

2012 Delaware Envirothon Current Issue Topic/Objectives

‘NONPOINT SOURCE POLLUTION/LOW IMPACT DEVELOPMENT’

Nonpoint source pollution, unlike pollution from industrial and sewage treatment plants, can come from many different sources. Stormwater runoff carries pollutants into our streams, rivers, reservoirs and other bodies of water.

These pollutants include:

- Excess fertilizers, herbicides, and insecticides from residential areas
- Oil, grease, and toxic chemicals from urban runoff
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks
- Bacteria and nutrients from pet wastes and faulty septic systems

An estimated 60 percent of current water pollution is attributed to stormwater runoff. Nonpoint source pollution can contaminate drinking water, destroy wildlife habitat, close beaches, kill fish and cause many other serious environmental and public health problems. Every year, millions of dollars are spent to restore and protect areas damaged by nonpoint source pollutants. Stormwater has been identified as one of the leading sources of pollution for all waterbody types in the United States. Furthermore, the impacts of stormwater pollution are not static; they usually increase with more development and urbanization.

One of the most exciting new trends in managing stormwater runoff is the increased use of **Low Impact Development (LID)** to help protect and restore water quality. LID comprises a set of approaches and practices that are designed to reduce runoff of water and pollutants from the site at which they are generated. By means of infiltration, evapotranspiration, and reuse of rainwater, LID techniques manage water and water pollutants at the source and thereby prevent or reduce the impact of development on rivers, streams, lakes, coastal waters, and ground water. LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions.

Some Benefits of LID:

- improved aesthetics
- expanded recreational opportunities
- increased property values due to the desirability of the lots and their proximity to open space
- increased total number of units developed
- increased marketing potential and faster sales
- reduced runoff volumes and pollutant loadings to downstream waters
- reduced incidences of combined sewer overflows
- enhanced property values
- improved habitat
- aesthetic amenities
- improved quality of life.

Although the increase in application of these practices is growing rapidly, data regarding both the effectiveness of these practices and their costs remain limited. In the vast majority of cases, the U.S. Environmental Protection Agency (EPA) has found that implementing well-chosen LID practices saves money for developers, property owners, and communities while protecting and restoring water quality.

As water becomes an ever-increasing issue nationwide, managing our stormwater properly is not only a green technology, it becomes a necessity. And through the use of Low Impact Development strategies, properly managing stormwater is something all of us can do.

2012 Delaware Envirothon Current Environmental Subject Learning Objectives:

After completing study of this issue, students will be able to:

1. Define Low Impact Development (LID) and give examples of how this concept was used in the Appoquinimink River watershed.
2. Define nonpoint source pollution.
3. Explain the impacts of land use on watersheds.
4. Understand the limitations and benefits of conventional stormwater management design versus LID.
5. Identify and apply LID Best Management Practices (BMPs) and selection criteria.
6. Explain how soils, wildlife, forestry, and aquatics affect and are affected by nonpoint source pollution (and its reduction) and LID.
7. Identify how LID is used to manage stormwater in Delaware.
8. Explain the impacts urban sprawl has on nonpoint source pollution and how LID can be used to manage and reduce nonpoint source pollution, especially for municipal organizations.
9. Analyze pros and cons of the application of LID Best Management Practices.
10. Understand the relationship between LID hydrologic controls (i.e. bioretention ponds, rain gardens, green roofs, etc.) and water quality benefits.
11. Provide examples of what individuals and communities can do to implement LID at home.
12. Provide examples of how the Delaware Department of Transportation is utilizing a 'green highway' concept.
13. Explain the difference between a 'rain barrel' and a 'rain garden'
14. Define NEMO and its' value to low impact development throughout Delaware