

BELEAGUERED BAYS

Like so many of the Cape's waterways, Bournes Pond in Falmouth has damaging levels of nitrogen



Falmouth's wastewater treatment plan

Falmouth officials have proposed a phased approach to wastewater treatment. They expect to submit a plan to local and state officials soon that includes the following:

■ Two initial phases would sewer areas south of Route 28 from Little Pond to Waquoit Bay. The third phase would sewer portions of town north of Route 28; to what extent will be determined after analysis of phase 1 and 2 are complete.

■ The first two phases are expected to cost \$400 million with the third phase costing an additional \$200 million if all areas being considered for sewers are included.

■ Wastewater would be treated at a new regional facility on the Massachusetts Military Reservation, at the Falmouth Country Club, or by expanding the existing facility on Blacksmith Shop Road.

■ The town is studying the use of wells along Route 151 to inject treated wastewater into the ground. Another possibility is an outfall pipe to transport treated water offshore of Nobska Point or into the Cape Cod Canal.

■ To reduce spending on sewers, the town is studying widening the inlets at Bournes Pond and Little Pond to increase natural flushing of nitrogen into Nantucket Sound.

The Cost

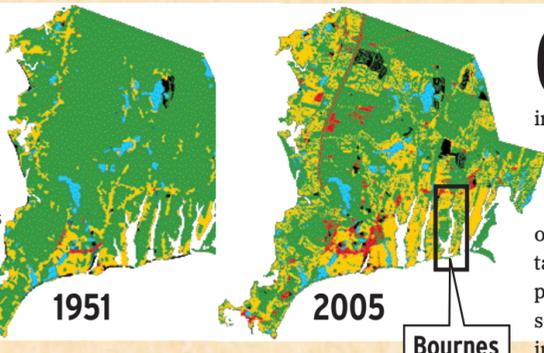
The connection fee for pipes, etc. to connect to the sewer system is estimated at \$2,000 to \$5,000 per household. There are two possibilities to pay for the sewers and treatment plant:

■ **One:** The town pays 100 percent of the system's design, treatment plant and discharge costs, and 30 percent of pipes and pumps. A 25-year payback period would add \$160 a year in property taxes to a \$400,000 home. Property owners served by the system would be responsible for the remaining 70 percent, estimated at \$31,000 per home. They would pay \$3,000 per year for 20 years, which includes 5 percent interest.

■ **Two:** All taxpayers share the responsibility for the total cost, translating to \$330 per year for a \$400,000 home for 25 years. The town would have to determine how to charge low-income properties and could spread payments over a longer time.

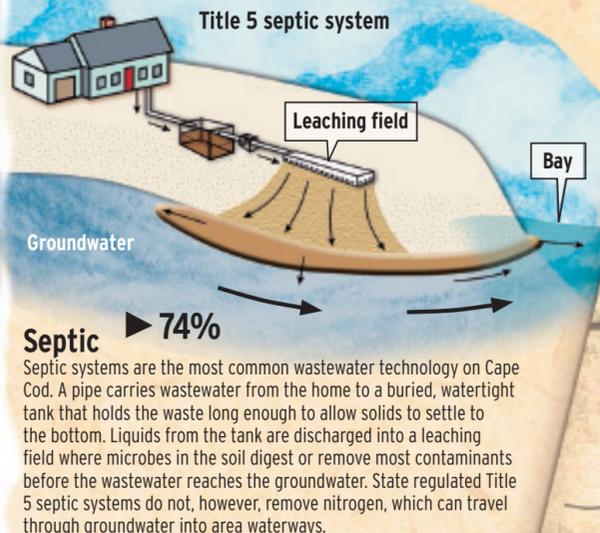
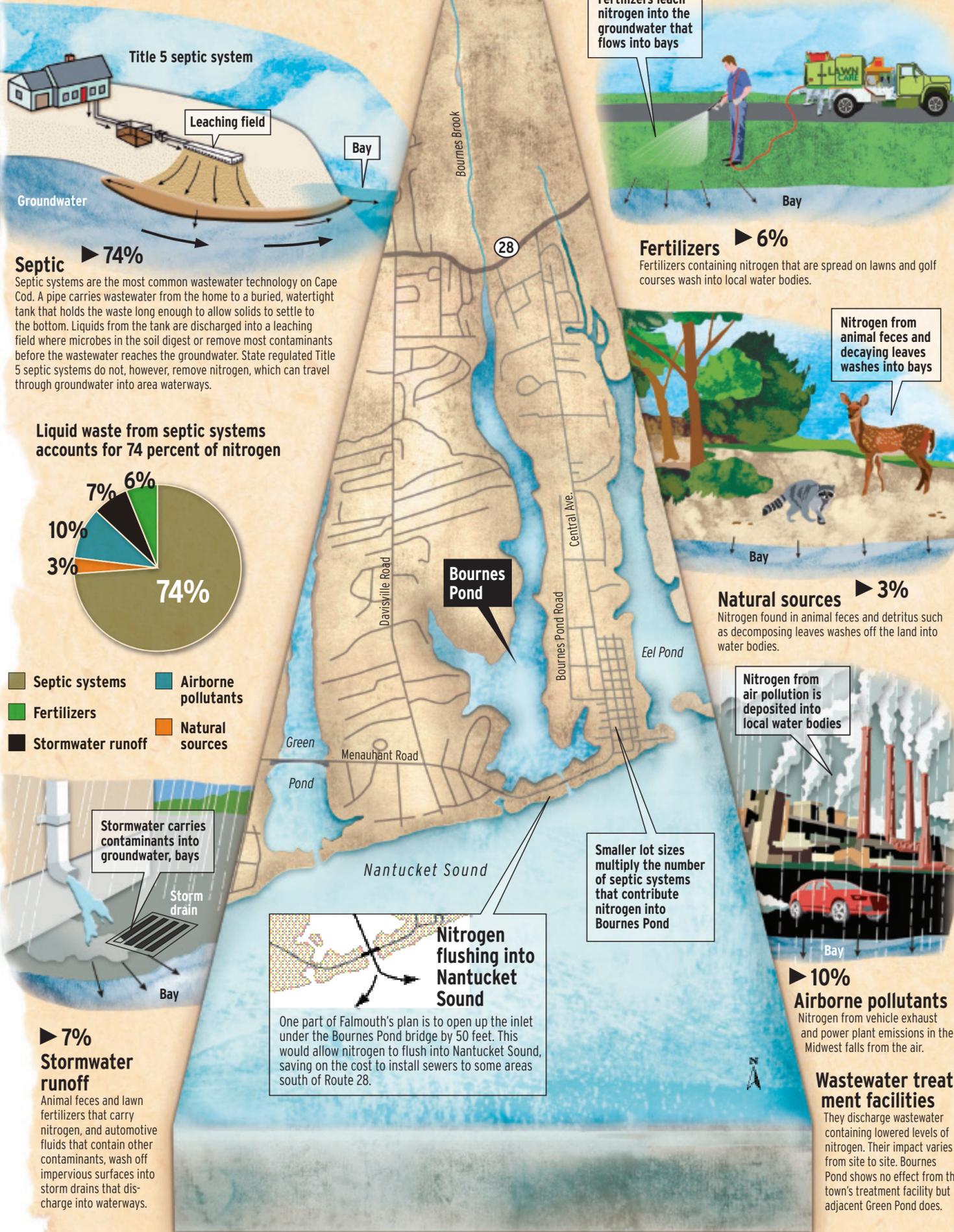
Falmouth's explosive growth

- Residential
- Commercial (Includes industrial)
- Open space (Includes forest, wetlands and agricultural)
- Golf courses (Includes recreation areas)
- Waterways

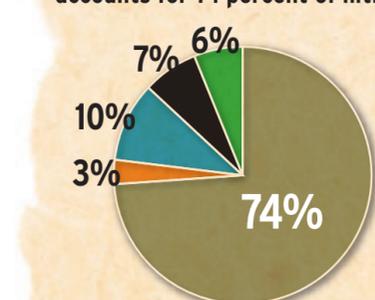


Cape Cod has a wastewater problem. By relying on septic systems, which remove solids and most disease-causing organisms but not nitrogen, we threaten the health of our bays, estuaries, ponds and rivers. The resulting high levels of nitrogen traveling through the groundwater into waterways jeopardize marine life, recreation, real estate values and the region's fishing and tourism industries. The solution, whether sewers, alternative treatment systems, or widening inlets to increase tidal flushing, will cost billions of dollars regionally - the largest municipal expenditure ever for the Cape's taxpayers. Bournes Pond is typical of one of about a half dozen saltwater ponds and bays that lace Falmouth's south-facing shore. It has nitrogen levels so high that scientists say nitrogen from septic systems can no longer flow into it. Now, town residents must face the solutions.

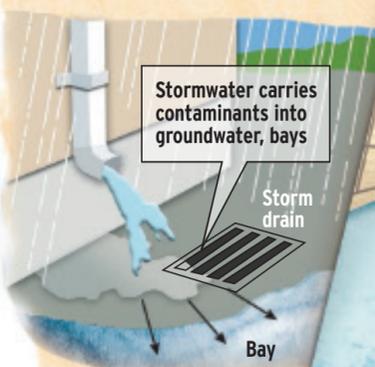
SOURCES OF NITROGEN IN BOURNES POND



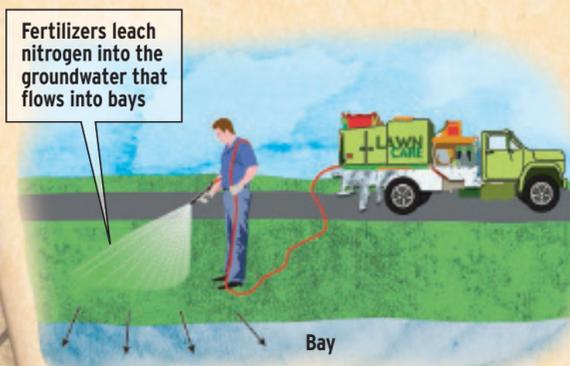
Liquid waste from septic systems accounts for 74 percent of nitrogen



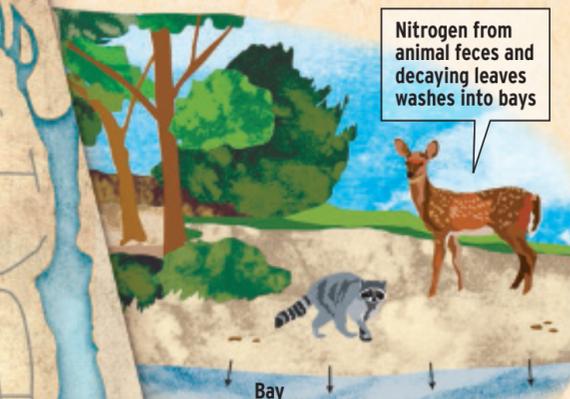
- Septic systems
- Airborne pollutants
- Fertilizers
- Stormwater runoff
- Natural sources



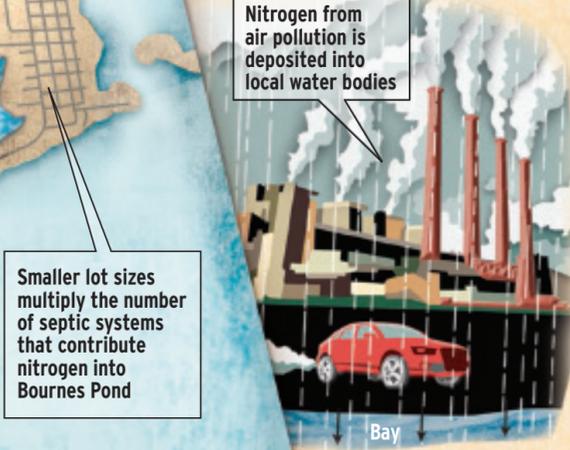
► **7% Stormwater runoff**
Animal feces and lawn fertilizers that carry nitrogen, and automotive fluids that contain other contaminants, wash off impervious surfaces into storm drains that discharge into waterways.



► **6% Fertilizers**
Fertilizers containing nitrogen that are spread on lawns and golf courses wash into local water bodies.



► **3% Natural sources**
Nitrogen found in animal feces and detritus such as decomposing leaves washes off the land into water bodies.

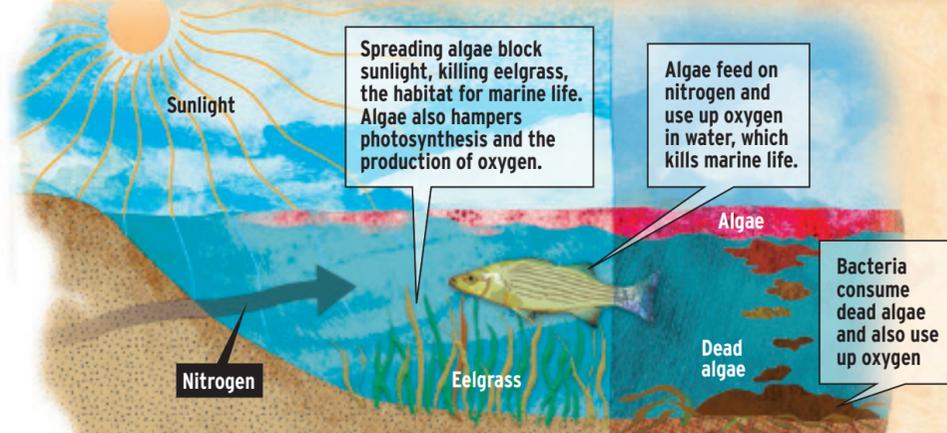


► **10% Airborne pollutants**
Nitrogen from vehicle exhaust and power plant emissions in the Midwest falls from the air.

► **Wastewater treatment facilities**
They discharge wastewater containing lowered levels of nitrogen. Their impact varies from site to site. Bournes Pond shows no effect from the town's treatment facility but adjacent Green Pond does.

Nitrogen flushing into Nantucket Sound
One part of Falmouth's plan is to open up the inlet under the Bournes Pond bridge by 50 feet. This would allow nitrogen to flush into Nantucket Sound, saving on the cost to install sewers to some areas south of Route 28.

Smaller lot sizes multiply the number of septic systems that contribute nitrogen into Bournes Pond



Nitrogen main cause of eutrophication

Eutrophication happens when algae, fed by manmade sources of nitrogen, deplete the oxygen in water bodies. Algae produce oxygen during daytime photosynthesis but consume it at night. When the water does not absorb enough oxygen from plant respiration or the atmosphere to meet the demands of marine plants and animals, oxygen levels plummet, killing marine life. This process is exacerbated on cloudy days when photosynthesis slows and even less oxygen is produced by algae and plants. Algae blooms also shade out native plants and other algae in deeper water that die and fall to the bottom. There, the dead plants and algae are consumed by bacteria that use up available oxygen.

Graphics by JAMES WARREN/CAPE COD TIMES
Sources: Woods Hole Research Center, Massachusetts Estuaries Project, Department of Environmental Protection and town of Falmouth