Summer 2006

L I D N E W S

Low Impact Development

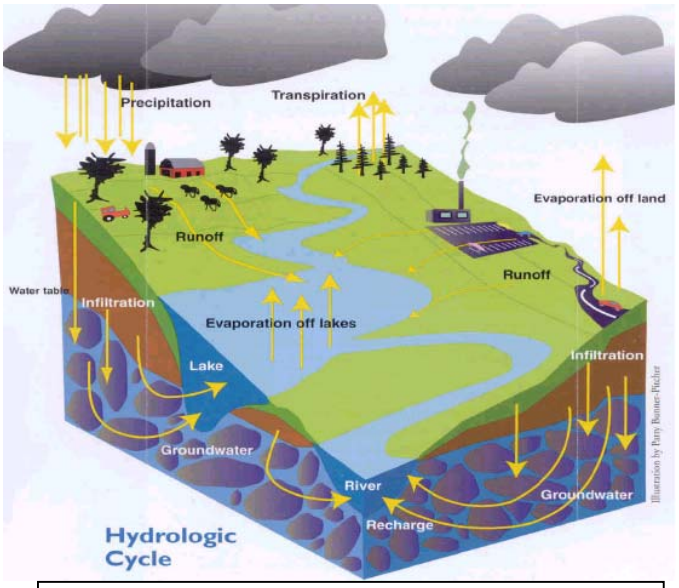
Balancing Development with Water Quality Protection

LID NEWS is a newsletter designed to inform elected and appointed officials in southwest Michigan about LOW IMPACT DEVELOPMENT (LID). The LID approach to land development utilizes various land use planning and design practices and technologies to simultaneously protect water quality and reduce infrastructure costs.

What is A Watershed?

A watershed is the area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake or groundwater. **You are sitting in a watershed now.** Homes, farms, ranches, forests, small towns, big cities and more can make up watersheds. Some watersheds cross county, state, and even international borders such as the Great Lakes Basin. Watersheds come in all shapes and sizes. Some are millions of square miles, others are just a few acres. Just as creeks drain into rivers, watersheds are nearly always part of a larger watershed or basin. For example the St. Joseph River Watershed is part of the Lake Michigan Watershed which is part of the Great Lakes Basin. Every stream, tributary or river has an associated watershed.

Most watersheds are composed of a mixture of uplands, wetlands, riparian areas, streams and lakes. The most common component of almost all watersheds is the upland area, covering in many cases over 99% of the total watershed area. The rain and snow that falls onto a watershed, and that does not evaporate, is stored in the soil, and over a period of time is released down slope through groundwater, wetlands and streams. This water then moves through a network of drainage pathways, both underground and on the surface.

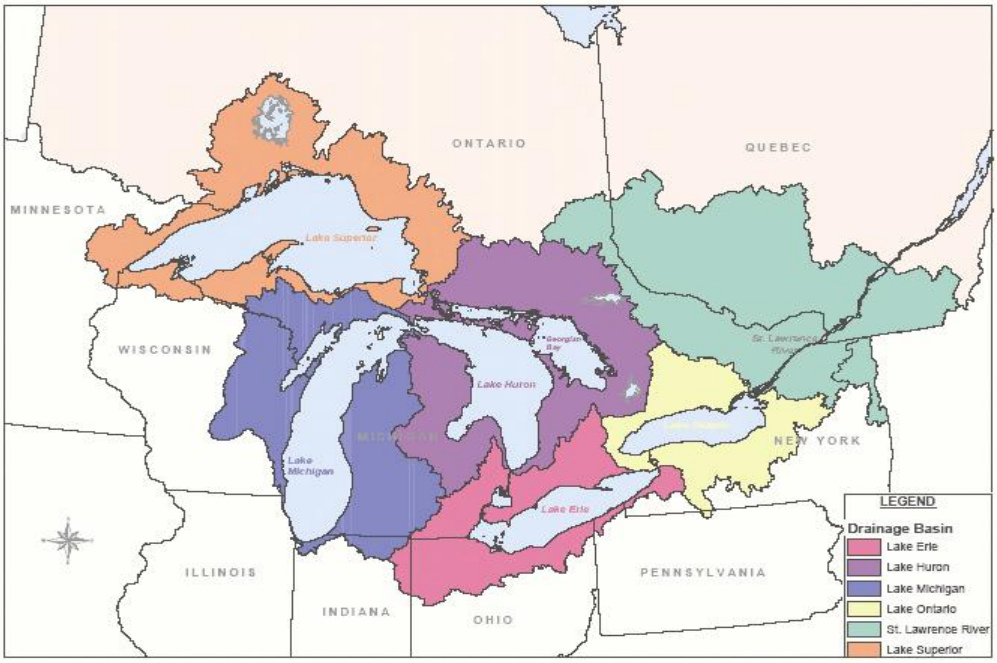


The next time it rains, look to see where the water that runs off of your roof and the driveway goes. Usually you will see it running down the street and into a storm sewer or a ditch along the road. Where does the rainwater eventually go? There are many paths that the water can take, but eventually it all ends up in the nearest stream, lake or wetland. Some of it soaks into the soil to become groundwater and slowly replenishes streams and lakes. Some water runs overland (called **runoff**) or through storm sewers and ditches then quickly flows into the nearest creek, river or wetland.

This is one of a series of six newsletters that will be developed focusing on Low Impact Development. This newsletter was developed by the Southwestern Michigan Commission with assistance from the MDEQ, EPA, and the following watershed projects: Black, Galien, Gun and Paw Paw River Watersheds. For additional information on LID and to download this newsletter visit www.swmicomm.org.

DEQ Michigan's Nonpoint Source Program

This Nonpoint Source Pollution Control project has been funded in part through the Michigan Nonpoint Source Program by the United States Environmental Protection Agency under assistance agreement C9975464-05 to the Southwestern Michigan Commission for the Paw Paw River Watershed Planning project. The contents of the document do not necessarily reflect the views and policies of the EPA, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.



All of west Michigan (dark blue area on map to the left) is in the Lake Michigan Watershed which is part of the Great Lakes drainage basin. (A drainage basin is another word for a watershed. A basin is usually a larger watershed made up of several large watersheds or drainage areas.)

The Connection Between Land Use and Water Quality

What is Non-Point Source Pollution?

Unlike pollution from factories and sewage treatment plants, non-point source pollution comes from many different areas with no particular place of origin. It is caused by rainfall or snow-melt moving over and through the ground. As this water moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, creeks, rivers, wetlands and even underground sources of drinking water. Pollutants can come from all land uses (residential, agricultural, commercial, golf courses, industrial, etc.) Pollutants include:

- Excess fertilizers, herbicides, and insecticides from farms, residential, commercial or municipal owned lawn areas and golf courses.
- Oil, grease, and toxic chemicals from urban runoff and energy production
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks
- Bacteria and nutrients from livestock, pet waste, and faulty septic systems
- Salt and sand from roads

How land is developed impacts the quality and quantity of our water. Land uses from any part of the watershed -- such as polluted runoff from farms, forests and homes -- eventually affect the health of the whole watershed.

In a healthy watershed, after a rain event, vegetation and wetlands intercept and slow the flow of water as it travels through the watershed, removing sediment and allowing large quantities of water to enter the soil and percolate into the groundwater. This groundwater is then available to contribute to late season stream flow, to the benefit of fisheries and water quality. In comparison, a watershed with more impervious surfaces and the loss of vegetation and wetlands, responds differently after a rain event. More water runs over the land instead of replenishing groundwater. This larger volume of water quickly reaches water bodies reducing the time available for the water to be cleansed and filtered and also causing erosion of stream banks.

Land use practices such as clearing land for timber or agriculture, developing and maintaining roads, housing developments, and water diversions may have environmental consequences that greatly affect stream conditions even when the activity is not directly associated with or near a stream. Proper planning and adequate care in implementing projects can help ensure that one activity within a watershed does not detrimentally impact the downstream environment.

Most human activities and development have the potential to adversely affect the overall health and quality of a watershed. Timber harvest on unstable slopes can cause erosion. Agricultural activities can increase levels of harmful bacteria and overload runoff with nutrients. Also, poorly planned urban and industrial growth can cause many of the same problems as farming and timber harvest in addition to contamination from toxic chemicals. Even seemingly harmless activities such as rural development and recreational activities along rivers and creeks can be harmful, impacting the watershed's sensitive riparian vegetation which is important for water quality protection and wildlife habitat.

When viewed individually, most human activities have little effect on the general health of the watershed. However, the effects of numerous activities within a watershed are cumulative and when combined can greatly diminish the watershed's overall health. Every activity has the potential to impact the area of the watershed downstream. ***As people place more demands on a watershed, greater efforts must be made to reduce these cumulative effects.*** Having clean water will require communities to work together to ensure that activities do not negatively impact those downstream.

One solution is LID ~
LOW IMPACT DEVELOPMENT

Low Impact Development is an ecologically friendly approach to site development and stormwater management that aims to mitigate development impacts to land, water and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site. The practice has been successfully integrated into many municipal development codes and storm water management ordinances throughout the United States.

Specifically LID aims to:

- Preserve open space and minimize land disturbance
- Protect natural systems and processes (drainage ways, vegetation, soils, wetlands)
- Reexamine the use and sizing of traditional infrastructure (lots, streets, curbs, gutters, sidewalks) and customize site design
- Incorporate natural site elements (wetlands, stream corridors, mature forests) as design elements
- Decentralize and micromanage stormwater at its source

Internet Resources on LID:

Low Impact Development Center
www.lowimpactdevelopment.org

Nonpoint Education for Municipal Officials
http://nemonet.uconn.edu/

Planning with Power
www.planningwithpower.org

USEPA Low Impact Development page
www.epa.gov/owow/nps/lid

www.urban-advantage.com/images_HTM.htm

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What is LID? Low **I**mpact **D**evelopment is an approach to designing a site for development or redevelopment that takes into account the natural resources and pre-development hydrology. It includes a suite of landscaping and design techniques that attempt to maintain the natural, pre-developed ability of a site to manage rainfall. LID techniques capture water on site, filter it through vegetation, and let it soak into the ground where it can recharge the local water table rather than being lost as surface runoff. An important LID principle includes the idea that stormwater is not merely a waste product to be disposed of, but rather that rainwater is a resource.

Where should LID be used? LID can be applied to new development, urban retrofits, and redevelopment/ revitalization projects at many scales. At a small scale, LID techniques can be used to better handle rainfall for a single family lot through rain barrels and rain gardens. At a larger scale, proper site design in combination with many landscaping and infiltration techniques distributed throughout a subdivision or development will cumulatively improve water quality and reduce runoff.

Conventional Development vs. LID:
Conventional development techniques often clear all trees and valuable topsoil from a site and re-grade it so that all water ends up in one large detention basin. Resulting problems include loss of recharge, increased water temperature, decreased water quality and higher runoff volumes. The LID approach protects the natural ability of the site to capture precipitation, keep it clean and allow it to recharge the local water table.

Future Issues of this newsletter will address:
Benefits of LID for developers, municipalities and for water resources
LID techniques (rain gardens, green roofs, porous pavement options, use of native plants, etc.)
Examples of LID in southwest Michigan (the Black, Gun, Galien, Dowagiac, Lower St. Joseph and Paw Paw River Watersheds)*

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