



Modeling tools can inform planning and design decisions on a range of scales from sizing green infrastructure controls such as a cisterns for a single site to developing green infrastructure scenarios for an entire watershed.

# Green Infrastructure Models and Calculators

[Links to Models and Calculators](#)

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This supplement supports Factsheet 2 in the Green Infrastructure Permitting and Enforcement Series: Combined Sewer Overflows

## Integrating Green Infrastructure Concepts into Permitting, Enforcement, and Water Quality Standards Actions

*This supplement is a companion to the U.S. EPA Green Infrastructure Permitting and Enforcement Series ([http://water.epa.gov/infrastructure/greeninfrastructure/gi\\_regulatory.cfm#permittingseries](http://water.epa.gov/infrastructure/greeninfrastructure/gi_regulatory.cfm#permittingseries)).*

*This series describes how EPA and state permitting and enforcement professionals can incorporate green infrastructure practices and approaches into National Pollutant Discharge Elimination System (NPDES) wet weather programs, including stormwater permits, Total Maximum Daily Loads (TMDLs), combined sewer overflow (CSO) long-term control plans (LTCPs), and enforcement actions. This series builds upon EPA's continued investment in green infrastructure and low impact development. Existing EPA authority, guidance, and agreements enable EPA Regions and state agencies to work with permittees to include green infrastructure measures as part of control programs.*

**For additional resources on green infrastructure, go to the EPA Green Infrastructure Web page:** <http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm>.

**Key green infrastructure guidance issued to date can be found at:** [http://water.epa.gov/infrastructure/greeninfrastructure/gi\\_policy.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm).

Depending on their structure, modeling tools can be used to inform a variety of green infrastructure planning and design decisions: from setting a green infrastructure target for an entire watershed, to designing a green infrastructure practice for a particular site. Outputs that are particularly important in informing green infrastructure planning and design include runoff volume, runoff rate, pollutant loading, cost, and other environmental benefits. This supplement provides links to a series of models that can be used to predict the performance and/or cost of green infrastructure approaches. The table also identifies the model owner, model price, and model outputs.

Table 1: Models and Calculators that Can Incorporate Green Infrastructure Control Measures

| Model/Calculator   | Owner   |
|--|---|
| <b>Bioretention, Permeable Pavement, Green Roof, and Rainwater Harvesting Models</b>           | NC State Cooperative Extension  |
| <b>Delaware Urban Runoff Management Model (DURMM)</b>  | Delaware Department of Natural Resources & Environmental Control                              |
| <b>Green LTCP-EZ</b>   | EPA   |
| <b>Green Save Calculator</b>   | Green Roofs for Healthy Cities  |
| <b>Green Values National Stormwater Management Calculator</b>                                  | Center for Neighborhood Technology  |
| <b>Hydrologic Modeling System (HEC-HMS)</b>  | US ACE  |
| <b>Hydrological Simulation Program – Fortran (HSPF)</b>  | USGS  |
| <b>i-Tree</b>  | USDA Forest Service   |
| <b>LID Quicksheet</b>  | Milwaukee Metropolitan Sewerage District  |
| <b>Long-Term Hydrologic Impact Assessment Model</b>  | Local Government Environmental Assistance Network   |
| <b>Program for Predicting Polluting Particle Passage through Pits, Puddles, and Ponds (P8)</b> | William Walker  |
| <b>RECARGA</b>   | University of Wisconsin – Madison, CEE Dept.  |
| <b>Site Evaluation Tool (SET)</b>  | Tetra Tech  |
| <b>Source Loading and Management Model (WinSLAMM)</b>  | PV & Associates   |
| <b>Stormulator</b>   | State Water Resources Control Board, UC Davis Extension, and the California Sea Grant Program |
| <b>Stormwater Management Model (SWMM)</b>  | EPA   |
| <b>Watershed Treatment Model</b>   | Center for Watershed Protection   |
| <b>WinTR-55</b>  | Natural Resources Conservation Service  |

**MORE INFORMATION ON GREEN INFRASTRUCTURE MODELING TOOLS CAN BE FOUND AT:**

[http://water.epa.gov/infrastructure/greeninfrastructure/gi\\_modelingtools.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_modelingtools.cfm)

| Freely Available?                  | Runoff Volume | Runoff Rate | Cost | Pollutant Loading | Environmental Benefits | More information  |
|------------------------------------|---------------|-------------|------|-------------------|------------------------|---|
| Yes, downloadable                  | •             |             |      |                   |                        | <a href="http://www.bae.ncsu.edu/stormwater/downloads.htm">http://www.bae.ncsu.edu/stormwater/downloads.htm</a>   |
| Yes, downloadable                  | •             | •           |      | •                 |                        | <a href="http://www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Stormwater/New/DURMM%20Release%201.0.xls">http://www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Stormwater/New/DURMM%20Release%201.0.xls</a> (Spreadsheet) <a href="http://www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Stormwater/New/DURMM_UsersManual_01-04.pdf">http://www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Stormwater/New/DURMM_UsersManual_01-04.pdf</a> (User's Manual) |
| Yes, downloadable                  | •             | •           | •    |                   |                        | <a href="http://www.epa.gov/npdes/pubs/final_form_green_ltcpez.xls">http://www.epa.gov/npdes/pubs/final_form_green_ltcpez.xls</a> (Spreadsheet)<br><a href="http://www.epa.gov/npdes/pubs/final_green_ltcpez_instructionswithpoecacomment.pdf">http://www.epa.gov/npdes/pubs/final_green_ltcpez_instructionswithpoecacomment.pdf</a> (Manual)   |
| No, members only                   | •             |             | •    |                   | •                      | <a href="http://lcc.greenroofs.org/index.php?option=com_content&amp;task=view&amp;id=626&amp;Itemid=116">http://lcc.greenroofs.org/index.php?option=com_content&amp;task=view&amp;id=626&amp;Itemid=116</a>   |
| Yes, web enabled                   | •             |             | •    |                   | •                      | <a href="http://greenvalues.cnt.org/national/calculator.php">http://greenvalues.cnt.org/national/calculator.php</a>   |
| Yes, downloadable                  | •             |             |      |                   |                        | <a href="http://www.hec.usace.army.mil/software/hec-hms/">http://www.hec.usace.army.mil/software/hec-hms/</a>   |
| Yes, downloadable                  | •             |             |      | •                 |                        | <a href="http://water.usgs.gov/software/HSPF/">http://water.usgs.gov/software/HSPF/</a>   |
| Yes, downloadable                  |               |             | •    |                   |                        | <a href="http://www.itreetools.org/index.php">http://www.itreetools.org/index.php</a>   |
| No, available on a CD for \$25 fee | •             |             |      |                   |                        | <a href="http://v2.mmsd.com/AssetsClient/Documents/stormwaterweb/PDFs/Appendix_L.pdf">http://v2.mmsd.com/AssetsClient/Documents/stormwaterweb/PDFs/Appendix_L.pdf</a>   |
| Yes, downloadable                  | •             |             |      | •                 |                        | <a href="http://www.ecn.purdue.edu/runoff/lthia/lthia_index.htm">http://www.ecn.purdue.edu/runoff/lthia/lthia_index.htm</a>   |
| Yes, downloadable                  | •             |             |      | •                 | •                      | <a href="http://www.walker.net/p8/">http://www.walker.net/p8/</a>   |
| Yes, downloadable                  | •             |             |      |                   |                        | <a href="http://dnr.wi.gov/topic/stormwater/standards/">http://dnr.wi.gov/topic/stormwater/standards/</a>   |
| Yes, downloadable                  | •             |             | •    | •                 |                        | <a href="http://www.unrba.org/set/index.shtml">http://www.unrba.org/set/index.shtml</a>   |
| No, available for \$320            | •             |             |      | •                 |                        | <a href="http://www.winslamm.com/winslamm_overview.html">http://www.winslamm.com/winslamm_overview.html</a>   |
| Yes, downloadable                  | •             |             |      |                   |                        | <a href="http://www.stormulator.com/StormUlator/Welcome.html">http://www.stormulator.com/StormUlator/Welcome.html</a>   |
| Yes, downloadable                  | •             | •           |      |                   |                        | <a href="http://www.epa.gov/nrmrl/wswrd/wq/models/swmm/index.htm">http://www.epa.gov/nrmrl/wswrd/wq/models/swmm/index.htm</a>   |
| Yes, downloadable                  | •             |             |      | •                 |                        | <a href="http://www.cwp.org/documents/cat_view/83-watershed-treatment-model.html">http://www.cwp.org/documents/cat_view/83-watershed-treatment-model.html</a>   |
| Yes, downloadable                  | •             | •           |      |                   |                        | <a href="http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/alphabetical/water/hydrology/?&amp;cid=stelprdb1042901">http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/alphabetical/water/hydrology/?&amp;cid=stelprdb1042901</a>   |





Green infrastructure manages stormwater at its source to protect receiving waters and the life that depends on them from contamination and habitat degradation.

### Green Infrastructure Permitting and Enforcement Series

*This series on integrating green infrastructure concepts into permitting, enforcement, and water quality standards actions contains six factsheets plus four supplemental materials that can be found at [http://water.epa.gov/infrastructure/greeninfrastructure/gi\\_regulatory.cfm#permittingseries](http://water.epa.gov/infrastructure/greeninfrastructure/gi_regulatory.cfm#permittingseries).*

#### **Factsheets**

1. Potential Challenges and Accountability Considerations
2. Combined Sewer Overflows
3. Sanitary Sewer Overflows
4. Stormwater
5. Total Maximum Daily Loads
6. Water Quality Standards

#### **Supplemental Materials**

1. Consent Decrees that Include Green Infrastructure Provisions
2. Consent Decree Language Addressing Green for Grey Substitutions
3. Green Infrastructure Models and Calculators
4. Green Infrastructure in Total Maximum Daily Loads (TMDLs)



For additional resources on green infrastructure, go to the EPA Green Infrastructure Web page: <http://www.epa.gov/greeninfrastructure/>.