

2011 CT Envirothon Oral Presentation Scenario: Hypoxia in Long Island Sound

Background:

- Long Island Sound is an **estuary**. All the land in Connecticut drains towards Long Island Sound. Each summer, the water on the bottom of the sound, especially on the western end of the basin, do not have enough dissolved oxygen (DO) to support marine life, including oysters, lobsters and other harvestable marine animals. This is known as **hypoxia**. Years of research, monitoring and modeling has helped the scientists to identify nitrogen sources in the Sound as a significant cause of decreased DO levels. In a process called eutrophication, excessive discharges of nutrients such as nitrogen fuel the growth of planktonic algae. The algae, and planktonic animals that feed on algae die, settle to the bottom of the Sound, and decay, using up oxygen in the process. To reduce nitrogen to the levels necessary to improve DO levels and meet water quality standards, the states of Connecticut and New York working with the US Environmental Protection Agency (EPA) have adopted a 58.5 percent nitrogen reduction target by 2017 from early 1990s baseline levels.
- Billions of dollars have been invested to upgrade sewage treatment plants and other **point source** discharges both in Connecticut and New York. Creative programs, such as a nitrogen credit trading program, have been initiated in Connecticut to reward municipalities that have reduced the amount of nitrogen in their wastewater discharges by allowing them to sell their credits to towns that haven't upgraded their treatment plants. This encourages the "credit buying" municipalities to make upgrades.
- Upgrading sewage treatment plants alone will not result in enough reductions in nitrogen sources impacting Long Island Sound. As point source loads are being reduced, the percentage of nitrogen from **non-point sources** (NPS) is increasing. Stormwater from all Connecticut municipalities carries nutrients and other pollutants to nearby rivers which then transport them to Long Island Sound. There is an increasing focus on all Connecticut municipalities to require them to reduce the amount of **stormwater carried pollutants**, including nitrogen containing compounds that end up in Long Island Sound.
- Reducing stormwater pollutants will not only improve the water quality of Long Island Sound but also have positive water quality impacts on all water resources throughout the **watershed** including your town.

Key words are highlighted in yellow.

The 2011 Connecticut Envirothon Oral Scenario:

Your team/consulting firm has been hired by the town of ----- to develop a plan to reduce the amount of non-point source nitrogen that your town sends to our estuary, Long Island Sound, causing Hypoxia.

(Regional, private or magnet schools will choose a town in their region.)

Stormwater sampling shows us that the largest sources of Nitrogen in Stormwater Runoff are from:

- Agricultural Land Use including Cropland, Pasture, Nurseries, Golf Courses, Athletic Fields
- Commercial Land Use including Retail, Industrial, Power Plants
- Transportation Land Use including Vehicle Emissions, Roads, Parking Lots, Airports,
- Residential Land Use including High Density Residential with 8+ units per acre, Medium Density Residential 2-7 units per acre and Low Density with 1 unit per 1-5 acres.

Your job is to make sure your town understands how the Long Island Sound Estuary functions, and why it is important to CT, both ecologically and economically. Then decide which two of the four land uses mentioned above are the biggest contributors of nitrogen in your town. Develop a plan with recommendations for your local officials to minimize your town's contribution. Put your town on a Nitrogen Crash Diet to solve the Hypoxia Problem.

1. Briefly describe the LIS estuary and explain its importance to Connecticut both ecologically and economically.
2. Explain how Hypoxia disrupts the function of a healthy estuary and why it is important for Connecticut to keep Long Island Sound free of Hypoxic episodes.
3. What is your watershed address? Show the path that runoff from your town travels on its way to Long Island Sound. Briefly identify the main NPS sources of nitrogen in the stormwater runoff from your town.
4. Discuss ways to reduce your town's Nitrogen runoff from:
(choose from the list of four land uses mentioned above based on what you believe to be one of the largest contributors of nitrogen to stormwater runoff)
5. Discuss ways to reduce your town's Nitrogen runoff from:
(select a second choice from the land use list above based on what you believe to be one of the largest contributors of nitrogen to stormwater runoff)

Resources:

<http://longislandsoundstudy.net/wp-content/uploads/2010/03/fact7.pdf>

2002 Connecticut Guidelines for Soil Erosion and Sediment Control (CT DEP, 2002)

http://www.ct.gov/dep/cwp/view.asp?a=2720&q=325660&depNav_GID=1654

1) Introduction, table of Contents and Chapters 1 through 5

2004 Stormwater Quality Manual (CT DEP, 2004)

<http://www.dep.state.ct.us/wtr/stormwater/strmwtrman.htm>

<http://nemo.uconn.edu/tools/publications.htm>

- 1) Rain Garden Brochure
- 2) CT LID Inventory
- 3) Fact Sheet #9

Watershed Management / Low Impact Development (LID) Project Examples in Connecticut: The following are examples of LID Implementation in Connecticut

[Green Roofs](#) (PDF, 3.5 MB)

[Pervious Pavement](#) (PDF, 4.8 MB)

[Rain Gardens](#) (PDF, 4.5 MB)

[Rainwater Harvesting](#) (PDF, 1.1 MB)

Maps:

<http://longislandsoundstudy.net/2010/03/geographic-zones-for-managing-total-nitrogen-loads/>

<http://longislandsoundstudy.net/2010/03/hypoxia-poster/>

<http://longislandsoundstudy.net/2010/03/long-island-sound-drainage-basin/>

Connecticut Environmental Conditions on-line

Maps and Geospatial Data for Planning, Management, Education and Research

http://www.cteco.uconn.edu/map_services.htm

Connecticut Landuse Education and Research (CLEAR) Connecticut's Changing Landscape Maps for your watershed

<http://clear.uconn.edu/projects/landscapev1/local/rbasin.asp>