



Westport River Watershed Alliance  
www.wrwa.com  
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# KNOW YOUR NITROGEN

## NITROGEN

It makes up 80% of the air we breathe. Without it, plants couldn't grow. It's an element so common to living things that it's hard to call it dangerous. But nitrogen in our water—in the form of nitrate nitrogen—can be lethal to life in our waterways. Unnaturally high doses of nitrogen in our streams, rivers and bays can trigger an imbalance in the ecosystem with drastic consequences.

Most of the nitrogen overloads come from large sources, namely agriculture, sewage treatment plants, and electric power plants. But it also comes from the average home, from inside your bathroom to the cars parked in your driveway, and fertilizers put on your lawn.

This fact sheet describes the harmful effects of nitrogen, its sources, and solutions. It also includes a worksheet on page 2 to help calculate your yearly nitrogen output. We can all do our part to help solve a big problem.

## THE TROUBLE WITH NITROGEN

Whatever its source around the home, nitrogen in the water soluble form (nitrate nitrogen) can be washed into a nearby stream, river or lake through stormwater runoff. When water flows into the salty Westport River via the streams and creeks, nitrogen feeds algae like a fertilizer feeds a corn crop. When high amounts of these nutrients are present, algae rapidly multiplies into huge masses called blooms. These floating algae blooms fill the water, blocking sunlight needed by underwater plants which provide food and habitat for many species. As the algae die, they sink and bacteria decomposes the algae in a process that removes oxygen from the water. Without enough oxygen, some species must leave the area. Those that can't leave die.

## WHERE IS THE EXTRA NITROGEN COMING FROM?

WESTPORT IS WORKING WITH THE MASSACHUSETTS ESTUARIES PROJECT TO SOLVE NITROGEN POLLUTION PROBLEMS IN THE RIVER.



Washington State Water Quality Consortium

WHEN YOU FERTILIZE THE LAWN, REMEMBER YOU'RE NOT JUST FERTILIZING THE LAWN

## FERTILIZERS

Complete fertilizers contain nitrogen, phosphorus and potassium, represented in that order by the three digit code on every bag, such as 10-10-10 or 16-4-8. All fertilizers vary in their nutrient analysis, so test your soil conditions before reaching for the nearest bag of weed 'n feed. Consider what your lawn needs. If you must fertilize, GO ORGANIC. You can get products at Westport's Grain and Feed on State Road.

## DON'T HAVE BAD TIMING

Apply fertilizer at the right time of

the year. Spring applications to common cool-season grasses, such as Kentucky blue-grass and fine fescue, can actually harm lawns by promoting more leaf growth than root growth. Fall application is best.

## TARGETED SPREADING

Careless applying of fertilizer near streets or other paved surfaces allows rain to wash the nutrients into storm drains, which eventually empty into nearby streams and the river.

## FEEDING PLANTS NOW...NOT LATER

Water-soluble ammonium nitrate is one of the cheaper sources of nitrogen in bulk-blend garden and lawn fertilizers. It gives an immediate green-up in both tomatoes and turf. But watch out if your soils are sandy. Using a form of nitrogen that is water-soluble and thus immediately available to the plant can be a poor choice if the soil drains easily, allowing nitrogen to leach into the ground water and nearby waterbodies.

## SEWAGE TREATMENT

In Westport, homes and businesses use septic systems to treat their waste water. Waste water is piped to an underground septic tank which traps the solids and disperses the liquids throughout an absorption (leach) field. Here, the soil neutralizes the waste. Once in the soil, nitrogen is removed primarily through denitrification (conversion to nitrogen gas). Rates of denitrification vary widely, depending on the type of soil and amount of water added to the ground.

The problem is that even properly working septic systems that do a good job removing bacteria, do little to remove nitrogen. Most of the nitrogen leaves the sewage disposal system absorption area, potentially to enter ground and surface water.

## CALCULATE YOUR NITROGEN FOOTPRINT WORKSHEET

This worksheet examines activities around your home which generate nitrogen. It focuses on those activities or facilities over which you have at least some control—areas in which choices can be made to reduce nitrogen outputs. It does not reflect how much nitrogen becomes pollution since some nitrogen is consumed by plants for growth or remains bound in the soil.

### DO YOU PUT FERTILIZERS ON YOUR YARD?

**STEP 1:** On the back of the fertilizer bag, note the parts of nitrogen, phosphorus, and potassium per bag. Nitrogen is the first number in the 3-digit formula. A 12-4-8 fertilizer, for instance, would contain 12 percent nitrogen on a weight basis.

**STEP 2:** Determine the size of your lawn in square feet. (40 ft wide by 100 ft long = 4000 square feet). Commercial fertilizers give recommendations for pounds of fertilizer per 1000 square feet. Divide the size of your lawn (in square feet) by 1000 square feet. SIZE \_\_\_\_\_ / 1000 = \_\_\_\_\_

**STEP 3:** Determine how many pounds of fertilizer is recommended per 1000 square feet. (A typical recommendation would be 1.5 lbs. per 1000 sq. ft.) Multiply this number by the factor arrived at in step 2. POUNDS \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

**STEP 4:** Take Step 1's nitrogen figure (the first number in the N-PK formula) and multiply by the total pounds of fertilizer arrived at in step 3. This is the total pounds of nitrogen you're applying in one application. No. 1 \_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_

**STEP 5:** Multiply the total pounds of nitrogen arrived at in step 4 by the number of times a year you fertilize you lawn with this formula. \_\_\_\_\_ X \_\_\_\_\_ per year = \_\_\_\_\_

Total pounds of nitrogen: \_\_\_\_\_

### DO YOU HAVE A SEPTIC SYSTEM?

The average amount of nitrogen produced by a person in septic system effluent over one year is estimated to be 9.9 pounds.

**STEP 1:** If you have a septic system, total the number of people living in your household, Number of people = \_\_\_\_\_

**STEP 2:** Multiply the number of people in your household by 9.9 pounds for a total annual amount. \_\_\_\_\_ X 9.9 = \_\_\_\_\_

Total pounds of nitrogen: \_\_\_\_\_

### DO YOU USE CLEANING SOLUTIONS AT HOME?

**STEP 1:** Check which cleaners you routinely use that contain ammonia. Six ounces is average use for the typical household.

**STEP 2:** Multiply six ounces by the number of times you use each of these cleaners in one year. 6 X \_\_\_\_\_ times = \_\_\_\_\_

**STEP 3:** Divide the total by 16 to calculate the number of pounds of each cleaner used in one year. \_\_\_\_\_ / 16 = \_\_\_\_\_

**STEP 4:** Sum the total pounds of ammonia-containing cleaners routinely used over one year. \_\_\_\_\_ cleaners X \_\_\_\_\_ = \_\_\_\_\_

Total pounds of nitrogen-containing cleaners: \_\_\_\_\_

### DO YOU DRIVE A GAS POWERED CAR?

**STEP 1:** Estimate the total miles driven per week for each of your family's cars. \_\_\_\_\_ miles

**STEP 2:** Multiply this mileage by .004 (approximate average of the pounds of nitrogen oxides emitted by cars over one mile). \_\_\_\_\_ X .004 = \_\_\_\_\_

**STEP 3:** Multiply this number (lbs. N emitted/one week) by 52 weeks/year for an annual amount. \_\_\_\_\_ X 52 = \_\_\_\_\_

Total pounds of nitrogen oxides: \_\_\_\_\_

### DO YOU USE GAS POWERED LAWN TOOLS?

Nitrogen Oxide Emission Rates:	weeks/ year	hours/ week	hours/ year	lb/ year
Lawn mowers - .0053 lb/hour	x	=	x rate	=
Riding mowers - .0163 lb/hour	x	=	x rate	=
Lawn/garden tractor - .026 lb/hour	x	=	x rate	=
Leaf blower/vacuum - .0022 lb/hour	x	=	x rate	=
Snow blower - .0066 lb/hour	x	=	x rate	=

**STEP 1:** For each type of equipment noted above, determine how many weeks a year you typically use the equipment.

**STEP 2:** For each season, determine how many hours a week each tool is typically used (yellow boxes).

**STEP 3:** For each equipment piece, multiply number of hours/week by the total weeks used in one year (red boxes).

**STEP 4:** Multiply the emission rate by the red boxes. Sum the totals for each small gas-powered engine. Total (green boxes)

Total pounds of nitrogen oxides: \_\_\_\_\_

### DO YOU HAVE AN ELECTRIC BILL?

Power plants fueled by coal (a fossil fuel) emit .0024 pounds of nitrogen oxides per kilowatt hour of electricity produced.

**STEP 1:** Over the course of a year, record the kilowatt hours of electricity used by your household, which is noted on your monthly electric bill. \_\_\_\_\_ kilowatt hours/year

**STEP 2:** Total the year's kilowatt hours and multiply by .0025 for an annual amount of nitrogen oxide emissions contributable to your household. \_\_\_\_\_ X .0025 = \_\_\_\_\_

Total pounds of nitrogen oxides: \_\_\_\_\_

ADD ALL OF THE ABOVE FIGURES: \_\_\_\_\_

This number is an estimate of how many pounds of nitrogen-containing compounds your household generates on a yearly basis.

Read on and you can learn how to reduce that number by some simple changes in your lifestyle. And here's an extra challenge. After reading the "What You Can Really Do" section, decide how your family can help reduce the nitrogen pollution problem. For one year, try out some new conservation practices and then re-work the calculations to see what kind of difference you have made.

# WHAT YOU REALLY CAN DO

## “GREEN” UP YOUR YARD

The key is to know your soil and know your fertilizer. Some simple landscaping techniques can produce a healthy, green lawn and garden without polluting ground water or the river.

Did you know...

- ✧ A lawn fertilization program should begin in early October, not early May.
- ✧ By leaving grass clippings on the lawn, nitrogen applications can be reduced 30-40%
- ✧ Healthy trees and shrubs do not require annual fertilizer applications.
- ✧ Chemical fertilizers can add salt to the soil and can harm soil structure. If you need to fertilize use organic products.
- ✧ Grass clippings and compost are better answers, returning needed bacteria and enzymes to the soil along with nutrients.
- ✧ Reduce impervious surfaces at home and increase the vegetated land cover of your property. Impervious surfaces include your roof, driveway, patios and lawn. Reduce rooftop runoff by directing your downspouts to vegetated areas, and not to the storm drain on your street. For driveways and patios, consider putting in permeable paving or patterns of cement and brick that allow water to filter through.

## MAINTAIN YOUR SEPTIC SYSTEM

Pump your septic tank regularly. The build-up of solids will inhibit the ability of a septic system to do its job. Pump your tank every three years for a four-person household and a 2500 gallon tank. This is preventive maintenance—if septic systems are left unmanaged, malfunctioning systems may force the homeowner to do costly repairs.

## PICK IT UP...IT'S YOUR “DOODIE”

When walking a dog, remember to carry a plastic bag and take the waste back home for proper disposal. At home, there are a few options for disposal:

- ✧ Flush wastes down the toilet (septic systems can remove some of the nitrogen and removes dangerous pathogens, bacteria and viruses).
- ✧ Be careful not to flush stones, sticks or cat litter (the cat feces may be scooped from the litter and flushed).
- ✧ Install an underground pet waste digester. It works like a small septic tank and can be purchased at pet stores or online at composters.com. If you live near a stream, wetland or the river check with the Board of Health or Conservation Commission which may restrict their use, design or location.

## REDUCE YOUR AIRBORNE NITROGEN

- ✧ Conserve electricity. Most electric power comes from coal burning power plants. If we use less energy, the power plants will burn less coal. And that, in turn, will help reduce nitrogen oxides in the atmosphere.
- ✧ Put the kids on the school bus. It goes by the house anyway.
- ✧ Use public transportation or car pool to get to work. The reduced mileage cuts down emissions and the wear and tear on your vehicle.
- ✧ Keep your car tuned up. Regular tune-ups reduce the amount of hydrocarbons, nitrous oxides and other pollutants coming from the exhaust pipe.
- ✧ Drive less and walk more. For short distances, riding a bike or walking is a smart option that will help keep you fit.

## FOR MORE INFORMATION

<http://www.epa.gov/waterscience/criteria/nutrient/>  
<http://www.savebuzzardsbay.org/ourwork/research/nutrients.htm>  
<http://www.buzzardsbay.org/nitrogen-pollution.htm>  
[http://environmentaldefenseblogs.org/climate411/2007/08/17/nitrogen\\_pollution/](http://environmentaldefenseblogs.org/climate411/2007/08/17/nitrogen_pollution/)

Use a push mower

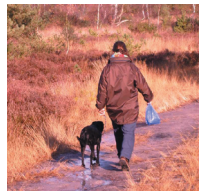


Living Roofs

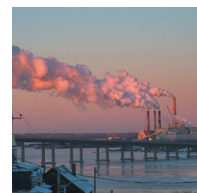
Pump it out



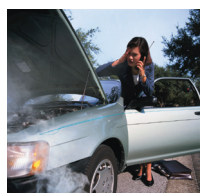
Try natural cleaners



Pet waste digester



Turn it off



Drive Less



## HOUSEHOLD CLEANERS

Household cleaners for glass, ovens, and vinyl siding often contain ammonia, a form of nitrogen. Some containers use spray or pump nozzles that unavoidably send nitrogen particles into the air never reaching their target. Simply rinsing buckets, rags and old containers can send nitrogen laden residue down the drain to into the ground water through the septic system, or to a local stream or the river via stormwater pipes. If household cleaners are harmful to humans, imagine what such products can do to the tiniest of aquatic life.



Even your lowly lawn mower and other small gas powered engines (chain saws, leaf blowers, weed whackers) emit nitrogen oxides and other smog-producing gases. According to the EPA, about 5% of air pollution comes from the nation's 89 million lawn mowers, garden tractors, and other gas-powered garden equipment. (For a leaf blower, one hour is the equivalent of 34 hours of driving.) Only recently has the EPA begun to regulate this type of equipment, setting exhaust emission standards for all new small spark-emission engines.

## PET WASTE

Dumping pet waste in the street, storm sewer or leaving it to decay in your yard adds to water pollution when the next rain or melting snowfall washes it into storm sewers that drain directly into our streams, and the river.



When pet waste is washed into the water, the waste decays, using up oxygen and sometimes releasing ammonia. Low oxygen levels and ammonia combined with warm temperatures can kill fish. Pet waste also contains nutrients that encourage weed and algae growth. Perhaps most importantly, pet waste carries disease which make water unsafe for swimming or drinking.

## AIRBORNE NITROGEN

Both cars and fossil fuel-burning power plants emit nitrogen oxides. Some of the nitrogen oxides are transformed into nitric acid in the atmosphere. This acid then falls to the earth in the form of acid rain, proven to reduce crop and forest yields, kill fish and other aquatic life, and to accelerate the decay of limestone statues, paint and metal finishes. If strong enough, acid rain can burn human skin, damage lungs, and irritate eyes and breathing functions. Everyone who drives a car or uses electricity generated by fossil fuels is partly responsible for this part of the nitrogen pollution problem.

Today's passenger cars emit about 70% less nitrogen oxides over their lifetimes than their uncontrolled counterparts of the 1960's. The number of cars and miles driven, however, has nearly doubled over the past 20 years. The net result is only a modest reduction in each automotive pollutant, except for lead which has dropped by more than 95%.



The Westport River Watershed Alliance (WRWA) is a nonprofit, citizens group formed in 1976 to protect and conserve the natural resources of the Westport River and its 100-square mile watershed located in Southeastern Massachusetts. The Westport River watershed encompasses the Massachusetts communities of Westport, Dartmouth, Fall River, and Freetown as well as Tiverton and Little Compton in Rhode Island. This informational mailer was funded by the generosity of the **RATHMANN FAMILY FOUNDATION.**



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