



# USEPA's Future Role for the Storm Water Management Model (SWMM)

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United States Environmental Protection Agency  
Environmental & Water Resources Institute – SWMM Summit  
Reston, VA  
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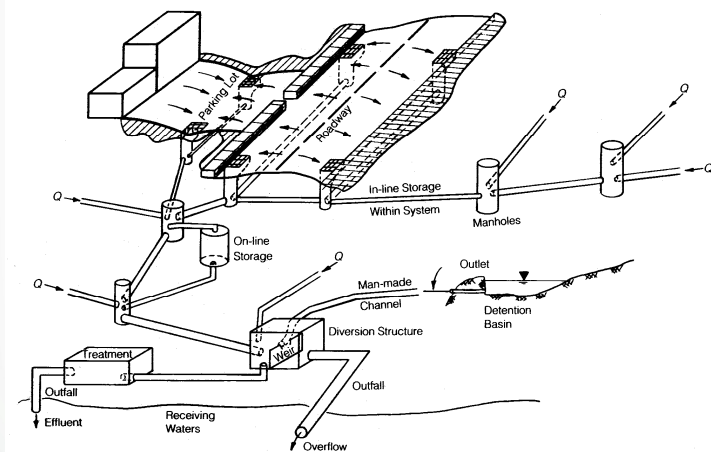


## Introduction

Michelle Simon, Ph.D. P.E.

EPA Point of Contact for SWMM

SWMM experience (2010- present)





## Talk Outline

### Advancements on SWMM

- Physics
- Program
- Advancement on SWMM Code
  - GUI
  - Multi-Thread
  - API
- Community Developed
- Protocol for the “official” EPA SWMM

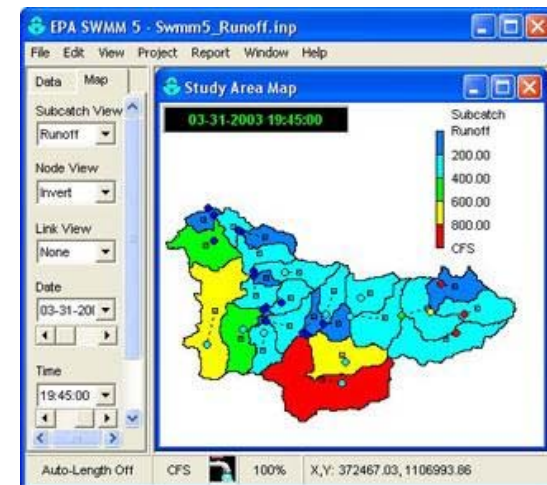


SWMM is a public domain, distributed, dynamic hydrologic - hydraulic - water quality model used for continuous simulation of runoff quantity and quality from primarily urban areas.



## Advancements to SWMM

- Physics
  - Better Water Quality
  - Sediment Transport?
  - Exfiltration?
- GUI interface with GIS
- SWMM with other public domain software
  - PEST, HSPF, WASP, SWAT, KINEROS2, HYDRUS1D





# 2016 Major Change in EPA's Approach

<https://github.com/USEPA/Stormwater-Management-Model>

## Federal Source Code Policy

[Discuss](#) | [Edit](#) | [View PDF](#)

### Introduction

#### 1 - Objectives

#### 2 - Scope and Applicability

#### 3 - Three-Step Software Solutions Analysis

#### 4 - Government-Wide Code Reuse

#### 5 - Open Source Software

#### 6 - Exceptions to Government Code Reuse

#### 7 - Implementation

#### Appendix A - Definitions

**M-16-21**

### **MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES**

**FROM:**

**Tony Scott**

**United States Chief Information Officer**

**Anne E. Rung**

**United States Chief Acquisition Officer**

**SUBJECT:**

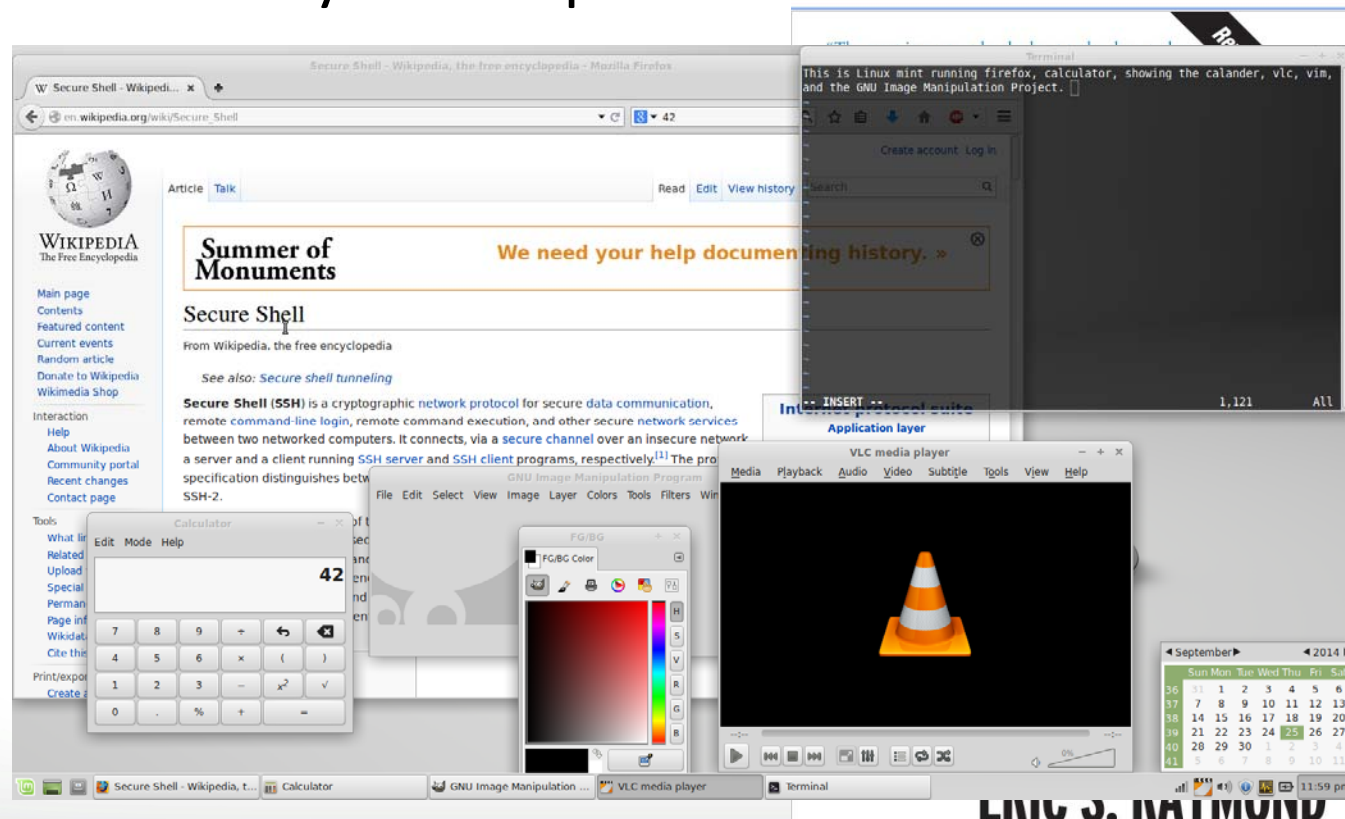
**Federal Source Code Policy: Achieving Efficiency, Transparency, and Innovation through Reusable and Open Source Software**

The U.S. Government is committed to improving the way Federal agencies buy, build, and deliver information technology (IT) and software solutions to better support cost efficiency, mission effectiveness, and the consumer experience with Government programs. Each year, the Federal Government spends more than \$6 billion on software through more than



**SWMM** always collaborative and open source

## Move to Community-Developed







## Some Existing Github Sites

- <https://github.com/USEPA/Stormwater-Management-Model>
- <https://github.com/OpenWaterAnalytics>
- <https://github.com/CHIWater/OpenSWMM>
- [https://github.com/USEPA/SWMM-EPANET User Interface](https://github.com/USEPA/SWMM-EPANET_User_Interface)
- Plus many more

## Code Development Process

- Github <https://github.com/>
- Bitbucket <https://bitbucket.com>
- Terms
  - Source Code
  - Fork / Merge
  - Git / Pull
  - Issues / Resolution
  - Contributors
  - Testing / Continuous Integration
  - Documentation
  - Communication – Gitter



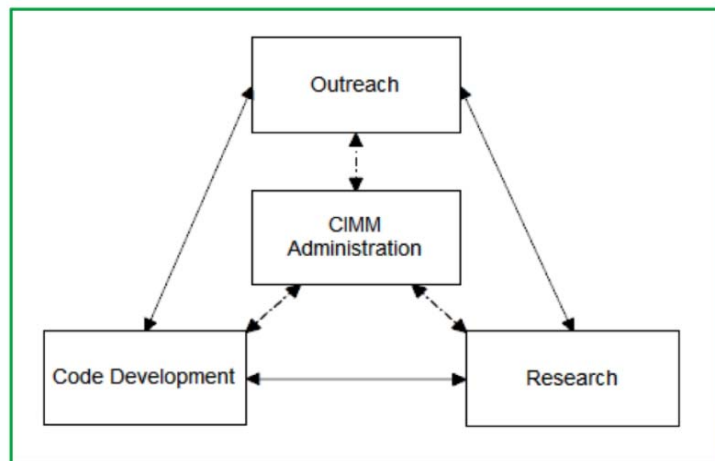




CIMM

## *Center for Infrastructure Modeling and Management*

Organized toward three major efforts



CIMM

<http://www.ncimm.org/>

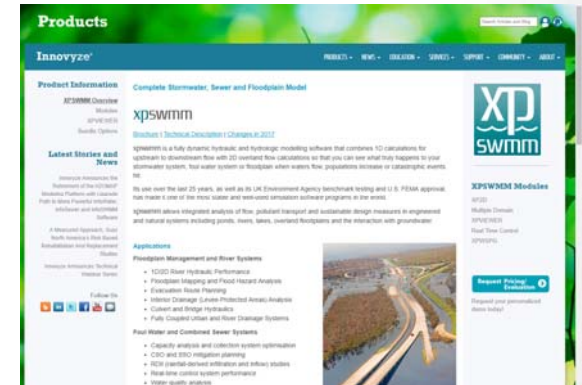
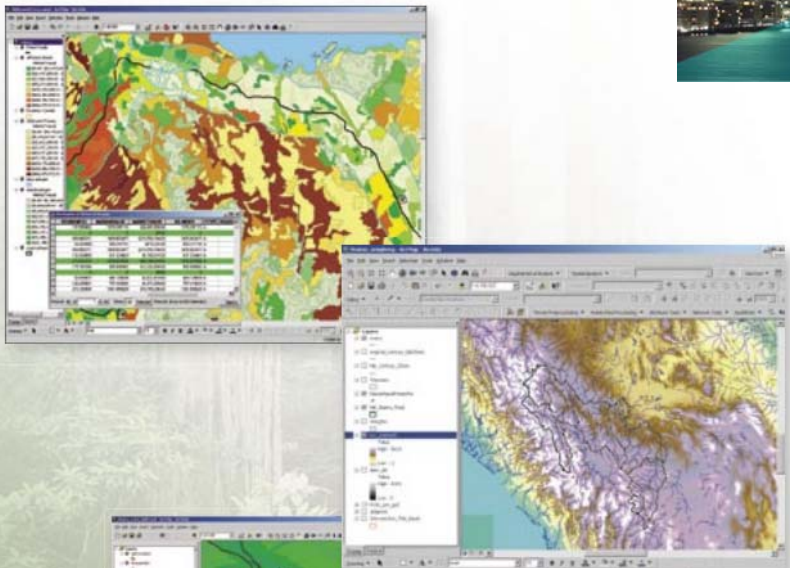
EPA Cooperative Agreement with  
University of Texas at Austin

Figure from Ben Hodge's 2/21/2018 CUASHI Talk



# Stakeholders - >33,000 downloads (2017)


ESRI® GIS Partner Solutions and Services for  
**Environmental and  
Natural Resources**






Regulators  
Communities,  
Utilities,  
Private industry,  
Consultants,  
Academia




<https://www.openswmm.org/>

 OPEN SWMM

KNOWLEDGE   CODE   RESEARCH   RESOURCES



Expand your knowledge of SWMM with the people who know it best: its users, developers and innovators.

Find and share solutions.

**SWMM KNOWLEDGE BASE** >

An easy-to-search knowledge center for EPA SWMM users that has 25 years of shared knowledge, more than 1,500 contributors and over 13,000 posts.

Understand your engine.

**SWMM CODE VIEWER** >


Browse the SWMM source code in an engineer-friendly way. View and share comments, solutions, modifications and suggestions for improvement.

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## EPA – Curator of SWMM Code

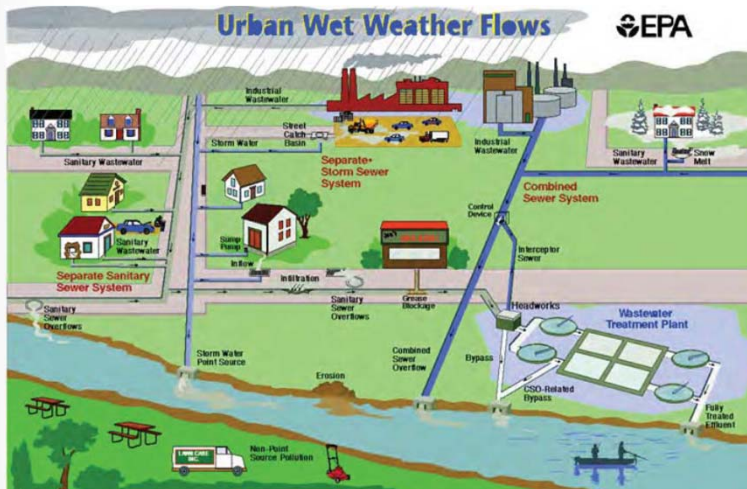
- Contribute to improving scientific aspects of SWMM
- Cooperative Agreement with CIMM
- Work with Stakeholder community
- Assist where possible with testing and ground-truthing of SWMM's numerical models and other software
- Publish an Official Version of SWMM

<https://www.epa.gov/water-research/storm-water-management-model-swmm>



Thank-you

<https://github.com/USEPA/Stormwater-Management-Model>



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<https://www.epa.gov/water-research/storm-water-management-model-swmm>



## Disclaimer

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## Extra Slides





## Why EPA Needs SWMM

Design and sizing of drainage system.

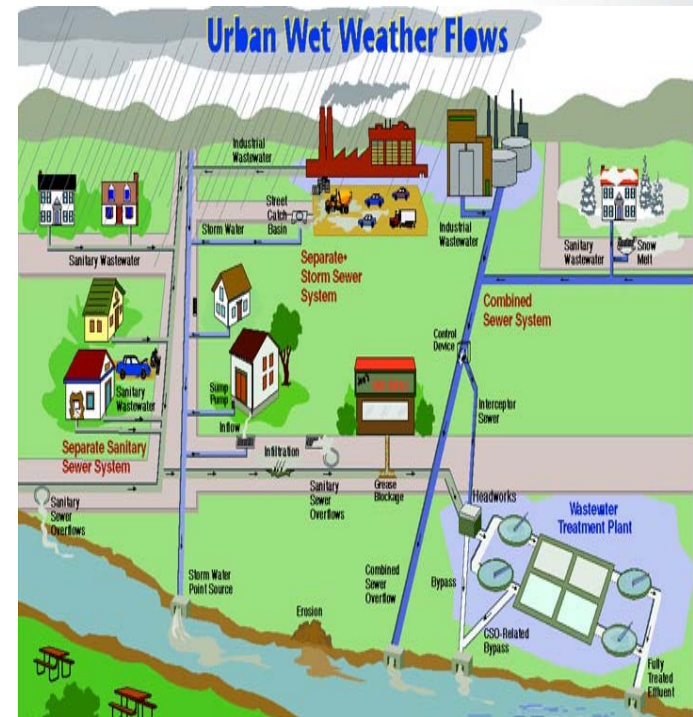
Control of combined and sanitary sewer overflows.

Modeling I&I in sanitary sewer systems.

Generating non-point source pollutant loadings for waste load allocation studies.

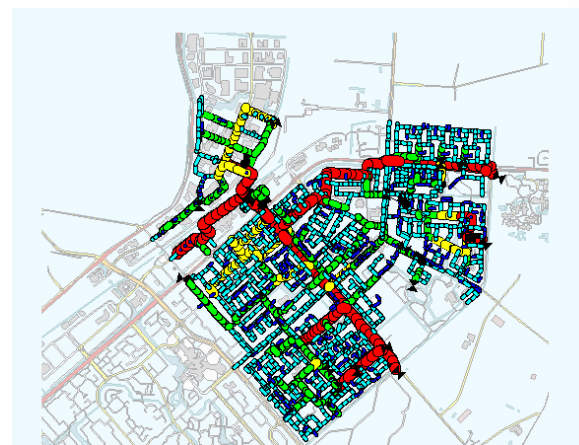
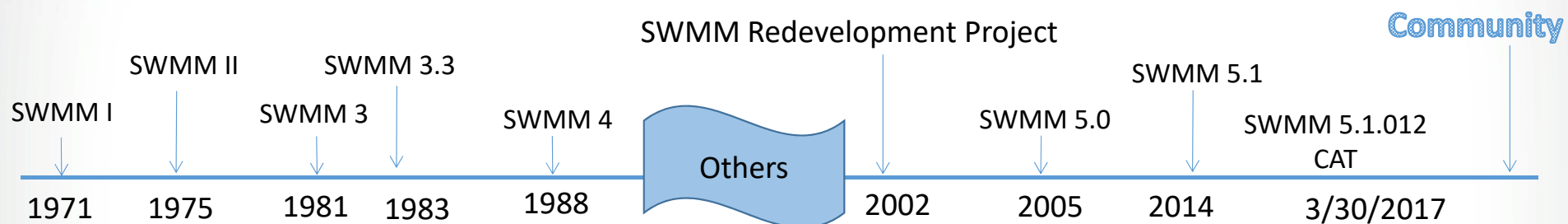
Evaluating green infrastructure

Flood plain mapping of natural channel systems.





## History of EPA and SWMM





## SWMM Development Chronology

Version	Year	Contributors	Comments
SWMM I	1971	Metcalf & Eddy, Inc. Water Resources Engineers University of Florida	First version of SWMM; focus was CSO modeling; few of its methods are still used today.
SWMM II	1975	University of Florida	First widely distributed version of SWMM.
SWMM 3	1981	University of Florida Camp Dresser & McKee	Full dynamic wave flow routing, Green-Ampt infiltration, snow melt, and continuous simulation added.
SWMM 3.3	1983	EPA	First PC version of SWMM.
SWMM 4	1988	Oregon State University Camp Dresser & McKee	Groundwater, RDII, irregular channel cross-sections and other refinements added over a series of updates throughout the 1990's.
SWMM 5	2005	EPA CDM	Complete re-write of the SWMM engine in C; graphical user interface added; improved algorithms and new features provided.
SWMM 5 - LID	2010	EPA	Explicit modeling of LID controls added.

