LONG ISLAND SOUND STUDY

What is Nonpoint Source Pollution ?

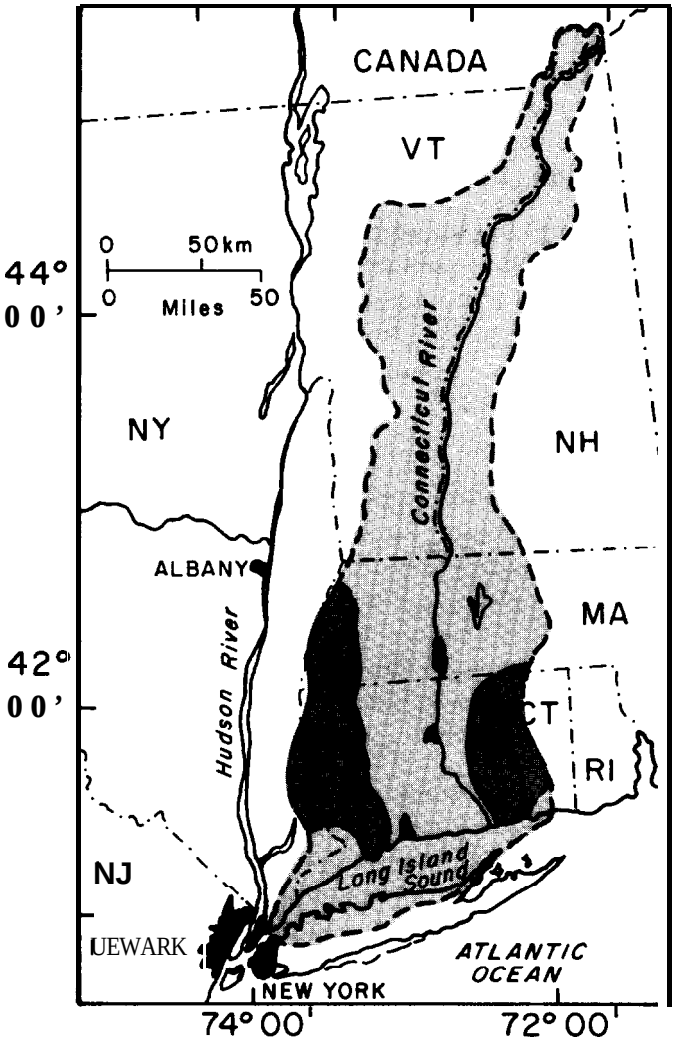
Most people think of a rusty pipe spewing sewage when pollution is mentioned, but lhere are many unseen sources as well. For example, every time it rains or snows, pollutants are added to Long Island Sound. As the rain forms and falls. it picks up pollutants from the atmosphere during its journey to the Earth and deposits them on the surface, a process catted *atmospheric deposition*. After reaching the ground, excess rainwater which is not absorbed washes soil and contaminants from the land into streams, takes, rivers, and storm drains on the way to its final destination – Long Island Sound. This process is catted *stormwater runoff*. Atmospheric deposition and stormwater runoff are Iwo processes contributing to *nonpoint source pollution*, a term used to describe pollution that originates over a very large area and flows to the Sound. Other examples include contaminated groundwater, failing septic systems, and marinas and recreational boats.

Pollutants entering the Sound can be divided into two categories: *point* and *nonpoint* sources of pollution. In the case of point sources, we can see the pollutants coming from a discharge pipe, sewage treatment plant, or industrial facility. Nonpoint source pollution is much more difficult to identify and regulate because its origins are so diffuse. Nonpoint source pollution enters Long Island Sound from sources throughout its ***drainage*** *basin* or *watershed*. As can be seen on the map, the Sound's drainage basin extends from southern Canada to Long Island and includes all of the streams and rivers that carry water to it. Because this system is large and runoff is contaminated, the contribution of pollution from nonpoint sources is significant and of serious concern.

The Effects of Nonpoint Source Pollution

Nonpoint source pollution causes many of the same problems as point source potturion. Nonpoint pollution adds bacteria, sediments, nutrients, and toxic material lo Long Island Sound. When too many bacteria are added to the Souncl, shellfish areas or bathing beaches must be closed for public health reasons. Heavy metals, pesticides, and other toxic chemicals washed off streets, farms, and lawns can harm marine life while nutrients from these sources can over- fertilize the Sound, leading to tower oxygen concentrations in the water (see Fact Sheets 1 and 2). Large amounts of sediment in the runoff can bury fish and shellfish habitats, fill in drainage systems, and increase the need for dredging and disposal. Petroleum products spilled or dumped into Long Island Sound remain for long periods of time, can accumulate in the tissues of fish and shellfish, and may be carcinogenic.

NONPOINT SOURCE POLLUTION IN LONG ISLAND SOUND



The Drainage Basin of **Long** *Island* **Sound**

Sources of Nonpoint Pollution

1) Atmospheric Deposition

Pollutants are added to the Sound directly when it rains or snows. Airborne pollutants such as sulfur, lead, and nitrogen – emitted from car exhaust pipes and building smokestacks – attach or adsorb IO moisture and particle? in the atmosphere. When enough moisture is present in the air, it rains or snows, carrying these pollutants back to the land and water. Estimates for nitrogen entering the Sound from atmospheric deposition run as high as 23% of the

total nitrogen load. In addition, these pollutant particles can build up in the atmosphere. When they weigh enough, they fall back to land in a process known as dry deposition.

2) Runoff

The major source of nonpoint pollution, stormwater runoff, adds a complex mixture of materials to the Sound. Rain washes soil, contaminants, and litter from the ground into streams, rivers, and bays. An analogy would be a snowball collecting snow and dirt as it rolls down a hill. Water acts in much the same way, collecting pollutants and contaminants as it runs over land into the Sound.

The contaminants present in stormwater runoff vary with the land use in a particular area. For example, in the northern areas of the Sound's drainage basin, farming and forestry are the primary land uses and runoff can contain a lot of sediment. Some farming practices may also add pesticides and nutrients – from fertilizers and animal wastes – to runoff.

In urban areas where most of the land is developed, impervious materials like asphalt, concrete, and buildings cover large areas, preventing rainwater from soaking into the ground. Instead, it is collected in storm drains and transported via drainage systems to nearby streams and rivers or directly to the Sound. As more land is developed, the amount of runoff increases because less ground is available to absorb or act as a filler for rainwater.

Urbanization also brings more people to the area which adds more cars, highways, parking lots, and pollution sources, further increasing the pollutants added to the Sound every day. Cars drip oil, grease, and lead onto roadways. These pollutants are picked up by and travel with runoff to the Sound. After a rainstorm, oil slicks, identified by the rainbows you can see on lhe waler or in puddles, are found in quiet waters of the Sound. 1/4 of a teaspoon of oil dropped in water will form a film over about 2000 square feet of the surface of the water. The major source of lead found in Long Island Sound is urban runoff. Fortunately, as a result of the switch to unleaded gasoline, this input is decreasing. Litter, often made up of floatable materials, also washes from streets into the Sound. contributing to marine debris.

Three additional sources of contaminants in urban runoff include lawn fertilizer. animal wastes, and overflows from failing septic systems. Often, more fertilizer is applied to lawns than is needed and some of the excess washes off and flows to the nearest drain. These wastes add nutrients and other pollutants to Long Island Sound. Urban centers also generate waste that is stored in landfills. When it rains, some contaminants may leak or leach out of the containment facility into the groundwater and then to nearby surface walers.

3) Marinas and Recreational Boating

Recreational use of our waterways also contributes nonpoint source pollutants to the Sound. Boats add to the amount of petroleum products discharged into the Sound. The discharge of untreated bilge and sanitary boat wastes can elevate bacterial, nutrient, and organic matter levels in the water. Antifouling paints also leach toxicants into the water and may poison marine life in areas of high boat concentrations. The discharge of sanitary waste from boats is considered a point source of pollution by some and nonpoint by others. Regardless of the category it falls into, it can be a contributor to water quality degradation in enclosed harbors or bays. Public education of boaters will be needed to address this problem.

4) Rivers

Rivers are also considered nonpoint sources because the conditions of their water varies, reflecting the activities that occur along the length of the watershed. Nine rivers carry pollutants to the Sound from the entire drainage basin. The Connecticut River accounts for roughly 70% of the freshwater flowing to the Sound each year. This amounts to almost 4 trillion gallons. Although the contaminant levels are relatively low in this river, the large volume of water discharged over the course of a year results in high cumulative pollutant input.

Nonpoint Pollution and The Long Island Sound Study

The Long Island Sound Study (LISS) examined the contribution of nonpoint sources of pollution to the Sound and found that runoff in lhe drainage basin is the largest source of waterborne lead, iron and suspended sediments and is a major source of nutrients, heavy metals, and pesticides.

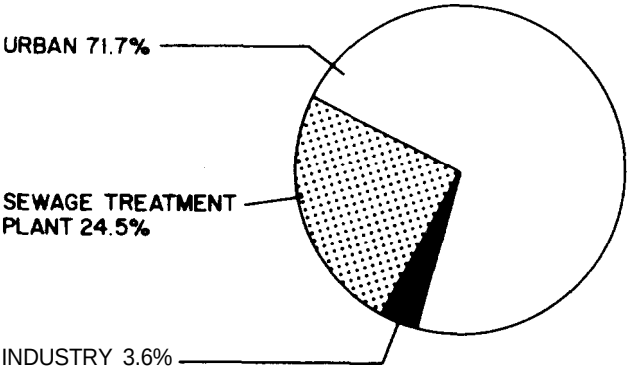
Nonpoint sources are a very important determinant of the quality ot Long Island Sound's water. Steps are being taken to reduce the input of pollutants from nonpoint sources. New York and Connecticut are developing nonpoint source pollution management plans which will detail methods to reduce nonpoint source pollution. The methods may include *best management practices* (BMPs) which are conservation practices that will not only reduce the volume and pollutant content of runoff, but will maintain the productivity of the land. Many BMPs are currently in place for land used for agricultural and forestry purposes and land under construction.

Another step towards reducing nonpoint source pollution is through a LISS project in hlamaroneck Harbor, New York. This project is evaluating methods to clean up or reduce the volume of stormwaler runoff, thereby decreasing the amount of materials discharged to the

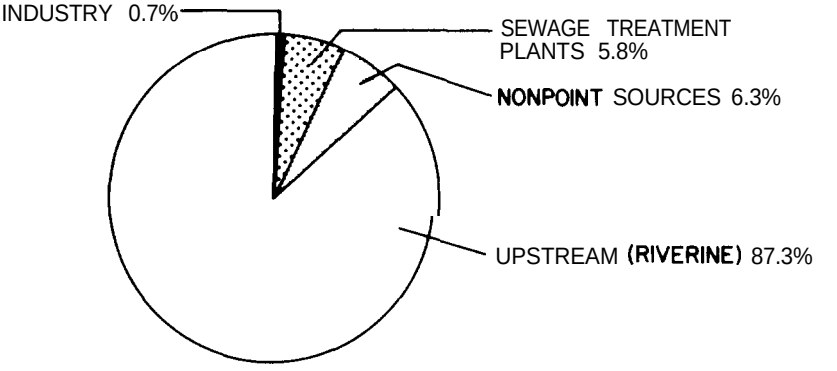
Sound. The goal of this effort is to allow the beaches in that area to remain open for swimming. The information gained from this project can be applied throughout the Sound's watershed.

The Mamaroneck Harbor project is only a start. What is needed is support from people living in the entire watershed. Nonpoint source pollution can be greatly reduced if everyone cooperates. Specific steps that can be taken are being developed now and will be outlined in the management plan being produced for the Study.

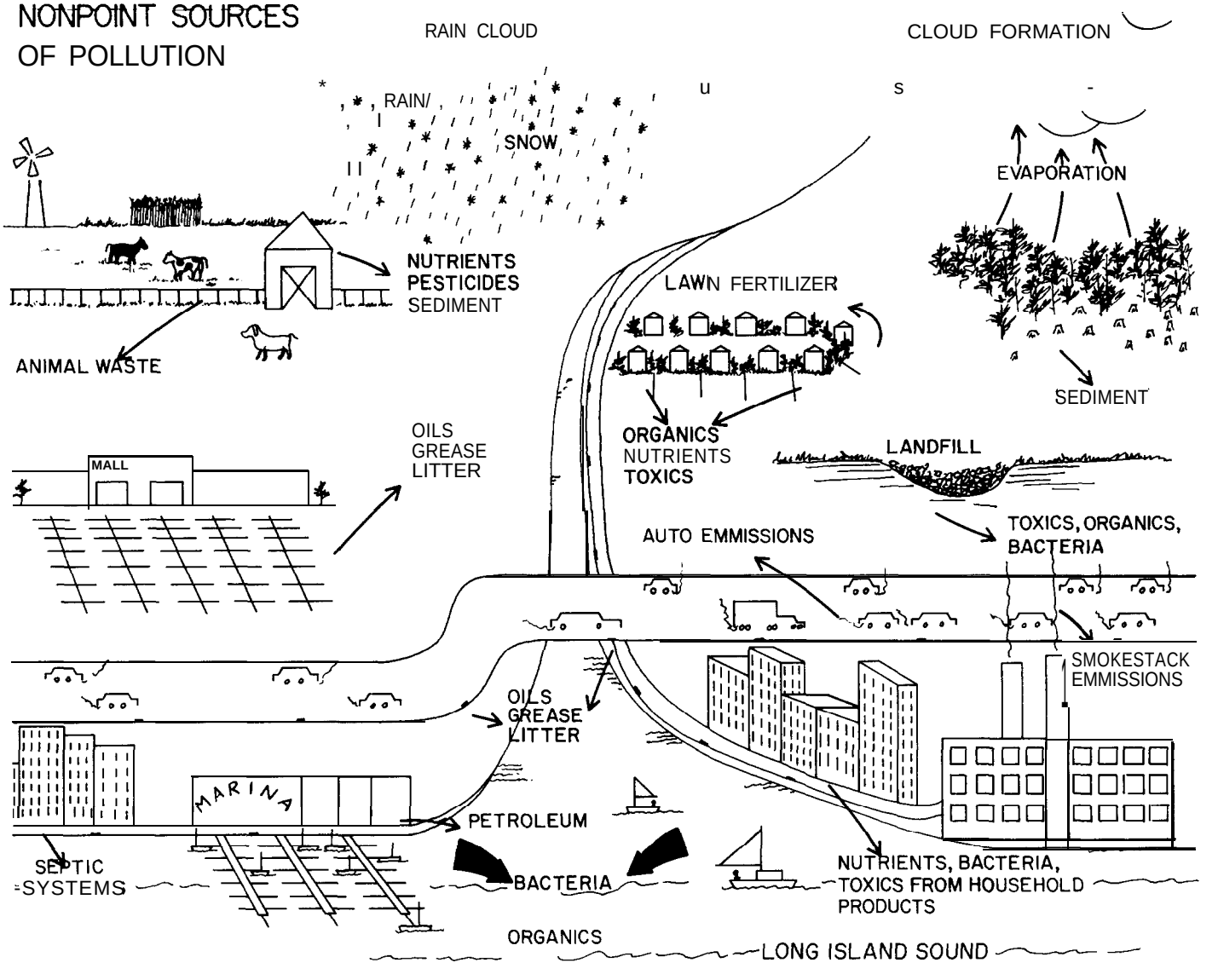
Lead Loads to Long Island Sound
By Source
(159 Tons/Year)



Discharges to Long Island Sound
(6,597 Billion Gallons/Year)



NONPOINT SOURCES OF POLLUTION



Nonpoint Pollution and You

You can help reduce nonpoint source pollution of the Sound. Here are some steps that can be taken in the home.

STEPS	EFFECT
1. Planting trees and shrubs	Retain more rainwater on property Replenish groundwater
2. Always test your soil before fertilizing	Reduce fertilizer applications
3 Never pour chemicals down the drain	Reduce pollutants flowing to LIS
4. Have your septic system checked regularly	Reduce malfunctions Reduce pollutants flowing to LIS
5. Recycle used motor oil. Gas stations that change oil are required by law to accept used motor oil in New York.	Reduce oil discharged into LIS

You can make a difference!

FOR MORE INFORMATION CALL:

New York State Department of Environmental Conservation Bureau of Water Quality Management	(5 18) 457-678 1
Connecticut Department of Environmental Protection Water Compliance Unit	(203) 566-2588
Connecticut Soil Conservation Service	(203) 487-4028
New York Soil Conservation Service	(914) 343-0517

The Long Island Sound Study

The Long Island Sound Study (LISS) is a six-year research and management project that began in 1985 as part of the National Estuary Program, a recent addition to the federal Clean Water Act created to protect estuaries of national importance. The LISS is a cooperative effort involving research institutions, regulatory agencies. marine user groups. and other concerned organizations and individuals. The purpose of the Study is to produce a management plan for the Souncl that will be administered by the three major LISS partners, the Environmental Protection Agency. and the states ot Connecticut and New York. To get involved with the Study, or for more information, contact: the New York Sea Grant Extension Program, Dutchess Hall, SUNY, Stony Brook, NY. 11794, Tel (5 16)632–8737; or the Connecticut Sea Grant Marine Advisory Program, 43 Marne Street, Hamden, CT. 06514, Tel. (203) 789–7865.

SEA GRANT

This fact sheet was produced by the New York St-a Grant Extension Programandthe Connecticut Sea Grant Marine Advisory Program. Written by Melissa Beristain.

Funding provided by the Long Island Sound Study. Cooperating Agencies:

6/89

CT DEP

EPA NEP

NYS DEC