



## LIWQC Resource Library

### What is LINAP?

The Long Island Nitrogen Action Plan ([LINAP](#)) is a multi-year initiative to reduce nitrogen in Long Island's surface and groundwaters through technical, management, regulatory and policy action. LINAP is a partnership made up of the New York State Department of Environmental Conservation ([DEC](#)), the Long Island Regional Planning Council ([LIRPC](#)), [Suffolk](#) and [Nassau](#) counties, local governments, area scientists, numerous environmental groups, non-governmental organizations, and a team of consultant services.

The Long Island Water Quality Challenge ([LIWQC](#)) is a LINAP initiative using project-based learning to help students better understand water quality issues related to nitrogen pollution and to play a vital role in reducing nitrogen pollution on school grounds and improving water quality on Long Island.

### Sources of Nitrogen Pollution

*Stormwater on school grounds will be the main source of nitrogen pollution to focus on for the LIQWC, however, it is helpful to understand where all sources of nitrogen pollution come from on Long Island to have a complete picture.*

**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. Note: 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 because of human actions 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.

## Glossary

**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 a 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 fresh water 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 threatening our drinking water and waterways.

**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.

**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.

## Key Concepts

**Connection between surface water and groundwater** - Surface water and groundwater are part of the water 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. Please refer to the diagram in the link for a better understanding of the [connection between the 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

- [LIRPC – Long Island Water Quality Challenge](#)
- [Long Island Nitrogen Action Plan \(LINAP\) - NYS Dept. of Environmental Conservation](#)
- [LINAP Initiatives - NYS Dept. of Environmental Conservation](#)
- [Connection Between Surface and Ground Water - USGS](#)
- [How Do I Build a Rain Garden? - YouTube](#)
- [Rainwater Harvesting Made Easy - Pfluger Architects](#)
- [Long Island Native Plants Guide – Cornell Cooperative Extension](#)
- [Onsite Wastewater Treatment - Center for Clean Water Technology, Stonybrook](#)
- [Nitrogen and Water - USGS](#)
- [Stormwater - NYS Dept. of Environmental Conservation](#)
- [Green Streets – The Road to Clean Water Video - EPA](#)
- [Groundwater – EPA](#)
- [Surface Water - National Geographic](#)
- [Water Science School - USGS](#)
- [The Water Cycle - USGS](#)
- [What is Green Infrastructure? - US EPA](#)

*While 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

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

**Determining if a Source is Credible** - Using sources is a vital part of scientific research, but it's important that these scientific sources are credible. [How to Spot Credible Sources](#)

## LIWQC Provided Materials

- [Project Proposal Requirements 6<sup>th</sup>-8<sup>th</sup> Grades](#)
- [Project Proposal Requirements 9<sup>th</sup>-12<sup>th</sup> Grades](#)
- [Scoring Rubric 6<sup>th</sup>-8<sup>th</sup> Grades](#)
- [Scoring Rubric 9<sup>th</sup>-12<sup>th</sup> Grades](#)
- [LIWQC Informational Video](#)
- [Green Infrastructure Fact Sheet](#)

## Technical Advisor

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