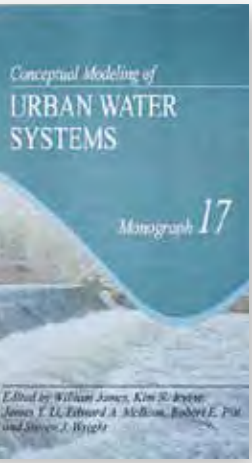
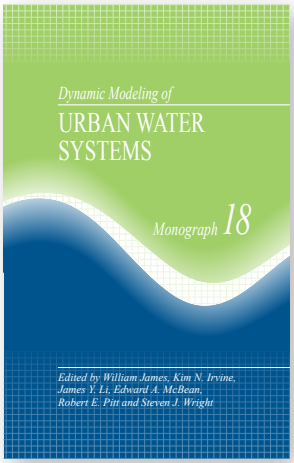
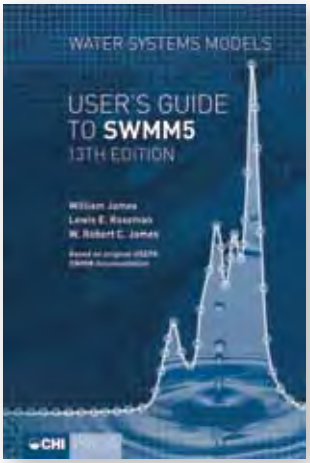
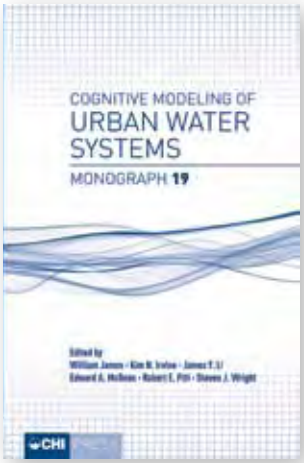
CHI PRESS

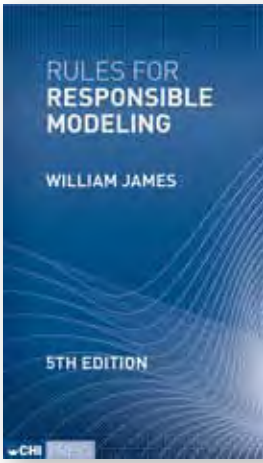
BOOKS ON
URBAN WATER SYSTEMS
AND MANUALS AND RESOURCE GUIDES FOR
SWMM MODELING











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CHI is dedicated to promoting healthier ecosystems and communities by providing the resources to simplify advanced water management and design. Over the years, CHI has printed many unique books covering various innovations and practices in water management. Our monographs, which are scholarly and informative, are written by experts in the field of urban and rural water systems planning, engineering and management. Derived from presentations at the annual Stormwater and Urban Water Systems Conference in Toronto, these books have been hardbound as an archival series since 1992. Each monograph is peer-reviewed, fully indexed and SI-US unit converted. As part of our mandate to continue the development of innovative modeling tools and techniques, CHI has also published over 200 technical papers and reports on urban drainage, most of which are available for purchase at **chiwater.com**.

CHI also publishes software manuals and practical guides for stormwater modeling, particularly with the USEPA stormwater management program.

- Available in hard and soft cover editions
- Same-day shipping
- Full index
- Conversion tables

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> **Asif Aslam, AECOM, Calgary, Alberta**

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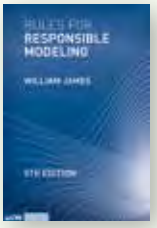
User's Guide to SWMM, 13th Ed.

January 2011

This User's guide to SWMM5 has been compiled from earlier sources as an interim measure, to bridge the gap until a complete SWMM5 manual, with theoretical background, is released. The present guide includes:

- A more narrowly-focused version (than appeared in the last edition 12, of the User's guide to SWMM 5) of the portions of the two 1988/9 user's manuals for SWMM 4, written as a guide to understanding the theory behind SWMM;
- The current SWMM 5 Manual (updated August 2010) – a practical user's guide – by Lew Rossman;
- The Stormwater Management Model Quality Assurance Report: Dynamic Wave Flow Routing by Lew Rossman;
- The SWMM Applications Manual by Jorge Gironas, Larry Roesner and Jennifer Davis, (downloaded September 2010); and
- Material derived from elsewhere, such as the SWMM Q&A archive (from the SWMM Users List).
- The text from all these sources, and indeed from the previous edition of the SWMM 5 User's guide, has been rearranged and changed. Instructions on the use of the model and cautions known to the writer(s) are included. Material in the original documentation that was deemed to be outdated or irrelevant has been deleted.
- For those who may be unfamiliar with some of the terminology used in these manuals, a Glossary is provided at the end of the volume.
- This 905-page manual has been reduced in size from the original set of EPA manuals to a single, handy, hard-cover, 6 x 9" format. Most importantly, it has been fully indexed for quick reference. Additional glossary, conversion and other tables are included.



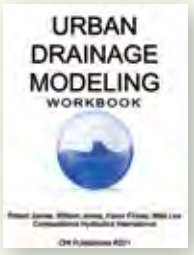
Rules for Responsible Modeling, 4th Edition

5th Edition coming in 2011

This is the fourth edition (2003) of a popular and well-used book that provides important background to the functions and attributes of the PCSWMM program. Seventeen chapters are presented and peer-reviewed for relevance and clarity. The 300-page book is presented in a beautiful, glossy, wire bound, soft cover format complete with references and glossary.

- What is a model?
- How to discretize and disaggregate
- Reliability of input parameters, data files and file management
- Optimal model complexity
- Continuous models
- Generation of long-term rain input
- Dynamic rain systems
- Decision support systems
- Objective functions
- Rules for responsible modeling
- Uncertainty analysis
- Sensitivity analysis
- State variable space
- Performance evaluation functions
- Parameter optimization and process calibration
- Fuzzy logic
- Presenting continuous uncertainty and model reliability in real time
- Conclusions and recommendations

NEW

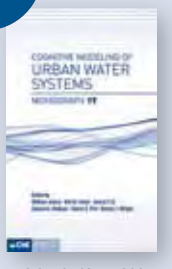


Urban Drainage Modeling Workbook

411 pages · 25 chapters
Updated every week or two

The workbook is related to the latest version of PCSWMM and SWMM. Exercises are being continuously developed, incorporated and updated, and are chosen and written to speed learning of SWMM as well as learning the special tools in PCSWMM. The workbook is written for attendees at CHI workshops, web-based workshops, as well as self-study. It includes instructions for downloading and installing PCSWMM and the associated exercise files, which are not included with the workbook, but must be separately downloaded from chiwater.com.

- Includes printouts of the PowerPoint lectures, and a suggested schedule for completing the exercises in two or three days
- Exercises covering new additions to the software (i.e. new within the preceding 12 months) are separately highlighted for the advanced one-day workshop
- Pages are printed in colour as required.
- The workbook exercises likely do not relate to later or earlier versions of the software, and therefore should be regularly replaced to keep up with the evolving technology.
- Recommended to be accompanied by two other publications: the *User's Guide to SWMM5* (approx 1000 pp) and *Rules of Responsible Modeling* (approx. 300 pp).
- Online evaluation is available for users who complete the exercises and wish to receive a CEU or CPD certificate.
- Past copies of the workbook are not provided. CHI generally does not widely disseminate the book.

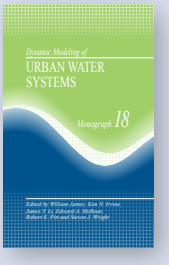


Cognitive Modeling of Urban Water Systems, Monograph 19

January 2011

404 pages · 21 chapters · Peer-reviewed
Selected from presentations at the 2010 Stormwater and Water Quality Management Modeling Conference

- Modeling Water Mains Filling Considering Air Pressurization
- Illinois Transient Model: Flow Dynamics in Combined Storm Sewer Systems
- Surges in Vertical Shafts in Stormwater Tunnels
- Effect of Sewer Cleaning Flush Waves and Water Levels
- Comparison of CFD with Reservoir Routing Models
- Vertical Temperature Profiles in a Stormwater Detention Pond
- Continuous Long-term Evaluations of Storage Treatment Stormwater Filters
- Green Infrastructure Components in a Combined Sewer Area
- Using the PCSWMM 2010 SRTC Tool to Design a Compost Biofilter
- Online Monitoring of Combined Sewer Systems
- Separating RDII Stages and Generating a Single Set of RTK Hydrographs
- RDII Unit Hydrographs for Continuous Simulation using SWMM 5
- Regression Analysis of Rainfall Derived Inflow and Infiltration
- Model Predictive Control with SWMM
- Industrial Application for Storm Water Modeling
- Prediction of Water Demands Using Artificial Neural Networks
- Kiski Valley WPCA Combined Sewer System Long-term Model Study
- Green Roof Stormwater Runoff Quality
- Low Impact Development Planning
- Advances in Floodplain Modeling and Mapping

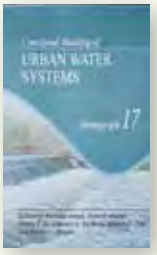


Dynamic Modeling of Urban Water Systems, Monograph 18

January 2010

544 pages · 30 chapters · Peer-reviewed
Selected from presentations at the 2009 Stormwater and Water Quality Management Modeling Conference

- Generating a Single Set of RTK Parameters for Continuous Calibration
- Phased Approach for SSO Control in Piqua, Ohio
- Unique Real Time Flash Flood Forecasting System in Martinique (France)
- Force Main Transients with SWMM5 and Other Programs
- Surge Analysis for the Proposed OSIS Augmentation Relief Sewer Tunnel
- Discrete Air Pocket Migration and Release in CSO Storage Tunnels
- Flushing Tanks in Simple Sewer Networks for In-Sewer Sediment Erosion and Transport
- Tools for Complex Collection Systems using SWMM
- Impervious Cover Variability in Urban Watersheds
- Small Storm Hydrology and BMP Modeling with SWMM5
- Modeling Low Impact Development Alternatives with SWMM
- Low Impact Development Scenarios in SWMM
- Low Impact Development for Stormwater Quantity and Quality
- Land Use Change on Sediment Erosion in the Cayuga Creek Watershed Using BASINS SWAT
- Weather Operating Strategies in a Large Sewer System
- Updating Physical Attributes of a Large Sewer System Model
- Addressing Chronic Flooding in Dynamic River System through an Ice Management Plan
- Low-Flow Modification of Flood Control Channels in Cities
- Industrial Site Spill Modeling
- Total Phosphorus Removal Model for Bioretention Systems
- High-Rate Stormwater Treatment with Up-Flow Filtration
- Honduran Imhoff Tanks: Potentials and Pitfalls
- Sustainable Financing for Municipal Stormwater Management Programs
- Hierarchical Optimization of Integrated Water Reuse Schemes
- Climate Change on the Reliability of Stormwater Infrastructure Components
- Representative Year of Precipitation for a Wet Weather Plan
- Forensic Analysis of Time Series
- Dynamic Bayesian Network Approach for Trihalomethanes for Water Supply
- Contaminant Source Identification in Water Distribution Systems
- Survival Rate Analyses of Watermains

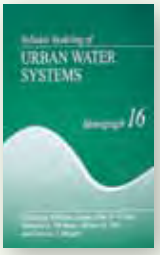


Conceptual Modeling of Urban Water Systems, Monograph 17

January 2009

466 pages · 24 chapters · Peer-reviewed
Selected from presentations at the 2008 Stormwater and Water Quality Management Modeling Conference

- Decision analysis and watershed modeling to investigate *E-coli* sources and solutions
- Applying HSPF to microbial indicator data
- Proposing a new research direction
- GIS applications for regulatory compliance
- Future channel migration from historical aerial photographs
- Stormwater management practices to provide flood protection
- Western New York stormwater coalition: compliance through collaboration
- Video processing techniques for assisted CCTV inspection and condition rating of sewers
- Multi-objective optimization decision support model for renewal planning of sewer networks
- Wet-weather sanitary system problems using computer modeling
- Storm drainage system modeling of the Edmonton Clareview and Pilot Sound Storm Basins
- Revising a combined sewer system design
- Integrating SWMM into a dam break, hurricane, and extreme flood modeling and damage assessment framework
- Surge potential in CSO tunnels
- Flow regime transition and air entrapment in combined sewer storage tunnels
- Manhole storage capacity influence on transient flow modeling during storm sewer flooding event
- Performance-based design method for urban drainage system
- Characterizing urban green roofs' stormwater run-off
- Stormwater catch-basin devices
- Flushing tanks in combined sewer networks
- Site DS-4 upper rouge tunnel system – physical model study and CSO diversion through bottom outlet slot
- On-line monitoring of drinking water distribution systems using inverse transient
- Analysis for leak detection in water distribution networks
- Network learning approach for asset management

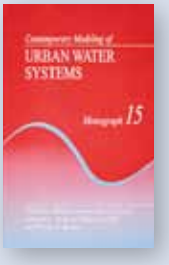


Reliable Modeling of Urban Water Systems, Monograph 16

January 2008

485 pages · 25 chapters · Peer-reviewed
Selected from presentations at the 2007 Stormwater and Water Quality Management Modeling Conference

- Interactions of phosphorus with anthropogenic and engineered particulate matter as a function of mass, number and surface area
- Overflow risk for stormwater systems
- Combined urban and rural models for integrated river management
- Hydraulic assessment of the Ganaraska River, Ontario
- Database for infield condition assessments of flood control infrastructure and prioritization of remedial action budgeting
- Minimizing erosion hazards in a dynamic river system
- Urban induced rainfall modifications on urban hydrologic response
- Integrated web-based flow monitoring and hydraulic modeling in Erie County, New York
- Integrating sewer inspection data into SWMM model calibration
- Surge modeling in sewers using alternative hydraulic software programs
- Arc Hydro: a framework for integrating GIS and hydrology
- Extrapolation of available monitoring data to facilitate long-term continuous simulation modeling
- Factors affecting scour of previously captured sediment from stormwater catch-basin sumps
- Assessing the effectiveness of proprietary stormwater treatment devices
- Characterization and comparison of sediments from four stormwater ponds
- Land development characteristics in Jefferson County, Alabama
- Modeling the stormwater benefits of green roofs in the city of Toronto
- Representation of non-directly connected impervious area in swmm runoff modeling
- Evapotranspiration and related calculations for bioretention devices
- Techniques to assess rain gardens as stormwater best management practices
- Locating leaks in water distribution systems using network modeling
- Explicit conduit storage synthesis algorithm for solving decoupled Forcemain Networks
- Determining a consistent peak flow level of control for a wet weather management plan
- Probabilistic versus regression modeling for disinfection by-products
- Determining peak flow recurrence in combined basins with limited flow data using genetic algorithm calibration



Contemporary Modeling of Urban Water Systems, Monograph 15 January 2007

578 pages · 26 chapters · Peer-reviewed
Selected from presentations at the 2006 Stormwater and Water Quality Management Modeling Conference

- Identifying and ranking R/R phenomena for evaluating stormwater models
- River bank erosion assessment by 3D hydrodynamic and sediment transport modeling
- A planning-level, system-wide model using SWMM
- Decision analyses for an urban run-off control program
- Stormwater surges in vertical shafts
- Surge modeling in sewers using the Transient Analysis Program
- Bioenergetic habitat modeling and food delivery for fish
- Reservoir operation optimization by reinforcement learning
- Upflow filtration for the treatment of stormwater
- Investigation of surcharging sewers
- Optimal design of urban drainage systems using genetic algorithms
- Flood control in downtown Ottawa
- Continuous distributed modeling of stormwater quality impacts of urban development
- Comprehensive ArcGIS-based urban drainage modeling for decision support
- CSO discharge reporting using a continuous modeling approach
- Reliability of design storms to size urban stormwater system elements
- Comparing design pipe sizes
- Modeling approach using PCSWMM to support I/I remediation
- An integrated 1D/2D modeling package for urban drainage
- Water quality modeling using fault tree method
- Stormwater databases: NURP, USGS, International BMP database and NSQD
- An efficient finite-volume scheme for modeling water hammer flows
- Identifying potential pipe failures
- Solutions to sanitary sewer system capacity deficiencies
- Assessing Phnom Penh's sewage discharges
- Spatial point pattern analysis for water mains failures in Iran
- Stormwater management and significant channel flows below the two-year return

CONFERENCE ON STORMWATER & URBAN WATER SYSTEMS MODELING

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Exchange ideas and experiences on current practices and emerging technologies

Courtyard Marriot Brampton-Toronto

Emphasis

- Hydrology
- Hydraulics
- Water quality and receiving waters
- Precipitation processes
- Runoff
- Pollutant build-up
- Washoff
- Surcharging pipe networks
- Water distribution systems
- Pollutant removal
- Impacts on aquatic ecosystems

Attendees

- Civil and environmental engineers
- Landscape engineers and architects
- Aquatic biologists
- Ecologists
- Fluvial geomorphologists
- Urban geographers and policy makers
- Professionals from municipal and government engineering
- Public works personnel
- Consultants
- Instructors and researchers at universities and research institutes

Two-day attendance earns 1.5 CEUs

45th Annual International Conference

This conference is a well-established and popular forum for engineers, scientists, and administrators involved in water pollution control and water systems design and analysis. Started in 1967 as the SWMM Users Group Meeting, it is now the recognized meeting place for enthusiasts in this field, with leading-edge presentations, high attendance, and lively discussions.

Proceedings

The proceedings are published as hard-bound monographs – peer-reviewed and closely edited for consistency and clarity – with a comprehensive index. Detailed papers make them a valuable resource. The 2011 proceedings, *On Modeling of Urban Water Systems – Monograph 20*, will be distributed at the conference and is included in the registration fee. Past volumes are also available.

Call for papers

One-page abstracts of proposed papers should be sent by **January 6, 2012 to info@chiwater.com.** Acceptance will be indicated promptly and authors advised of format requirements. The final paper is due at the conference.

Exhibit at the Conference

The conference is an excellent forum for displaying posters and exhibiting instrumentation, equipment, and products related to stormwater and water quality modeling. For more exhibitor information, please contact CHI at **519.767.0197** or **info@chiwater.com** or visit our website for details.

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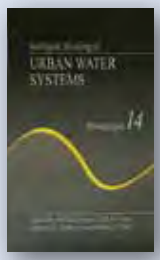
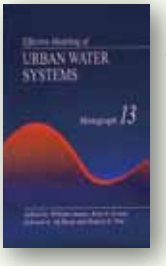


Intelligent Modeling of Urban Water Systems, Monograph 14

January 2006

602 pages · 24 chapters · Peer-reviewed
Selected from presentations at the 2005 Stormwater and Water Quality Management Modeling Conference

- Multi-objective calibration of SWMM
- Sediment transport in grass swales
- Urban water reuse management modeling
- Enhanced coagulation using Bayesian Networks
- A model maintenance tool for a system-wide model
- An overview of water quality issues in Cambodia
- Stormwater management concepts in tropical countries
- Modeling every sanitary pipe in a city: unique aspects and benefits
- High resolution rainfall information in urban run-off simulation
- Imperviousness impacts in large, developing watersheds
- Urban area dry diffuse pollutants washoff composition
- Stormwater quality modeling of cross Israel highway runoff
- Analytical and simulation approaches for assessing robustness of reliability for water distribution systems
- Modeling the reliability of water distribution systems
- Stormwater quality using the National Stormwater Quality Database
- Transient flow modeling of a 20-MGD raw water conveyance system
- Hydraulic changes to stormwater flow through wetlands
- Monitoring the performance of a construction sediment pond
- Current issues on modeling extreme inflows in stormwater pystems
- Investigation of rapid filling of empty pipes
- Allocating RDII using footing drain flow and other information
- Comparison of SWMM4 and SWMM5 results to flow monitoring data
- Minor loss coefficients for storm drain modeling with SWMM
- Assessment of unaccounted-for water in municipal water networks

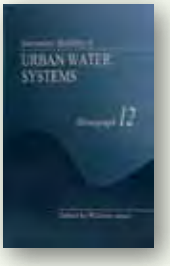


Effective Modeling of Urban Water Systems, Monograph 13

January 2005

568 pages · 25 chapters · Peer-reviewed
Selected from presentations at the 2004 Stormwater and Water Quality Management Modeling Conference

- Evaluation of stormwater improvement alternatives
- Surface infiltration rate for pemeable pavements
- ArcGIS and SWMM integration
- Flow needs for the city of Detroit through 2050
- Genetic algorithm for minimum-cost stormwater system
- Lifecycle-cost-based stormwater system design optimization
- Rapid detection of bacteria in a water distribution system
- GISRed tool for water distribution models for master plans
- Modeling water demand considering impact of climate change
- Reliability analysis review for quality in water distribution
- Continuous simulation in centralized stormwater management design for partial treatment of urbanizing watersheds
- Continuous surface runoff, groundwater and water quality modeling
- Run-time comparisons between SWMM 4 and SWMM 5
- Historical review of street dust and dirt accumulation and washoff
- Stormwater quality using the 3-parameter lognormal distribution
- Planning drainage solutions in large, multi-jurisdictional watersheds
- Normalizing raingauge network biases with calibrated radar estimates
- Rainfall accuracy using radar and raingage networks for R/R monitoring
- Impacts of rainfall data on model refinement
- Limitations of single phase models to the rapid filling pipe problem
- Calibration of BASINS HSPF for a watershed approach to CSO planning
- Continuous simulation approach for separate sewered areas
- Sources of pollutants in urban areas – older monitoring
- Sources of pollutants in urban areas – recent sheetflow monitoring

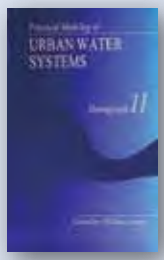


Innovative Modeling of Urban Water Systems, Monograph 12

January 2004

826 pages · 34 chapters · Peer-reviewed
Selected from presentations at the 2003 Stormwater and Water Quality Management Modeling Conference

- Urbanization impacts on Houston rainstorms
- Radar-rainfall technology and modeling projects
- Fate of pathogens in stormwater plumes
- Using SWMM Extran to simulate WWTP hydraulics
- Implementing a thermal urban runoff model (TURM)
- Thermal enrichment by stormwater
- SWMM 5 – the next generation
- GIS applications for water distribution systems
- Complex vs simple stormwater network models
- Improved parameter estimation techniques for soil storage capacity
- Modeling interaction with PCSWMM and MODFLOW in Russia
- Fluorescence spectroscopy as a tool and monitor for urban water quality
- Response to a 1:100 year rainfall event – Lethbridge flooding 2002
- SSO control alternatives in Detroit's regional collection system
- Stormwater management and BMPs at Miami international airport
- Modeling the transition of free surface/pressurized flow in storm sewers
- Simulation of urban wet weather BMPs at the watershed scale
- Collecting/examining a municipal separate storm sewer system database
- Practical flow monitoring for large modeling applications
- Statistical tests on first flush from the national stormwater database
- Design of the data translation and the testing of the SWMM 5 engine
- Automated calibration using SWMM Runoff
- Water resources open source code versus proprietary software
- Clogging of permeable pavement by street particulates and rain
- Drinking water quality and techniques for recharging an urban water system
- Sewer assessment, I/I assessment and recalibration saves millions
- Two chapters on urban litter in South Africa
- Twp chapters on hydrological modeling in South Africa
- Communicating flooding issues to the public at large
- Upgrading the Belhar stormwater system to combat pollution
- Catchment, stormwater and river management in Cape Town



Practical Modeling of Urban Water Systems, Monograph 11

January 2003

511 pages · 22 chapters · Peer-reviewed
Selected from presentations at the 2002 Stormwater and Water Quality Management Modeling Conference

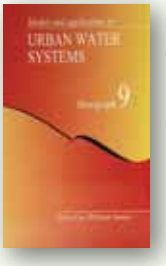
- Integrating floodplain and stormwater management
- Overcoming obstacles in applying SWMM to large-scale watersheds
- Continuous modeling for design, construction and monitoring
- Level of service evaluations for stormwater performance assessments
- Modeling for economic analysis of basement flood relief projects
- Development of a basement flooding remediation strategy
- Directing sampling based on uncertainty analysis
- Internet GIS for the water industry
- Development of long-term precipitation and infiltration records for the performance evaluation of a proposed regional tunnel
- Impacts of rainfall data on model refinement in greater Pittsburgh
- Model calibration of an urban sewer system using radar precipitation
- Infiltration through compacted urban soils and effects on biofiltration
- Stormwater quality modeling improvements needed for SWMM
- Using annual hydrographs to determine effective impervious area
- Implementating a program to prevent SSOs by reducing inflow
- Modeling sedimentation in stormwater storage facilities
- Using baffle boxes for stormwater treatment
- Surges associated with filling of stormwater storage tunnels
- Study of decomposition of grass and leaves
- Comparison of neural networks to Ormsbee's rain generation
- Curve numbers in stormwater simulation
- Maintenance of infiltration in MIC pavers with external drainage cells

Best Modeling Practices for Urban Water Systems, Monograph 10

January 2002

445 pages · 21 chapters · Peer-reviewed
Selected from presentations at the 2001 Stormwater and Water Quality Management Modeling Conference

- A tiered modeling system to satisfy multiple objectives in complex sewershed applications
- Modeling urban hydrological management scenarios at different scales
- Short time-interval rainfall disaggregation for continuous simulation
- Urban rainwater composition study
- SWMM calibration using genetic algorithms with PCSWMM
- Simulation of a combined sewer overflow storage tank
- Robustness of the Rainpak algorithm for storm direction and speed
- Improvements in urban sub-catchment runoff modeling
- Evaluation of stormwater retrofit options for Mimico creek watershed
- Quantifying pollutant reduction benefits of traditional practices
- River floatables control and continuous water quality monitoring
- A modeling system of nutrient loads to long island sound
- SSO evaluations: I/I using SWMM Runoff and Extran
- Wetlands management using GIS and multi-criteria evaluation tools
- GIS applications in inspection and maintenance of collection systems
- Modeling a flume-gravel-trench system and surrounding soils
- Modifying detention basin outlets using calibrated SWMM models
- Development of a management tool for vegetative filter strips
- Loss in capacity of water mains due to encrustation and biofouling
- Detailed representation of a large pumping station using Extran
- Web graduate courses on benign urban water systems: optimal complexity and user performance improvement.



Models and Applications to Urban Water Systems, Monograph 9

January 2001

549 pages · 27 chapters · Peer-reviewed
Selected from presentations at the 2000 Stormwater and Water Quality Management Modeling Conference

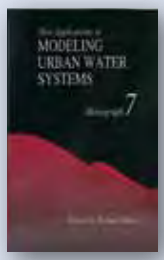
- Pollution prevention in stormwater management
- Zero discharge stormwater management
- Designing/assessing baffles for floatables control
- Reducing urban litter through catchment-based plans
- DEM applications in hydrologic modeling
- Spatial urban land use change for hydrologic modeling
- Watershed assessment using an integrated modeling approach
- Continuous modeling in stormwater management system design
- Use of SLAMM in evaluating best management practices
- Water quality management using a fuzzy inference system
- Re-oxygenation coefficient in Qual2E:a prediction methodology
- An Arcview GIS tool for SWMM
- GIS and SWMM modeling for sewer separation design
- A constructed wetland for treating glycol-contaminated stormwater
- Developing a model for basement flood relief works
- Comparing rainfall dependent I/I simulation methods
- Equivalent rainfall technique to identify DWF data for Detroit
- Accuracy assessment using dye dilution testing for flow metering
- Sizing a new CSO storage tank using continuous swmm
- Continuous SWMM for CSO notification for Detroit
- CSO modeling in New Haven, Connecticut
- Three chapters on RTC, siphon weirs and gates modeling within Extran
- Validating the rain-runoff kernel function in Runoff with PCSWMM
- PCSWMM stormwater management model for permeable pavement
- Mapping and database management in urban sewer system models

Applied Modeling of Urban Water Systems, Monograph 8

January 2000

464 pages · 21 chapters · Peer-reviewed
Selected from presentations at the 1999 Stormwater and Water Quality Management Modeling Conference

- Infiltration through disturbed urban soils
- towards smart, benign urban water infrastructure
- Wavelet techniques for rainfall data
- Parallel processing enhancement to SWMM/Extran
- Automatic calibration of the SWMM model
- Real time flow prediction using fuzzy logic models
- AM/FM/GIS applications for stormwater systems
- Environmental modeling using HSPF
- An upwardly complex water network analysis program
- Numerical techniques for overland flow from pavement
- A laboratory rig for testing runoff from paved surfaces
- Stormwater two-ramp drop structures
- Characterization of urban runoff quality
- Software for underground stormwater detention tanks
- Evaluation and improvement of a retention treatment facility system
- Hydrodynamic modeling of a stormwater pond
- Analysis/design of extended-detention ponds
- Permeable pavement option in SWMM
- Aquatic plant growth model, ECOL
- Simulation of collection and wastewater treatment plant
- EPA's urban watershed modeling activities



New Applications in Modeling Urban Water Systems, Monograph 7

January 1999

442 pages · 20 chapters · Peer-reviewed
Selected from presentations at the 1998 Stormwater and Water Quality Management Modeling Conference

- Reliability of time varying design
- Thermal enrichment of streams
- Alum treatment of stormwater
- Winnipeg CSO management study
- Inflow and infiltration into sanitary sewers
- Analytical stormwater management models
- Flood modification by unregulated wetlands
- Environmental compliance modeling with PCSWMM
- CSO floc characteristics for modeling solids in a detention basin with PCSWMM
- Detroit Water & Sewerage Department model extensions
- Parameter uncertainty and seasonal variation impacts a model
- Toxic loadings to the Detroit river from CSOs
- Model verification for the Twelve Towns drain improvement
- Real-time control of CSOs: the SWIFT model
- A GIS-based, distributed surface-runoff model
- An inherent difficulty with the unit hydrograph method
- Mass balance modeling for planning remediation techniques
- Small storm hydrology to design stormwater control practices
- GIS and water resources modeling: state-of-the-art
- The thermal enrichment of storm runoff from paved areas.

Advances in Modeling the Management of Stormwater Impacts, Volume 6

January 1998

490 pages · 23 chapters · Peer-reviewed
Selected from presentations at the 1997 Stormwater and Water Quality Management Modeling Conference

- Better stormwater management practices
- The source loading management model (SLAMM)
- Chemical criteria for airport stormwater
- Method for the evaluation of stormwater BMP
- A stormwater retrofit plan for an urban creek subwatershed
- Arcview applications in SWMM modeling
- Long-term continuous SWMM modeling of combined sewers
- Catchment modeling diagnostic tool for integrated water management
- Robust data analysis systems for urban watershed decision support
- Optimization of uncertainty, complexity and cost for CSOs
- Sensitivity-calibration decision-support for continuous SWMM
- Sensitivity and cross-calibration of continuous stormwater models
- Shallow groundwater routine for infiltration BMPs in urban models
- Infiltration/inflow for a regional sewer system model
- Combined sewer area inflow hydrograph representation
- Outfall representation in Extran using HEC-2
- Pollutants leached from four different pavements by acid rain
- High efficiency sweeping for stormwater treatment
- Annual loading estimates of selected metals and PAHs in CSOs, using PCSWMM
- Circulation and water quality model for stormwater ponds
- Estimating volume requirements for runoff storage facilities
- Impervious area curve number

Advances in Modeling the Management of Stormwater Impacts, Volume 5

January 1997

520 pages · 28 chapters · Peer-reviewed
Selected from presentations at the 1996 Stormwater and Water Quality Management Modeling Conference

- Water quality control by stormwater ponds
- Continuous time-series data management system
- Continuous simulation and statistical methods
- Modeling fecal coliform
- Management practices for base flow and erosion
- SWMM graphics
- Street sweeping can be an effective BMP
- Thermal enrichment of stormwater by urban pavement
- Infiltration through clogged porous concrete block pavers
- Pervious and impervious pavements in a parking-lot
- Tangential helicoidal-ramp inlet for dropstructures
- Uncertainties in metering stormwater flows
- Environmental approval for the Toronto storage tunnel
- Impacts and control of wet weather pollution on large rivers
- Cost effectiveness of urban runoff and CSO options
- Pollutant concentrations and loadings for CSOs
- StormTreat System installation
- Application of a mass-balance equation to an urban creek
- Total maximum daily loads for an urban water body
- Wastewater information management system
- WASP5E for phosphorus removal dynamics in a wetland
- Retrofitted extended-detention wet ponds and wetland pockets
- Techniques used in an urban watershed planning study
- USDA SCS runoff curve number for a small watershed
- Role of municipal stormwater management guidelines.

Advances in Modeling the Management of Stormwater Impacts, Volume 4

January 1996

450 pages · 18 chapters · Peer-reviewed
Selected from presentations at the 1995 Stormwater and Water Quality Management Modeling Conference

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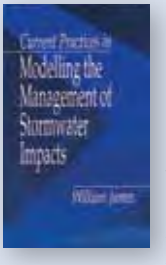
- Sophisticated stormwater quality modeling
- Calibration of SWMM-EXTRAN
- Continuous in-stream temperature modeling
- Hydrologic models for coastal flatland watersheds
- A computer mapping program for sewer systems
- Operational model development for a regional municipality
- Modeling and monitoring inflow reduction programs
- Management of time series data for long-term continuous stormwater modeling
- Neural networks, principal component analysis and universal process modeling for environmental data
- An update on consolidated frequency analysis
- Regional estimation of short-duration rainfall distribution
- Design storm events for urban drainage
- Quality control optimization of extended detention dry ponds
- Stormwater discharge permitting
- Retention of an existing wetland for stormwater management
- CSO conventional and toxic concentrations from wastewater treatment plant influent data
- Trace metals contamination of urban streams and stormwater detention ponds
- Software and database access to 1736 paper references

Modern Methods for Modeling the Management of Stormwater Impacts, Volume 3

January 1995

500 pages · 26 chapters · Peer-reviewed
Selected from presentations at the 1994 Stormwater and Water Quality Management Modeling Conference

- Global Rivers Environmental Education Network
- Educating citizens to understand runoff
- BMP planner for stormwater management plans
- Preliminary non-point source management plan
- Regional stormwater detention concept
- On-site runoff control for industrial parks
- Urban runoff control costs at Ontario RAP sites
- GIS in stormwater management
- Side-by-side comparisons of hydraulic models
- Economic evaluation of non-point source load reduction strategies
- Estimating heavy metals, total PCBs and HCB loadings with PCSWMM
- Water quality control under uncertainty
- Is there a limit to model size and complexity?
- HSP-F simulation of a constructed wetland
- Modeling the water column, sediment and biota concentrations
- Indicator bacteria-sediment relationships
- Full phosphorus cycle water quality model to Lake Champlain
- Simplified stream temperature model for urban drainage inputs
- Characteristic width and infiltration for continuous SWMM
- Combined sewer overflow monitoring plan
- Database management model for SCADAsystems
- An error-control decision support system for SWMM
- A Comparison of dual drainage modeling techniques
- Parking-lot pavements for surface water pollution control studies
- Exfiltration and filtration systems pilot/ demonstration project
- Guide to 309 papers



Current Practices in Modelling the Management of Stormwater Impacts, Volume 2

January 1994

512 pages · 25 chapters · Peer-reviewed
Selected from presentations at the 1993 Stormwater and Water Quality Management Modeling Conference

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- Weather radar and flood forecasting
- Real-time flood forecasting with GIS
- GIS-based urban drainage modeling
- the use of HSP-F in subwatershed planning
- The calibration of SWMM models
- Pollution control at a highway interchange
- Environmental concentrations of urban pesticides
- Instream flow incremental methodology for modeling fish habitat
- Developing bioretention practices for stormwater management
- Ecologically sensitive channel design for urban receivers
- Predicting in-stream water quality from watershed characteristics
- BMP planning utilizing knowledge engineering techniques
- Long-term performance modeling of stormwater quality ponds
- Continuous simulation of urban runoff quality control ponds
- Characterization of stormwater runoff from highways
- Hydraulic and pollutant modeling of CSOs using SWMM Extran
- Modeling solar thermal enrichment of urban stormwater
- Modeling and optimization methods for infrastructure rehabilitation
- Continuous simulation of urban stormwater discharge character
- A time adaptive grid on the QUAL2E water quality model
- Two methods of end-of-pipe control for CSO and stormwater
- Modified low flow frequency analysis of wastewater allocation
- Toward cost effective planning and management of water quality
- Rainfall record analysis for design storm for CSO abatement
- Guide to the 485 papers of the Kentucky symposia, 1975–1985

New Techniques for Modelling the Management of Stormwater Quality, Volume 1

January 1993

534 pages · 23 chapters · Peer-reviewed
Selected from presentations at the 1993 Stormwater and Water Quality Management Modeling Conference

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- Introduction to the SWMM environment
- An ecosystem context for the management of water and water systems
- A comprehensive stream study
- Tools to evaluate environmental, water quality and quantity issues
- A decision support system for highway runoff
- Modeling surface water quality for urbanizing watersheds
- Comprehensive urban runoff quantity/quality management modeling
- Remote sensing inputs for flash flood forecasting in urban areas
- Multiple linear regression modeling to estimate stormwater pollution
- Calibrating PCSWMM to estimate metals, PCBs and HCB in CSOs
- Microcomputer-based RTC of CSOs in an industrialized city
- SWMM4 modeling of real time control of a storm trunk sewer
- Integrating on-line weather station and water management for crops
- Quality of stormwater from residential areas
- Simulation of stormwater management pond configurations
- Continuous simulation for the assessment of infiltration basins
- Water quality modeling of a proposed reservoir
- Interactive computer aided infrastructure design and GIS - the future?
- GIS-based hydraulic model pictures the interceptor future
- Applying a GIS to assess flood hydrology of urbanizing watersheds
- Application of GIS in watershed management
- Flood plain management integrating GIS and HEC-2
- Data manipulation of GIS for modeling in resource management

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- Urban Surface Water Pollution
- On the Maximal User of Information from Scarce Data
- Discharge Measurement of Stormwater in Sewerage Systems
- Water Quality Impacts of Urban Expansion in Developing Countries
- Principles for Sustainable Management of Natural Resources
- Establishing Environmental Plans for Old Landfills
- Hydrochemical Models
- Environmental Risk Analysis
- Biofuel Alternative to Fossil Fuel Engines
- Civil Engineering and the Environment
- Controversies between Water Resources Development and Protection of Environment
- Reliability Concepts in Reservoir Design
- Optimization in Combined Use of Groundwater and Surface Water Resources
- Water Scarcity Generates Environmental Stress and Potential Conflicts
- Pilot Irrigation Project in Mali
- Some Problems Related to Modelling of Flow and Dispersion in Fractured Rock
- Beach Change Numerical Modelling
- Climatic Influence on Peak Flows in Northern Sweden
- Successful Management of Pollution Control Planning

Successful Management of Pollution Control Planning 1991

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- Sewer Rehabilitation
- Key to Successful Pollution Remedy
- How to Look at Pollutants in their Proper Perspective
- Formulation, Evaluation and Screening of Pollution Control Plans
- Wet Weather Flows and Modelling
- Monitoring and Sampling for Pollution Control Planning Studies
- Developing Solutions to Complex Environmental Problems

Pollution Control Planning 1987

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- Problem Identification and Assessment
- Field Data Collection and Management
- Outline of Analysis Techniques
- Evaluation of Alternatives
- Water Quality Modeling and the Regulation Environment
- Packaging a Pollution Control Planning Study

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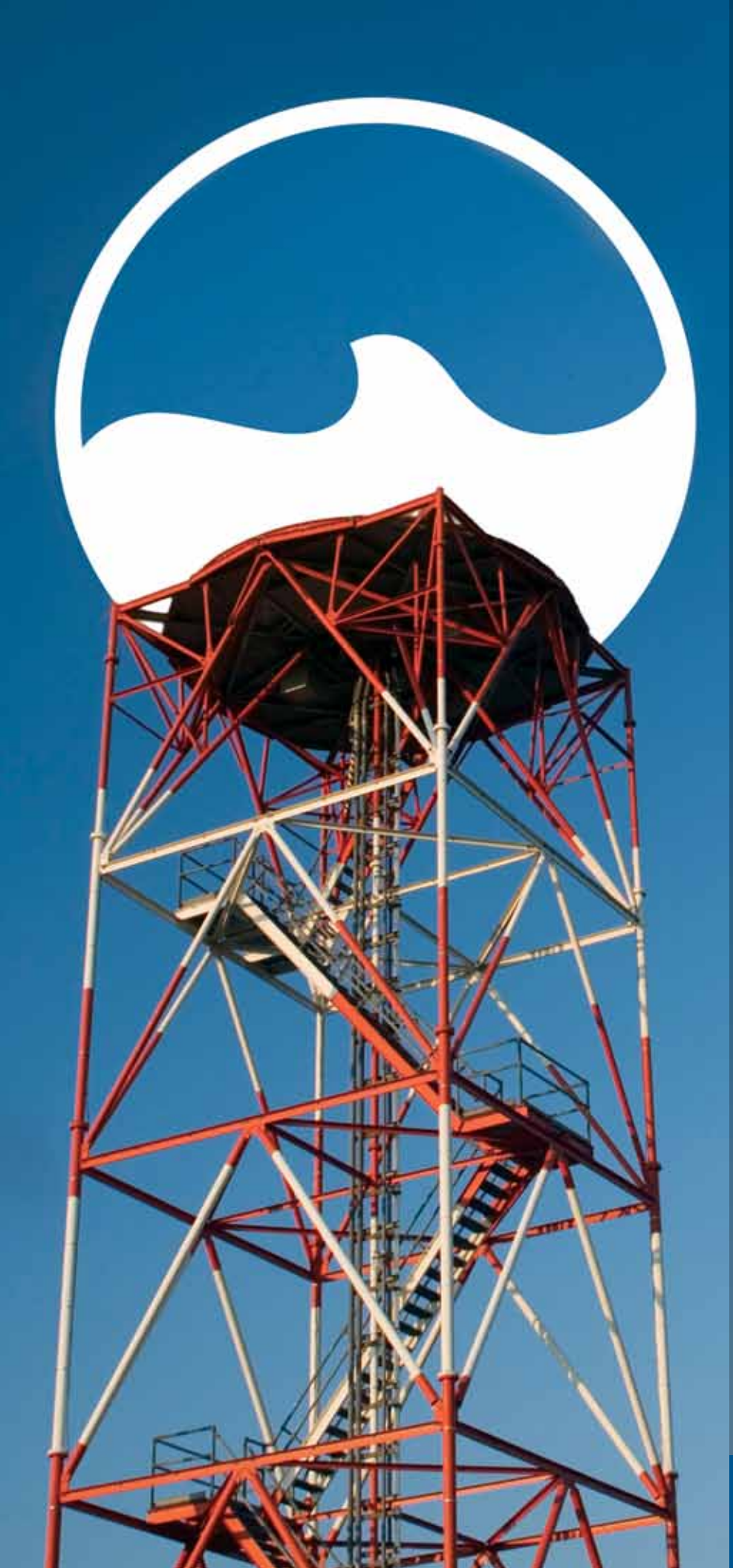
Bill and Lyn James came to Hamilton in 1971. They decided that the best way to settle into new surroundings was to undertake a project involving local history. Their pump-house research has not only taken them into every nook and cranny of Hamilton but also further afield in North America and in Europe.



About CHI

Since 1978, CHI has been devoted to developing solutions that result in bettering the quality of life through better drainage and water quality improvement. CHI's innovative technology offers engineers the tools to analyze flooding and facilitate responsible urban and natural drainage planning and design. Our solutions are easily attainable and implemented globally, promoting healthier communities, sustained ecosystems, increased bio-diversity and reduced environmental impact.

CHI is staffed by professional engineers, seasoned educators and software industry professionals armed with a wealth of industry knowledge and application development history. Highly committed to future technology development, CHI continually collaborates with our clients to perpetually improve our technology and develop new applications. Our workshops, annual Stormwater and Urban Water Systems Modeling Conference and the papers presented therein are great sources for industry information transfer. Our list serve forums and blog are also excellent networks for free idea exchange. As part of our mandate to continue the development of innovative modeling tools and techniques, CHI's staff have published over 200 technical papers on urban drainage.

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