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Waste fouls the waters

Cesspools, septic tanks blamed for nitrogen pollution

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When the waters of the Forge River turned cloudy and rank, and the fish began to die, many Mastic residents figured sewage was to blame.

In a way, they were right.

But the pollution suffocating the troubled waterway didn't come from a broken sewer main, or the tanker trunk of an unscrupulous pump man dumping effluent on the sly.

Instead, researchers and health officials unraveling this environmental whodunnit think nitrogen pollution from nearby cesspools bears much of the blame for the dismal state of the Forge, which was designated an impaired waterway last year by New York State.

"I don't think that the people of Mastic and Shirley are overfertilizing their lawns," said Vito Minei, director of the Suffolk County Health Department's division of environmental quality. "The major source of the nitrogen in that area would be from the old cesspool systems ... It's the ongoing continual degradation of groundwater by this density of sewage being discharged."

Nationally nearly one in four households relies on cesspools or septic systems to dispose of sewage, according the federal Environmental Protection Agency. In Suffolk, that statistic gets turned on its head: Here about three out of four households use on-site wastewater treatment. The systems discharge sewage into the soil, and eventually to the groundwater, with minimal processing.

Given Suffolk's unusual reliance on septic tanks and cesspools, environmentalists say the Forge River's decline serves as a warning for the future health of other bays, streams and the aquifers that supply Long Island's drinking water. Increasingly, county regulators agree.

Algae, fed by nitrogen in water bodies such as the Forge and the Peconic Bay, suck out oxygen, endangering marine life. Sewage is just one source of the nitrogen; county studies also implicate the tons of fertilizer dumped on lawns, golf courses and crops.

Still, a number of environmentalists warn that action must be taken to address pollution from Suffolk's septic systems and cesspools - 80 percent of which predate the county sanitary code, enacted in 1981.

Suffolk's Health Department is now taking up the issue as it prepares a new county water management plan that will, among other things, examine whether the current sanitary code adequately protects water quality. The new plan could spur changes to the code and the extension of existing sewer districts. Says Minei: "We've been doing this approach now for 30 years with housing density and septic tanks. Is this still the way to go?"

In the 1990s, similar health and environmental concerns in Massachusetts and Rhode Island led to stricter sanitary regulations and the adoption of new septic technologies that do more to treat wastewater before it is discharged to the soil. But new rules add new administrative burdens for agencies and new costs for homeowners.

There's also a cost to doing nothing, say those along the banks of the Forge who have witnessed the fish kills and algae blooms of the past two summers.

Nitrogen linked to cesspools

Preliminary tests by the county Health Department indicate that a significant source of the nitrogen fouling the Forge is probably wastewater leaching into the soil each day from cesspools serving the 2,000 or so homes in the densely populated neighborhood to the west. Scientists think the nitrogen-loaded liquid percolates down to the groundwater, then passes horizontally through the banks and into the river.

When conditions are right - say, on a warm summer day after a heavy rain - the nitrogen-enriched water supercharges the growth of algae. The algae removes oxygen from the water as it decays, releasing a sulphurous stink and padding the river bottom with waste.

Other players in the Forge's pollution include fertilizer runoff, a sewage treatment plant at a riverfront condo, duck muck from poultry farms that once lined the river and even atmospheric nitrogen carried to the soil by rainwater.

But scientists suspect the steady wash of nitrogen-tainted groundwater from cesspools to the west is the tipping point that pushed the Forge over the edge.

"If I had to guess, it would be groundwater, which would be why it [the Forge] could handle five duck farms historically but can't handle one anymore," said Bruce Brownawell, a Stony Brook University professor who has been analyzing data collected there last summer. "I don't know where we should be putting our waste. But we need to be rethinking high density septage when we're at the groundwater table."

When it comes to sanitation, Suffolk, despite its large suburban population, looks more like a rural community. According to the 1990 census. 70percent of Suffolk's housing units relied on septic tanks or cesspools - aboutthe same percentage as rural Allegany County in Western New York. But with more than 1.3 million residents, Suffolk had more than 25 times the population and gained another 100,000 by the 2000 census.

As many as 375,000 Suffolk households now use some sort of on-site sewage disposal, according to the county. Each day's residential toilet flushes, showers and laundry loads send 112.5 million gallons of wastewater into the soil, using the county's estimate that the average household generates 300 gallons per day.

The concern? Standard septic tanks and cesspools remove only limited amounts of nitrogen before releasing liquid waste into the ground. University of Rhode Island septic guru George Loomis estimates they remove between 10 to 20 percent; Minei estimates as much as 50 percent.

Concerns for drinking water

In Suffolk, nitrogen from septic systems, cesspools and agriculture has tainted the upper reaches of the underground aquifers that supply the region's drinking water. Some shallower wells have been shut down due to health concerns. In rare cases, excessive nitrogen levels in drinking water can lead to "blue baby syndrome," or methemoglobinemia, a potentially fatal condition that interferes with blood's ability to carry oxygen.

Last fall, escalating nitrogen levels in a public supply well in Northport spawned a controversy over the Suffolk County Water Authority's bid to lessen that concentration by mixing in cleaner water from the Lloyd Aquifer, Long Island's deepest and least tapped source of drinking water.

For the past three decades, Suffolk's sanitary code has used the same basic two-pronged strategy to regulate on-site wastewater treatment systems and safeguard drinking water. New septic tanks must comply with the county sanitary code, and they must be spaced far enough apart to protect groundwater from being overwhelmed by nitrogen and other pollutants.

That approach has won praise from the state health and environmental agencies and from federal environmental officials who work in the region. They say Suffolk's rules are stricter, more science-based and better enforced than those in many other municipalities.

Still, Suffolk's sanitary code has only limited power: It applies to about 20 percent of the county's on-site wastewater treatment systems, according to Health Department estimates. The rest are old-fashioned cesspools built before the code was enacted in 1981. Homeowners are only required to update those systems if they expand their houses - many of which were built at much greater densities than is now allowed.

For example, lots for new homes with septic tanks typically must be at least half an acre. That's designed to keep the level of nitrate (a nitrogen compound) in local groundwater at or below the federal drinking water standard of 10 parts per million.

But many lots in Mastic, which was subdivided as a summer bungalow community more than 70 years ago, are a quarter acre or even smaller, said Thomas Carrano, an assistant waterways management supervisor with the town of Brookhaven. The population in the neighborhood just west of the Forge has also jumped by about 700 percent in the last 40 years, said Larry Swanson, a Stony Brook University professor and associate dean of the campus's Marine Sciences Research Center.

"Treating the sewage via septics and cesspools on very small lots is a recipe for significant water quality impacts," said John Turner, director of Brookhaven's Division of Environmental Protection. "That's been borne out by Suffolk County monitoring wells on the west side of the Forge."

The county has been slow to adopt new septic technologies that could ease environmental impacts in crowded areas such as Mastic, as has been done in geologically similar stretches of coastal Rhode Island. And some, including members of the Long Island Liquid Waste Association trade group, ask why Suffolk has not tightened regulations to require regular septic tank servicing and inspections or added provisions like the one requiring Massachusetts homeowners to bring failing systems up to code when properties change hands.

"We've got to start moving away from the antiquated cesspools that do little to reduce nitrogen . . .," said Kevin McAllister, the Peconic Baykeeper and head of an environmental group of the same name. "We have to start looking in this direction if we want to get serious about protecting our surface waters."

Other sources of pollution

Minei, of the Health Department, defends the county's regulations. He points out that septic tanks and cesspools are just one part of the picture when it comes to nitrogen pollution.

His agency's studies indicate that on a 1/2-acre lot, about half the nitrogen going into the groundwater comes from septic waste, and the rest from fertilizer. Minei and others say upgrading individual wastewater treatment systems is more costly than trying to limit nitrogen from other sources, such as excessive fertilizer use.

Last month, Suffolk County Executive Steve Levy said he would introduce legislation to reduce nitrogen in groundwater. He wants to ban its use on frozen ground and require stores to notify consumers of the danger of using such fertilizers. Past campaigns also have tried to get farmers and consumers to use less fertilizer.

"Half [the nitrogen] is coming from turf and landscaping," said Richard Balla of the federal Environmental Protection Agency, who works with Minei on watershed management for the Peconic Bay Estuary. "It becomes a matter of public policy and cost as we decide how we want to manage nitrogen."

Even some environmentalists acknowledge the difficulty of upgrading Suffolk's cesspools and septic tanks. Ultimate responsibility lies with the homeowner, not local government, although smaller counties, such as New York's Cayuga County, have stepped up their regulation with some success.

"The aging infrastructure of septics is causing groundwater and estuary pollution, and yet because of the price tag to repair it, no one has," said Adrienne Esposito, executive director of the Citizens Campaign for the Environment, based in Farmingdale. "We can't just do away with septic systems. So how are we going to deal with them?"

Portions of Suffolk's new water resources management plan grapple with that question. Scheduled for completion this fall, the plan will review how other jurisdictions regulate septic systems. It also will evaluate whether new septic tank technologies could help reconcile the imperative of protecting drinking water with Long Island's need for affordable housing and so-called smart growth, which are typically denser developments that require sewer systems. And the plan will examine whether Suffolk's regulations adequately address ecological health.

Properly sited and maintained, septic systems can provide a cost-effective treatment option for communities without access to central sewers. But they have to be far enough apart so that the flow of effluent doesn't overwhelm the filtering capacity of the soil. And homeowners need to take care of the treatment systems underneath their lawns for them to function correctly.

Lack of maintenance rapped

Some of those who install and pump out Long Island's septic systems and cesspools say proper maintenance is the exception rather than the rule in Suffolk, where upkeep and inspections are not mandated by law.

"The majority, the only time they pump their pool is when they have a backup," said Steve Macchio, owner of Clear Flo Technologies, a liquid waste processing and transfer station in North Lindenhurst.

Most homes in unsewered areas of Suffolk don't have septic systems at all because they predate the county law requiring them. Minei estimates that some 300,000 households are served by simple cesspools - concrete-domed, underground pits. The waste piles up, and the liquid drips down through the dirt.

By contrast, the more modern septic systems required by Suffolk's code have enclosed tanks. Liquid and solid effluent settle and separate; wastewater then is released into concrete rings that slowly leach it into the soil.

Many of Long Island's aging cesspools also were built from concrete blocks that tend to crumble with age, opening sinkholes in lawns and driveways like the one into which an elderly Elwood woman fell and died last July. And some - as in Mastic - are crowded next to one another on postage-stamp lots far smaller than the half-acre laid out by the sanitary code.

Recently traveling the Forge River by boat, Baykeeper McAllister pointed to tidal wetlands near the William Floyd estate that he said help filter pollution from the river and Moriches Bay. But further north, on the Forge's western tributaries, are those postage-stamp lots. Waterfront houses nestle shoulder to shoulder on green lawns that slope down to a shoreline punctuated by docks and girded by bulkheads.

"Plenty of nitrogen coming off that property," said McAllister, pointing to a two-story home on Wills Creek. "If you step back a block, the density would be triple what you see here."

Given how closely spaced the homes along the Forge are, it wouldn't make much of a difference if all homeowners were forced to upgrade their cesspools, Minei said, because septic tanks don't do much more to remove nitrogen from human waste.

County officials are considering a proposal to install a sewer line along Montauk Highway, which would lessen the nitrogen load flooding the Forge and also allow for more intensive development. But it will be expensive and could spark protest from residents who object to their streets being dug up for months at a time.

"We're one of the few populations that is so dense and we are not sewered," said Henry Bokuniewicz, a professor at the Stony Brook marine sciences research center and director of the university's groundwater institute. "It's not a panacea; there are other problems you create. But it does tend to eliminate this kind of sowing the seeds of contamination in every backyard."

SEWAGE SYSTEMS

DO

1. Know where your septic system is located.

2. Have your septic tank or cesspool pumped and inspected every two years

by a licensed septic service contractor.

3. Direct all storm water run-off away from the septic system.

4. Conserve water by using water-saving fixtures.

5. Fix all leaking plumbing fixtures.

DON'T

1. Drive or park vehicles over the septic system.

2. Plant trees or construct accessory buildings over the septic system.

3. Use to dispose of food scraps.

4. Flush chemicals such as paints, varnishes or pesticides.

5. Throw nonbiodegradable materials such as hair, dental floss, kitty

litter, or feminine hygiene products down the drain or toilet.

SOURCE: EPA, LONG ISLAND LIQUID WASTE ASSOCIATION, NATIONAL SMALL FLOWS

CLEARINGHOUSE

SIGNS OF FAILURE

1. Sluggishness when flushing the toilet.

2. Water backups in sinks, bathtubs and showers.

3. Gurgling sounds in plumbing.

4. Grass in yard growing faster and greener in one particular area.

5. Obnoxious odors inside or outside your home.

6. Low spots beginning to appear in yard, ground mushy underfoot.

SAFETY TIPS

1. Cesspools built before the mid 1970s pose a risk of collapse. The brick or cement blocks typically used in these pools can weaken over time and open up sinkholes if materials crumble. Replacing the block cesspool is the only way to eliminate the danger of collapse.

2. Never use electrical appliances, tools or lights close to the septic system. They can trigger electrical shock or explosion.

3. No smoking, open flames, charcoal or gas grills near system. Gasses may be present and can cause explosions.

4. Never try to enter a sanitary system. Trapped gasses may be present and can cause asphyxiation. There may be harmful bacteria, viruses and disease-causing organisms.

PRE-CODE CESSPOOL vs. SEPTIC SYSTEM

In Suffolk County, three out of four homes dispose of their sewage either via cesspools or septic systems, many of which predate the county's 1981 sanitary

code. Here's how the systems compare.

CESSPOOL

What it is: A pit that receives household sewage.

HOW IT WORKS

1. Older cesspools were built of brick or concrete blocks with unlined bottoms.

2. As waste from the home flows in, solids accumulate at the bottom while liquids seep down into the soil.

Newer cesspools are made of concrete with side openings that allow effluent to each out while strengthening the soil walls to prevent collapse. Sometimes an extra leaching pit is added to extend system capacity.

SEPTIC SYSTEM

What it is: The septic system required by Suffolk's sanitary code funnels sewage from the home to enclosed septic tank; after settling, effluent is piped to a leaching pool that slowly releases wastewater into the soil.

HOW IT WORKS

1. Waste flows through a household sewer into the tank, which typically holds about 1,000 gallons of sewage.

2. Solids settle at the bottom of the tank while liquids and grease rise to the top; bacteria breaks the solids down into sludge.

3. Wastewater flows out to a leaching pool made of precast concrete rings and leaches into the soil.

SOURCES: Suffolk County Department of Health Services; the National Small Flows Clearinghouse.