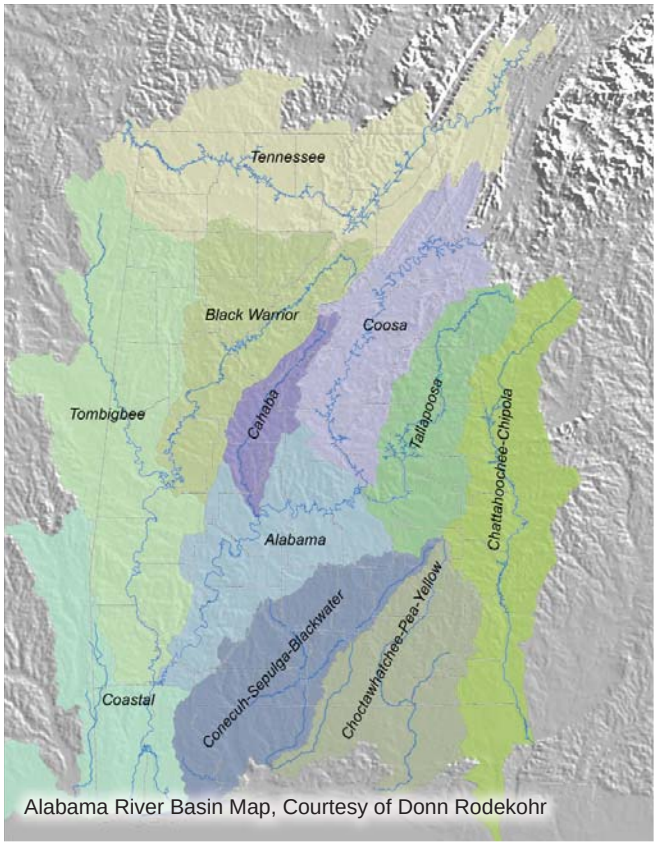
Low Impact Development Overview



Alabama River Basin Map, Courtesy of Donn Rodekohr

Alabama is blessed with abundant water resources including over 77,000 miles of streams and rivers, diverse wetland ecosystems, coastal waters, reservoirs, and groundwater. These resources are critical for maintaining Alabama's amazing plant and animal biodiversity, drinking water supplies, opportunities for ecotourism, water sources for irrigation, and transportation networks. The quality of water that flows through our communities is a reflection of our quality of life.

Interest in and awareness of the need to better manage stormwater runoff in urban and suburban landscapes has increased in recent years. Multiple studies have identified the negative impacts of poorly managed post construction stormwater on our nation's waters. As landscapes become more urbanized, there is a corresponding increase in the amount of impervious surfaces that limit the ability of stormwater to infiltrate into the ground. In some watersheds, as much as 55% of rainfall runs off an urban landscape that is covered by parking lots, roads, and buildings and only 15% of rainfall soaks into the ground. In comparison, a more natural landscape will infiltrate 45% of the rainfall with only 10% running off. The negative environmental impacts of an increase in stormwater runoff and subsequent peak instream flows in developed landscapes leads to increases in its delivery of pollutants such as nutrients, pathogens, metals, and sediment.

Careful consideration of stormwater management is critical for planners, environmental program managers, elected officials, homeowners, business owners, developers, contractors, design professionals, and others; however, it is rare that these groups have an opportunity to work together in planning for future development and redevelopment, particularly on a watershed level. Low impact development or LID is an interdisciplinary systematic approach to stormwater management that, when planned, designed, constructed, and maintained appropriately, can result in improved stormwater quality, improved health of local water bodies, reduced flooding, increased groundwater recharge, more attractive landscapes, wildlife habitat benefits, and improved quality of life.

Low impact development minimizes runoff and employs natural processes such as infiltration, evapotranspiration (evaporation and transpiration from plants), and storage of stormwater at multiple fine scale locations to be as near to the source of stormwater as possible. Successful implementation of LID recreates a more natural hydrologic cycle in a developed watershed.

The first step in LID is to consider the landscape that will be developed. What are the natural features of the area that may be used or mimicked to promote stormwater infiltration, evapotranspiration, or storage? This may include sensitive areas such as steep slopes, wetlands, and streamside forests that should be retained. See Table 2.4 in Site Selection for a checklist that can be used by developers and designers during construction plan review. Understanding the opportunities and limitations of a landscape to be developed will help with the strategic placement of LID stormwater control measure practices at multiple locations so that stormwater is slowed, stored, and soaked in near to its point of origin.

It is critical to understand local soils, size constraints, groundwater level, native vegetation options, and other potential constraints so that the appropriate LID stormwater control measure practices can be selected to meet the project goals. The LID stormwater practice should be designed to effectively store, infiltrate, or spread out stormwater in its landscape setting, ideally working as a system with the other practices in the development and watershed. Understanding local hydrology and function of a specific stormwater management practice within a particular setting will make stormwater management design more efficient and cost effective.

Auburn University Soil Resources and Conservation Class, Turf Research Unit; Auburn, AL

As with any built practice, LID requires a schedule of maintenance tasks to promote long-term pollutant removal efficiencies. The concern that this maintenance burden will be greater than conventional “grey” stormwater practices should not be a barrier – it is different maintenance, not necessarily more maintenance. In fact, the US EPA has noted that LID life cycle costs are usually less than traditional practices. Traditional stormwater practices may have a greater initial capital investment, use valuable land area for stormwater storage, and incur operation and maintenance costs such as dredging, inlet pumping, and residuals disposal. LID practices typically have lower initial investment, but require more maintenance in the first years of establishment. Once established, they may be maintained in a manner similar to other landscaped areas. Additionally, these practices may help reduce the cost of mowing and irrigation post establishment. Additional LID elements to include in a cost/benefit comparison include improved aesthetics, wildlife habitat, community quality of life, citizen involvement and engagement, and the pride of implementing practices that allow economic and community development to proceed with minimized impacts on water resources. These elements are part of the overall picture of LID that encourages a connection by all stakeholders to transform stormwater into being viewed as a valuable resource.

Recently, Green Infrastructure (GI) has emerged as the term to describe planning and implementation of projects that use vegetation, soils, and natural processes to manage water and create healthier urban environments. On a broad, watershed scale GI may encourage the linking of new and existing greenways, promotion of canopy cover to assist with energy reductions and carbon sequestration, and the preservation of natural areas. As the scale becomes finer, GI encompasses the stormwater management approach recommended by LID to treat stormwater close to its source through infiltration, evapotranspiration, and storage.

Technological advances in LID are helping to fine tune elements of the planning, design, construction, and maintenance of LID stormwater practices. This handbook presents current research and design recommendations to assist all interested groups in setting goals for their development and re-development projects. Goals may include maximizing pollutant load reductions, incorporation of low maintenance, attractive native vegetation, and/or community involvement in understanding connections between what we do in our landscapes and the health of local streams. We strongly recommend seeking input from all stakeholders as we move forward with LID in Alabama so that we understand what is needed to successfully achieve improved water quality and community quality of life.

References

Arnold C. and J. Gibbons. 1996. Impervious Surface Coverage: The Emergence of a Key Environmental Indicator. Journal of the American Planning Association, 62(2): 243-258.

US EPA. Fact Sheet #1. Benefits of LID: How LID Can Protect your Community's Resources. Last accessed April 2013. http://water.epa.gov/polwaste/green/upload/bbfs1benefits.pdf

US EPA. Fact Sheet #5. Maintenance of Low Impact Development. Last accessed April 2013. http://water.epa.gov/polwaste/green/upload/bbfs6maintenance.pdf

US EPA. What is Green Infrastructure? Last accessed April 2013. http://water.epa.gov/infrastructure/greeninfrastructure

Walsh, C. J., A. H. Roy, J. W. Feminella, P.D. Cottingham, P. M. Groffman, and R. P. Morgan II. 2005. The Urban Stream Syndrome: Current Knowledge and the Search for a Cure. Journal of the North American Botanical Society, 24(3): 706 - 723.