

American Water Resources Association Spring Specialty Conference 2010

GIS and Water Resources VI

**Orlando, Florida, USA
29-31 March 2010**

Editors:

Francisco Olivera

ISBN: 978-1-61738-705-0

Printed from e-media with permission by:

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



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

Copyright© (2010) by the American Water Resources Association
All rights reserved.

Printed by Curran Associates, Inc. (2010)

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

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

SESSION 1: FLORIDA ARC HYDRO I

ArcHydro Implementation at SJRWMD - Evolving Toward Simplicity	1
<i>Christine Mundy, Ellen Dean, Doug Campbell</i>	
Constructing a Production-Ready Arc Hydro Enhanced Database (AHED) as the Enterprise Database for Hydrologic Feature Locations	2
<i>Maryam Mashayekhi, Lakin Flowers, Alan Foley</i>	
Enterprise Integration and Early Operational Phase Support of the Arc Hydro Enhanced Database	3
<i>Lakin Flowers, Timothy Minter</i>	
SWFWMD Watershed Management Program – GIS Data Schema and Tools for Watershed Management	4
<i>Gordon McClung, Jamison Janke</i>	

SESSION 2: LiDAR I

Terrain Datasets: How Good Are They?	5
<i>Celso Ferreira, F. Olivera, Dean Djokic</i>	
Practical Considerations for Integrating LiDAR DEMs with Legacy Hydrographic Data	6
<i>Benjamin Houston, Erika Boghici, Cheryl Rose</i>	
Terrain-Based Levee Freeboard Analysis for Flood Hazard Assessment and Planning	7
<i>Milver Valenzuela, Stuart Geiger, Jean Huang, Alan Springett</i>	
Technical Advancements and Differences of Two County-Wide LiDAR Datasets from 2001 to 2008 in Harris County, Texas	8
<i>John Grounds, Brandon T. Grimm, Jacob Spenn</i>	

SESSION 3: GROUNDWATER I

GIS-Enabled Multiscale Modeling of a Complex Groundwater Remediation Site	9
<i>Huasheng Liao, Shu-Guang Li, Yang Li</i>	
GIS Enabled Stochastic Modeling of Groundwater Systems and Its Application to Real Problems	15
<i>Dipa Dey, Huasheng Liao, Shu-Guang Li</i>	
Analyzing the Impacts of Climate Change on Groundwater Monitoring Network Design Using GIS	16
<i>Abdelhaleem Khader, Mac McKee</i>	
Supporting Fully-Coupled Surface Water-Groundwater Flow Simulations with ArcHydro	17
<i>Chin Man Mok, Raghavendra Suribhatla, Miao Zhang</i>	

SESSION 4: HYDROLOGIC MODELING I

Using GIS to Assess Climate Change Impacts on the Rio Grande and its Riparian Forest	18
<i>Julie Coonrod, Kelly Isaacson, Venkatesh Merwade</i>	
Assessment of Water Availability in the Mountainous Watersheds of Idaho	19
<i>Venkataramana Sridhar, Sumathy Sinnathamby, Muluken Muche</i>	
An Assessment of Climate Change Impact on Water Resources in Spain	20
<i>Javier Álvarez-Rodríguez, Luis Barranco Sanz, Ángela Potenciano De Las Heras, Luis Quintas Ripoll</i>	
Delineation of Water Resources Planning and Management Regions Using GIS	25
<i>Ana Carolina Coelho Maran, Darrell G. Fontane, Evan Vlachos, John Labadie, Benedito Braga</i>	

SESSION 5: ARC HYDRO PANEL

The Florida Arc Hydro Experience: Where Do We Go From Here?	32
<i>Sandra Fox, David Maidment, Gordon McClung, James Cameron, Alan Foley</i>	

SESSION 6: LiDAR II

Hydrologic & Hydraulic Modleing of the Rancocas Creek Dam Failures	34
<i>Dennis Johnson, Arthur C. Miller, Norm Folmar</i>	
Using Lidar Data to Assess the Interdependence of Headwater Wetlands, Groundwater Levels, and Streamflow in Central-Florida Watersheds	40
<i>Terrie Lee, Geoff Fouad</i>	
Using LiDAR Data to Assess Landscape Vulnerability to Coal Bed Methane Extraction in the Powder River Basin of Wyoming	41
<i>Charles Yuill, Michael P. Strager</i>	

SESSION 7: GROUNDWATER II

Use of GIS-Based Data for Modeling Complex Groundwater Systems in Michigan	42
<i>Mehmet Oztan, Huasheng Liao, Shu-Guang Li, Richard Mandel</i>	
Application of a GIS-Enabled Modeling System to Protect Michigan's Groundwater and Groundwater Dependent Ecosystems	43
<i>Hassan Abbas, Huasheng Liao, Shu-Guang Li, Richard Mandel</i>	
Off-Stream Storage Analysis with HydroGeoSphere (HGS)	44
<i>Lisa Rainger, Lorri Peltz-Lewis</i>	
Application of GIS on a Regional Transient Groundwater Flow Model	45
<i>Oscar Vera</i>	

SESSION 8: HYDROLOGIC MODELING II

Development of GIS-Based Drainage Facilities Master Plans Using Local Hydrologic Methods	51
<i>Justin Rogers, Jim Zhu, Sunit Deo</i>	
Using GIS to Estimate Citywide Benefits from Stormwater BMPs in New York City	52
<i>Francisco Brillhante, Marc Korpus, Carter H. Strickland Jr.</i>	
Performance Comparison of GIS-Based CPU, Multi-Threading and GPU Enhanced 2D Flood Models	53
<i>Alfred Kalyanapu, Siddharth Shankar, Abe Stephens, Steven J. Burian, David R. Judi, Timothy N. McPherson</i>	
GIS Based Hydrologic Modeling Using Object Oriented Approach	54
<i>Kwangmin Kang, Venkatesh Merwade</i>	
Impact of Pit Removal Methods on DEM Derived Drainage Lines in Flat Regions	55
<i>Walter Collischonn, Diogo Costa Buarque, Adriano Rolim Da Paz, Carlos André Bulhões Mendes, Fernando Mainardi Fan</i>	

SESSION 9: FLORIDA ARC HYDRO II

Estimating Hydroperiod on the Kissimmee River Floodplain: A Comparison of Competing Models	61
<i>Lawrence Spencer</i>	
Clark County Regional Flood Control District Arc Hydro (CCRFCD Arc Hydro): Toward Ongoing Stormwater Master Planning	62
<i>Stephen Bourne, Kevin Eubanks, Harshal Desai, Brian Rowley</i>	
Animating Near Real-Time Rainfall in Google Earth	63
<i>Anand Trivedi, Kurt Saari</i>	
Exploration of Estuarine Salinity Patterns Using ACES - Analytical Framework for Coastal and Estuarine Study	64
<i>Sandra Fox, Stephen Bourne, Clay Montague, Palmer Kinser</i>	

SESSION 10: BASINS

BASINS 4.0 - Overview and Recent Developments	65
<i>Paul Duda, Daniel Ames, James N. Carleton</i>	
HydroForecaster: An Open Source GIS-Enabled Hydrologic Data Time Series Forecasting Framework and Artificial Neural Network Implementation	71
<i>Tevaganthan Veluppillai, Daniel Ames, Harold Dunsford</i>	

Development and Demonstration of a Hybrid Modeling Capability within the Fort Benning HSPF Watershed Model: Refinement of Unpaved Road Simulation Using WEPP:Road	72
<i>John Imhoff, John L. Kittle Jr., Brandon B. Gonzales, Anthony S. Donigian Jr., Patrick N. Deliman, William J. Elliot, Dennis C. Flanagan</i>	
Towards Virtual Watersheds: Integrated Data Mining, Management, Mapping	78
<i>Yang Cao, Daniel Ames, Ping Yang</i>	

SESSION 11: LiDAR III

Hydrologic Terrain Processing Using Parallel Computing	83
<i>David Tarboton, D. W. Watson, R. Wallace, K. A. T. Schreuders, T. K. Tesfa</i>	
Assembly and Management of an Extensive LiDAR Elevation Database in a Low-Relief Coastal Area	84
<i>Timothy Liebermann, Diana Umpierre</i>	
The Red River of the North LiDAR Dissemination Portal and Flood Forecast Display Tool	85
<i>Brian Fischer, Charles Fritz</i>	
LiDAR: A Blessing in Disguise for Watershed Modeling	86
<i>Ekaterina Fitos, Al Karlin, Gordon McClung, Jamison Janke</i>	

SESSION 12: GROUNDWATER III

An GIS-Enabled Realtime Interactive Groundwater Modeling Environment	87
<i>Shu-Guang Li, Huasheng Liao</i>	
Suitability Analysis for Groundwater Recharge for the Freeport Element of the American River Use Strategy in San Joaquin County, California	88
<i>Sarah Watkins, Ron Schnabel, Mark Williamson</i>	
Comparison of Empirical Estimates of Mountain Front Recharge for the Southern Jornada Del Muerto Basin, New Mexico	89
<i>Bvn Kambhammettu, James P. King, Praveena Allena, Bobby J. Creel</i>	
3-D Volumetric Analysis of Groundwater Resources in Nolan County, Texas	95
<i>Beronica Lee-Brand, Michelle Sutherland, Allan Standen</i>	

SESSION 13: HYDROLOGIC INFORMATION SYSTEMS I

Sharing Hydrologic Data with the CUAHSI Hydrologic Information System	96
<i>David Tarboton, David Maidment, Ilya Zaslavsky, Jeffery Horsburgh, Timothy Whiteaker, Michael Piasecki, J. Goodall, David Valentine, Thomas Whitenack</i>	
HydroDesktop: A Free and Open Source Platform for Hydrologic Data Discovery, Visualization, and Analysis	97
<i>Daniel Ames, Jiri Kadlec, Jeffery Horsburgh</i>	
HydroModeler: A Modeling Plug-in for the CUAHSI HIS HydroDesktop Application	98
<i>J. Goodall, Anthony M. Castronova, Daniel Ames</i>	
Texas Hydrologic Information System	99
<i>Timothy Whiteaker, David Maidment, Dharhas Pothina, James Seppi, Eric Hersh, Wendy Harrison</i>	

SESSION 14: WATER QUALITY I

Tritium Spill Modeling in the Savannah River Using BASINS 4.0	105
<i>Amber R. Ignatius, Todd C. Rasmussen</i>	
Cities as Forces for Good in the Environment: Scientific Visualization and Stakeholder Dialogue	106
<i>Ibrahim Demir, Amanda K. Parker, M. Bruce Beck</i>	
Using Storm Event Samplers to Calibrate the Watershed Loading Model for Use in the Development of the Lake Jesup TMDL	107
<i>Joe Walter</i>	
A Decision Support System for Forest Harvest Planning in North Carolina	108
<i>D. G. Jones, A. D. Bailey, T. B. Allen, D. K. O'Loughlin, J. L. Boggs</i>	

SESSION 15: ARC HYDRO GROUNDWATER

The Arc Hydro Groundwater Data Model and Tools	114
<i>Norm Jones, Gil Strassberg</i>	
Automated Well Permitting Using Arc Hydro Groundwater	120
<i>Alan Lemon, Douglas Gallup, Norm Jones</i>	
Application of Arc Hydro Ground Water to the Sacramento Regional Model	126
<i>Michelle Smilowitz, Norm Jones, Derrick Whitehead</i>	
Hydrogeologic Site Characterization via Cross Section Editing	132
<i>Timothy Whiteaker, Norm Jones, Douglas Gallup, Gil Strassberg</i>	

SESSION 16: REMOTE SENSING

Using Hyperspectral Imagery to Detect Submerged Aquatic Vegetation	138
<i>Courtney Hart, Charles Jacoby</i>	
Fractional Vegetation and Impervious Surface Dynamics in the Wetland-Urban-Agriculture Interface Systems of South Florida: A Remote Sensing Perspective	144
<i>A. Melesse, F. Miralles-Wilhelm</i>	
Value of NDVI as a Tool to Monitor Vegetation Recovery on Restored Wetlands	145
<i>D. Samuel Rajasekhar, Melinda Donnelly</i>	
SeaWiFS-Based Chlorophyll-A Concentration in Coastal Waters of Everglades	146
<i>A. Melesse, F. Miralles-Wilhelm, A. Thomas</i>	

SESSION 17: HYDROLOGIC INFORMATION SYSTEMS II

Hydroserver: A Platform for Publishing Space-Time Hydrologic Datasets	147
<i>Jeffery Horsburgh, David Tarboton, K. A. T. Schreuders, David Maidment, Ilya Zaslavsky, David Valentine</i>	
Near Real Time Visualization of USGS Instantaneous Data: Integration of Open Source Data Turbine in CUAHSI HIS	153
<i>Thomas Whitenack, David Ryan, David Valentine, Ilya Zaslavsky</i>	
Internationalizing the CUAHSI Hydrologic Information System: A Case Study from the Czech Republic	154
<i>Jiri Kadlec, Daniel Ames, Jakub Langhammer</i>	

SESSION 18: WATER QUALITY II

Optimizing the Chlorophyll Monitoring Program in the Neuse Estuary Through the Use of a Hierarchical Spatio-Temporal Bayesian Model	155
<i>Ibrahim Alameddine, Song Qian, Eric S. Money</i>	
Cleaning House: Collaboration Among Federal Agencies to Restore Impaired Waters on Public Lands	156
<i>Jamie Fowler, Douglas J. Norton, Seth Mann, Eric Monschein, Dwight Atkinson</i>	
Assessment of Atmospheric Nitrogen Deposition on Estuarine Nutrient Enrichment Using Modeling and Monitoring	157
<i>Michele Cutrofello, Keith Little, Marion Deerhake, Randy Waite, Anne Rea</i>	
Bayesian SPARROW for Understanding the Dynamic Changes in Nutrient Loadings	158
<i>Song Qian, J. Goodall</i>	

SESSION 19: NEXRAD

Validation Rain Gauges for Quality Assurance of NexRad Rainfall Data	159
<i>Michael Daly</i>	
Spatially Distributed Rainfall for the Florida Water Management Districts	160
<i>Jean Vieux, Baxter E. Vieux</i>	
Utilizing Radar-Derived Rainfall Data for Watershed Model Calibration	166
<i>Mathew Mampara, Srikanth Koka, Arvind Goswami</i>	

SESSION 20: INTEGRATING TIME SERIES DATA

Data Interoperability Between Generic Hydrologic and Hydraulic Databases and Models	167
<i>Steve Jencen, R. Srinivasan</i>	
ArcGIS Tools for Importing, Storing, and Analyzing Reservoir Vertical Profile and Other Water Quality Data	168
<i>James Nelson, Caleb Buahin, Rushit Hila, Tamara Rabadi, Oliver Obregon, Reed Chilton, Ashley Childers, Gustavious Williams</i>	
ArcHydstra: Integrating Kisters' hydrologic Software Hydstra into ArcGIS for Mapping Reports Development.....	174
<i>Aisa Ceric, Brian McKay, Kyle Knoche</i>	
Turning Your GIS into a Temporal Information System (TIS) - How to Plot, Visualize and Analyze Time-Series Data Within the GIS Environment	175
<i>Richard Koehler, Jennifer Boehnert</i>	

SESSION 21: HYDROLOGIC INFORMATION SYSTEMS III

HydroPortal and HydroViewer: Registration and Discovery of CUAHSI Web Services.....	176
<i>Dean Djokic, Zhumei Qian, Christine Eggers, Zichuan Ye, Jignesh Divecha</i>	
OLAP-Based Analysis, Visualization and Animation of Large Volumes of Hydrologic Data	177
<i>Matthew Rodriguez, Thomas Whitenack, David Valentine, Ilya Zaslavsky</i>	
Hydrologic Metadata Catalog and Semantic Search Services in CUAHSI HIS	183
<i>Thomas Whitenack, David Valentine, Ilya Zaslavsky, Michael Piasecki, David Tarboton, Jeffery Horsburgh, Timothy Whiteaker, Daniel Ames, David Maidment</i>	
Transition to OGC Standards in CUAHSI Hydrologic Information System	184
<i>David Valentine, Ilya Zaslavsky, David Maidment</i>	
Interdisciplinary Environmental Time Series Data Management.....	185
<i>Stefan Fuest, Stan Malinky, Michael Natschke</i>	

SESSION 22: WATER QUALITY III

Nutrient Reductions in the Watershed Protection Plan for the Caloosahatchee River	186
<i>Timothy Liebermann</i>	
Land Cover - Nutrient Export Relationships in Space and Time	187
<i>James Wickham</i>	
A GIS Methodology to Strategically Place Constructed Wetlands for Nitrate Removal in Tile-Drained Agricultural Watersheds.....	188
<i>Margaret McCahon, Indrajeet Chaubey, Jane Frankenberger, Eileen Kladviko</i>	
GIS Applications in Watershed Modeling Using HSPF in Northeast Florida	189
<i>Maria Mao</i>	
Application of NHDPlus for SPARROW Nutrient Modeling of the Northeastern and Mid-Atlantic Region of the United States	197
<i>Richard Moore, Craig M. Johnston, Richard A. Smith</i>	

SESSION 23: FLOOD INUNDATION I

GIS as the Foundation for FEMA Flood Map Modernization Success.....	198
<i>Andrea Ryon, Doug A. Bellomo</i>	
Flood Map Desktop	199
<i>Joshua Price</i>	
Remote Sensing Approach to Flood Inundation Mapping: Case Studies for Wetlands in New South Wales, Australia.....	200
<i>Mustak Shaikh, Narendra Tuteja</i>	
Implementation of New Tools and Data Sources to Manage Flood Risk	208
<i>José María Bodoque, J. A. Ballesteros-Cánovas, M. Sánchez, A. Díez-Herrero, A. Nieto, Peter Torp</i>	

SESSION 24: INTERNET-BASED DATA SHARING

HDR USACE Wetland Delineation Toolset	214
<i>Michael Gilbrook</i>	
H₂OInfo - A Web-Based Citizen's Tool for Turning Real-Time Water Quality Monitoring Data into Information	215
<i>Jeff Siegel, Christopher Magruder, Mike Benedict, Troy Deibert</i>	
USGS GIS Science Support: Development of Geographic Information Systems (GIS) Tools to Support Use of National Water Information System (NWIS) Web Services in ArcMap	216
<i>David McCulloch</i>	
Customized, Open Source GIS Solutions for Increasing Data Accessibility	217
<i>Mathew Mampara, Milver Valenzuela, Brian Marchionni, Daniel Ames</i>	

SESSION 25: PANEL – THE FUTURE OF THE NATIONAL HYDROGRAPHY DATASET

The Future of the National Hydrography Dataset	218
<i>Jeff Simley, Tommy Dewald, Brian Sanborn, Dan Wickwire, Mark Olsen, Ricardo Lopez-Torrijos</i>	

SESSION 26: DECISION SUPPORT SYSTEMS

North Slope Decision Support System: Water Resources Management in Support of Oil and Gas Exploration in Alaska	219
<i>Kelly Brumbelow, Amy C. Tidwell, Stephen Bourne, William F. Schnabel, James Halebian, Arun K. Aryasomayajula</i>	
Designing Decision Support Systems for Water Resources: Making the Tool Fit the Needs	225
<i>Daniel Sheer</i>	
Using LDCurve to Support Watershed Management Decisions	226
<i>Stephanie Johnson</i>	
Linking Modeling and Data Visualization to Create a Climate Change Adaptation Decision Support Tool for a California Water District	227
<i>David Purkey, David Yates, Elizabeth Mansfield, Jack Sieber, Vishal Mehta</i>	

SESSION 27: FLOOD INUNDATION II

Understanding and Predicting Floods in Arid Environments	228
<i>Tatiana H. Papakos, Kristi Root</i>	
Leveraging Geospatial Data for Urban Flash Flood Warning	234
<i>Jean Vieux, Baxter E. Vieux</i>	
Quantifying Uncertainty in Flood Inundation Mapping	239
<i>Younghun Jung, Venkatesh Merwade</i>	
Dam Breach Analysis and Inundation Mapping in Low Slope Coastal Plains	240
<i>Ross Gordon, Jacob M. Torres, Tyler Ray, Anthony Holder, Lonnie Anderson, Jason Afinowicz, Matthew Zeve</i>	

SESSION 28: HYDROLOGIC AND HYDRAULIC MODELING I

Development of Parameter Maps of the Modified Bartlett-Lewis Rectangular Pulse Stochastic Rainfall Generator	241
<i>F. Olivera, Dongkyun Kim</i>	
Building a Better Hydraulic Model from the Ground Up	242
<i>Ajay Prasad, James Carolan, Constantin Banciulescu</i>	
Channel Geometry Characterization for Modeling with HEC-RAS	247
<i>Steve Jencen, R. Srinivasan</i>	
Projecting Future Precipitation Pattern for Ohio	248
<i>Shuang-Ye Wu</i>	

SESSION 29: NATIONAL HYDROGRAPHY DATASET II

NHD Tool Development for Local-State Stewardship	255
<i>Steve McKinney, Phillip Henderson</i>	
Introduction to the Hydrography Event Management (HEM) Tools	256
<i>Ariel Bates</i>	
What's Happening with the National Hydrography Dataset Plus (NHDPlus)?	257
<i>Tommy Dewald</i>	
Improving Stream Flow Estimates in NHDPlus	258
<i>Tim Bondelid, Kernell Ries, Richard Moore</i>	

SESSION 30: FLOOD INUNDATION III

Gunbarrel Fire Burned Area Emergency Response Assessment and Associated Flood Risk Reduction Project	259
<i>Gregory S. Bevenger</i>	
The National Flood Hazard Layer (NFHL): Continually Updated Flood Hazard Data at Your Fingertips	260
<i>Jeff Tornatore, Mike Domaratz</i>	
3D Water Surface Elevation Generation Leveraging ESRI's Terrain Data Type	261
<i>Stuart Geiger, Benjamin Pratt, Mathew Mampara</i>	

SESSION 31: FORECASTING WATER USE

ARC Population and Employment Allocation Disaggregator -- A Simple GIS-Based Tool for Parcel-Scale Population Projection	262
<i>Stephen Bourne, Mike Alexander, Wei Wang</i>	
Using Econometrics to Forecast Temporal Sensitivity of Critical Nutrient Loading Thresholds	263
<i>Valerie Seidel, Paul Yacobellis, Chris De Bodisco</i>	
Irrigated Agricultural Acreage Inventory Model (Irigain)	269
<i>Mehrshad Nourani</i>	
Modeling the Impacts of Land Use on Water Purification and Nutrient Retention Using Invest Tool	273
<i>Driss Ennaanay, Marc Conte, Stacie Wolny, Manu Sharma</i>	

SESSION 32: HYDROLOGIC AND HYDRAULIC MODELING II

A GIS-Based Approach to Natural Stream Channel Design Construction	274
<i>Karen Warner, Aziza Baan, John Kiefer, Kristen Blanton</i>	
Basemap and DFIRM Database Development Using SWMM Model Output	280
<i>Krystal Forgenie, Erin Hardin</i>	
Modeling Upland Erosion Potential in the Le Sueur River Watershed, Minnesota: A GIS Mediated Application of the WEPP Model	281
<i>Fukhrudin Maalim, A. Melesse, P. Belmont</i>	
Combining Spatial Analysis and Multivariate Statistical Methods to Characterize Watershed Water Quality Conditions	282
<i>Andrew Gamble, Meghna Babbar-Sebens</i>	

SESSION 33: NATIONAL HYDROGRAPHY DATASET III

Fundamentals of Stewardship for the National Hydrography Dataset (NHD)	288
<i>Elizabeth McCartney, David Arnold</i>	
Florida's National Hydrographic Dataset (NHD)	289
<i>Joseph North</i>	
NHDPlus Version 2.0	290
<i>Cindy McKay, Tommy Dewald</i>	
Hydrography Conflation: Challenges in Updating Hydrography Data	291
<i>Bernard Catalinotto</i>	

SESSION 34: USER INTERFACE

The User Experience in Water Resources GIS Software	292
<i>Stephen Bourne</i>	
A Pen-Based Approach for Water Resources Model User Interfacing	293
<i>Joshua Peschel, Tracy Hammond</i>	
Use of the National Hydrography Dataset in the USGS StreamStats Web Application	294
<i>Alan Rea</i>	
EMAPS: Environmental Monitoring and Planning System	295
<i>Kurt Saari, Rick Householder</i>	

SESSION 35: HYDROLOGIC AND HYDRAULIC MODELING III

Using Ecological Sites to Parameterize a Hydrologic Simulation Model in a Geospatial Rangeland Watershed Assessment Tool	296
<i>Anthony Perlinski, Ginger B. Paige, J. J. Stone, Scott N. Miller, Jagath Vithanage</i>	
'WHAT' (GIS) Tool Explores the Future Environments of the Lake Okeechobee Watershed Project	297
<i>Barry Wharton, Anwar Khan, Stephanie Morse</i>	
Geo-RAS for Unsteady Models: Friend or Foe?	302
<i>Marlene Tomaszewicz</i>	
Customized GIS Tools to Aid in Hydrologic Modeling	303
<i>Mark Schwartz, Jie Gao</i>	

SESSION 36: LAND USE I

The Leaf-Out Analysis as a GIS Tool in Urban Watershed Forestry	304
<i>Lisa Fraley-McNeal, Karen Cappiella, Hyunjin Kim</i>	
Estimating Tree Root Encroachment on Levees Using GIS	311
<i>Tomomi Ito, John Stormont, Julie Coonrod, James Cleverly</i>	
Predicting Hydrologic/Hydraulic Condition of Streams Using Interferometric Synthetic Aperture Radar	312
<i>Nathaniel Todea, Shane Green</i>	
Land Use Dynamics Assessment and Its Impact on the Hydrology of Beles Basin, ETHIOPIA	318
<i>Anwar Surur, S. Setegn</i>	

SESSION 37: NHD AND NHD/WBD INTEGRATION

Harmonization of the National Hydrography Dataset (NHD) and the Watershed Boundary Dataset (WBD) with Sister Datasets in Canada	319
<i>Pete Steeves, Karen Hanson</i>	
Harmonization of the National Hydrography Dataset (NHD) and the Watershed Boundary Dataset (WBD) with Sister Datasets in Mexico	320
<i>Karen Hanson, Paul J. Kimsey</i>	
Progress Report on the Stewardship of the National Hydrography Dataset	321
<i>Jeff Simley</i>	
WBD/NHD Integration	322
<i>Stephen Daw, Karen Hanson</i>	

SESSION 38: ENVIRONMENTAL ISSUES

Influence of Riparian Spatial Structure on Aquatic Environment Conservation in Small Streams of Southeast Brazil	323
<i>Silvio Frosini De Barros Ferraz, Felipe Rossetti De Paula, Gisele Biem Mori, Giovana Athayde, Pedro Gerhard, Antônio Fernando Monteiro Camargo</i>	
Ecological Sites of the Walnut Gulch Experimental Watershed	325
<i>Philip Heilman, J. J. Stone, D. Robinett</i>	
GIS Analysis of the Hydrogeomorphic Attributes of the Niobrara River	333
<i>Nathaniel Schaepe, Jason S. Alexander</i>	

SESSION 39: DRINKING WATER SUPPLY

Source Water Protection Analysis Based on the DWMA	334
<i>William Cooter, A. Roger Anzolin, James I. Rineer, Brandon Bergenroth, David Chrest</i>	
Mitigation of Uncertainty in Spatial Analyses: A Case Study of Siting a Water Supply Wellfield in an Urban Environment	340
<i>Francis Henderson</i>	
Integrating GIS and Failure Forecasting to Identify “At Risk” Assets	341
<i>Seth Garrison, James Carolan</i>	
Leveraging GIS and Database Technologies for Water Supply Facilities Siting	346
<i>Prasad Chittaluru, John Watson, Lynn Wile, George Schlutermann, Katherine Paisley</i>	

SESSION 40: LAND USE II

Developing a GIS and Database Analysis Framework for Estimating Current and Future Water Use in a Stream Impairment and Buildout Water Demand Analysis	352
<i>Parker Wittman</i>	
LiDAR Mapping of Wetlands Areas	353
<i>Ross Gordon, Kelly Krenz Doe</i>	
Estimating Connected Impervious Areas as a Function of Rainfall Depth	354
<i>Ahmed Said, Harry Downing</i>	
A Comprehensive Approach to Assessing Sustainability for Transportation Projects	365
<i>Michele Aitkenhead</i>	

POSTER PRESENTATIONS

Quantifying the Impact of Land Use Change on Non-Point Source Nitrogen Loading to Streams in the Contiguous United States	366
<i>Md. Jahangir Alam, J. Goodall</i>	
Hydrological Effects Due to Landcover Changes in a Basin	367
<i>M. Alejandra Arbueta, Raul Pedraza, Graciela Pusineri</i>	
Natural Stream Flow Estimates for Montana: Using the NHDPlus Unit Runoff Method	373
<i>Ariel Bates</i>	
Finding Flooding Solutions Using Interfacing Tools	374
<i>Cynthia Baumann</i>	
A Watershed-Based Hydrogeographic Analysis System for Forest Product Industry Stakeholders	380
<i>John Beebe</i>	
Hydrologic Response Estimation of the Arroyo Cabrera (Spanish Central System) Flash Flood 1997 Event	381
<i>José María Bodoque, A. Díez-Herrero, F. Olivera, V. Ruíz-Villanueva</i>	
Creating Complex Chem-Box Labels in ArcGIS	382
<i>Gary Bowles, Gopi Jalingama</i>	
The Role of GIS in Identifying Utilities Vulnerable to Erosion from Natural Watercourses	383
<i>Rayna Carmichael, Wolfgang Wolter</i>	
A Methodology for Forecasting Local and Regional Water Sustainability	384
<i>Rebecca Carroll, Elisabeth Jenicek, Natalie Myers, Kevin Miller, Melena Hessel, Ryan Holmes, Donald Fournier</i>	
Screening Watershed Health Using Spatial Datasets	390
<i>Rebecca Carroll, Elisabeth Jenicek, Natalie Myers</i>	
Putting the Information Together for Making Better Management Decisions: Water Quantity and Quality Story of the St. Johns River in NE Florida	396
<i>Aisa Ceric, Steve Winkler, Fay Baird, Tom Mirti, Brian McKay</i>	
Application of GIS and GMS for Coastal Management (North of France)	397
<i>F. Chaaban, B. Louche, J. El Khattabi, E. Masson, H. Darwishe, E. Carlier, Y. Battiau-Queney</i>	
Coupling GIS with Hydrogeological Modeling, Case Study: Chalk Aquifer of Northern France	403
<i>H. Darwishe, B. Louche, E. Masson, J. El Khattabi, F. Chaaban, E. Carlier</i>	
GIS-Based Application of Process Based Model for Identification of Potential Sediment Source Areas and Derivation of Site Related Measures to Minimize Erosion	409
<i>Mengistu Defersha, A. Melesse, M. McClain</i>	

Interrill Erosion, Runoff and Sediment Size Distribution as Affected by Slope Steepness and Antecedent Moisture Content	410
<i>Mengistu Defersha, Shoeb Quraishi, A. Melesse, M. McClain</i>	
Developing Residential Irrigable Areas Using GIS	411
<i>Corey Denninger, Yassert Gonzalez, Kevin Wills, Sarah Goolsby</i>	
TIN Processing for Hydraulic Analysis Using GIS	412
<i>Sunit Deo, Justin Rogers</i>	
Modeling the Influence of Vegetation Dynamics on the Hydrology of Mara River Basin Using Semi-Distributed Hydrologic Models	413
<i>Shimelis Dessu, A. Melesse, M. McClain</i>	
National Hydrography Dataset Plus (NHDPlus) Elevation-Derived Catchments	414
<i>Tommy Dewald</i>	
Water Resources Assessment and GIS-Based Stormwater Runoff Estimates for Artificial Recharge of Freshwater Aquifers in New Providence, Bahamas	415
<i>Genevieve Diamond, A. Melesse</i>	
SWAT Model as a Decision Support Tool for Framing Adaptation Strategies in Agriculture under Changing Climate	416
<i>Vellingiri Geethalakshmi, A. Lakshmanan, R. Srinivasan</i>	
Online Mapping Systems for Hydroclimatic Data Delivery	417
<i>Stephen Gray, Christopher Nicholson, Tony Bergantino</i>	
Vermont Public Community Water Systems Groundwater Interference Study	418
<i>Eric Hanson</i>	
Hydrologic Resource Sheds and Great Lakes Applications	424
<i>Chansheng He, Thomas E. Croley II</i>	
The KCI Geofusion Center is an Innovative Blending of Technologies Designed to Assist in Monitoring Environmental Compliance on Construction Sites	425
<i>Christopher Heyn, Brian Maher, Ian Botts, Ashton Lamont</i>	
A GIS-Based Vulnerability Assessment and Disaster Management Tool for Surface Water, Groundwater, and Dams	426
<i>Tanya Holtz, Abhishek Singh, Toya Jones, John Pickens, Robert M. Holt, Joel Kuszmaul, Brian Gunter</i>	
Development of a Decision Support Tool to Ensure Safe Drinking Water in Rural Communities in Puerto Rico	432
<i>Sangchul Hwang, Melissa Herrera</i>	
The Hydrographic Setting for Mercury Sampling	433
<i>Kathy Isham, Jeff Simley</i>	
Using Web-Based GIS to Manage Hardcopy Infrastructure Plans	434
<i>Mary Johnson, Robert Cheetham</i>	
Innovative Approaches and GIS Tools for Watershed Planning	440
<i>Anwar Khan, Steve Schubert, Lewis Hornung, Barry Wharton, Stephanie Morse</i>	
Modeling the Effect of Land Use/ Land Cover Change and Rainfall on the Hydrology of the River Flow, Kenya Basin	441
<i>Liya Mango, A. Melesse, M. McClain, D. Gann, S. Setegn</i>	
An Alternative Delineation of Basins Method Using DEMs. Preliminary Algorithms	442
<i>Sergio Martinez, Gonzalo Espinoza</i>	
Automatic Estimation of Flood Flows in the Island of Tenerife, Spain	447
<i>F. Olivera, Jose Fernandez-Bethencourt, Pedro Delgado-Melian, Jesus Lopez-Garcia, Martin Rodriguez-Pallares</i>	
Navigability Potential of Washington Rivers and Streams Determined with Hydraulic Geometry and Geographic Information System	448
<i>Theresa Olsen, Chris Magirl</i>	
Analyzing Changes in Vegetation over the Last Sixty Years in Emerald Marsh Conservation Area, Florida, USA	449
<i>Sarita Pachhai Karki, John R. Stenberg, Walter Godwin</i>	
Innovating GIS Education with a FishFinder	450
<i>Travis Rayfield, William Wright, Michael Hendricks</i>	
Calibration and Validation of Arcswat Model for Prediction of Hydrological Water Balance of Rio Haina Basin, Dominican Republic	455
<i>S. Setegn, A. Melesse, M. McClain, Xixi Wang</i>	
Analysis of Spatial Distribution of Climate Data Impact on Prediction of the Hydrology of Beles Basin, Ethiopia: Application of Remote Sensing, GIS and Hydrological Model	456
<i>S. Setegn, Yirgalem Chebud, A. Melesse</i>	
The Role of Hydrography in Popular Map Viewers	457
<i>Jeff Simley, Kenton Curtis</i>	

UTIMS: Utah Inundation Mapping Software	458
<i>Brian Stevens, Sanjay Chauhan, David S. Bowles</i>	
Flood Inundation Maps and Sediment Storage Metrics for Cattail Creek in Howard County, Maryland	459
<i>Dennis Sugrue</i>	
The Effect of Land Use/ Management on Spatial Variation of Water Quality Parameters in Yuna and Haina River Watersheds, Dominican Republic	465
<i>A. Thomas, A. Melesse, S. Setegn, F. Nunez, J. Chalas, A. G. Castillo</i>	
The Effect of Reservoir on Spatial Variation of Water Quality Parameters in Yuna River Watershed, Dominican Republic	466
<i>A. Thomas, A. Melesse, S. Setegn, F. Nunez, J. Chalas, A. G. Castillo</i>	
Glacier Variability in Wyoming's Teton Range	467
<i>Glenn Tootle, Jake Edmunds, Greg Kerr</i>	
A GIS-Based Integrated Flood Information System	468
<i>Donghai Wang, Naser Bateni, David Parker, Arthur Hinojosa, Jeremy Arrich, Jon Ericson</i>	
Using an Expert Evaluation Process and GIS Tools for Selection of an Off-Line Reservoir Site in West Central and Southwest Florida	469
<i>Gary Wantland, Cara Rothfuss</i>	
Integrated Spatio-Temporal Modeling Using an Open Source Model Builder Application Linked to Web Processing Services Based Hydrologic Models	470
<i>Ping Yang, Yang Cao, Daniel Ames</i>	
Author Index	