

## SLAMM: Source Loading and Management Model

**Model Uses** Source Loading and Management Model (SLAMM) is an urban watershed pollutant source area identification and management tool.

**Major Categories** Water Quality  
Hydrology and Water Use  
Decision Support

Subject Knowledge Level  
Intermediate

**Minor Categories** Pollution  
Point Source  
Non-Point Source  
Run Off  
Management

Technical Difficulty Level  
Intermediate

**Model Type** Physical Model

Geographic in Nature?  
Semi

### **Abstract**

Source Loading and Management Model (SLAMM) is an urban watershed pollutant source area identification and management tool. SLAMM is a continuous sequential event based model that simulates rainfall runoff to analyze an urban drainage area. It can be used for various land use scenarios including residential, institutional, commercial, industrial, open space, and freeways.

SLAMM determines the runoff from a series of normal rainfall events and calculates the pollutant loading created by these rainfall events. The user is also able to apply a series of control devices, such as infiltration/biofiltration, street sweeping, wet detention ponds, grass swales, porous pavement, or catch-basins to determine how effectively these devices remove pollutants.

SLAMM is strongly based on actual field observations, with minimal reliance on theoretical processes that have not been adequately documented or confirmed in the field. SLAMM is mostly used as a planning tool, to better understand sources of urban runoff pollutants and their control. Special emphasis has been placed on small storm hydrology and particulate wash-off in SLAMM

### **Future Developments**

- Enhanced model output summary information
- Added peak-to-average ratio options to the hydrographs for both the biofilters and detention ponds (Available August 31, 2003 as version 8.6.0)
- An option to exclude a user-defined winter season from a multi-year model analysis
- An updated and simplified batch processor to allow the user to run many sub-basins at once.
- Developing a treatment train option for the control devices selected within a source area. (Tentatively available February 1, 2004)

### **Model Limitations**

All the possible controls for storm-water best management practices are not listed in the model.

### **Model Features**

- SLAMM can analyze an urban drainage area with up to 6 different land use and 14 source area types per land use.
- SLAMM's BMPs include: catch basins, swales, infiltration devices, porous pavement, wet detention ponds, street sweeping and user-defined devices.
- SLAMM can run batch mode that permits the simulation of additional sub-areas and/or different management scenarios.
- For additional wet detention pond analysis or design, SLAMM output can be entered into the DETPOND model.
- SLAMM is a continuous sequential event based model. SLAMM simulates rainfall runoff; snowmelt may be modeled with a modified rain file.
- SLAMM simulates runoff volume and loading for ten standard and six user-defined pollutants.
- SLAMM is ideally suited for pollutant source area identification and source area BMP evaluation. It is also useful for water balance studies in conjunction with DETPOND.

#### Required Data Types

##### SLAMM source areas:

Roofs

Sidewalks/Walks

Other Impervious Areas

Paved Parking/Storage

Streets/Alleys

Freeway Lanes/Shoulders

Unpaved Parking/Storage

Undeveloped Areas

Large Turf Areas

Playgrounds

Small Landscaped Areas

Large Landscaped Areas

Driveways

Other Pervious Areas

Each source area has specific data requirements, or parameters, that depend upon the characteristics of the source area and upon the source area's land use. These parameters include the area (acres), the roof slope, the drainage system connection type, the soil type, building density, and alleys. Not all parameters apply to each source area

The DOS parameter module contains six subprograms that create the parameter files needed to run SLAMM.

1. **Rain Data:** Creates files listing rainfall depths, durations, and interevent time periods from actual or stochastically generated rainfall data.

2. **Runoff Coefficient Data:** Creates files containing the data needed to calculate runoff from specific urban source areas.

3. **Particle Size Data:** Creates files describing the particle size distribution of sediment in urban runoff

#### Model Outputs

- **Output source areas by land use & outfall for each rain (complete printout):** Output consists of runoff, concentration, and loading values, by rain event, for all source areas in each land use, and outfall totals for each rain event.
- **Output source area totals and outfall summaries:** Output consists of runoff, concentration, and loading value totals for all rain events, for all source areas in each land use, and outfall value totals for entire model run.
- **Output outfall data only for each rain:** Output consists of outfall runoff, concentration, and loading values, by rain event.
- **Default option - Output outfall summaries only:** Output consists of outfall runoff, concentration, and loading value totals for entire model run.
- **Runoff & Flow Summary:** One line data summary per event.
- **Outfall Hydrograph Data** Three time increment options - 6, 15, or 60 minute. Output a component of SLAMM integration with SWMM

entering detention ponds.

**4. Particulate Solids Concentration Data:** Creates files containing the particulate solids concentration data needed by SLAMM to predict particulate solids loadings in urban source areas and land uses.

**5. Particulate Residue Reduction Data:** Creates files that determine the particulate residue loading remaining in curb and gutter delivery systems after a storm event. Data in this file will reduce the particulate loading between the total yield without drainage controls and the total yield with drainage controls.

**6. Pollutant Probability Distribution Data:** Creates files describing pollutant (ex. lead, zinc, etc.) concentrations from SLAMM source areas and land uses

**Source**

PV and Associates  
John Panuska, Wisconsin Department of Natural Resources  
USGS Water Resources of Wisconsin

**Source (URL)**

<http://www.winslamm.com/>  
<http://coastal.lic.wisc.edu/stormwater/fwwa-stormwater-gis-slammm.pdf>  
<http://wi.water.usgs.gov/slammm/>

**Hardware Requirements**

Since the model is intended to work on Windows operating systems, the minimum hardware requirements are dependent on the Windows operating system used and not on the program.

	Supported Platforms	
DOS	<input type="checkbox"/>	UNIX <input type="checkbox"/>
Windows	<input checked="" type="checkbox"/>	Macintosh <input type="checkbox"/>

**Software Requirements**

Windows

**Cost, Licensing and Availability**

SLAMM can be purchased for \$215 plus tax at [http://www.winslamm.com/purchase\\_software.htm](http://www.winslamm.com/purchase_software.htm)