



LIWQC Resource Library

What is the Long Island Watershed Program?

The [Long Island Watershed Program \(LIWP\)](#) is a New York State Department of Environmental Conservation (DEC) program to guide water quality related activities happening in and around the Long Island watershed. Long Island's water resources are vital to the residents, countless tourists, and the aquatic and terrestrial species that inhabit the island.

The [Long Island Water Quality Challenge \(LIWQC\)](#) is a LIWP initiative, in partnership with the [Long Island Regional Planning Council \(LIRPC\)](#), to help students better understand water quality issues on Long Island and to play a vital role in reducing stormwater runoff on school grounds.

Water Quality Concerns on Long Island

Compared to the rest of New York State, Long Island is unique with sandy soil, minimal fresh surface water, and a large sole-source aquifer system underlying the island that provides drinking water to Nassau and Suffolk County's nearly 3 million residents. While there are a variety of water quality concerns on Long Island, nutrient pollution is a leading cause of water quality impairment, with nitrogen being the main concern for marine waters. The main sources of nitrogen are on-site wastewater (i.e. cesspools and septic systems), fertilizer, and stormwater runoff. Additional water quality concerns include bacteria pollution, coastal acidification, and the presence of emerging contaminants. The Long Island Water Quality Challenge focuses on stormwater runoff and flooding and implementing green infrastructure solutions to address these sources.

Nitrogen Pollution & Sources

Nitrogen Pollution - Nitrogen pollution is when excess nitrogen enters waterbodies (streams, rivers, tributaries, lakes, etc.). Too much nitrogen can reduce the amount of oxygen available for plants and animals in the ecosystem causing dead zones, fish kills, and harmful algal blooms. Your proposal should be focused on excess nitrogen in the environment.

Stormwater - Stormwater is water from rain or melting snow that flows over streets, parking lots, roofs, and other hard surfaces, before directly entering a storm drain or waterbody. As the water travels, it picks up fertilizer, waste, and pollutants along the way. The water can flow directly into a storm drain or waterbody, without the opportunity for a water treatment facility or soil and plants to filter out excess nitrogen.

Fertilizer – Fertilizer contains nitrogen and represents a substantial portion of the nitrogen pollution in some areas of Long Island. Fertilizers are used on our lawns, golf courses, soccer fields, parks, and farms. If used improperly, fertilizers can become a source of nitrogen pollution and harm Long Island's groundwater and waterbodies.

Wastewater - Wastewater is the water that we use in our homes each day when we shower, flush the toilet, wash our hands, and run the dishwasher. Water leaving our homes generally goes either into a septic tank or cesspool in our yard or is sent to a wastewater-treatment facility through a sewer system. On Long Island, there is a large reliance on cesspools and septic systems which are not designed to remove nitrogen. While doing research for this challenge, you may find that stormwater and wastewater are terms used interchangeably. However, when focusing on Long Island, they are two very different concepts and are managed and treated in different ways.

Atmospheric Deposition - Atmospheric deposition is the process where substances in the air, such as gases, or pollutants like nitrogen, encounter rain, snow, or other forms of precipitation and get carried down to the ground. When there is excess nitrogen and other pollutants in the air from human sources such as car exhaust, factories, littering, using fertilizer, and waste from animals, it can have negative effects on human health, crop yields, and the health of land and marine ecosystems.

Pollutants

Pollutants are substances that can harm water quality, ecosystems, or human health when present at harmful levels.

Pollutant Transport: Pollutants can be transported from one place to another through water, including stormwater runoff and flooding.

Nutrients: Nitrogen is commonly the leading cause of water quality deterioration for marine waters, like coastal waters and estuaries. **Phosphorus** is also of important concern in freshwater systems such as lakes and ponds.

Pathogens and Bacteria: Pathogens are microorganisms, such as certain bacteria, viruses, and parasites, that can cause illness. They can enter waterways through sewage, failing septic

systems, animal waste, and polluted runoff. High levels of harmful bacteria or other pathogens can make water unsafe for swimming, shellfishing, and other recreational uses.

Emerging Contaminants: Emerging contaminants are chemicals found in the environment that may pose risks to water quality, human health, or wildlife and are still being studied. On Long Island, examples include forever chemicals like PFAS and 1,4-dioxane, which have been found in groundwater and surface waters.

Glossary

Watershed: An area of land where rainfall and streams drain to a common outlet, such as a stream, bay, or other waterbody.

Aquifer - An aquifer is the saturated zone beneath the water table. Water in the aquifer is called groundwater, a body of porous rock or sediment that act as water storage.

Green Infrastructure - Green infrastructure is a cost-effective, resilient approach to managing rain and stormwater runoff impacts that provides many community benefits. While traditional “gray” infrastructure like gutters, storm drains, and concrete, are designed to move stormwater away from the built environment, green infrastructure reduces and treats stormwater where it falls while delivering environmental, social, and economic benefits.

Groundwater - Groundwater is freshwater from rain or melting ice and snow that soaks into the soil and is stored in the tiny spaces (pores) underground between rocks and soil, feeding all the lakes, streams, bays, and harbors throughout the Island. Unfortunately, groundwater contamination is increasing and can be a threat to our drinking water and waterways.

Surface water - Surface water is any body of water found on the Earth’s surface, including both the saltwater in the ocean and the freshwater in rivers, streams, and lakes. A body of surface water can persist all year long or for only part of the year.

Flooding: Water covering land that is normally dry. Local flooding can occur when rainfall exceeds the ability of the ground or drainage system to absorb or move the water. Flooding can increase the amount and speed of polluted runoff reaching waterways.

Key Concepts

Connection between surface water and groundwater - Surface water and groundwater are part of the hydrologic cycle, the constant movement of water above, on, and below the earth’s surface. Surface water (any body of water on the Earth’s surface) seeps into the ground and replenishes the underlying aquifer (a body of porous rock or sediment that holds water).

Groundwater (water that has soaked into the soil from rain, snow) discharges or moves to the surface and supplies the stream with baseflow. Refer to the diagram linked [here](#) for a better understanding of the connection between groundwater and surface water.

Long Island's main source of drinking water is from the groundwater in an aquifer – making it a [Sole Source Aquifer](#). Nitrogen and other pollutants from runoff and fertilizer will make their way into surface water which will then seep into the ground and recharge (replenishment by the absorption of water) the aquifer, which can present health concerns.

Recommended Resources

- [Long Island Water Quality Challenge – A STEAM Competition – LIRPC](#)
- [Long Island Watershed Program - NYSDEC](#)
- [Long Island Watershed Program Initiatives - NYSDEC](#)
- [Stormwater Pollution & Green Infrastructure Solutions – Nassau County Soil and Water Conservation District](#)
- [Groundwater/Surface-Water Interaction | U.S. Geological Survey](#)
- [How Do I Build A Rain Garden? – New Hampshire Department of Environmental Services](#)
- [Long Island Native Plant Guide – Cornell Cooperative Extension Suffolk County](#)
- [Onsite Wastewater Treatment – Center for Clean Water Technology](#)
- [Nitrogen and Water | U.S. Geological Survey](#)
- [Stormwater - NYSDEC](#)
- [Green Streets: The Road to Clean Water – U.S. EPA](#)
- [Groundwater: What is Groundwater? | U.S. Geological Survey](#)
- [Surface Water – National Geographic](#)
- [Learn about water | U.S. Geological Survey](#)
- [Green Infrastructure | US EPA](#)
- [Nitrogen and Water - USGS](#)
- [Pathogens – LIS Partnership](#)
- [Emerging Contaminants - USDEC](#)
- [Managing Water Resources on Long Island - USGS](#)

It is encouraged that students conduct their own research and find additional sources to the ones highlighted in this document. Remember to use credible, regionally relevant, and grade-level appropriate sources.

Sources and References

Use reliable sources such as government agencies, universities, scientific organizations, and other trusted environmental organizations. Keep track of where you find your information so you can cite your sources in your proposal.

When citing sources for academic documents, a common style used is American Psychological Association or APA. APA references generally include information about the author, publication date, title, and source. Please refer to: [Basic Rules of References](#) and [Common Reference Example Guide](#) for more information.

Technical Advisor

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