

LITTER

ISSUE

Long Island Sound, our region's greatest treasure, is affected by many types of pollution. The thoughtless, but all too common act of missing or failing to dispose of trash in the proper receptacle has a major effect on the health of Long Island Sound. The fact is Americans create *a lot* of garbage. To be exact, 340 million tons of municipal solid waste is generated each year (a large portion of which winds up on the ground¹). This is an increase of 13 million tons from last year and a 36% increase over what was reported ten years ago. A whopping 48% of Americans admit to having purposefully littered at one time or another in the past ten years.²

How does that cigarette tossed out of a car window, or that coffee cup that missed the trash really affect Long Island Sound?

PROBLEM

After litter hits the ground, there are many ways that it can reach the Sound^A. It can be blown in directly by wind, it can go down the storm drain and be emptied into Long Island Sound or it can enter any tributary in the watershed^B and drift down to the Sound. While all forms of litter can be extremely dangerous to aquatic life, the most common form of litter affecting the Sound is floatable debris. These are objects that are found floating on the surface of the water or washed up onto shore. While most people think that marine life can avoid litter, in actuality they cannot. Floatable debris causes problems for Long Island Sound its inhabitants in two ways: **ingestion and entanglement**.

Floating litter often becomes mistaken for food and is ingested by birds, sea turtles and other marine life. When ingested, litter can cause suffocation, starvation or poisoning.

- Cigarette butts, the single most littered item in America, is composed of cellulose acetate, a form of plastic that can persist in the environment for 10-12 years! An estimated 4.5 trillion non-biodegradable cigarette butts are littered worldwide.^C
- The next most significant offender is floatable litter that contains polystyrene^D. When ingested by animals who mistake it for food, polystyrene can poison and/or clog stomachs leading to death by either toxicity or starvation. Once released into

¹ www.kab.org

² Biocycle, *The State of Garbage in America*, April 1998 pg. 32-43

the environment, polystyrene will NEVER decompose to a non-recognizable form.

Entanglement occurs when animal becomes inextricably wrapped in or ensnared up by something. In many cases litter can entangle an animal swimming by. If the animal is unable to extricate itself, it can suffocate or drown.

- Six packs rings are estimated to cause 6 million sea bird deaths a year and over 100,000 marine mammal deaths. The plastic used to create the rings takes 450 years to decompose! ³
- Plastic shopping bags, which can result in both suffocation and drowning, take between 10-20 years to decompose

Not only is litter unsightly to the beaches and shores of the Sound and dangerous to aquatic life, it can create economic consequences. Long Island Sound contributes \$6 billion per year to the bi-state region: \$800 million in commercial fishing, \$1 billion in recreational fishing, \$3.3 billion in boating, \$750 million in swimming/visiting the beach, and \$150 million intrinsic value. These figures do not include real estate values, the importance of the Sound as a water highway for commercial boat traffic, or the sixteen seaports. Even with these figures the value that the culture and history of this costal region has, can never be evaluated- it is truly priceless

SOLUTIONS/ACTIONS

Step1: Simple Actions

Set an example by not littering.

Dispose of trash properly. Recycle any materials that can be recycled and dispose of the rest in a garbage can.

Do not dump anything down the storm drain.

Keep a litterbag in your car.

Avoid excess packaging when you shop. This will decrease litter from the start.

Purchase reusable canvas bags for your groceries and errands. Keep these items in your car so that they are handy whenever you might need them.

³ US Fish and Wildlife Service, *Long Island Sound Environmental Education Activity Kit*, 500 St. Mark's Lane, Islip NY 11751. 516-581-1538

Do not accept plastic bags with items you purchase if you can carry your purchase with out them.

Keep your yard clean and free of things that can blow into the street and become litter.

Keep your driveway and street clear of grass clippings and leaves.

When you visit a park or beach, remember to take out what you bring in. Keep trash and recyclables in a bag or backpack until you can put them in a litter basket.

Talk to your family and friends about recycling to reduce the amount of material you throw away, this will also result in a reduction of litter generally.

At home, make sure garbage and recycling bags are tied securely so that loose papers and other items cannot fall out and become litter.

Make sure you close the lid on your refuse containers after depositing your trash or recycling inside. This will prevent refuse from spilling into the street.

Do not overfill refuse containers; exposed garbage will likely result in litter.

Remove flyers or take-out menus promptly from your front door or windshield before they are blown away and become litter.

Step 2: More Involvement

Participate in and promote recycling programs. If there is not a curbside recycling program in your neighborhood, contact your city officials.

Contact your city if there are not trash bins at your local parks, beaches or public areas.

Stop litter at the source. Reduce your junk mail by writing to:
Contact Direct Marketing Association
PO Box 9008 Farmingdale, NY 11736-9008

Step 3: Most Involvement

Participate in beach clean-ups.^E

Participate in a Storm Drain Stenciling Project^F

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- Storm Drain Stenciling: is a project aimed to reduce marine litter and raise public awareness about the harm of litter. Stencils that read “Don’t Dump: Drains to Long Island Sound” are used along with spray paint to mark storm drains. The purpose is to let the public know that anything they throw in the storm drain will end up in Long Island Sound.
- To find out more about how to participate in a stenciling project visit Save the Sound.

FOR MORE INFORMATION:

Follow links for more information on these topics:

Why people litter:

- <http://www.epa.nsw.gov.au/>
- www.kab.org

Anti Litter Campaigns:

- <http://www.cigarettelitter.org/index.asp?pagename=FreeAshtrays>
- <http://www.environ.ie/press/lap.html>

Marine Pollution:

- www.noaa.gov

International Coastal Clean-up:

- www.oceanconservancy.org

To Stop Junk Mail:

- www.stopjunk.com

Municipal Sewers and Storm Drains:

- <http://pasture.ecn.purdue.edu/~epados/waste/src/flush.htm>

^A **HOW DOES LITTER REACH THE SOUND?**

Much of the floatable litter that ends up in the Sound is transported through the storm drain system. The type of infrastructure varies by community, but eventually all systems drain to Long Island Sound.

The grates that you see along the roadside are called storm drains, and they feed into a stormwater system, a set of pipes that collect runoff from streets, driveways, parking lots and lawns. In most cases, these pipes flow directly into Long Island Sound untreated.

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Separate sanitary sewer systems transport wastewater to sewage treatment plants for processing before effluent is released into the Sound. A few municipalities in Connecticut have [combined sewer systems](#),^[0] where both sanitary waste and rainfall runoff are transported through a single system of pipes to the local sewage treatment plant.

Stormwater Systems

Stormwater runoff can have a significant impact on water quality, causing harm to surface water and contributing to a failure to meet water quality standards. This occurs due to alteration of natural hydrologic patterns, accelerated stream flows, destruction of natural habitats, and elevation of pollutant loadings. Runoff may contain high levels of suspended solids, nutrients such as phosphorus and nitrogen, heavy metals, pathogens, toxins, floatables and organic materials. Rainfall causes these pollutants to be transported into nearby rivers, lakes, streams, estuaries, wetlands and oceans, where they can have a detrimental effect on water quality, compromise designated uses, and cause habitat alteration or destruction.

The 1998 National Water Quality Inventory, as required under section 305(b) of the Clean Water Act, (www.epa.gov, 1998) found that approximately 44% of the nation's assessed estuarine waters were impaired. Urban runoff and storm sewer discharges were identified as major sources of water quality impairment nationwide. Urbanization is a trend that continues to significantly reduce the infiltration capacity of the land while generating a variety of pollutants, leading to an increase in storm water runoff volume and pollutant loadings. The increase in impervious surface area that results from urban development causes storm water and snow-melt runoff to pick up pollutants along the way, while increasing in speed and volume. Resulting flows are higher in volume, pollutants and temperature than those in areas with lower percentages of impervious surface and more vegetation and soil to filter the runoff.

Additional stormwater pollution results from illicit discharges into the system, either via direct connections such as wastewater piping connected to storm drains, or indirect discharges such as infiltration from cracked sanitary systems, spills or dumping. The resulting untreated discharges contribute substances such as heavy metals, toxics, oil and grease, solvents, nutrients, viruses and bacteria to the pollutant load.

In the report entitled *Testing the Waters, A Guide to Water Quality at Vacation Beaches* (NRDC, 2001), The Natural Resources Defense Council indicates that of the major causes of beach closings in 2000, 85% were based on monitoring that detected bacteria levels exceeding beachwater-quality standards. Elevated bacteria levels can usually be traced to sewage or stormwater discharges, but it is difficult to identify the exact source of the problem. In Connecticut, the report cites stormwater pollution as a cause for 87%

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of the beach pollution closures.

The 1972 amendments to the Clean Water Act prohibit discharge of any pollutant from a point source without authorization by a NPDES permit (National Pollution Discharge Elimination System). The original control measures for point sources did not address storm water runoff, which was found to be a major source of water quality impairment, so in 1987 the CWA was amended to include a two phase program to address storm water discharges. Phase I required NPDES permits for stormwater discharges from priority sources such as medium and large municipal separate storm sewer systems (MS4's) (see definition below) serving populations of 100,000 or more and construction activity that disturbed five or more acres of land. Phase II will require permits for storm water discharges from certain small MS4's and for construction activity disturbing between 1 and 5 acres. This represents the next step in EPA's effort to preserve, protect and improve water quality by addressing polluted storm water runoff.

Definition: MS4 - Municipal separate storm sewer system - "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains). They may be owned by: State, city, town, borough, county, parish, district, association, other public body, including special districts or management agency; designed for collecting or conveying storm water; not a combined sewer; not part of POTW (publicly owned treatment works)." Storm Water Phase II Compliance Assistance Guide, U.S. EPA, Office of Water, EPA 833-R-00-002, March 2000.

Separate Sanitary Sewer Systems

In areas connected to separate municipal sewer systems, wastes flow into underground pipes from residences, office buildings, businesses and schools. These pipes convey the waste to a sewage treatment plant, where it is treated and the remaining effluent is discharged into Long Island Sound. The level of treatment and resulting water quality of the effluent varies by facility, and some pollutants such as metals and pesticide residues may be found in the discharge.

Heavy rainfall can also hydraulically overload separate sanitary sewer systems that carry raw sewage to sewage treatment plants. This is a particular problem for systems where excess rainfall infiltrates through the ground into leaky sanitary sewers and with large inflows from sources such as roof drains connected directly to sewers. When these inputs exceed the capacity of the system, sewers can overflow and discharge untreated sewage from manholes and bypasses at pump stations and sewage treatment plants. The discharges flow into local waterways cause water pollution problems.

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Sewage Treatment Plants

In the past, the biochemical processes that take place in water bodies were relied upon to neutralize sewage. Aerobic, or oxygen-requiring, bacteria feed on the organic material in sewage, decomposing it. However, this process may use up the available oxygen that is dissolved in water. Frequently, the concentration of organic waste is so great that the biochemical oxygen demand (BOD) depletes the water's oxygen supply, killing fish and plants. The BOD measures of the amount of oxygen needed (in milligrams per liter or parts per million) by bacteria and other microorganisms to oxidize the organic matter present in a water sample over a period of 5 days. The BOD of drinking water should be less than 1, while raw sewage may run to several hundred.

Sewage treatment is classified as primary, secondary, or tertiary, depending on the degree to which the effluent is purified. All treatment facilities that discharge to waters of the United States must comply with the **secondary treatment** standards. **Primary treatment** is removal of floating and suspended solids. **Secondary treatment** uses biological methods such as digestion. **Tertiary treatment** removes all but a negligible portion of bacterial and organic matter.

Primary and secondary treatment together can remove up to 90% of the BOD. After undergoing chlorination to remove its bacterial component, the effluent from secondary sewage treatment is returned to the local surface water. This combination of primary and secondary treatment removes most of the organic matter in sewage and thus lowers the BOD. However, most of the **nitrogen** and **phosphorus** in sewage still remains in the effluent from secondary treatment. These inorganic nutrients can cause eutrophication of surface water receiving the effluent causing blooms of algae. To avoid this, a few communities add a third stage of treatment called **tertiary** or advanced waste treatment.

During this final process, the nearly purified water flows from the post-secondary sedimentation tanks into a large basin, where it is chlorinated to kill any remaining potential pathogens. This tertiary effluent then undergoes an aeration process to de-chlorinate the water as it flows down a series of steps prior to its final discharge from the sewage treatment plant. Discharge water must be free of odors, suspended solids, and objectionable bacteria. (Coliform bacteria, which inhabit the lower intestines of mammals, while not pathogenic of themselves, are taken as an index of contamination of watercourses.)

^B Long Island Sound Watershed

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Estuaries

Long Island Sound is an estuary. An estuary is a tidal body of water that is fed by both salt and fresh water sources. Estuaries are partially sheltered water sources that are protected by land from harsh winds, and storms, that occur in oceans. Because of this protection, estuaries are perfect habitats for marine creatures in early stages of development. Estuaries are special because they act as transition habitats for marine animals moving from fresh water sources to ocean habitats. They also act as temporary homes or resting places for many creatures such as migratory birds and mammals, and as breeding grounds for many fish and other wildlife, and as permanent homes to shellfish and finfish. Tens of thousands of species can be found in an estuary. Many types of birds, fish, and mammals depend on estuaries for survival.

Estuaries are important because they are among the most productive systems on earth. Due to the unique water chemistry, many habitats are created. The mixture of salt and fresh water, tidal conditions, and shelter from harsh atmospheric conditions, create a unique and critical habitat for the survival of many marine species. Habitats are very diverse in estuaries ranging from less to concentrated saline areas, rocky shores to sandy beaches, mud flats to coral reefs, shallow harbors to deeper open waters, and regularly flushed areas to more stagnant enclosed areas.

Long Island Sound

Long Island Sound is bordered by New York and Connecticut. It is approximately 110 miles long and at its widest point reaches 21 miles. It is unusual in that it connected to the ocean at opposite ends: “the Race” at its eastern end, and the East River at its west end. (Most estuaries have only one connection to the ocean.) Long Island Sound’s salt-water source is the Atlantic Ocean; its fresh water is from all of the rivers that drain to it, but the most significant fresh water sources are the Housatonic, Connecticut, and Thames Rivers.

Over 5,000,000,000 dollars is generated from activities related to Long Island Sound, including sport fishing, boating, swimming, and beach-going as well as commercial fishing. Long Island Sound’s oyster fishery is one of the largest in the United States, generating 95% of the Nation’s oysters.

Long Island Sound Watershed

Although Long Island Sound itself is 110 miles long, its watershed covers more than 16,000 square miles – an area the size of Delaware times eight. Long Island Sound’s

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watershed covers all of Connecticut and parts of New York, Massachusetts, Rhode Island, Vermont, New Hampshire, and a small portion of Quebec, Canada. It is estimated that 8,000,000 people live within Long Island Sound's watershed. Because of the large human population in the watershed, human impacts are high.

We all live in a watershed. Watersheds consist of a network of land and water that eventually join at one location, much like the branches of a tree come together at its trunk. Watersheds channel water from rain, snow, and ice and from underground sources to larger bodies of water. Watersheds are the land that water flows across as it makes its way to gutters, streams, bays, lakes, and rivers, and out to estuaries and eventually the ocean. In this process, nutrients are picked up and deposited into these bodies of water as well as on the land along the way. Watersheds can be small or large; the Long Island Sound watershed is large, but consists of a network of many smaller watersheds. Because watersheds are networks, changes to one watershed will affect others downstream.

Due to the significant human population in Long Island Sound's watershed, human-induced activities have a detrimental effect on water quality in the Sound. Humans have altered the land in the watershed, reduced open spaces, and have caused both point and non-point types of pollution in the watershed and in the Sound.

Point-source pollution is pollution from a specific source. It is the type of pollution that is discharged from a pipe from a factory, industrial site, or sewage treatment plant. It is the image most commonly associated with pollution. Although point-source pollution is an important issue concerning Long Island Sound and other water bodies, another type of pollution has an even greater negative effect – non-point source pollution.

Non-point source pollution, or “people pollution”, cannot be associated with a distinct source but comes from many diffuse sources. It is a product of human activities, such as driving and washing automobiles and boats, maintaining lawns and gardens, constructing buildings and homes, altering the land, improper disposal of hazardous chemicals, and failing septic systems. These actions directly and indirectly affect the water quality of nearby waters that, in turn, will travel to the Sound. Because Long Island Sound's watershed is large and highly populated, the amount of non-point source pollution entering water bodies that drain into Long Island Sound is quite significant.

Non-point source pollution causes many of the same problems as point-source pollution, the only differences are that it is difficult to pinpoint its exact source and that it is far more difficult to prevent. Non-point source pollution adds extra nutrients, sediment, bacteria, toxins, and heavy metals to the Sound. This can stress and kill organisms and it adds to poor water quality resulting in such problems as hypoxia.

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Why protect Long Island Sound?

Long Island Sound provides more than five billion dollars to the region's economy. People enjoy the recreational, economic, and aesthetic values of Long Island Sound, which are part of the region's culture. The Long Island Sound estuary not only provides recreational, economic, and aesthetic values, but it supports a wide variety of habitats. These habitats provide food and shelter for plants and animals as well as protect humans from the full force of storms. As more and more people choose to live and vacation in the region, human impacts to the Sound will also increase. It is critical that humans evaluate their activities at home and work to minimize their impact on the watershed and the Sound. The Sound is an important to the region's natural, recreational, and economic vitality; it is the region's greatest natural resource. It is our responsibility to protect and restore it so that it remains viable for future generations.

CIGARETTE LITTER



Photo courtesy of Clean Virginia Waterways

While cigarette butts might be much smaller and less visible on the ground than other types of litter, they have a significant negative impact on our environment. In fact, cigarette butts are the most frequently littered item there is, with smokers littering about 4.5 trillion cigarette butts yearly. According to the Environmental Protection Agency and the Center for Marine Conservation, cigarette butts are the most prevalent littered item found during the Center's International Coastal Cleanup Project, accounting for nearly one of every five items collected.

Although the paper and tobacco that comprise cigarettes are themselves biodegradable, the cellulose acetate filter (the "butt") is not. Once a cigarette is thrown away improperly, the butt that remains becomes litter just as much as other non-biodegradable litter such as plastic bags. Cigarette butts can leach harmful chemicals into the ground and water, and be ingested accidentally by wildlife or even small children.

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2000 International Coastal Cleanup - United States Dirty Dozen

PERCENTAGE OF TOTAL COLLECTED	DEBRIS ITEMS	TOTAL NUMBER REPORTED
20.25%	1. cigarette butts	1,027,303
6.65%	2. plastic pieces	337,384
5.60%	3. food bags/wrappers (plastic)	284,287
5.30%	4. foamed plastic pieces	268,945
5.03%	5. caps, lids (plastic)	255,253
4.32%	6. paper pieces	219,256
4.13%	7. glass pieces	209,531
3.63%	8. beverage cans	184,294
2.96%	9. beverage bottles (glass)	150,129
3.19%	10. straws	161,639
2.96%	11. beverage bottles (plastic)	150,129
2.57%	12. bottle caps (metal)	130,401
67.12%	Dirty Dozen Totals	3,405,461

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^D POLYSTYRENE

Polystyrene is a plastic made from the styrene monomer. Most people know it under the name Styrofoam, which is actually a type of polystyrene and a registered trademark of Dow Chemical. It's a lightweight material, about 95% air, with insulation properties and is used in all types of products from cups to packaging material. It is a threat to Long Island Sound because it is made with petroleum, a non-sustainable, heavily polluting and disappearing commodity and the product **does not biodegrade**. It crumbles into fragments that have no expiration date. That is why once it reaches the Sound; it can remain a threat to aquatic animals forever.

^E BEACH CLEAN-UPS

On the third Saturday of September, the Ocean Conservancy sponsors International Coastal Clean-up Day. On this day, groups of volunteers gather on the beaches around the world to physically remove litter and washed up debris. These events are very successful to remove large amounts of litter and to determine the types of litter that are plaguing our shorelines. Each volunteer is armed with gloves, garbage bags and a tally sheet to record what they pick up. This information serves to educate the public on marine debris issues and to reduce debris in waterways. During the 2000 cleanup – three thousand volunteers in CT and NY participated and 63,000 pounds of litter were collected. (LISS) Cigarette butts are repeatedly the number one item picked up.

This event is a great activity to do with family, friends or as a community outreach project. Come be part of this annual event to help restore Long Island Sound. If you are interested in this event, call Bridgett Byrnes, the CT State Coordinator, at Save the Sound 203-354-0036 (www.savethesound.org) or visit the Ocean Conservancy website at www.oceanconservancy.org

^F Storm Drain Stenciling (SDS) Project

SDS is a project aimed to reduce marine litter and raise public awareness about the harm of litter. Stencils that read “Don’t Dump: Drains to Long Island Sound” are used along with spray paint to mark storm drains in a community with this message.

The purpose is to inform the public that anything they throw in the storm drain will end up in Long Island Sound.

Contact Save The Sound to participate.

[SAVE THE SOUND, INC.](#)

www.savethesound.org

Save the Sound is a bi-state, non-profit membership organization dedicated to the restoration, protection, and appreciation of Long Island Sound and its watershed through advocacy, education and research.

Save the Sound is a non-profit 501(c)(3) organization funded by its membership contributions, individual and corporate donations, foundations, government grants, and income from educational programs. The organization was originally founded in 1972 as the Long Island Sound Taskforce and was first affiliated with the Sierra Club, then the Oceanic Society. It has been an independent organization since 1989. The name was changed to Save the Sound, Inc. in 1995 to better express the organization's mission and as a call to action. Save the Sound, Inc. is headquartered in South Norwalk, CT and has offices on Long Island at Garvies Point Museum, Glen Cove, NY and at UCONN's Marine Technology and Research Center in Groton, CT. Save the Sound employs 8 full-time staff members and over 42 additional part-time volunteers and seasonal staff. Our programs in [education](#), [research](#), and [advocacy](#) are the means through which we strive to accomplish our mission: saving Long Island Sound.

Save the Sound's main office is located at:

20 Marshall Street
South Norwalk, CT
06854
203-354-0036

Save the Sound has regional offices located at:

Save the Sound at Garvies Point Museum
50 Barry Drive
Glen Cove, NY 11542

516-759-2165

Save the Sound at The Coastal Environmental Research Facility

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