



Watershed Management and Low Impact Development in the Niantic River Watershed

Connecticut Department of Environmental Protection

Watershed, Lakes and NPS Programs

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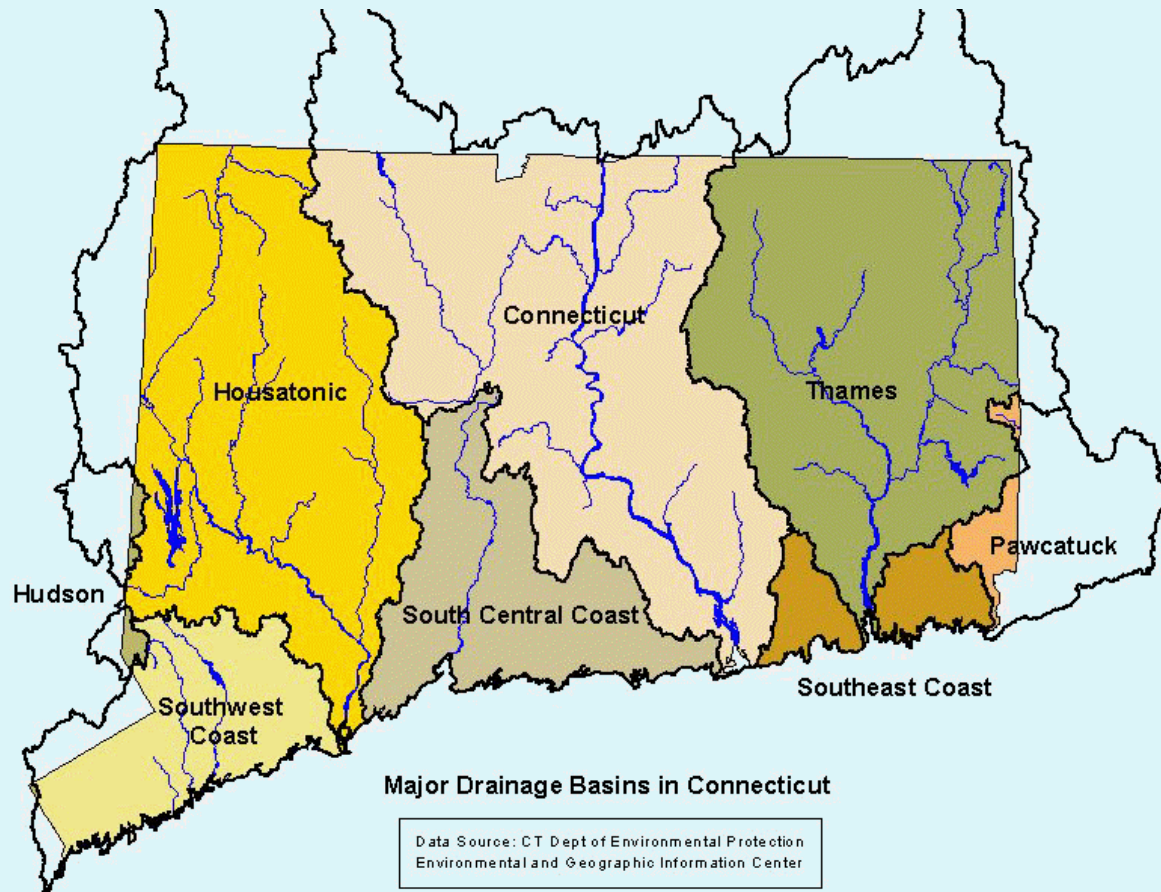
Wednesday, September 29th, 2010

Waterford, CT

Overview

- Stormwater Management, Water Quality and Quantity, and LID
- LID Regulations, Effectiveness, Costs
- LID and the NRWPP
- DEP Municipal Assistance
- CT LID Examples
- Questions

Major Connecticut Watersheds



Watershed Management and Low Impact Development

Watersheds, Lakes
and Nonpoint Source
Implementation

Nonpoint Source
Implementation
-319 nonpoint source
program

Watershed
Management

Lakes Management

Low Impact
Development

Low Impact Development

LID is a site design strategy intended to maintain or replicate predevelopment hydrology through the use of small-scale controls integrated throughout the site to manage runoff as close to its source as possible.

(2004 CT-DEP Stormwater Quality Manual)

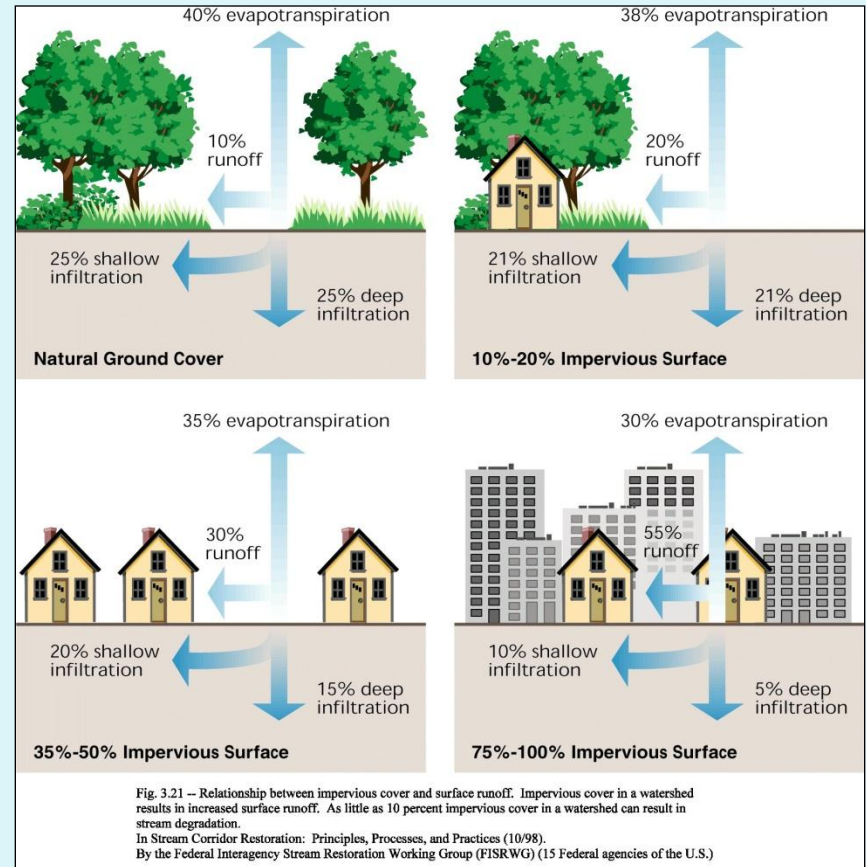


Photo: UCONN

Stormwater, Water Quality, and LID

Land use and stormwater management are directly related to water quality

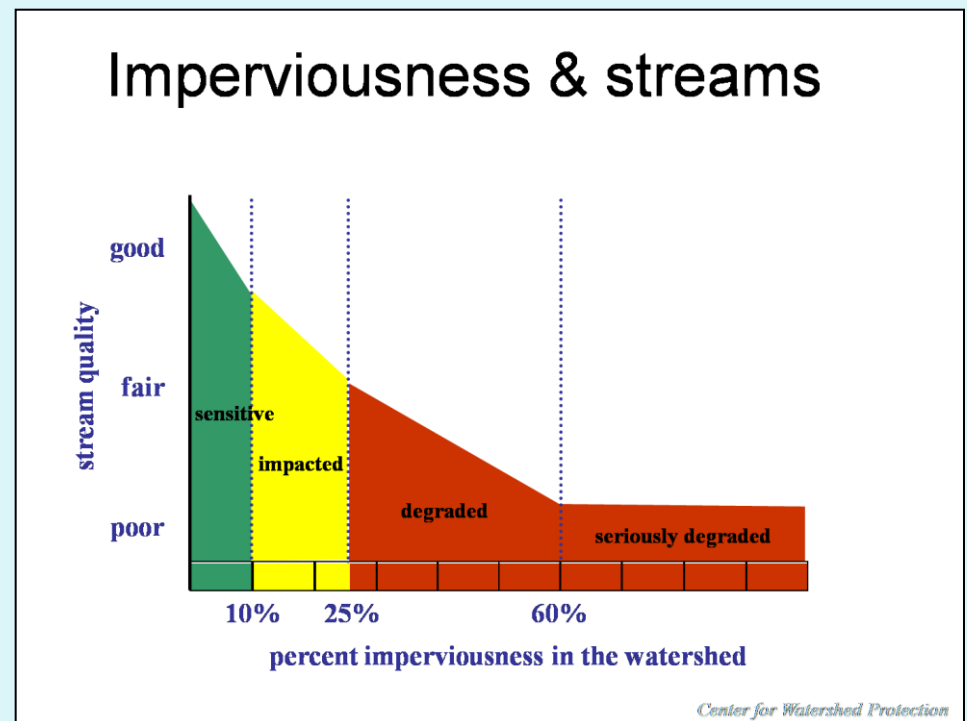
- As impervious cover increases...
- Less water infiltrates into the ground...
- And there is less soil to filter out pollutants.



Source: Federal Interagency Stream Restoration Working Group

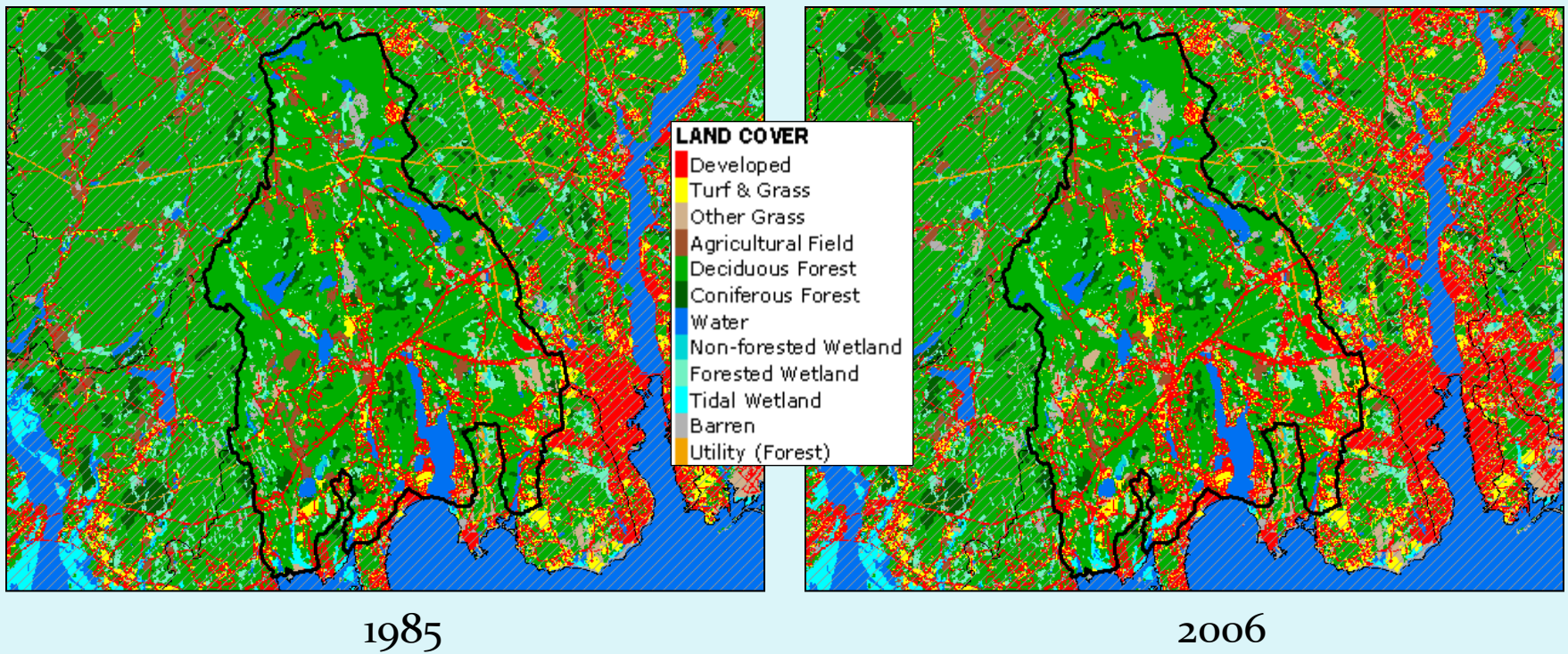
Stormwater, Water Quality, and LID

- Studies have shown that as impervious cover in a watershed exceeds 10% streams become negatively impacted
- At 25-30% IC stream quality becomes degraded



Source: Center for Watershed Protection

Southeast Western Complex Regional Basin Land Cover 1985-2006



Stormwater, Water Quality, and LID

- Goal of LID is to protect water quality and minimize changes in water quantity to receiving water bodies, through local land use planning
- Municipalities can gain environmental benefits through regulatory changes in:
 - Parking
 - Landscaping
 - Residential and Municipal Site planning
 - Municipal road design



Source: CT DEP

Low Impact Development and Land Use Planning

- Most common sections of local regulations to find LID are:
 - Zoning
 - Subdivision
 - Inland Wetlands & Watercourses

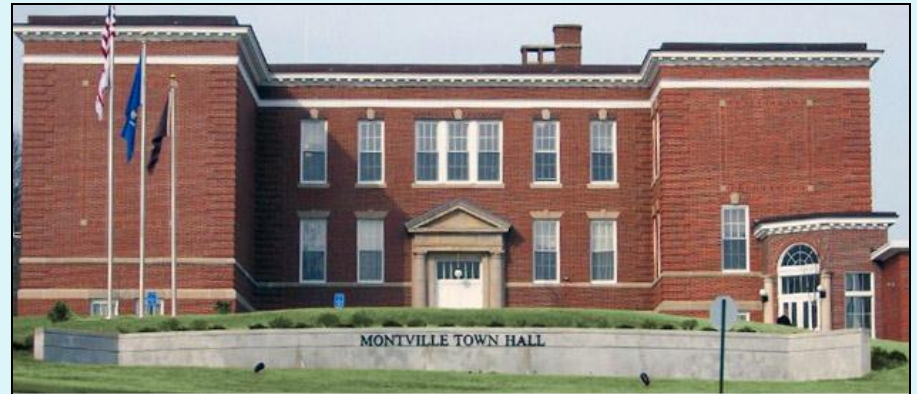


Photo: <http://www.montville-ct.org>

How to I.D. Your LID

- Municipal LID design strategies include:
 - Reduction in road width
 - Elimination of curb and gutter
 - One-way cul-de-sac
 - Depressed island (bioretention) in cul-de-sac
 - Swales in right of way
 - Elimination of sidewalks

How to I.D. Your LID

- Residential LID design strategies include:
 - Residential rain gardens
 - Rainwater Harvesting
 - Green Roofs
 - Shared driveways
 - Alternative pavement surfaces
 - Zero lot line setback
 - Reduced front setback
 - Stormwater disconnects

LID – How much does it cost?

- LID can result in cost savings through reduced:
 - Costs for site grading and preparation
 - Stormwater infrastructure (curbs and gutters, catch basins, etc.)
 - Site paving
 - Landscaping
- Initial LID project costs can sometimes be more expensive due to:
 - Soil preparation
 - Underdrains
 - Materials

Table 2. Summary of Cost Comparisons Between Conventional and LID Approaches^a

Project	Conventional Development Cost	LID Cost	Cost Difference ^b	Percent Difference ^b
2 nd Avenue SEA Street	\$868,803	\$651,548	\$217,255	25%
Auburn Hills	\$2,360,385	\$1,598,989	\$761,396	32%
Bellingham City Hall	\$27,600	\$5,600	\$22,000	80%
Bellingham Bloedel Donovan Park	\$52,800	\$12,800	\$40,000	76%
Gap Creek	\$4,620,600	\$3,942,100	\$678,500	15%
Garden Valley	\$324,400	\$260,700	\$63,700	20%
Kensington Estates	\$765,700	\$1,502,900	-\$737,200	-96%
Laurel Springs	\$1,654,021	\$1,149,552	\$504,469	30%
Mill Creek ^c	\$12,510	\$9,099	\$3,411	27%
Prairie Glen	\$1,004,848	\$599,536	\$405,312	40%
Somerset	\$2,456,843	\$1,671,461	\$785,382	32%
Tellabs Corporate Campus	\$3,162,160	\$2,700,650	\$461,510	15%

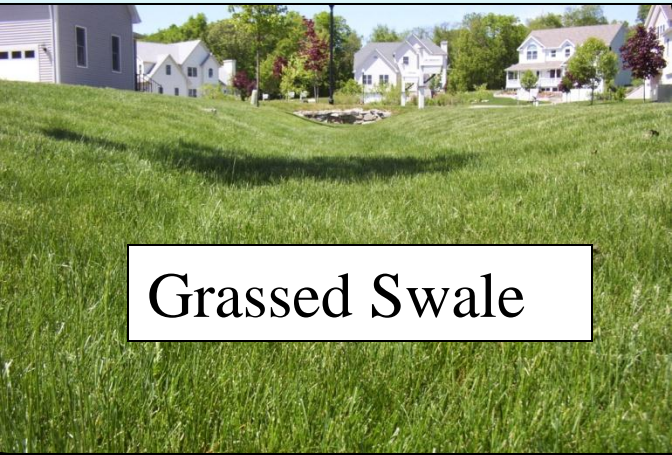
^a The Central Park Commercial Redesigns, Crown Street, Poplar Street Apartments, Prairie Crossing, Portland Downspout Disconnection, and Toronto Green Roofs study results do not lend themselves to display in the format of this table.
^b Negative values denote increased cost for the LID design over conventional development costs.
^c Mill Creek costs are reported on a per-lot basis.

Source: EPA - <http://www.epa.gov/owow/nps/lid/costs07/>

LID – Does it Work?



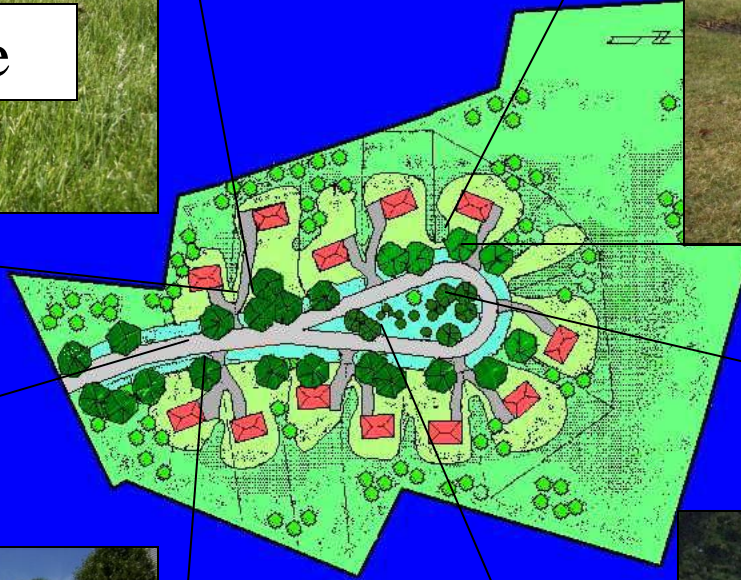
LID Best Management Practices (BMPs)



Grassed Swale



Rain garden



Permeable pavers



Bioretention cul-de-sac

LID – Does it Work?

Jordan Cove Post-Construction Monitoring Results:

- Water Quantity:
 - Traditional Subdivision: Runoff volume increased 894%!
 - LID Subdivision: Runoff volume decreased -97%!
- Water Quality:
 - Traditional Subdivision: Mass export of most pollutants increased significantly
 - LID Subdivision: Only small increases in mass export of TSS and TP (significantly less than traditional)



Photo: CT DEP

LID – Does it Work?

Jordan Cove Planning Recommendations:

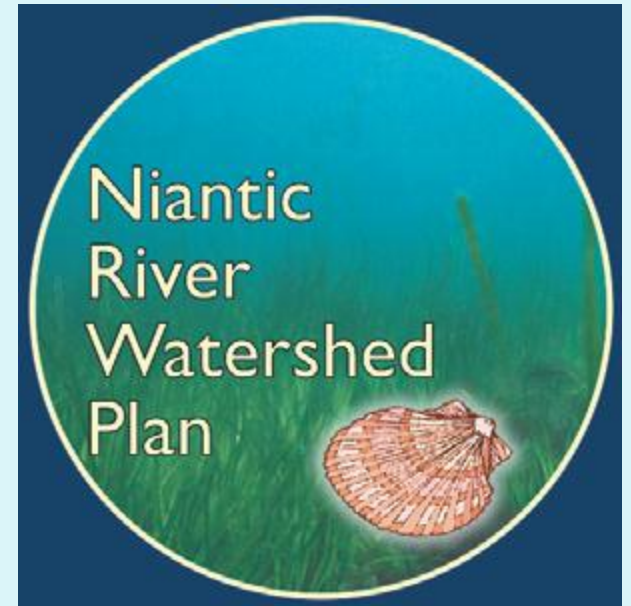
- Cluster design
 - Reduces imperviousness
- LID ordinance
 - Instead of waivers
- Stormwater disconnects
 - Reduce effective imperviousness of the site/subdivision



Photo: CT DEP

LID and the Niantic River Watershed Protection Plan

- Priority Actions include:
 - Mitigating the impacts of increased/increasing impervious surfaces from development
 - Enforcing state-of-the art stormwater practices for all development (pre- and post-development)
 - Steering developers toward and/or regulating low-impact design



LID and the Niantic River Watershed Protection Plan

- Stormwater/LID Checklist for Site Plan Review:
 - Developed by staff from all four towns through §319 Grant funding
 - Guideline for developers during the design process to minimize stormwater impacts
 - Tool for commissions during site plan review process



Photo: CT DEP

LID and the Niantic River Watershed Protection Plan

- Stormwater/LID Checklist has three parts:
 1. General watershed information
 2. Stormwater objectives and site design
 3. Treatment train practices and expected pollutant removal



Photo: CT DEP

CT DEP Watershed Management and LID Program work

- Meeting with stakeholders to implement LID and other recommendations outlined in Watershed based plans. (§319 funding)
 - Stakeholders include YOU
 - Shifting focus of NPS program to include Low Impact Development implementation
 - Supporting education, technical coordination and implementation site by site

DEP Municipal Assistance

New DEP Web Page: www.ct.gov/dep/watershed

Watershed Municipal Outreach and Low Impact Development Includes:

- LID Library – Updated periodically
- *Rainfall as a Resource* Brochures
- DEP Stormwater Program information
- LID Resources – Technical assistance and funding sources

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