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## TABLE OF CONTENTS

Dedication to Professor JOSE D. SALAS	v
List of accepted abstracts (as of February 22, 2003)	vi
<b>LIMITING SOURCE DIMENSIONS OF THREE-DIMENSIONAL ANALYTICAL POINT SOURCE MODEL FOR SOLUTE TRANSPORT</b> A. Noman M. Ahsanuzzaman, Randall Kolar and Musharraf Zaman	1
<b>ANALYSIS OF SHORT-TIME SINGLE-RING INFILTRATION UNDER FALLING-HEAD CONDITIONS WITH GRAVITATIONAL EFFECTS</b> Rafael Angulo-Jaramillo, David Elrick, J.-Yves Parlange, Pierre Gérard-Marchant and Randel Haverkamp	16
<b>CELLULAR AUTOMATA MODELS OF PARTICLE INTERACTIONS IN SEDIMENT ENTRAINMENT</b> Nancy E. Brown, Jorge A. Ramírez and Ellen E. Wohl	24
<b>ON THE PROBABILISTIC CHARACTERIZATION OF DROUGHT EVENTS</b> A. Cancelliere, B. Bonaccorso, and G. Rossi, and J. D. Salas	33
<b>THE APPLICATION OF QUANTITATIVE ASSESSMENT OF LAND USE CHANGES IMPACT ON WATER CONSERVATION FOR RESERVOIR WATERSHED</b> Tien-Yin Chou, Zheng Dao Xie and Mei-Hsin Chen	45
<b>IMPROVING MODFLOW'S RIVER PACKAGE FOR UNSATURATED STREAM/AQUIFER FLOW</b> Garey Fox	56
<b>ESTIMATING STREAMBED AND AQUIFER PARAMETERS FROM A STREAM/AQUIFER ANALYSIS TEST</b> Garey Fox	68
<b>ENGINEERING DESIGN PARAMETER OF STORMS IN VENEZUELA</b> Edilberto Guevara	80
<b>HISTORY OF HYDRAULICS AND FLUID MECHANICS AT COLORADO STATE UNIVERSITY</b> Pierre Y. Julien and Robert N. Meroney	92
<b>HABITAT IMPROVEMENT TECHNIQUES FOR AQUATIC FISHERY: APPLICATION EXPERIENCES AT TA-CHIA RIVER IN TAIWAN</b> Bing-Shyan Lin, Chao-Hsien Yeh, Hui-Pang Lien and Ching-Hao Tuan	104
<b>PRELIMINARY ANALYSIS OF SEDIMENT TRANSPORT CAPACITY IN THE COLORADO PLATEAU</b> Robert T. Milhous	117
<b>CRITERIA FOR RISK EVALUATION IN GROUNDWATER MANAGEMENT PROJECTS: A COMPARATIVE STUDY</b> Cinzia Miracapillo	129
<b>DROUGHT AND WATER POLICY: IMPLICATIONS FOR COLORADO</b> Neil S. Grigg	141

<b>THE AXIS OF RISK AND UNCERTAINTY IN HYDROLOGIC DESIGN</b> J. D. Salas, P. Burlando, J.H. Heo and D. J. Lee	153
<b>PROGRESS IN STOCHASTIC ANALYSIS, MODELING, AND SIMULATION: SAMS-2003</b> O. G. B. Sveinsson, J. D. Salas, W. L. Lane and D. K. Frevert	165
<b>AGGREGATION SCENARIOS TO MODEL WATER FLUXES IN WATERSHEDS WITH SPATIAL CHANGES IN SOIL TEXTURE</b> Jose M. Soria, Feike J. Leij, Rafael Angulo-Jaramillo, Carlos Fuentes, Randel Haverkamp and J.-Yves Parlange	176
<b>PARAMETER ESTIMATION TECHNIQUE FOR A WATER BALANCE MODEL AND APPLICATION TO MEASURED DATA</b> V. Toninelli, D. G. Salvucci and M. Mancini	192
<b>MODELING THE CONTINENTAL-SCALE DYNAMICS OF THE COUPLED LAND-SURFACE AND ATMOSPHERIC WATER BALANCES WITH A STOCHASTIC DIFFERENTIAL EQUATION</b> John P. Kochendorfer and Jorge A. Ramírez	207
<b>2002 MUNICIPAL RESPONSE TO DROUGHT IN THE COLORADO FRONT RANGE</b> Douglas Kenney, Roberta Klein and Adam Morrison	219
<b>EVOLUTIONARY NEURAL NETWORK MODELING FOR DESCRIBING RAINFALL-RUNOFF PROCESS</b> Alireza Nazemi, Hossein Poorkhadem,-N., Mohammad -R., Akbarzadeh -T. and Seyed Mahmood Hosseini	224

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TWENTY-THIRD HYDROLOGY DAYS  
March 31 – April 2, 2003



Dedicated to  
**José D. Salas**  
Borland Professor of Hydrology and Water Resources  
and Professor of Civil Engineering  
Civil Engineering Department  
Colorado State University

In recognition of his significant contributions to water resource and hydrologic science and engineering; flood prediction, forecasting and control; regional drought analysis, prediction, and management; modeling of hydro-climatic processes exhibiting shifting level patterns; modeling and simulation of periodic stochastic hydrologic processes; regional frequency analysis of extreme events; and the estimation of return periods and risk for dependent hydrologic processes.

## LIST OF ACCEPTED ABSTRACTS<sup>1</sup>

### **Linking drought research to water resource management actions**

Professor John A. Dracup, Department of Civil and Environmental Engineering,  
University of California, Berkeley

### **Scale Dependence Of Dispersivity Estimated From Temporal Moments In Heterogeneous Porous Media**

Daniel Fernández-García, Tissa H. Illangasekare, Environmental Science And Engineering  
Division, Colorado School Of Mines. Harihar Rajaram, Department Of Civil,  
Environmental And Architectural Engineering, University Of Colorado, Boulder

### **Short Comings in Applying Regional Hydraulic and Morphologic Databases in Natural Channel Design Projects**

W.K. Annable - Engineering Research Center, Department of Civil Engineering, Colorado  
State University, Fort Collins, Co. 80523-1372

### **Limiting Source Dimensions of Three-Dimensional Analytical Point Source Model for Solute Transport**

A. Noman M. Ahsanuzzaman, University of Oklahoma, Randall Kolar, PhD, University of  
Oklahoma, Musharraf Zaman, PhD, University of Oklahoma

### **Collecting continuous flow data on headwater reaches of the Little Snake River, Colorado**

Russell J. Anderson, Civil Engineering Department, Colorado State University, Fort  
Collins, CO, Brian P. Bledsoe, Civil Engineering Department, Colorado State University,  
Fort Collins, CO

### **Process controls on stream and river channel width**

Russell J. Anderson, Civil Engineering Department, Colorado State University, Fort  
Collins, CO, Brian P. Bledsoe, Civil Engineering Department, Colorado State University,  
Fort Collins, CO

### **Analysis of short-time single-ring infiltration under falling-head conditions with gravitational effects**

Rafael Angulo-Jaramillo, Laboratoire d'Etude des Transferts en Hydrologie et  
Environnement, Grenoble, France, David Elrick, Land Resource Science, University of  
Guelph, Ontario, Canada, J.-Yves Parlange, Pierre Gérard-Marchant, Department of  
Biological and Environmental Engineering, Cornell University, Ithaca, NY 14853, Randel  
Haverkamp, Laboratoire d'Etude des Transferts en Hydrologie et Environnement,  
Grenoble, France

### **Local Regression Quantile Estimator for Flood Frequency Analysis**

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<sup>1</sup> As of February 22, 2003

### **Electrically Induced Redox Barriers (e<sup>-</sup>barriers) - Borden Field Experiment**

Matthew N. Ballaban, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario, Canada, Tom Sale, Department of Civil Engineering, Colorado State University, Fort Collins, Colorado, USA, David Gilbert, Department of Civil Engineering, Colorado State University, Fort Collins, Colorado, USA, Robert W. Gillham, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario, Canada

### **The Application of Quantitative Assessment of Land Use Changes Impact on Water Conservation for Reservoir Watershed**

Tien-Yin Chou Director and Professor, GIS Research Center, Feng Chia University, Taichung, Taiwan., Zheng Dao Xie, Chief, Conservation Division, Water Resources Agency, Ministry of Economic Affairs, Taiwan. Mei-Hsin Chen, Lecture and Project Division Manager, GIS Research Center, Feng Chia University, Taichung, Taiwan.

### **Application of TOPMODEL in the Distributed Model Intercomparison Project (DMIP)**

Christina Bandaragoda, Civil and Environmental Engineering Department, Utah State University, Logan, UT, David G. Tarboton, Civil and Environmental Engineering Department, Utah State University, Logan, UT, Ross Woods, National Institute of Water and Atmospheric Research, NIWA, Christchurch, New Zealand

### **Effective discharge determination**

Carmen Bernedo, Water Resources, Hydrologic and Environmental Sciences Division, Civil Engineering Department, Colorado State University, Fort Collins, Jorge A. Ramírez, Water Resources, Hydrologic and Environmental Sciences Division, Civil Engineering Department, Colorado State University, Fort Collins

### **Development of theoretically based design criteria for a porous V-weir**

Chance J. Bitner, Hydraulics Division, Department of Civil Engineering, Colorado State University, Christopher I. Thornton, Hydraulics Division, Department of Civil Engineering, Colorado State University

### **On the probabilistic characterization of drought events**

A. Cancelliere, B. Bonaccorso, and G. Rossi, Civil and Environmental Engineering Department, University of Catania, Catania, Italy, J. D. Salas, Department of Civil Engineering, Colorado State University, Fort Collins, USA (on sabbatical leave at ETH, Zurich, Switzerland)

### **Cellular automata models of particle interactions in sediment entrainment**

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### **Variation of bedload rating and flow competence curves with stream and bed material parameters**

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## **Calibrated Groundwater Flow and Salinity Transport Modeling in the Lower Arkansas River Basin of Colorado**

J. Philip Burkhalter, Timothy K. Gates and John W. Labadie - Dept. of Civil Engineering, Colorado State University, Fort Collins, CO

## **Shear stress distributions in streams with high bank roughness**

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## **GIS Database Implementation for San Antonio River Authority**

Durmus Cesur, San Antonio River Authority, GIS/Database Administrator, Finance and Administration-Information Technology, San Antonio, TX

## **An Objective Method for the Intercomparison of Terrain Stability Models and Incorporation of Parameter Uncertainty**

Kiran Chinnayakanahalli, David G. Tarboton, and Robert T Pack, Civil and Environmental Engineering Department, Utah State University, Logan, UT

## **Information Content in Transient Drawdown Data**

Tom Clemo, Center for the Geophysical Investigation of the Shallow Subsurface, Boise State University, Boise, ID, Paul Micheals, Geological Sciences Department, Boise State University, Boise, ID, R. Michael Lehman, Idaho National Environmental and Engineering Laboratory, Idaho Falls, ID

## **Predicting the Spatial Distribution of Fine Sediment In Stream Networks**

Christopher O. Cuhaciyan, Civil Engineering Department, Colorado State University, Fort Collins, CO., Brian P. Bledsoe, Civil Engineering Department, Colorado State University, Fort Collins, CO

## **Natural And Surfactant Enhanced Dissolution Of Field DNAPLs**

Dongping Dai, Satawat Saenton, and Tissa H. Illangasekare, Environmental Science and Engineering Division, Colorado School of Mines Coolbaugh Hall, 14<sup>th</sup> and Illinois St., Golden, CO 80401

## **Severe Drought: A Review of the 2002 Water Year in Colorado**

Nolan J. Doesken, Colorado Climate Center, Atmospheric Science Department, Colorado State University, Fort Collins, Colorado - Michael A Gillespie, Snow Survey Division, Natural Resources Conservation Service, U.S. Department of Agriculture, Lakewood, Colorado

## **Drought In An Evolutionary Context: Molecular Evidence From Endemic Colorado River Fishes In Western North America**

Marlis R. Douglas, Ph.D., and Michael E. Douglas, Ph.D., Conservation Genetics, Biodiversity and Molecular Ecology, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO, and Patrick C. Brunner, Ph.D., Molecular Systematics and Biodiversity Division, Swiss Federal Research Station, Waedenswil, Switzerland



**Long-term effects of dam removal on aquatic biodiversity of the Colorado River**

Michael E. Douglas, Ph.D. and Marlis R. Douglas, Ph.D., Conservation Genetics, Biodiversity and Molecular Ecology, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO

**Effect of performance of Canal System in Ganges**

Kobadak and Pabna integrated rural development project on poverty. S.H.M.Fakhruddin Saad Siddiqui

**Spatial and temporal snowpack variation for the Salt River in Arizona**

Steven Fassnacht, Watershed Sciences Program, Department of Forest, Rangeland and Watershed Stewardship, Colorado State University, Fort Collins

**Improving MODFLOW's RIVER Package for Unsaturated Stream/Aquifer Flow**

Garey Fox, Water Resources, Hydrologic, and Environmental Sciences Division, Department of Civil Engineering, Colorado State University

**Estimating Streambed and Aquifer Parameters from a Stream/Aquifer Analysis Test**

Garey Fox, Water Resources, Hydrologic, and Environmental Sciences Division, Department of Civil Engineering, Colorado State University

**Real Time Monitoring of NAPL Sources Using Photon Attenuation Techniques on Chlorinated Solvents**

Jose L. Gago and Tissa Illangasekare, Colorado School of Mines, Environmental Science and Engineering Division, Golden, Colorado

**Using CFD to Define the Hydraulic Zone of Influence at Cooling Water Intake Structures**

Dan Gessler, Alden Research Laboratory, John Richardson, Alden Research Laboratory, Doug Dixon, Electric Power Research Institute

**Microbially Influenced Mass Transfer from Entrapped Pools of Non-Aqueous Phase Tetrachloroethene: Preliminary Results of Small Flow-Cell Experiments**

Kent C. Glover, Ann Hoenke, Tissa H. Illangasekare, and Junko Munakata-Marr, Colorado School of Mines, Environmental Science and Engineering Division, Golden, Colorado

**Water Release from Cross-linked Polyacrylamide**

C.H. Green, G. Butters, and G.E. Cardon, Colorado State University, Dept. of Soil & Crop Sciences

**Drought and Water Policy: Implications for Colorado**

Neil S. Grigg, Water Resources Planning and Management Division, Civil Engineering Department, Colorado State University, Fort Collins, CO

**Engineering Design Parameter Of Storms In Venezuela**

Edilberto Guevara. Professor of Civil Engineering, Carabobo University, Valencia, Venezuela

**Modeling the Influence of Irrigated Agriculture on Selenium Levels in the Uncompahgre River in Western Colorado**

R. Blair Hanna, Water Resources, Hydrologic and Environmental Sciences Division, Civil Engineering Department, Colorado State University, Jim C. Loftis, Civil Engineering Department, Colorado State University, Eric C. Schuck, Department of Agriculture and Resource Economics, Colorado State University, Fort Collins, CO

**Development of a Technique for Analyzing <sup>15</sup>N in Waters with Low Nitrate Content**

Greg Harp, Watershed Sciences, College of Natural Resources, Department of Geosciences, Colorado State University, Fort Collins, CO.

**Fine Sediment Dynamics in the Upper Colorado River During Spring Runoff and Summer Baseflows: Implications for Flow Recommendations and Biological Productivity**

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**Island Ageing and Dynamics in the Snake River, Western Idaho, USA**

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**Use of Chemical Oxidation to Reduce Rate-Limited Matrix Diffusion of PCE from Low Permeability Materials – A Numerical Study**

Jeffrey L. Heiderscheidt, Environmental Science and Engineering Division, Colorado School of Mines, Golden, Colorado, Tissa H. Illangasekare, Professor, Environmental Science and Engineering Division, Colorado School of Mines, Golden, Colorado, Robert L. Siegrist, Professor and Interim Director, Environmental Science and Engineering Division, Colorado School of Mines, Golden, Colorado

**Is Pan Evaporation Decreasing Across the Conterminous United States? If it is, so what?**

Michael T. Hobbins and Jorge A. Ramírez, Water Resources, Hydrologic and Environmental Sciences Division, Civil Engineering Department, Colorado State University, Fort Collins; Thomas C. Brown, Rocky Mountain Research Station, U. S. Forest Service, Fort Collins

**Use of a Rainfall Simulator to Assess Controls on Post-Fire Runoff and Sediment Production, Colorado Front Range**

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**Assessment of Phosphorus Distribution in a Drought-Impacted Reservoir and Recommendations for Potentially Mitigating Eutrophication Concerns**

Blair Hurst, Ken Carlson, Chester Watson, Department of Civil Engineering, CSU

**Inter-comparison of spatial estimation schemes for precipitation and temperature in hydrologic modeling**

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**A method of conducting Watershed Scale Sediment Impact Assessments for two highly erodible basins in Northern Mississippi :Implications for phosphorus loading and water quality.**

Brett Jordan, Department of Civil Engineering, Colorado State University, Fort Collins CO

**History Of Hydraulics and Fluid Mechanics At Colorado State University**

Pierre Y. Julien and Robert N. Meroney, Civil Engineering Department, Colorado State University

**2002 Municipal Response To Drought In The Colorado Front Range**

Douglas Kenney, University of Colorado Natural Resources Law Center, Boulder, Colorado, Roberta Klein CIRES Center for Science and Technology Policy Research, Boulder, Colorado, Adam Morrison, University of Colorado Department of Political Science, Boulder, Colorado

**Mass transfer characteristics of entrapped DNAPL during surfactant flushing in two-dimensional flow field.**

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**Streamflow and sediment yield following the 2000 Bobcat fire, Colorado Front Range**

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**Depicting channel reaches at sub-link scales using digital elevation models**

Alejandro N. Flores, Civil Engineering Department, Colorado State University, Brian P. Bledsoe, Civil Engineering Department, Colorado State University

**Factors affecting predictions of stream reach morphology using remotely sensed data: implications for restoration and habitat evaluation**

Alejandro N. Flores, Civil Engineering Department, Colorado State University, Brian P. Bledsoe, Civil Engineering Department, Colorado State University

**Effects of Drought on Antibiotic Occurrence and Water Quality in a River Influenced by Urban and Agricultural Activity**

Ben Lengacher, Kenneth Carlson, Shinwoo Yang, Department of Civil Engineering, Colorado State University, Fort Collins

**GIS-based temperature interpolation for distributed modeling of reference evapotranspiration**

Shujun Li, Civil and Environmental Engineering Department, Utah State University, Logan, UT, David G. Tarboton, Civil and Environmental Engineering Department, Utah State University, Logan, UT, Mac McKee, Civil and Environmental Engineering Department, Utah State University, Logan, UT

**Effects of the Hayman Fire and Thinning on Sediment Production Rates, Channel Morphology, and Water Quality**

Zamir Libohova, Watershed Science Academic Program, Forest, Rangeland, and Watershed Stewardship Dept., Colorado State University, Fort Collins, Lee H. MacDonald, Watershed Science Academic Program, Forest, Rangeland, and Watershed Stewardship Dept., Colorado State University, Fort Collins

**Coping with Droughts: Region-wide Reservoir Storage estimation for efficient Water Management, and Drought Mitigation**

Jens Liebe, Center for Development Research, University of Bonn, Germany, Nick van de Giesen, Center for Development Research, University of Bonn, Germany, Marc Andreini, Center for Development Research, University of Bonn, Germany, and IWMI, Accra, Ghana,

**Habitat Improvement Techniques for Aquatic Fishery: Application Experiences at Ta-Chia River in Taiwan**

Bing-Shyan, Lin, Department of Hydraulics, Feng Chia University, Taichung, Taiwan, Chao-Hsien Yeh Associate Professor, Department of Hydraulics, Feng Chia University, Taiwan, Hui-Pang Lien, Associate Professor, Department of Hydraulics, Feng Chia University, Taiwan, Ching-Hao Tuan, Professor, Department of Soil and Water Conservation, National Chung Hsing University, Taiwan,

**Climate, Water Resources, and Environmental Sustainability: Ensuring Adequate Water Supplies in the 21<sup>st</sup> Century.**

Martyn Clark, Chris Goemans, Charles Howe, Douglas Kenney, Rutherford Platt, Lee Rozaklis, James Saunders, Brad Udall, and John Wiener, Center for Science and Technology Policy Research, 1333 Grandview Avenue, Campus Box 488, University of Colorado at Boulder, Boulder, CO 80309-0488

**Application of Physical Principles of the Unit Hydrograph Method in Characterizing Streamflows for River Restoration and Management**

Margaret A. Matter, Civil Engineering Department, Colorado State University, Luis Garcia, Bioresources and Agricultural Engineering, Civil Engineering Department Colorado State University,

**South Platte River at Globeville Physical Model**

Peter M. McCarthy, Thomas E. Brisbane, and Steven R. Abt, Hydraulics Program, Civil Engineering Department, Colorado State University, Fort Collins

**Spatial Relations Between Soil Electrical Conductivity and Soil Water Content, Texture, and Chemistry**

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**Preliminary Analysis Of Sediment Transport Capacity In The Colorado Plateau**

Robert T. Milhous, Fort Collins Science Center. U.S. Geological Survey.

**Criteria For Risk Evaluation In Groundwater Management Projects: A Comparative Study**

Cinzia Miracapillo, Geologisch-Paläontologisches Institut der Universität Basel,

**Influence Of Pool Morphology On The Performance Of The Pitt For DNAPL Characterization**

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**Identification of the Ordinary High-Water Mark of the Snake River, Western Idaho, USA**

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**Common themes in channel design failure: Case studies from southern Ontario**

John Parish and Paul V. Villard, PARISH Geomorphic Ltd., Georgetown, ON, L7G 4J9, Email: [pvillard@parishgeomorphic.com](mailto:pvillard@parishgeomorphic.com)

**Electrically Induced Redox Barriers for the Treatment of Ground Water – Warren AFB Field Experiment**

Matthew Petersen, Chemical Engineering Department, Colorado State University, Fort Collins, David Gilbert, Civil Engineering Department, Colorado State University, Fort Collins, Tom Sale, Civil Engineering Department, Colorado State University, Fort Collins,

**Investigation of the Hydraulic Patterns in a Riffle using Three-Dimensional Velocity Characteristics**

Tracy L. Phelps, Department of Earth Resources, Colorado State University, Fort Collins, CO, Ellen E. Wohl, Department of Earth Resources, Colorado State University, Fort Collins, CO

**Drought in Colorado -Where are we in 2003?**

Roger A. Pielke, Sr., Department of Atmospheric Science, Colorado State University, Fort Collins, Colorado - Colorado State Climatologist

### **Post-Fire Erosion in the Colorado Front Range: Rates and Recovery**

Joseph H. Pietraszek and Lee H. MacDonald, Watershed Science Academic Program, Forest, Range, and Watershed Stewardship Dept., Colorado State University, Fort Collins, Juan de D. Benavides-Solorio, National Council of Science and Technology, Guadalajara, Mexico

### **Analyzing nonvolatile organic disinfection by-products using gas chromatography/mass spectrometry**

Xian Qiming, School of Environment, Nanjing University

### **AFCEE Source Zone Initiative- Technical Assistance To FE Warren, NAS Fort Worth & AFP 4**

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### **Drought, fire and forests – lessons from 1851 and 2002**

William H. Romme, Department of Forest, Range, and Watershed Stewardship, Colorado State University, Fort Collins

### **Effectiveness of BAER treatments in the Bobcat, Hayman, and Schoonover Fires**

Daniella T.M. Rough, Lee H. MacDonald, and Joseph W. Wagenbrenner, Watershed Science Program, College of Natural Resources, Colorado State University, Fort Collins, CO 80523

### **Relative Effects of Lithology on Fine Sediment Deposition In the Coast Range of Oregon**

Kurt A. Sable and Ellen E. Wohl: Geosciences Department, Colorado State University, Fort Collins CO 80523, Contact: [ksable@cnr.colostate.edu](mailto:ksable@cnr.colostate.edu)

### **Consequences of Incomplete Remediation of the DNAPL-Contaminated Aquifers: Intermediate-Scale Experiments and Numerical Modeling Studies**

Satawat Saenton and Tissa H. Illangasekare, Division of Environmental Science and Engineering, Colorado School of Mines, Golden, Colorado, 80401 U.S.A.

### **Progress in Stochastic Analysis, Modeling, and Simulation: SAMS-2003**

O.G. B. Sveinsson, International Research Institute (IRI), Columbia University, N. York – J. D. Salas, Professor of Civil Engineering, Colorado State University, Fort Collins, Colorado - W.L. Lane, Private Consultant, Golden, Colorado, D.K. Frevort, Hydraulic Engineer, U.S. Bureau of Reclamation, Technical Services Center, Lakewood, Colorado

### **Predicting Flow Regime for Ungauged Streams in the Western United States**

Stephen C. Sanborn, Civil Engineering Department, Colorado State University, Fort Collins, CO, Brian P. Bledsoe, Civil Engineering Department, Colorado State University, Fort Collins, CO

### **Storage analysis using stochastic nonparametric streamflow simulation: Case study of the proposed Seaman reservoir expansion in Northern Colorado**

Satish Regonda, Balaji Rajagopalan and Kenneth Strzepek Department of Civil Environmental and Architectural Eng., University of Colorado, Boulder, CO

### **One-Dimensional Column Studies of Emulsified Vegetable Oil for Dense Non-Aqueous Phase Liquid Subsurface Remediation**

Shannon Ullmann, Dongping Dai and Tissa H. Illangasekare, Division of Environmental Science and Engineering, Colorado School Of Mines, Golden, CO 80401. Email: [sschakel@mines.edu](mailto:sschakel@mines.edu)

### **The Axis of Risk and Uncertainty in Hydrologic Design**

J. D. Salas, Department of Civil Engineering, Colorado State University, Fort Collins, USA - P. Burlando, Institute of Hydromechanics and Water Resources Management, ETH, Zurich, Switzerland - J.H. Heo, and D.J. Lee School of Civil & Environmental Engineering, Yonsei University, Seoul, 120-749, Korea

### **Characterizing the Dynamics of Droughts**

José D. Salas, Professor, Department of Civil Engineering, Colorado State University, Fort Collins, Colorado

### **Aggregation scenarios to model water fluxes in watersheds with spatial changes in soil texture**

Jose M. Soria, Feike J. Leij, Rafael Angulo-Jaramillo, Laboratoire d'Etude des Transferts en Hydrologie et Environnement, Grenoble, France, Carlos Fuentes, Instituto Mexicano de Tecnologia del Agua (IMTA), Mexico, Randel Haverkamp, Laboratoire d'Etude des Transferts en Hydrologie et Environnement, Grenoble, France, J.-Yves Parlange, Department of Biological and Environmental Engineering, Cornell University, Ithaca, NY 14853

### **Effect of Forest Thinning on Soil Moisture after 12 Years**

Steve Thomas, Watershed Science Academic Program, Forest, Rangeland, and Watershed Stewardship Dept., Colorado State University, Fort Collins

### **Role Of Stream Stability And Channel Morphology In Controlling Phosphorus Export From Agricultural Watersheds**

Joel A. Tillery, Civil Engineering, Colorado State University, Kenneth H. Carlson, Civil Engineering, Colorado State University, Chester C. Watson, Civil Engineering, Colorado State University

### **Issues Of Heterogeneity, Characterization, Mass Transfer And Up-Scaling Associated With Partial Source Zone Treatment At DNAPL Contaminated Sites**

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### **Parameter estimation technique for a water balance model and application to measured data**

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### **DNAPL Dissolution in Random Heterogeneity Fields**

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### **Mountain Floodplain Hydrologic Regime Alteration due to Beaver Activity**

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### **An Investigation of the Downstream Effects of DNAPL Source Zone Remediation.**

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### **Channel Remediation and Restoration Design for Silver Bow Creek, Butte Montana**

C. Gary Wolff, Senior Engineer, Mussetter Engineering, Inc., Fort Collins, Colorado, Robert A. Mussetter, Principal Engineer, Mussetter Engineering, Inc., Fort Collins, Colorado, Bill Bucher, Senior Engineer, Maxim Technologies, Inc., Helena, Montana

### **Influence of Bedrock Geology on Water Quality in Selected Front Range Reservoirs**

Julie Woodke, Department of Forest, Rangeland, and Watershed Stewardship, Colorado State University, Fort Collins

### **Vegetable Oil Delivery Techniques For Use As A Carbon Source In The Reductive Dechlorination Of Chlorinated Solvents In Saturated Porous Media**

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### **Snow covered area images based representation of spatial distribution pattern of snow in a mountainous watershed**

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