




New MOST Course: Landscaping for Resilience in a Changing Climate

Regional Environmental Committee
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The logo for the Municipal Online Stormwater Training Center (most) features the lowercase letters 'm', 'o', 's', and 't' in a white, sans-serif font. The letter 'o' is replaced by a blue circular icon containing a white power symbol (a circle with a vertical line) and a blue wavy line representing water.

Municipal Online Stormwater Training Center

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COURSE CATALOG

Landscaping for Resilience
in a Changing Climate




Dig Once



Economic Ecology™



User's Guide to
Urban BMPs in the Bay



Green Infrastructure and Low
Impact Development 101



Erosion and Sediment
Control for Construction Sites



Asset Management
for Stormwater




Stormwater Financing 101



Introduction to
Local Government
Stormwater Financing



The Building Blocks of an
Effective Stormwater
Management Program



More Courses
Coming Soon



Landscaping for Resilience in a Changing Climate

- Landscape pros, non-profits, and local govt
- Developed by CBLP and Univ. of Maryland Ext.
- Featured presenters:
 - Dave Hirschman
 - Tim Stromberg



Landscaping for Resilience in a Changing Climate

- Climate Change in the Ches Bay Watershed
- Climate Impacts of Sustainable Landscape Practices
- Climate Change and Native Plants
- Climate Impacts on Stormwater
- Impacts of Climate Change at the Water's Edge




Climate Impacts on Stormwater

- More frequent extreme storms and more rain
- Design considerations
 - Use natural areas
 - Plan for increased storage volume
 - Plan for maintenance
 - Use treatment trains
 - Green infrastructure for smaller storm events

Green Infrastructure for Climate Resiliency


Climate change is impacting urban areas in many ways, from exacerbating the urban heat island effect to elevating flood risk. Build green infrastructure to help improve community resilience.

FLOODING




By the end of the century, annual damages from flooding in the U.S. are projected to **increase by 30%**.¹

DROUGHT




1 out of 3 U.S. counties in the lower 48 states face higher risks of water shortages by mid-century.²

COASTAL DAMAGE




50% of Americans live in coastal counties, where water and energy infrastructure are increasingly vulnerable to higher sea levels.³

URBAN HEAT



Climate change will likely lead to **more frequent and severe** heat waves during summer months.⁴

Green Infrastructure Builds Resiliency



- 1** Vegetation-based green infrastructure practices can mitigate carbon pollution.
- 2** Build green infrastructure like rain gardens and permeable pavement to manage flooding.
- 3** Reduce dependence on imported water and save money. Let water soak into the ground to recharge local groundwater supplies.
- 4** Keep water local. Capture runoff in cisterns and rain barrels to reduce municipal water use.
- 5** Plant trees and green roofs to mitigate the urban heat island effect.
- 6** Use living shorelines, buffers, dunes and marsh restoration to reduce the impact of storm surges.

Green Infrastructure at Work

LOWER URBAN HEAT ISLAND EFFECTS



Studies show that green roofs can **reduce the energy** needed for cooling on the floor below the roof by more than **50%**.⁵

KEEP WATER LOCAL



By capturing rain where it falls, urbanized Southern California and the San Francisco Bay area could boost water supplies by up to **200 billion gallons per year** – as much water as the city of Los Angeles uses annually.⁶

BUILD COASTAL RESILIENCY



Research suggests that **wave height can be reduced by 50%** within the first 16 feet of marsh and 95% after crossing 100 feet of marsh.⁷

MANAGE FLOOD RISK



A study in Burnsville, MN showed a **93% reduction** in runoff volume after the installation of 17 rain gardens in a 5.3 acre neighborhood.⁸

USE LESS ENERGY



Give your air conditioner a rest! One young, healthy tree can produce cooling effects equivalent to **ten room-size air conditioners** operating 20 hours a day.⁹

EPA
United States Environmental Protection Agency

For more information on green infrastructure, see:
www.epa.gov/greeninfrastructure

1. <http://antimatter.wiley.com/doi/10.1111/j.1365-3113.12043.pdf>

2. www.epa.gov/water/2013/12/22/20131222.asp

3. <http://na2014.globechange.gov/report>

4. USGCRP (2009). *Global Climate Change Impacts in the United States*. King, L.S., M. Melillo, and C.C. Peterson (eds). United States Global Change Research Program. Cambridge University Press, New York, NY, USA.

5. www.epa.gov/water/pollution/iles/GreenRoofReport.pdf

6. www.epa.gov/water/iles/water-supply-solutions-urbanwater-08.pdf

7. Knutson, P.L., R.A. Bracha, W.N. Seelig, and M. Inskeep. 1992. Wave Damping in *Spartina alterniflora* Marshes. *Wetlands*, 2:47-50.

8. www.epa.gov/water/DocumentCenter/Home/View/1519

9. www.epa.gov/trees/benefits.cfm

Impacts of Climate Change at the Water's Edge

- Higher storm surge, expanded flood zones, tidal wetlands drowning, increased polluted runoff, loss of agric lands, fluctuations in salinity, etc.
- Design strategies
 - Combine nature-based and engineered solutions
 - Connect green infrastructure
 - Emphasize the role of trees as pumps
- Example - Norfolk's Thrive Project



DEQ Continuing Education Credits

Building Blocks of an Effective SW Mgmt Program	2 hours	Inspectors and Administrators
Dig Once	1.5 hours	Inspectors and Administrators
Economic Ecology	2.5 hours	Inspectors and Administrators
ESC for Construction Sites	2 hours	Inspectors and Administrators
Green Infrastructure and LID 101	2 hours	Inspectors and Administrators
Landscaping for Resilience in a Changing Climate	2 hours	Inspectors and Administrators
User's Guide to Urban BMPs in the Bay	2 hours	Inspectors and Administrators
Asset Mgmt for Stormwater	1 hour	Administrators
Intro to Local Govt Stormwater Financing	3 hours	Administrators
Stormwater Financing 101	1 hour	Administrators