reigning in water demand is not the sole domain of North Kingstown. South Kingstown and Narragansett have had their fair share of issues: high summer water demand has compelled the water utilities there to implement mandatory, though temporary, watering restrictions and boil water advisories due to water quality concerns related to low pressure from high demand. The Kent County Water Authority, which supplies water to Warwick, West Warwick, East Greenwich, and West Greenwich, has seen water demand skyrocket from rapid development along the I-95 corridor. The agency, which pointed to lawn watering and car washing as the prime cause of rising demand, angered town officials, who worried developers would shy away from the area due to water supply concerns.

Recent studies indicate that water withdrawals from several watersheds within the state are unsustainable. This includes the Hunt–Annaquatucket–Pettamquamscutt Basin (HAP), perhaps the most over allocated watershed in the state. It is a critical watershed. Wells in the watershed provide water to North Kingstown, the Kent County Water Authority, and the Quonset Business Park. There is concern about the sufficiency of water supply for future development of Quonset, which is a critical component of the state's economic development future.

We get lots of rain. Why do we have to worry about water?

The subject of drinking water is often a hazy one. A friend of mine teaches an introductory environmental science course at RIC. On the first day of class, she asks the students a simple question: where does your water come from? Three quarters of the students respond with a blank, utterly confused stare. A small percentage answer 'from the tap'. A few say 'from a lake'. Only a handful have known the answer.

But who can blame the students, right? We live in Rhode Island, where we get over three feet of rain annually, water is plentiful, and record floods destroy malls and homes and stop traffic on I-95. We don't need to think about water. We turn on the tap and there it is.

But it is slowly dawning on us that water is an issue no longer confined to the arid West. Atlanta, suffering from prolonged drought and skyrocketing water demand associated with rampant population growth, is in the midst of a water crisis. It's primary water source, Lake Lanier, nearly went dry. We've all seen the pictures of boats and docks sitting on dirt. Development was halted. Water restrictions were implemented. The city is now locked in a legal battle over the lake with Alabama and Florida, each of which rely on it for water supply. This summer officials in West Palm Beach predicted they could run out of water by July; a prolonged drought had severely reduced the volume of the lake they depend on for water. Emergency lawn watering restrictions were implemented. Withdrawals for golf course and agricultural irrigation were severely curtailed. Desperate to reduce demand, the water department has issued 225 warnings and 173 citations. Despite these actions, demand remains high and lake are remain dangerously low—three feet below average.

But one need not leave New England to find examples of the impacts of rising water demand and dwindling resources. Take the Ipswich River, in Massachusetts. The river is the prime water resource for several communities on the North Shore. Rising demand associated with residential development has, in most summers, dried up the river. The result: fish kills, watering restrictions, stymied recreation and development, and expensive infrastructure improvements. Developers are required to pay fees into a water conservation fund, and Danvers and Reading were forced to switch water sources.

North Kingstown hit its limits in 2005. The water distribution system reached capacity and the Hunt River ran dry. The Kent County Water Authority has for years struggled with surging demand, imposing watering restrictions and asking for moratoriums on development. In 2005, the situation came to a head. Amgen, the pharmaceutical company, requested from the agency a guarantee of 800,000 gallons per day (GPD) for its West Greenwich facility. Negotiations between the company and the authority faltered. In 2006, the state took the extraordinary step of passing legislation forcing the agency to meet Amgen's needs. Clearly, state officials did not want water to stand in the way of development. This episode really seemed to snap the state awake. Suddenly, water issues were front and center; the connection between economic development and water supply was made. There were limits to water use. Unsustainable water use would hit these limits and could result in the loss of a major employer. It was clear we could no longer avoid thinking about water.

The need for state level legislative action was evident. Water suppliers, town officials, and an influential group of environmental and business organizations named the Coalition for Water Security had been calling for state guidance on water conservation and allocation that balances economic goals and environmental protection. Their efforts spurred the legislature to pass the 2009 Water Use Efficiency Act. The bill sets goals for water conservation and a framework for allocating the state's water resources amongst users. The Water Resources Board, the agency tasked with managing water supply, has written conservation rules. The Department of Environmental Management has developed a Streamflow Depletion Methodology to determine the quantity of water that can safely be withdrawn from a water body without permanently damaging aquatic habitat. The findings could lead to withdrawal limits that could be integrated into future



There are 484 public water suppliers in Rhode Island, but nearly sixty percent of Rhode Islanders get their water from the Scituate Reservoir. *Photo: Jim Warcup, R.I. Airport Corporation.*

allocation regulations. A preliminary evaluation indicates water withdrawals in several watersheds, including the HAP, exceed safe limits. Reducing demand will be critical.

Where do we go from here?

Here's an astounding fact: there are 478 public water suppliers in Rhode Island, but 60 percent of Rhode Islanders get their water from just one: the Providence Water Supply Board (PWSB). The PWSB is one of the twenty-eight large water utilities, defined as those that supply over 50 million gallons annually. The PWSB draws water mainly from the Scituate Reservoir, which it sells to retail customers, those residents and businesses within their district, and to wholesale customers, typically other water utilities. The PWSB supplies water, either via retail or wholesale sales, to North Providence, Providence, Cranston, Johnston, Lincoln, Smithfield, Warwick, West Warwick, Coventry, Bristol, Scituate, Barrington, and Warren. In short, the reservoir is the prime water source for the north and central portion of the state.

The situation in the southern portion of the state is much different. Many of the hundreds of small water suppliers are located here, and they are largely dependent on groundwater. The lack of storage (ie, reservoirs), the seasonal population influx, and the largely suburban quality of development conspire to leave southern utilities particularly vulnerable to water supply risks. The lack of storage was and is often still seen as a major issue.

Some years ago there was a proposal to develop a reservoir in the Big River Management Area, which the Water Resources Board had acquired for the purpose of developing additional water sources. After going through the environmental review process, the proposal was cast aside; it was determined the wetlands impacts resulting from the project would be extensive and severe. Some saw this as a victory. Maximizing the efficiency with which water is used, particularly outdoors, could free up the water needed for southern water utilities and avoid the need for a reservoir. The reservoir proposal dead, the Water Resources Board is currently exploring the option of instead developing wells at Big River. The water would be sold to water utilities and other users,

though how it would be allocated is unclear.

The project opponents may have a case. Outdoor water use is certainly the culprit behind the unsustainably high summer demands. A few interesting data points, culled from North Kingstown water use data, support this conclusion. First, total summer water demand is double winter demand. Second, outdoor water use at some accounts is virtually nil in the winter and skyrockets in the summer. Third, at some households outdoor water use comprises 75 percent of total summer water demand. Fourth, and perhaps most telling, is that an analysis reveals that many homeowners are watering their lawns well above the recommended 1"/week rate. All of this means there is likely room for water conservation targeted at outdoor water use before developing expensive additional water sources or system upgrades.

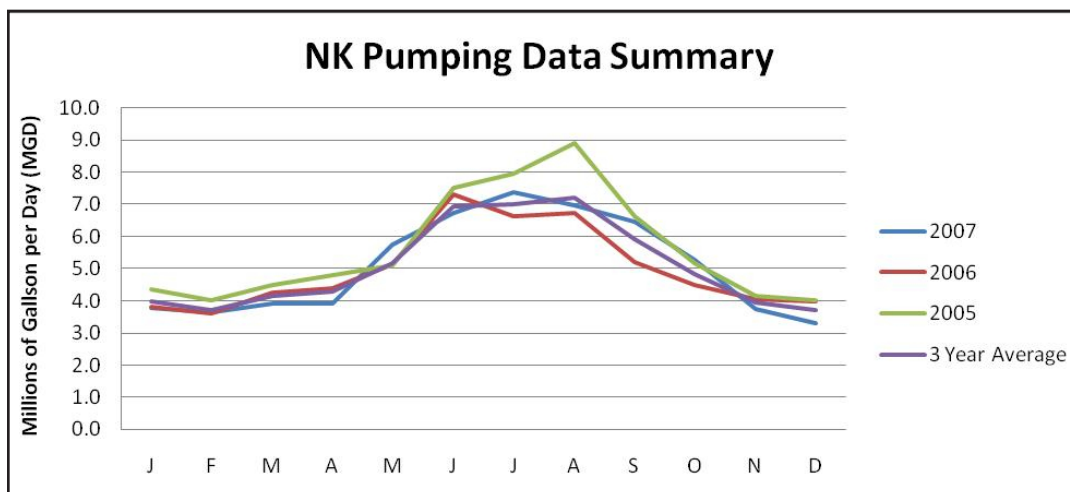
Critical steps have been taken to reduce excessive and unsustainable water use in the state. The Water Resources Board has initiated an educational campaign, called 'Slow the Flow this Summer', aimed at educating residents on the importance of conserving water by proper lawn watering. North Kingstown can serve as a model for other towns and utilities struggling with managing water demand and, in the future, striving to comply with the Water Use and Efficiency Act.

But much remains to be done. The Water Resources Board continues to write regulations as required by the new law. But the process may be interrupted. The recently approved state budget appears to roll the Water Resource Board into the Division of Planning. The future of the board seems uncertain. RIDEM's streamflow depletion methodology is still being developed and how, if at all, it will be integrated into future water allocation regulations is uncertain. Equally important is making the linkage—at the state level—between land use and water supply planning. There is a linkage. After all, single family homes use much more water than condos or small businesses.

Despite the uncertainty, conserve water we must. Unchecked water use could, like in the Amgen case and in North Kingstown, impede development at Quonset Business Park, the critical component in the state's economic future. It

damages our water resources, as evidenced by the occurrences at the Hunt and Ipswich rivers. By reducing excessive water use, Rhode Island can leverage its water resources and its abundant precipitation as a competitive economic advantage while ensuring environmentally sustainability. It's time to think about water.

~Michael Clark is a researcher, writer, and consultant. He lives in Providence with his wife and daughter.



The problem is the peak: North Kingstown's water use during the years 2005–2007, showing the summer peak.

Graphic: Michael Clark.