

Annual Water Resources Conference 2008

**New Orleans, Louisiana, USA
17-20 November 2008**

ISBN: 978-1-61567-062-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© 2008 by the American Water Resources Association
All rights reserved.

Printed by Curran Associates, Inc. 2009

For permission requests, please contact the American Water Resources Association
at the address below.

American Water Resources Association
PO Box 1626
Middleburg, VA 20118

Phone: (540) 687-8390
Fax: (540) 687-8395

awrahq@aol.com

TABLE OF CONTENTS

SESSION 1: INTEGRATED WATER RESOURCES PLANNING I

To B/C or Not to B/C: Developing a Benefit/Cost Process for Storm Water Capital Improvement Projects	1
<i>M. Gustis, N. Banerjee, R. Gaddam</i>	
Quantification of the Relationship Between Environmental Benefits and Project Costs for a Major Everglades Restoration Project	2
<i>L. Hornung, A. Khan</i>	
Assessing Sustainability of Water Programs and Projects	3
<i>L. Lampe, L. Adams</i>	
Water Resources Prioritization for Local Government: Optimizing Return on Investment Using an Objective Process and Shared Vision	4
<i>A. Carlson, R. Middleton, P. Cooper</i>	

SESSION 2: WATERSHED PLANNING AND MANAGEMENT – HYDROLOGIC DATA

Trends in the Hydrological Cycle Components: an Assessment Based on Long-term Observations and Modeling	5
<i>A. Nayak, V. Sridhar, D. Marks</i>	
A Meteorological Network Design for Prediction and Recovery Efforts for a Coastal City	6
<i>M. Goel, S. S. Iyer, S. McLaughlin</i>	
The Influence of Precipitation Record Length on Watershed Management in the State of California	7
<i>S. Merayyan, S. M. Ara</i>	
Temporal Aggregation of Rainfall and Its Impact on Hydrologic Modeling	8
<i>P. Tara, R. Murch</i>	

SESSION 3: RAINFALL ISSUES AND CLIMATE CHANGE

Climate Change and Land Management Impacts on Soil Erosion across the Southern US	9
<i>S. McNulty, E. Cohen, E. Treasure, G. Sun</i>	
Can Large Water Supply Projects Be Permitted in Today's Climate	10
<i>B. Lytle</i>	
Incorporating the Implications of Climate Change Into Water Supply Planning Using the Latest Methods and Technology	11
<i>A. Hope, L. Dumas, A. Watson</i>	

SESSION 4: APPROACHES TO NONPOINT SOURCE TMDL IMPLEMENTATION

Phased Approach to Addressing a Bacteria TMDL for a South Texas Watershed	12
<i>J. Mott, R. Hay</i>	
Integrated Shellfish Bed Pathogen TMDL Development Protocol	13
<i>E. Moye</i>	
Kissimmee River Watershed: Recommendations for Data and Model Refinement from a Florida TMDL Case Study	14
<i>L. Rivera, M. F. Schmidt, S. Lu, R. Wagner, D. Gilbert, X. Gao</i>	
Innovative Nutrient TMDL for a Large Diverse Basin	15
<i>T. Amidon, J. F. Cosgrove Jr.</i>	

SESSION 5: PANEL

Waterlogged: Water in the Blogosphere..... 16
M. Campana, R. Osborne, J. Simpson, A. Brown, N. Hall

SESSION 6: MARKET BASED SOLUTION AND FINANCING

Willingness to Pay: Septic Tank to Sanitary Sewer Conversion..... 17
L. DeMouche, A. Hansen

Evidence Supporting Cap and Trade as a Groundwater Policy Option in Nebraska..... 18
C. Thompson, R. Supalla, D. Martin, B. McMullen

Conserve to Enhance: Voluntary Municipal Conservation to Support Environmental Restoration 19
S. B. Megdal, A. Schwarz, J. Bate

Economic Value of the Christina Basin in Delaware and Pennsylvania 20
G. Kauffman, L. Yayac, M. Corrozi

SESSION 7: WATERSHED PLANNING AND MANAGEMENT I

Integration of Flood Protection and Coastal Restoration Efforts in Louisiana..... 21
C. Knotts, L. E. LeBas, C. Williams

Water Conservation in Agriculture: How Much More Water Can Be Saved 22
A. Michelsen, R. Lacewell, J. Gilley, Z. Sheng, M. Chavez

Effect of Spatial Configuration of Watershed Land Use on Hydrology 23
P. Ekness, T. Randhir

Standard Error Parameter Development for Double-ringed Infiltration Procedure 24
V. Alba, K. Clancy

SESSION 8: EFFECTS OF CLIMATE CHANGE I

Hydrologic Effects of Climate Change in a Tropical, Glaciated Watershed in Peru 25
T. Randhir, M. Mazzarino

Monitoring and Evaluation of Road Removal in the Clearwater National Forests 26
R. Lloyd, A. Connor

Assessing Performance of Climate Change Adaptation Measures in the Okanagan Region 27
S. Cohen, S. Langsdale

SESSION 9: IMPACT AND MANAGEMENT OF NONPOINT SOURCE POLLUTION I

An Interstate Focus on Nutrient Criteria Development for the Red River Watershed: Database Development, Data Properties, and Preliminary Analyses 28
S. Longing, B. E. Haggard

McKenzie River Septic System Assistance Project 29
N. Toth, K. Morgenstern

Utilization of Water Treatment Residuals to Reduce Phosphorus Runoff from Land Applied Biosolids..... 30
R. Williams, P. A. Moore Jr.

Biophysical Economic Analysis of Drainage Management Systems in the Mississippi River Basin..... 31
J. Westra, A. Matekole

SESSION 10: PANEL

Sustainability: What Does it Mean to You? 32
M. F. Schmidt, A. Ravin, P. Warner, P. Gleason, L. W. Schwartz, L. Wiseman

SESSION 11: INTEGRATED WATER RESOURCES PLANNING II

Sustainability of the Everglades Ecosystem: Dependence on Streamlining Planning, Funding and Implementation Processes	33
<i>P. Warner, K. G. Ammon, P. Gleason</i>	
Planning for Change in a World of Unknowns	34
<i>S. Ritchie, K. Abusaba</i>	
Integrated Water Resources Management and Adaptation to Climate Change Impacts on Floods in Bangladesh and Nepal	35
<i>R. A. Vaidya</i>	
Increasing Uncertainty in the Integrated Water Resources Management of the Delaware River Basin	36
<i>C. Collier</i>	

SESSION 12: WATERSHED PLANNING AND MANAGEMENT II

Recharge Analyses in a Desert Groundwater Basin	37
<i>D. Stephens, T. Umstot</i>	
River Basin Management in West Africa: Status, Challenges, and Opportunities	38
<i>G. Koty, E. Nzewi</i>	
Distributed Parameter Modeling of an Arid Watershed to Assess Net Infiltration	39
<i>T. Umstot, D. Stephens</i>	
Developing a Basin-wide Water Supply Management Model	40
<i>H. Strickland, W. F. Hahn</i>	

SESSION 13: EFFECTS OF CLIMATE CHANGE II

Scenario-Based Assessment of Sea-Level Rise Impacts: A Method for Planning Under Uncertain Conditions	41
<i>K. Esterson</i>	
Long Term Adaptation to Climate Change: Infrastructure Investment in the Coastal Zone and the Drying Interior	42
<i>E. Fitch</i>	
The Climate Change Factor: Water Utilities Research and Planning	43
<i>S. Turnquist, K. Ozekin, L. Reekie</i>	
Scenario Planning under Uncertainty Using a Dynamic DSS (D2S2)	44
<i>K. O'Neil, K. Esterson, G. Kiker</i>	

SESSION 14: IMPACT AND MANAGEMENT OF NONPOINT SOURCE POLLUTION II

A Modeling Study of Impacts of Human and Natural Condition on Dissolved Oxygen in Unnamed Tributary to Pitts Creek, Accomack County, Virginia	45
<i>J. Shen, Y. Zhao, T. Wang</i>	
Impact of Groundwater Seepage Flow on the Development of TMDL for the Upper Kissimmee River Watershed in FL	46
<i>S. Lu, R. Wagner, M. F. Schmidt, X. Gao, L. Wiseman, L. Rivera</i>	
Uncertainty and Variability in Fecal Indicator Bacteria-Based Water Quality Standard Compliance and Impacts on Pollutant Loading Reduction Estimates	47
<i>A. Gronewold, M. E. Borsuk, R. L. Wolpert, K. H. Reckhow</i>	
Estimation of the Impact of Land Use Changes on Hydrology in the Occoquan Watershed, Virginia, Using a Complexly-Linked Watershed-Reservoir Model	48
<i>Z. Xu, A. N. Godrej</i>	

SESSION 15: POLICY AND MARKET SOLUTION TO WATER ISSUES

Promoting Water Resource Conflict Resolution: The Emerging Role of the Private Sector	49
<i>H. Herron, E. Blumberg</i>	
Water Management: Planning for Health and Equity	50
<i>J. T. Rolfe</i>	

Ecosystem Service Markets and Potential for Water	51
<i>A. Todd, E. Larry</i>	
Experimental Alternative Dispute Resolution for the South Saskatchewan River Basin	52
<i>D. Sheer, D. J. Eaton</i>	

SESSION 16: WATERSHED PLANNING AND MANAGEMENT III

Assessing the Impact of Development and Customizing Mitigation Practices Using a Distributed Hydrologic Model on Cypress Creek Watershed	53
<i>H. Robinson, A. Zimmer, P. B. Bedient</i>	
Watershed-Scale Riparian and Aquatic Resource Habitat Protection and Restoration Prioritization: Geospatial Solutions to Ecological Resource Challenges	54
<i>J. Monahan, W. S. Wright</i>	
Effects on Mean Annual Flow to USJRB Due to Boundary Changes in the Interbasin Diversion Unit	55
<i>T. Jobes</i>	
Tropical Storm Fay, Effective Water Management with a Major Civil Works Project	56
<i>M. Cullum</i>	

SESSION 17: EFFECTS OF URBANIZATION I

Remote Sensing Based Urban Water Stress Analysis and Drought Management	57
<i>I. Jeyachandran, M. Yan, S. Burian</i>	
Study of Water System Planning for China's Urban Areas	58
<i>M. Jiang, E. Jiang</i>	
Drainage Master Plan for Bush Intercontinental Airport	59
<i>J. Grounds, B. Shittu, T. Hiremath</i>	

SESSION 18: EMERGING CONTAMINANTS AND NONPOINT SOURCE POLLUTION

Effectiveness of Chlorination and Ozonation for Removing Organic Wastewater-related Contaminants at a Drinking-water-treatment Plant	60
<i>J. Fischer, P. Stackelberg, K. Romanok, J. Gibs, R. L. Lippincott</i>	
Evaluating Errors in the Sampling and Measurement of Solids	61
<i>C. Siu, S. E. Clark, R. Pitt</i>	
Clean Up of PCBs in the Delaware Estuary - Adaptive Implementation is the Key	62
<i>C. Collier</i>	
Practical Strategies for Emerging Microbial Contaminants	63
<i>M. Diblin, A. Shortelle, B. Jarvis</i>	

SESSION 19: NEW ORLEANS RESTORATION AND FUTURE PROTECTION

Unwatering New Orleans	64
<i>H. Winer</i>	
Designing Inland Levees for Coastal Storms: Considerations and Challenges	65
<i>T. DeMunda, J. Tabar, H. Winer, D. F. Elzey Sr.</i>	
Risk-based Analysis for the New Orleans East Polder	66
<i>M. Van Ledden, A. Bos, B. Jonkman</i>	

SESSION 20: EMERGING ISSUES

Efficiency of Small-scale, Storage Networks in India	67
<i>T. Randhir, I. Sekar</i>	
Microbiological Indicators, Frank Pathogens and Disease in Very Small Potable Water Systems	68
<i>G. I. R. Toro, P. Hunter, H. Minnigh, D. Herson, K. Verweille</i>	
Multi-Scale Variability and Water Resources Vulnerability	69
<i>S. Perveen</i>	

AFRICOM and Water: Mitigating Future Conflicts	70
<i>H. Herron, J. Singh</i>	

SESSION 21: WATER DEMAND AND DROUGHT PLANNING MANAGEMENT

Semiparametric Estimation of Community Water Demand with Instrumental Price	71
<i>D. Bell, R. C. Griffin, A. Egbendewe-Mondzozo</i>	
Drought Management in San Diego County: Regional Actions to Effectively Manage Potential Water Supply Shortages	72
<i>D. Friehauf, T. Bombardier</i>	
Weathering the Challenge of Drought Management in South Florida	73
<i>M. Meeker</i>	
Field Observations and Groundwater Modeling as Tools to Mitigate Groudwater Supply Impacts During the Removal of Milltown Dam, Western Montana	74
<i>A. Berthelote, W. Woessner</i>	

SESSION 22: URBAN STORMWATER IMPACTS

Closing the Gap in NPDES Stormwater Permitting	75
<i>C. Kilian</i>	
Floodplain Acquisition and Restoration as a Local Government Tool for Achieving Water Quality Standards and TMDL Compliance	76
<i>D. Wrye, M. Milne</i>	
Characterization of an Urban Stream for Stormwater Control	77
<i>C. Siu, S. E. Clark, K. H. Baker</i>	
Integrating Water Quality and Water Quantity into Stormwater Capital Improvement Planning in the City of Jacksonville	78
<i>D. L. Reisinger, W. T. Joyce, R. Wagner, P. R. Victor, M. F. Schmidt</i>	

SESSION 23: WATER QUALITY AND GROUNDWATER CONTAMINATION

Response of Didymosphenia Geminata to Nutrient Dosing in an Oligotrophic Stream	79
<i>B. Berdanier, P. V. Sundareshwar</i>	
Groundwater Contamination and Water Quality Trends in the Gulf Coast Aquifer of Texas	80
<i>S. Glenn, J. Lester</i>	
How Oil Recycling and Biodieesal Programs Can Protect Drinking Water Sources	81
<i>R. McElroy</i>	
Groundwater Vulnerability in Sandy Soil Under Tropical Climate Conditions	83
<i>M. Minihane, D. Freyberg</i>	

SESSION 24: LOUISIANA COASTAL RESTORATION

Quantifying Benefits of Freshwater Flow Diversion to Coastal Marshes	84
<i>S. K. McKay, C. Fischenich, R. Paille, T. Armstrong</i>	
ADCIRC Modeling of Variance in Marshland Hydroperiod Caused by Manmade Flood Protection Barriers	85
<i>H. Roberts, J. Atkinson, F. R. Clark, J. Westerink, A. Sleath</i>	
A Numerical Model Study of the Davis Pond Floating Marsh	86
<i>T. McAlpin, J. V. Letter, K. Martin</i>	
An Adaptive Hydrodynamic and Sediment Transport Model for Freshwater Diversions	87
<i>E. Karadogan, C. R. Berger, G. Brown, C. S. Willson</i>	

SESSION 25: INFRASTRUCTURE PLANNING AND IMPLEMENTATION

The Third Straw: Public Outreach for Lake Mead Intake No	88
<i>R. Rocky</i>	
Beach Sewer Tunnel Stabilization and Pipeline Replacement Project	89
<i>J. McDivitt, D. Jurich, H. M. MacDonald</i>	

Rethinking Dams: Efforts in the Midwest to Remove, Revitalize and Remake our Dams	90
<i>M. Hrzic, W. Ivarson, M. Schwar</i>	
Another Dam Solution for Another Dam Problem?	91
<i>M. Landis</i>	

SESSION 26: FLOODING AND FLOODPLAIN MANAGEMENT I

A Tale of Two Models	92
<i>M. Tomaszekwicz</i>	
Emergency Flood Management Using Computational Fluid Dynamics	93
<i>D. Judi, S. Burian, B. Okhuysen, T. McPherson</i>	
Visualization of the Floods Using Advances in Hydraulics	94
<i>A. Hannan, B. Johnson, S. Draksharam</i>	
Internet Map Serving the Hurricane Katrina Storm Tide Crest in Alabama, Mississippi, and Louisiana	95
<i>P. Turnipseed, K. Van Wilson, J. E. Hathorn Jr., D. Tyler, J. Stoker, R. R. Mason Jr.</i>	

SESSION 27: EFFECTS OF URBANIZATION II

Multilevel Models of Urbanization Effects on Algae and Fish Assemblages	96
<i>Y. K. Cha, I. Alameddine, B. Lee, R. Kashuba</i>	
Multilevel Modeling Clarifies Effects of Urbanization on Stream Macroinvertebrates	97
<i>R. Kashuba, Y. K. Cha, I. Alameddine</i>	
What is Multilevel Modeling and Why it is Effective for Analyzing the Effects of Urbanization on Stream Ecosystems	98
<i>S. Qian, T. F. Cuffney, I. Alameddine, G. McMahon</i>	
Modeling the Interactions Between Urbanization and Stream Biota	99
<i>G. McMahon, T. F. Cuffney</i>	

SESSION 28: WATER QUALITY MONITORING AND ANALYSIS

Seasonal Variation of Nitrogen Isotope Chemistry of the Mississippi-Atchafalaya River System	100
<i>A. BryantMason, Y. J. Xu, M. Altabet</i>	
Evaluating Nutrient Flux from Canals Discharging to Biscayne Bay, South Florida	101
<i>R. O. Carey, K. Migliaccio, T. Brown</i>	
A Statistical Analysis of the Effects of River Flow on Downstream Water Quality in the Lower Roanoke River, North Carolina	102
<i>C. Wu, S. Cibik, M. Gerath, J. Cassada, M. Woolfolk, M. Lebo</i>	
The Savannah Harbor ReOxygenation Demonstration Project	103
<i>M. Tanner, S. Davie, T. Kinnard, L. A. Neal, H. Moorer</i>	

SESSION 29: PANEL

Coastal Restoration and Protection Effort in Louisiana - How Do You Keep America's Premier Below Sea Level City from Drowning?	104
<i>S. Mathies</i>	

SESSION 30: PANEL

State Water Resources Plans: Expensive doorstops or Valuable Tools?	105
<i>B. Bateman, D. R. Haller, C. Collier, J. E. Kundell, L. Beutler</i>	

SESSION 31: FLOODING AND FLOODPLAIN MANAGEMENT II

Incorporating Coastal Storm Processes in Southern Louisiana Parish FIRMs	106
<i>J. Mason</i>	

Stability and Failure of Vegetation in Arid Regions	107
<i>S. K. McKay, C. Fischenich, M. Stone, K. Acharya, J. Goreham</i>	
Impacts of Channel Morphology Data Automation on Wide-Area Flood Inundation and Infrastructure Analysis	108
<i>D. Judi, A. Kalyanapu, S. Burian, A. Gilliland, T. McPherson</i>	
Accounting for the Effect of Reservoirs in Flood Risk Assessment	109
<i>L. Garrote, A. Sordo, F. Martin-Carrasco, A. Jimenez</i>	

SESSION 32: EFFECTS OF URBANIZATION ON WATER RESOURCES I

Selection of Sediment Transport Functions for St. Thomas Guts	110
<i>W. Silva-Araya, G. G. Medina, R. Ruiz</i>	
Flood and Drought Management for Resort Planning in Central Vietnam	111
<i>V. Lee, S. Asselin</i>	
Water Sensor Time Series Validation Using a Parity Space Method	112
<i>P. Hudson, E. Quilty, T. Farahmand</i>	
Sediment - Bacteria Dynamics in Construction Site Detention Ponds	113
<i>C. Sawyer, J. Hayes, W. R. English, L. Jolley, C. Post</i>	

SESSION 33: WATER QUALITY MONITORING

Trend Analysis of Water Quality Data of Lake Houston	114
<i>A. Teague, B. Buzcu-Guven, P. B. Bedient</i>	
A Malmquist-Based Water Quality Index (WQI)	115
<i>R. Confesor, G. Whittaker, R. Fare, S. Grosskopf</i>	
High-Frequency In-Situ Nitrate Measurements using Commercial Sensors Based on Flow-Injection Analysis and UV Spectroscopy Technology	116
<i>T. Rayfield, R. G. Thomas, J. Gullely, J. J. Delfino, J. Martin, M. Cohen, J. Heffernan</i>	
Dissolved Oxygen Dynamics and Hypoxia in Shallow Estuaries: Findings from High-frequency Field Water Quality Monitoring Practices	117
<i>T. Wang, H. Wang</i>	

SESSION 34: LOWER MISSISSIPPI FLOOD CONTROL

Flood Protection Impacts in the Lake Pontchartrain System	118
<i>K. Martin, T. McAlpin, J. N. Tate</i>	
Storm Surge Propagation in the Lower Mississippi River	119
<i>R. Martyr, M. Hope, C. Dietrich, J. Westerink, J. Atkinson, H. Roberts, C. Szpilka</i>	
Robust Modeling Leads to Improved Feasibility	120
<i>R. Graham, A. J. Risko, D. F. Elzey Sr.</i>	
New Orleans and Vicinity, Perimeter Hurricane Protection Pump Stations Design	121
<i>R. Ivarson</i>	

SESSION 35: WATER RIGHTS AND COMMUNITY EMPOWERMENT

The International Law of Transboundary Aquifers	122
<i>J. Dellapenna</i>	
The Yellow River Law: A Proposed Framework for Integrated River Basin Management	123
<i>G. McMahon, I. Hannam</i>	
The Community is the Key - Generating Environmental Data with Communities	124
<i>H. Minnigh, G. I. R. Toro, B. Christian, M. Brinson, H. Hertler</i>	
Potable Water and Empowerment for the Epera Indians	125
<i>M. Campana</i>	

SESSION 36: FLOOD FORECASTING AND WARNING

Advanced Flood Alert System with Hydraulic Prediction for a Major Evacuation Route in Houston	126
<i>Z. Fang, P. B. Bedient</i>	

Times-Series River Runoff Forecasting: Case of the Upper and Inland Niger River Basin	127
<i>G. Koty</i>	
Comparison of 1-D and 2-D Models for Floodplain Flow	128
<i>R. Clarke</i>	
Teach an Old Dog a New Trick: Using the Palmer Drought Severity Index to Predict Rising and Falling Lake Levels	129
<i>D. A. Moulton, C. Dabbs Jr., P. Post, R. P. Schreiber</i>	

SESSION 37: EFFECT OF URBANIZATION ON WATER RESOURCES II

Trust, Learning and Success of Regional Watershed Partnerships	130
<i>L. Mandarano</i>	
Challenges of Drainage Improvements in Old Residential Neighborhoods	131
<i>A. Salazar, S. Eubanks</i>	
Urban Landscape and Climate Influences on Urban Water Cycle	132
<i>I. Jeyachandran, S. Burian, N. Augustus, E. Pardyjak, P. Ramamurthy, C. Forster</i>	
The National Estuary Program: Pathways and Roadblocks to Collaboration and Implementation	133
<i>B. Ashburn</i>	

SESSION 38: SEDIMENTS, NUTRIENTS, AND COASTAL ISSUES

Storm Protection Benefits of Barrier Island Restoration	134
<i>A. Sleath, M. Cialone, T. McAlpin</i>	
Analysis of Current and Historical Sediment Loads in the Mississippi River to Support Restoration of the Delta	135
<i>O. P. Harmar, N. Clifford, C. Thorne, K. Knuuti, C. Watson, D. Biedenham, R. Measures, R. Harpin</i>	
Changes in Streamflow and the Flux of Nutrients	136
<i>W. Battaglin, B. T. Aulenbach</i>	
Sediment Ecosystem Restoration	137
<i>T. Kryzak</i>	

SESSION 39: GIS, REMOTE SENSING AND MODELING

Virtual Watershed	138
<i>C. Lant, S. Kraft, J. Beaulieu, J. Nicklow, S. Soman, G. Misgna, R. Sengupta</i>	
Incorporating Root Zone Soil Moisture Using Two Modeling Approaches and a Data Assimilation Technique in Different Climatic Divisions of Nebraska	139
<i>V. Sridhar, S. Sinnathamby, A. Nayak, K. G. Hubbard</i>	
Developing a GIS-Based Suitability Model for Rural Water Supply in Rwanda	140
<i>M. Baber, K. Noble-Goodman</i>	
Radar Estimations for Assessing Runoff in the Delaware Watershed	141
<i>R. Ruggles, C. Kelleher</i>	

SESSION 40: MEETING FUTURE WATER DEMANDS II

Building a Framework for Sustainable Allocation of Water Resources	142
<i>J. Wells, P. VanBuren</i>	
A Preliminary Screening Methodology for Water Supply Reservoirs	143
<i>T. Kinnard, M. Tanner, T. Reifenberger, D. Sample</i>	
Impact of Lateral Flow on Open Channel Flow	144
<i>R. Ruggles</i>	

SESSION 41: FLOODING AND FLOODPLAIN MANAGEMENT III

Coastal Hazards in Louisiana	145
<i>G. Simon, M. DelCharco</i>	
Estimation of Streambank Lateral Migration and Erosion Hazard Boundaries	146
<i>B. Phillips</i>	

St. Petersburg Flood Protection Barrier	147
<i>D. Edwards</i>	
Flood Control Study for Rio de la Plata, Puerto Rico	148
<i>M. Delcharco, J. Hashtak, R. Parab</i>	

SESSION 42: WATER SUPPLY ISSUES

Meeting Future Needs: Looking for Storage in Unusual Places	149
<i>N. Parulekar</i>	
The Quest for Long-Term Water Resource Planning	150
<i>S. B. Megdal, A. Lien</i>	
Water Requirements for Energy Generation: Opportunities for Combined Efficiencies	151
<i>L. Lampe, R. Hayslett, K. Reedy</i>	
Groundwater Management and Administration Incorporation into States' Water Laws	152
<i>L. Stadjuhar, K. Wynne</i>	

SESSION 43: PATHOGENS SOURCE AND CONTROL IN WATERSHEDS

Using Microbial Source Tracking and HSPF to Improve Bacterial TMDL Analyses	153
<i>M. Morrison, O. Shanks, J. V. Bonta, K. G. Field</i>	
An Evaluation of Dual Bacteria Indicators for Urban Storm Water Control	154
<i>A. Bennett</i>	
Treatment of Stormwater Runoff at Public Bathing Beaches	155
<i>J. Hiller</i>	
Evaluation of Urban Sources of Bacteria in the Middle Santa Ana River Watershed	156
<i>S. Wolosoff, R. Meyerhoff, T. Lo</i>	

SESSION 44: PANEL

Dredged Material Management: from the Open Water to Mine Reclamation, Wetlands Construction and an Operational Outlook for Louisiana	157
<i>D. Grubb</i>	

SESSION 45: MEETING FUTURE WATER DEMAND III

Integrated Surface and Ground Water Model for Conjunctive Water Resource Manage	158
<i>J. Engel, A. MacEwan</i>	
Water Supply Portfolio Development for Future Management in the San Francisco Bay Area	159
<i>L. Dumas, A. Hope, M. Tobin</i>	
Water Demand Forecasting for a Sustainable Residential Development in California	160
<i>E. Flegel, A. Dutton</i>	
Optimization of Reservoir Operations to Meet Multiple Water Supply Demands in Puerto Rico	161
<i>R. E. Frias III, G. Miller, P. Standish-Lee, P. M. Garcia, A. Quinones</i>	

SESSION 46: STORMWATER MANAGEMENT LID BMPs

Do We Really Need Another Model: Designing a Tool to Assess the Effectiveness of Best Management Practices	162
<i>A. Moore, W. Wilkerson</i>	
Evolution of the Beaufort County BMP Manual	163
<i>R. Wagner, R. Klink, D. Ahern</i>	
Impacts of Urban Runoff on Rain Gardens Planted with Native Vegetation vs Cool Season Turf Grass	164
<i>T. Short, K. Clancy, L. Werner, C. Wallschalger</i>	
Regenerative Stormwater Conveyance - An Innovative Approach to Open Channel Conveyance of Stormwater	165
<i>T. Brown, J. Berg, K. Underwood</i>	

SESSION 47: SOURCE WATER PROTECTION

Raisin Region/South Nation Source Water Protection Region - Eastern Ontario Esker Characterization Project	166
<i>N. Farrell, S. Mancini</i>	
Development of Pesticide Tracking Methodology for Source Water Protection Programs	167
<i>S. Nash, J. Smith, E. C. K. Moran</i>	
From Forest to the Faucet: Connecting Forests, Water, & People	168
<i>A. Todd, M. Barnes, R. Whitney, P. Barten</i>	
Evaluating Nonpoint Sources of Pollution Activities and Prioritizing Drinking Water Source Protection Efforts	169
<i>K. Morgenstern</i>	

SESSION 48: RIPARIAN AND AQUATIC ECOSYSTEM RESTORATION

Integration of Hydrodynamic, Water Quality, and Habitat Modeling to Evaluate Oyster Restoration Alternatives in the Neuse River Estuary	170
<i>Y. Plis, C. R. Wilson, J. M. Hazelton, G. D. Sousa</i>	
River Bottom Restoration and Enhancement Plan	171
<i>M. Homza, W. S. Wright, R. Richardson</i>	
Developing Alternatives for Fish Passage at the Belvidere Dam (Belvidere, IL)	172
<i>H. Schwar</i>	
Effect of Mountain Pine Beetle Infestation on Water Supply	173
<i>L. Stadjuhar, K. Wynne, M. McHugh, M. Bliss</i>	

SESSION 49: GIS, REMOTE SENSING, AND HYDROLOGIC DATA SETS

GIS Based Spatial Precipitation Estimation Using Raingauge Data and NEXRAD	174
<i>X. Zhang, R. Srinivasan</i>	
Information Infrastructure for the Conserve Florida Water Clearinghouse Digital Library	175
<i>L. Ziemba, H. W. Beck</i>	
The National Hydrography Dataset	176
<i>J. Simley</i>	
Remotely Sensed Data Fusion for Soil Moisture Prediction Using Relevance Vector and Support Vector Machines	177
<i>B. Zaman, M. Mckee</i>	

SESSION 50: WATER QUALITY TRADING AND EFFECT OF URBANIZATION

Encouraging the Use of Wetlands in Water Quality Trading Programs	178
<i>M. T. Heberling, J. H. Garcia, H. W. Thruston</i>	
Economic and Ecological Perspectives on the Design of Water Quality Markets	179
<i>J. Shortle, R. Horan</i>	
Point/Nonpoint Trading: Can it Work?	180
<i>M. Ribauda</i>	
Modeling of Weeks Bay Watershed for Assessing Impacts of Land Use/Cover Changes	181
<i>H. V. Singh, L. Kalin</i>	

SESSION 51: STORMWATER MANAGEMENT BMP PERFORMANCE

Is Your Design Manual Presuming Too Much?	182
<i>A. Black, P. Bloch</i>	
Simulating Stormwater Treatment Performance of Man-made Lake BMPs	183
<i>R. Rovanssek</i>	
Assessing Hydrodynamic Separators Under High Water Flow Conditions	184
<i>D. Saddoris, O. Mohseni, J. Gulliver</i>	

Combination of Two Existing Groundwater/Surface Water Models to Illustrate the Effects of a Proposed Development	185
<i>D. A. Moulton, R. P. Schreiber</i>	

SESSION 52: STREAM CHANNEL PROCESSES

Hydraulic Carving as a Stream Restoration Technology: CF Industries DB-2 Case Study	186
<i>K. Warner, J. Kiefer, M. Marshall</i>	
Sediment Transport Characterization for Bridge Crossing Design or Maintenance	187
<i>J. Newlin, P. Johnson, A. Miller, K. Fecko</i>	
An Assessment of Downstream Changes in Transport Capacity of South Boulder Creek, Colorado As a Result of River Diversions	188
<i>K. Wynne, J. Pitlick</i>	
Creating Stable Waterway Transitions at Bridges	189
<i>P. Johnson, J. Newlin, S. Sheeder</i>	

SESSION 53: RIPARIAN BUFFER AND STREAM ECOLOGY

Abiotic Factors Structure Native Fish Assemblages in an Urban Stream	190
<i>A. Ficke, L. C. Bergstedt, D. C. Conklin Jr., J. W. Chadwick</i>	
Nutrient Biochemistry and Microbial Activity in the Upper Mississippi River Basin: Stoichiometry and Downstream Patterns	191
<i>B. Hill, C. Elonen, T. Jicha, D. Bolgrien</i>	
Streamside Management Zones and Water Quality in the Virginia Piedmont	192
<i>A. Dolloff, W. Lake, M. Aust</i>	

SESSION 54: SURFACE WATER AND GROUNDWATER INTERACTION

Effects of Groundwater Pumping on the Regulated Stream Flow in an Arid Region	193
<i>Z. Sheng, Y. Liu, E. Herrera</i>	
Simulation of Anthropogenic Effects on Hydrologic Cycle in Changjiang and Yellow River Catchments, China	194
<i>T. Nakayama</i>	
Development of Minimum Flows for the Rainbow River, a First Magnitude Spring System in Southwest Florida	195
<i>A. Munson, M. Kelly, D. Leeper, J. Morales, J. Hood</i>	
Calibration of an Integrated Surface Water Groundwater Model in a Low-lying Area in Florida	196
<i>M. Walters, J. L. Greco III</i>	

SESSION 55: WATER CONSERVATION

Conserving Water in the Urban Landscape Through Application of Soil Moisture Sensors for Irrigation	197
<i>K. Migliaccio, M. D. Dukes, S. M. Gutierrez, L. Vasquez, M. Balbin</i>	
Use and Perception of Graywater in Berkeley, CA	198
<i>C. Khong, K. Cushing</i>	
Every Little Bit Helps: Developing Integrated Water Resource Alternatives in Lake Arrowhead, CA	199
<i>P. Charles</i>	
Statistical Analysis of Utility Per Capita Water Demand in the Southwest Florida Water Management District	200
<i>J. Yingling, G. John, J. Whitcomb</i>	

SESSION 56: STORMWATER MANAGEMENT LOW IMPACT DEVELOPMENT

Design Scenarios for Low Impact Development in Ultra-Urban Watershed-Scale Redevelopment Projects: Case Studies from Boston's Charles River	201
<i>S. Hurley</i>	

Using Modeling Results to Improve Future Management: The Case in the Clinton River Watershed - Part II	202
<i>S. Pennington, S. Job</i>	
Solar Power Plants – a Natural Match for Water Distribution Facilities	203
<i>G. T. Sheehan, R. Holz, D. Herman, A. Begley, S. Hetznecker</i>	
LID Decision Making to Model Treatment Train Impacts on Runoff and Water Quality	204
<i>J. Hayes, S. J. Klaine, C. Sawyer</i>	

SESSION 57: IMPACTS AND MANAGEMENT OF AGRICULTURAL SOURCES

The Non-point Source Pollution in the Portneuf Watershed: Modeling with SWAT	205
<i>S. Sinnathamby, V. Sridhar</i>	
Can the Adoption of Environmental Management Systems on Animal Feeding Operatinos in the Upper Mississippi River Basin Decrease Nutrient Loadings into the Gulf of Mexico	206
<i>T. Davenport, A. Corro, B. A. Kirschner</i>	
The Lake Okeechobee Fast Track (LOFT) Project - A Watershed Approach to Phosphorus Removal for a Complex System	207
<i>M. F. Schmidt, W. K. Taylor</i>	
Reducing Tri-County Agricultural Area Pollutant Loads to the Lower St Johns River in Florida	208
<i>S. Wood, B. K. McLane, P. L. Way, A. Steinmetz</i>	

SESSION 58: WETLANDS RESTORATION, PROTECTION AND DESIGN

Urban Wetland Restoration in Southwest Florida	209
<i>J. Murray, C. Dabbs</i>	
Wetland Restoration in South Florida	210
<i>J. Duncan, M. Schwar, M. Hrzic</i>	
Sustainable Golf in Wetland Communities: An Asian Perspective	211
<i>S. Dulong, T. K. Soe, D. Gallacher, K. Myers</i>	
Analytical Estimation of Water Surface Profiles in Stormwater Treatment Areas	212
<i>M. Chen, J. Ladner, L. Wiseman, L. Schwartz</i>	

SESSION 59: PANEL

Extreme Environment Makeover: Florida's Model Approach to Water Quality Improvement and Environmental Restoration	213
<i>C. A. Wehle, T. W. Olliff, K. G. Ammon, T. Strowd</i>	

SESSION 60: COMMUNITY INVOLVEMENT AND WATERSHED PLANNING

Kentucky Institute for Watershed Management Support	214
<i>A. Storey, A. Ernest, J. Fattic</i>	
The White Clay Creek State of the Watershed Report	215
<i>M. C. Narvaez, G. Kauffman, A. Homsey, M. Nelson, E. Farris</i>	
Developing a Regional and Carbon Neutral Water Supply for the Monterey Area	216
<i>R. Alameda</i>	
Protection of Ground Water and Dependent Aquatic Ecosystems During a Two-decade Long Tunnel Construction Project in a Complex Hydrogeologic Setting in Southern California	217
<i>J. Chatoian, N. Berg</i>	

SESSION 61: STORMWATER MANAGEMENT AND RESERVOIR MODELING

Development of a Water and Salt Balance Model to Estimate Potential Future Water Demands and Salinity of a Lake in a Semi-Arid Region	218
<i>A. Dutton, A. Carr, V. H. Nelson</i>	
Bayesian Learning Machine Approach to Optimize Operation of a Multiple Reservoir System	219
<i>A. Ticlavilca, M. McKee</i>	

Multi-Objective Non-Linear Programming for the Optimization of Reservoir Operations	220
<i>E. Nzewi, B. Mengistu</i>	
Basics of Water Accounting and its Implications for Raw Water Supply Operations	221
<i>A. Salazar, T. Gooch, K. Alexander</i>	

SESSION 62: AGRICULTURAL BMPs AND MODELING

Utilizing WAM to Evaluate Local and Regional Agricultural BMPs	222
<i>B. Whitfield, C. Bedregal, A. Vazquez, D. Bottcher, B. Jacobson</i>	
Remote Sensing of Vegetative BMPs and Landowner Maintenance	223
<i>A. Baumgart-Getz, L. S. Prokopy</i>	
Forecasting Weather Parameters to Estimate Reference Evapotranspiration Using Multivariate Relevance Vector Machines	224
<i>A. Torres, W. R. Walker, M. McKee</i>	
Application of An Enhanced Version of SWAT to a Complex Agricultural Watershed	225
<i>K. Heim, M. Winchell</i>	

SESSION 63: RIPARIAN AND AQUATIC ECOSYSTEM RESTORATION

Twenty Years of Progress at Bluewater Creek, New Mexico	226
<i>R. LaFayette, L. J. Schmidt, W. Zeedyk, D. Pawelek</i>	
Effect of State Policies on the Success of Stream Restoration	227
<i>S. Sheeder, P. Johnson</i>	
Storing Water on the Landscape to Optimize Riparian and Aquatic System Restoration	228
<i>J. Berg, K. Underwood</i>	
The Napa River Project - Achieving the Living River Solution to Ecosystem Restoration and Flood Protection	229
<i>M. O'Connell</i>	

SESSION 64: DECISION SUPPORT

Water Optimizer: A Deficit Irrigation Management Tool	230
<i>C. Thompson, D. Martin, R. Supalla, B. McMullen, P. Burgener, G. Hergert</i>	
Farm-based Water Management Research Shared Through a Community of Practice Model	231
<i>K. Leigh, D. L. Doerfert</i>	
Determining a Framework for Modeling	232
<i>S. H. Alemohammad, R. Ardakanian, A. Karimi</i>	
Watershed Information Management and Modeling with Spatial Database Engine (SDE)	233
<i>J. M. Guzman, B. Joyce, E. Hardin</i>	

SESSION 65: STORMWATER MANAGEMENT NUTRIENT, HYDROLOGY, HYDRAULIC

Application of a Monte Carlo Framework for Long-term Swmm Simulations to Evaluate Stormwater Runoff Quality	234
<i>A. Carr, K. Heidel, M. Zucca</i>	
A Freehand Sketching Approach for Hydrologic Modeling	235
<i>J. Peschel, T. Hammond, K. Brumbelow, A. T. Cahill</i>	
Incorporation of Uncertainty Analysis Into the Preliminary Design of a Storm Water Treatment Area	236
<i>R. Murch, P. Tara, A. Owosina</i>	
Stormwater BMPs and Managing Phosphorus Loads from Stream Banks in Virginia	237
<i>D. Powers, J. Curran</i>	

SESSION 66: AGRICULTURAL HYDROLOGY

A Surface Energy Balance Method to Model Evapotranspiration of Partial Canopy/Residue/Soil Covered Fields	238
<i>L. O. Lagos, D. Martin, S. Irmak, S. Verma, A. Suyker</i>	

Using Satellite Remote Sensing to Estimate Winter Cover Crop Nutrient Uptake Efficiency	239
<i>W. D. Hively, L. M. Lang, G. McCarty, J. Keppler, A. Sadeghi</i>	
Hydraulic Model Development for Robust Simulation of Border Irrigation	241
<i>J. Escurra, G. P. Merkley</i>	
Intensive Monitoring and Quantification of Sediment and Nutrient Runoff Resulting from Snowmelt at the Pioneer Farm in Platteville, Wisconsin	242
<i>M. Penn, D. Busch, R. Mentz</i>	

SESSION 67: NATIONAL AND INTERNATIONAL ECOSYSTEMS RESTORATION

Hydrodynamic and Water Quality Modeling of the A.R.M. Loxahatchee National Wildlife Refuge, Northern Everglades, Florida	243
<i>E. Meselhe, M. G. Waldon, C. Chen, W. Roth, H. Wang, M. C. Harwell, J. Arceneaux</i>	
The Nation's Largest Wetland Restoration Projects and Their Approaches to Common Considerations	244
<i>L. M. Belden</i>	
Real World Issues in Implementing a Large Scale Environmental Restoration Project	245
<i>J. Bolleter, B. Kacvinsky</i>	
The Landscape Ecosystem Classification (LEC) model: Using Northeast Florida Wetland Mitigation Bank as a Case Study	246
<i>D. Dickson, G. Howalt, J. Barmore</i>	

POSTER SESSION:

Site-specific Design and Evaluation of Vegetative Buffers Utilizing GIS to Incorporate Physical Parameter Layers	247
<i>A. Aslan, K. M. Trauth</i>	
Pharmaceuticals and Organic Wastewater Compounds in Water	248
<i>L. Bartsch, B. E. Haggard</i>	
Selenium and Physical Habitat Influences on Fish Assemblages	249
<i>L. Bergstedt, S. P. Canton, J. W. Chadwick, L. Wall</i>	
Impact of Stream Network Detail on Automated Watershed Delineation and Hydrologic Process Modeling	250
<i>J. Braud, C. S. Willson</i>	
Sustainable Assessment of the Coastal Dune Lakes of Florida	251
<i>G. Brown, J. Bhadha, J. Jawitz, A. Bunch, M. Brenner, D. Kaplan</i>	
Comparing Two Methods of Calculating Open-Water Evaporation for a Shallow, Subtropical Lake	252
<i>K. Brown, Y. J. Xu, P. Saksa, R. Mesmer</i>	
Fully Integrated Surficial Aquifer Groundwater Flow and Wetland	253
<i>H. H. Cheng, L. Wiseman, L. N. Schwartz, M. F. Schmidt, M. A. Long</i>	
The Role of America's Wetland Conservation Corps in Wetland Restoration through Volunteerism, Education, and Outreach	254
<i>M. Colligan, H. Collis</i>	
Dissolved Oxygen Response to Rain Events in a Shallow Eutrophic Urban Lake	255
<i>D. Davis, Y. J. Xu, P. Saksa</i>	
Export of Nitrogen, Carbon and Total Suspended Solids during the 2008 Mississippi River flood	256
<i>D. Davis, Y. J. Xu</i>	
Measuring Surface Soil Moisture Based on RGB-NIR Images: A Correlation Analysis with Ground Soil Moisture Probe Data	257
<i>H. Dou, B. Wang, B. Zaman, M. McKee</i>	
Impacts of Climatic Change on Water Resources: Some Considerations Stemming from the Revision of Scenarios Proposed in the 1990s for Central Italy	258
<i>W. Dragoni, D. Valigi, M. Melillo</i>	
Determining Origins of Impaired Water Quality at Backbone State Park, Iowa	259
<i>D. Easley, O. de Silva, M. Husheena</i>	
Development of Regression-Based Models to Predict Fecal Indicator Bacteria at the Illinois River Basin, Arkansas and Oklahoma	260
<i>B. E. Haggard</i>	
Multiple Micro Aerial Vehicles for Applications in Real-Time Remote Sensing	261
<i>C. Hall, D. Morgan, A. M. Jensen, H. Chao, Y. Chen, M. McKee</i>	

Occurrence of Methyl Tert-Butyl Ether in a Small Drinking-water Supply Reservoir in Southern California.....	262
<i>G. O. Mendez, M. S. Majewski</i>	
Tidally Influenced New Orleans Canal Network Benefits from Accurate Water Level, Conductivity, and Temperature Data	263
<i>R. Mooney</i>	
An Exploratory Analysis of the Ruralpolitan Population and Their Attitudes Toward Water Management and Conservation.....	264
<i>M. Newsom, D. L. Doerfert, J. Carr</i>	
Integrated Water Resources Management in the Upper and Middle Niger River.....	265
<i>E. Nzewi, G. Koty</i>	
Solute Transfer by Pressure Induced Flows into the Sediment Beds of Streams and Lakes.....	266
<i>Q. Qian, V. R. Voller, H. G. Stefan</i>	
The Impact of the Lake Borgne Barrier on Storm Surge and Wave Energy in the Inner Harbor Navigation Canal	267
<i>A. Sleath, J. Chapman</i>	
Evaluation of Groundwater Resources for Sustainable Development El Toro Planning Area, Monterey County, California.....	268
<i>G. Thrupp, J. Fortuna, H. Franklin, P. Kwiek</i>	
Urban Expansion Dynamic and its Impact on Water Infiltration and Stream-flow in Huntsville City, AL	269
<i>M. F. Wagaw, G. Kebede, T. Gabre, G. Bekelel, W. Tadesse</i>	
The Critical Role of the Community Coordinator in Facilitating an Agriculture Water Management and Conservation Community of Practice.....	270
<i>D. L. Doerfert, J. Wilkinson</i>	
Developing Tomorrow's Water Researchers Today	271
<i>C. Williams, D. L. Doerfert, M. Baker, C. Akers</i>	
Prediction of Fate of Polychlorinated Biphenyls and Source Contribution in Small Coastal Basins the Chesapeake Bay: A Case Study in the Northeast River, Maryland, USA.....	272
<i>Y. Zhao, L. Schugam, A. Soehl, J. Shen</i>	

ADDITIONAL PAPERS

Residential Water Demand with Non Linear Tariff in West Africa Urban: The Case of Ouagadougou in Burkina Faso.....	273
<i>A. Sidibe, R. Brannlund, P. Gong</i>	
Assessing Drought Threat for Urban Water Plans	274
<i>G. Watland</i>	
Author Index	