

Program Agenda

Presenting authors appear in bold

Saturday, November 11, 2000

- 3:00pm- Conference registration office opens – *Westminster*
8:00pm and poster presenter's display set-up – *Windsor Salons I-IV*

Sunday, November 12, 2000

- 7:30am- Conference registration office opens – *Westminster*
5:00pm and poster presenter's display set-up – *Windsor Salons I-IV*
- 7:30am Continental breakfast for tour registrants – *Lobby Level, Crickets*
- 8:00am- Tour to OEW and Orange County ESA (lunch provided)
5:00pm *Buses depart from front lobby, outside front door*
- 6:00pm- Welcome reception – *Poolside*
8:00pm

Monday, November 13, 2000

am

- 7:30 Conference registration office opens – *Westminster*
8:00 Continental breakfast – *Windsor Salons I-IV, poster room*

Plenary Session – Global Issues

Windsor Salons V-VII

Chair: *R. H. Kadlec*, Wetland Management Services

am

- 8:30 **Introductory Remarks**
K. Ramesh Reddy, University of Florida, Gainesville, FL, USA
Raimund Habertl, IWA Specialist Group and Dept. for Sanitary Engineering and Water Pollution Control, University of Agricultural Sciences Vienna, Vienna, Austria
Joseph Joyce, Executive Associate Vice President for Agriculture and Natural Resources, University of Florida, Gainesville, FL USA
- 9:00 **Keynote Speaker: Restoring the World's Everglades**
David Struhs, Secretary, Florida Department of Environmental Protection, Tallahassee, FL, USA
- 9:30 **Wetland and watershed restoration: What the new millennium will bring?**
William J. Mitsch, Ohio State University, Olentangy River Wetland Research Park, Columbus, OH, USA
- 10:00 **Fundamental Processes Within Natural and Constructed Wetland Ecosystems: Short-Term vs. Long-Term Objectives**
Robert G. Wetzel, University of Alabama, Tuscaloosa, AL, USA
- 10:30 Refreshment break - *Windsor Salons I-IV, poster room*
- 10: 50 **Development of Reed Bed Systems - A European Perspective**
Christoph Platzer, COBAS – Consultaria Brasil-Alemanha de Saneamento Ltda., Florianópolis, Brazil
- 11:20 **Plants as Ecosystem Engineers in Subsurface-Flow Treatment Wetlands**
Chris C. Tanner, National Institute of Water and Atmospheric Research (NIWA), Hamilton, New Zealand
- 11:50 Discussion
- 12:00 Adjourn (lunch is on your own)

Monday, November 13, 2000 (continued)

Concurrent Session I - Phosphorus Removal and Transformations (part I)

Windsor Salons V-VII

Chair: *Larry Battoe, St. Johns River Water Management District*

pm

- 1:30 **How can Phosphorus Removal be Sustained in Subsurface-Flow Constructed Wetlands?**
H. Brix, Department of Plant Ecology, University of Aarhus, Nordlandsvej, Risskov, Denmark; *C. A. Arias*, Department of Hydraulics, Polytechnic University of Catalunya, Barcelona, Spain; *M. del Bubba*, Department of Analytical Chemistry, University of Florence, Florence, Italy
- 1:50 **Measurement and Modelling of Phosphorus Retention in Small Constructed Wetlands Treating Agricultural Non-Point Source Pollution**
B. C. Braskerud, Jordforsk (Norwegian Centre for Soil and Environmental Research), Norway
- 2:10 **Phosphorus Removal from Trout Farm Effluents by Constructed Wetlands**
Yves Comeau, Department of Civil, Geological and Mining Engineering, Ecole Polytechnique, Montreal Quebec, Canada; *Jacques Brisson*, Institut de recherche en biologie végétale, Montreal Quebec, Canada; *Jean-Pierre Reville*, Pisciculture du Lac William, St-Ferdinand Quebec, Canada; *Christiane Forget* and *Aleksandra Drizo*, Department of Civil, Geological and Mining Engineering, Ecole Polytechnique, Montreal, Quebec, Canada
- 2:30 **Phosphorus Removal in a Vertical Upflow Constructed Wetland System**
Neda Farahbakhshazad, Department of Applied Environmental Science, Göteborg University, Göteborg, Sweden; *Gregory M. Morrison*, Water Environment Transport, Chalmers University of Technology, Göteborg, Sweden
- 2:50 **Phosphorus Retention Capacity of Iron-Ore and Blast Furnace Slag in Subsurface Flow Constructed Wetlands**
Björn Grüneberg and *Jürgen Kern*, Institute of Agricultural Engineering, Potsdam, Germany
- 3:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 3:30 **Pilot Study for Phosphorus Removal from Tertiary Effluent Using a Modified Submerged Bed Wetland System**
L. A. Spokas and *R. L. Lavigne*, Department of Plant and Soil Sciences, University of Massachusetts, Amherst, MA, USA
- 3:50 **The Impact of Biomass Harvesting on Phosphorus Uptake by Wetland Plants**
Sung-Youn Kim, Department of Environmental Science and Engineering, Kwangju Institute of Science and Technology (K-Jist), Korea; *Phillip M. Geary*, School of Geosciences, The University of Newcastle, Callaghan, NSW, Australia
- 4:10 **Seasonal Variations in Nutrient Removal in Cold Climate Constructed Wetland**
Leif Ydstebø, School of Science and Technology, Stavanger University College, Stavanger, Norway; *Roald Kommedal* and *Rune Bakke*, Department of Environmental Technology, Telemark University College, Porsgrunn, Norway
- 4:30 **Removing Filterable Reactive P from Highly Coloured Stormwater Using Constructed Wetlands**
Mark A. Lund, *Paul S. Lavery* and *Raymond F. Froend*, Centre for Ecosystem Management, Edith Cowan University, Joondalup, WA, Australia
- 4:50 **Post-Installation Solutions for Phosphorous Reduction in Cold Climate Treatment Wetlands**
B. C. Anderson and *S. Rosolen*, Queen's Natural FLOWS Research Group, Department of Civil Engineering, Queen's University, Kingston, Ontario, Canada
- 5:10 Adjourn

Monday, November 13, 2000 (continued)

Concurrent Session II - Agricultural Waste Waters

Windsor Salons VIII and IX

Chair: *Patrick Hunt*, USDA-ARS, South Carolina

pm

- 1:30 **A Superficial Flow Constructed Wetland for Treating Agricultural Waste Waters**
M. Borin, G. Bonaiti, G. Santamaria and L. Giardini, Dipartimento di Agronomia Ambientale e Produzioni Vegetali, Agripolis, Università di Padova, Legnaro (PD), Italy
- 1:50 **Constructed Wetlands: A More Suitable Alternative for Wastewater Purification in Uruguayan Dairy Processing Industry**
S. Perdomo, and *C. Bangueses*, Inst. of Chemical Engineering, School of Engineering, Univ. of the Republic, Montevideo, Uruguay; *J. Fuentes*, Dept. of Mathematics, School of Chemistry, Univ. of the Republic, Montevideo, Uruguay; *J. Castro* and *H. Acevedo*, Uruguayan Technology Laboratory, LATU, Montevideo, Uruguay; *C. Michelotti*, Inst. of Chemical Engineering, School of Engineering, Univ. of the Republic, Montevideo, Uruguay
- 2:10 **Treatment of Stormwater Runoff from Row Crop Farming in Ruskin, Florida**
Betty T. Rushton, Southwest Florida Water Management District, Brooksville, FL, USA; *Benjamin M. Bahk*, Korea Institute of Construction Technology, Ilsan-Gu, Koyang-shi Konggi-do, Republic of Korea
- 2:30 **Experimental Evidence on the Spatial Heterogeneity of Nutrient Removal in Wetlands used for Agricultural Wastewater Treatment**
Jose A. Romero, F. A. Comín and Carmen García, Department of Ecology, University of Barcelona, Barcelona, Spain
- 2:50 **Treatment of Swine Wastewater in Marsh-Pond-Marsh Constructed Wetlands**
G. B. Reddy, Department of Natural Resources & Environmental Design, North Carolina A&T State University, Greensboro, NC, USA; *Patrick G. Hunt*, United States Department of Agriculture, Agricultural Research Service, Coastal Plains, Soil, Water and Plant Research Center, Florence, SC, USA; *Richard Phillips*, Department of Natural Resources & Environmental Design, North Carolina A&T State University, Greensboro, NC, USA; *Kenneth Stone*, United States Department of Agriculture, Agricultural Research Service, Coastal Plains, Soil, Water and Plant Research Center, Florence, SC, USA; *Anthony Grubbs*, Department of Natural Resources & Environmental Design, North Carolina A&T State University, Greensboro, NC, USA
- 3:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 3:30 **Reed Bed Dewatering of Agricultural Sludges and Slurries**
J. K. Edwards and *K. R. Gray*, School of Chemical Engineering, University of Birmingham, Birmingham UK; *D. J. Cooper*, A.R.M. Ltd., Rydal House, Rugeley, Staffordshire, UK; *A. J. Biddlestone*, School of Chemical Engineering, University of Birmingham, Birmingham, UK; *N. Willoughby*, A.R.M. Ltd., Rydal House, Rugeley, Staffordshire, UK
- 3:50 **Wetland System for Agriculture and Animal Industry**
Carmem Lúcia Roquette Pinto, Universidade Federal Fluminense, Niterói, Rio de Janeiro, Brazil; *Lila Risso*, Instituto Nacional de Tecnologia, Rio de Janeiro, Brazil;
Roberto G. Pereira, Márcio Oliveira, and Jorge B. Jorge, Universidade Federal Fluminense, Niterói, Rio de Janeiro, Brazil
- 4:10 Adjourn

Monday, November 13, 2000 (continued)

Concurrent Session III - Subsurface Flow Wetland Systems (part I)

Windsor Salon X and XI

Chair: *F. T. Dierberg*, DB Environmental, Inc.

pm

- 1:30 **Constructed Wetlands for Wastewater Treatment in the Czech Republic**
Jan Vymazal, Ecology and Use Wetlands, Praha, Czech Republic

- 1:50 **Nutrient Removal in Subsurface Flow Constructed Wetlands for Application in Sensitive Regions**
H. Rustige, Akut Umweltschutz Ingenieurgesellschaft mbH, Biesenthal, Germany; *Chr. Platzer*, COBAS – Consultaria Brasil-Alemanha De Saneamento Ltda., Florianópolis, Brazil
- 2:10 **Residential Subsurface Flow Treatment Wetlands in Northern Minnesota**
R. Axler, *J. Henneck* and *B. McCarthy*, Natural Resources Research Institute, University of Minnesota, Duluth, MN, USA
- 2:30 **On-Site Wastewater Treatment by Reed Bed in the Moist Subtropics**
L. Davison, *T. Headley* and *M. Edmonds*, School of Resource Science and Management, Southern Cross University, Lismore, NSW, Australia
- 2:50 **Linear Alkylbenzenesulfonates (LAS) Removal in a Pilot Submerged Horizontal Flow Constructed Wetland**
M. Del Bubba, *L. Lepri*, and *A. Cincinelli*, Department of Public Health, Epidemiology and Environmental Analytical Chemistry, University of Florence, Florence, Italy; *O. Griffini* and *F. Tabani*, Florentine Division of Water Production and Wastewater Treatment, Municipality of Florence, Florence, Italy
- 3:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 3:30 **Removal of Hydrogen Sulphide BOD from Brackish Water Using Vertical Flow Wetlands in a Coastal Caribbean Environment**
E. Giraldo and *E. Zárate*, CIIA, Centro de Investigaciones en Ingeniería Ambiental. Departamento De Ingeniería Civil y Ambiental, Universidad de los Andes, Santafé de Bogotá, Colombia
- 3:50 **Influence of Substrate Clogging on the Treatment Capacity of a Vertical-Flow Constructed Wetland System**
J. Laber, *R. Haberl*, *R. Perfler* and *G. Langergraber*, Dept. for Sanitary Engineering and Water Pollution Control, University of Agricultural Sciences Vienna, Vienna, Austria
- 4:10 **Innovations Concerning the Wastewater Treatment**
D. H. Müller and *K. Coppik*, Staatliche Lehr- und Forschungsanstalt für Landwirtschaft Weinbau und Gartenbau, Fachbereich Ökologie, Neustadt, W.Germany; *L. Coppik*, Landesamt für Wasserwirtschaft Rheinland-Pfalz, Mainz, Germany
- 4:30 **Compact Wetland System for Urban Area in Japan**
Keigo Nakamura, River Environment Division, Environment Department, Public Works Research Institute, Ministry of Construction, Asahi Tsukuba, Japan; *Osamu Miki*, Nippon Steel Corporation, Tomitsu-Shi, Chiba, Japan; *Yukihiro Shimatani*, River Environment Division, Environment Department, Public Works Research Institute, Ministry of Construction, Asahi Tsukuba, Japan
- 4:50 **The Removal of Nutrients from Plant Nursery Irrigation Runoff in Subsurface Horizontal-Flow Wetlands**
T. R. Headley, School of Resource Science and Management, Southern Cross University, Lismore, NSW, Australia; *D. O. Huett*, Tropical Fruit Research Station, NSW Agriculture, Alstonville, NSW, Australia; *L. Davison*, School of Resource Science and Management, Southern Cross University, Lismore, NSW, Australia
- 5:10 Adjourn

Monday, November 13, 2000 (continued)

Poster Session 6:00pm-8:00pm

Windsor Salons I-IV

- 5:10pm Conference registration office closes
- 6:00pm Poster reception
- 7:00pm Poster presenters present by their material for discussion
Poster papers and presenters are listed by category at the end of this program
- 8:00pm Program concluded for the day

Tuesday, November 14, 2000

8:00am Conference registration office opens - *Westminster*
Continental breakfast - *Windsor Salons I-IV, poster room*

Concurrent Session I- Phosphorus Removal and Transformations (part II)

Windsor Salons V-VII

Chair: *Jennifer George*, South Florida Water Management District

am

- 8:30 **The Use of Macrophyte-Based Systems for Phosphorus Removal: An Overview of 25 Years of Research and Operational Results in Florida**
Thomas A. DeBusk and *Forrest E. Dierberg*, DB Environmental Laboratories, Inc., Rockledge, FL, USA; *K. Ramesh Reddy*, Wetland Biogeochemistry Laboratory, Soil and Water Science Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, USA
- 8:50 **Environmental Impacts to the Everglades Ecosystem: A Historical Perspective and Restoration Strategies**
Michael J. Chimney, Ecological Technologies Department, South Florida Water Management District, West Palm Beach, FL, USA; *Gary Goforth*, Environmental Engineering Section, South Florida Water Management District, West Palm Beach, FL, USA
- 9:10 **Performance of a Recirculating Wetland Filter Designed to Remove Particulate Phosphorus for Restoration of Lake Apopka (Florida, USA)**
M. F. Coveney, *E. F. Lowe*, and *L. E. Battoe*, Department of Water Resources, St. Johns River Water Management District, Palatka, FL, USA
- 9:30 **Evaluation of Phosphorus Retention in a South Florida Treatment Wetland**
Martha K. Nungesser and *Michael J. Chimney*, Ecological Technologies Department, South Florida Water Management District, West Palm Beach, FL, USA
- 9:50 **Chemical Treatment as a Supplement to Natural Systems for Phosphorus Removal**
J.L. Lopez and *D. Campbell*, Everglades Construction Project, Ecological Technologies Department, South Florida Water Management District, West Palm Beach, FL, USA; *T. Emenhisser*, *T.Horan* and *E. Shanon*, HSA Engineers & Scientists, West Palm Beach, FL, USA
- 10:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 10:30 **Standard of Comparison for Advanced Treatment Technologies for Treating Discharges into the Everglades Protection Area**
Lori Wenkert and *Gregory Coffelt*, South Florida Water Management District, West Palm Beach, FL, USA
- 10:50 **The Everglades Nutrient Removal Project Test Cells: STA Optimization – Status of the Research at the North Site**
Jana Majer Newman and *Tammy Lynch*, Ecological Technologies Department, South Florida Water Management District, West Palm Beach, FL, USA
- 11:10 **Phosphorus Removal from Everglades Agricultural Area Runoff by Submerged Aquatic Vegetation/Limerock Treatment Technology: An Overview of Research**
Binhe Gu, Ecological Technologies Department, South Florida Water Management District, West Palm Beach, FL, USA; *Thomas A. Debusk*, DB Environmental Laboratories, Inc., Rockledge, FL, USA; *Michael J. Chimney* and *Kathleen C. Pietro*, Ecological Technologies Department, South Florida Water Management District, West Palm Beach, FL, USA; *Taufiqul Aziz*, Florida Department of Environmental Protection, Tallahassee, FL, USA
- 11:30 **Potential Internal Loading of Phosphorus in Constructed Wetlands**
H. K. Pant and *K. R. Reddy*, Wetland Biogeochemistry Laboratory, Soil and Water Science Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, USA
- 11:50 **Progress in the Research and Demonstration of Everglades Periphyton-Based Stormwater Treatment Areas**
J. S. Bays, CH2M HILL, Tampa, FL, USA; *R. L. Knight*, Environmental Consultant, Gainesville, FL, USA; *L. Wenkert*, South Florida Water Management District, West Palm Beach, FL, USA; *R. Clarke*, CH2M HILL, Gainesville, FL, USA; *S. Gong*, CH2M HILL, Deerfield Beach, FL, USA
- 12:10 Adjourn (lunch is on your own)

Tuesday, November 14, 2000 (continued)

Concurrent Session II - Optimization and Modelling

Windsor Salons VIII and IX

Chair: *Jim Bays*, CH2M HILL

am

- 8:30 **Thermal Environments of Subsurface Treatment Wetlands**
Robert H. Kadlec, Wetland Management Services, Chelsea, MI, USA
- 8:50 **Cold Climate Wetlands: Design & Performance**
S. Wallace, North American Wetland Engineering, Forest Lake, MN, USA; *G. Parkin* and *C. Cross*, Department of Civil & Environmental Engineering, University of Iowa, Iowa City, IA, USA
- 9:10 **Behavior of Organic Carbon During Subsurface Wetland Treatment in the Sonoran Desert**
David M. Quanrud, Department of Hydrology and Water Resources, The University of Arizona, Tucson, AZ, USA; *Martin M. Karpiscak*, Office of Arid Lands Studies, The University of Arizona, Tucson, AZ, USA; *Kevin E. Lansey*, Department of Civil Engineering and Engineering Mechanics, The University of Arizona, Tucson, AZ, USA; *Robert G. Arnold*, Department of Chemical and Environmental Engineering, The University of Arizona, Tucson, AZ, USA
- 9:30 **Biochemical Indicators of Pore Clogging Status and Accumulated Organic Solids in a Gravel-Bed Constructed Wetland**
Long Nguyen, National Institute of Water & Atmospheric Research Ltd. (NIWA), Hamilton, New Zealand
- 9:50 **Performance Modeling of Subsurface-Flow Constructed Wetlands Systems**
M. F. Dahab and *W. Liu*, Department of Civil Engineering, University of Nebraska-Lincoln, Lincoln, NE, USA; *R. Y. Surampalli*, US Environmental Protection Agency, Kansas City, KS, USA
- 10:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 10:30 **The Influence of Vegetation on Hydraulic Performance in a Surface Flow Wetland**
Luigi Dal Cin, Dipartimento dei Processi Chimici dell'Ingegneria, Università di Padova, Padova, Italy; *Jesper Persson*, The Royal Danish School for Pharmacy, Copenhagen, Denmark
- 10:50 **Design Analysis of a Recirculating Living Machine for Domestic Wastewater Treatment**
John Ives Halperin, Natural Systems International, Alexandria, VA, USA; *Patrick C. Kangas*, Biological Resources Engineering Department, University of Maryland, College Park, MD, USA
- 11:10 **The Influence of Water Table Fluctuations on the Processes in the Rhizosphere of Common Reed (*Phragmites australis*)**
O. Urbanc-Berčič, and *A. Gaberščik*, National Institute of Biology, Ljubljana, Slovenia
- 11:30 **Design Study on Gravel Bed Constructed Wetland Wastewater Treatment System in the Subtropics**
Yang Yang, South China Institute of Environmental Sciences, SEPA Yuancun, Guangzhou, P. R. China; *Zhenbing Wu*, Institute of Hydrobiology, The Chinese Academy of Sciences, Luojiashan, Wuhan, P. R. China
- 11:50 Adjourn (lunch is on your own)

Tuesday, November 14, 2000 (continued)

Concurrent Session III - Stormwater

Windsor Salon X and XI

Chair: *Eric Livingston*, Florida Department of Environmental Protection

am

- 8:30 **Stormwater Treatment: Do Constructed Wetlands Yield Improved Pollutant Management Performance over Detention Pond Systems**
H. J. Bavor, *C. M. Davies*, and *K. Sakadevan*, Water Research Laboratory, Centre for Water and Environmental Technology, University of Western Sydney – Hawkesbury, Richmond, Australia

- 8:50 **An Experimental Constructed Wetland System for the Treatment of Highway Runoff in the UK**
R. B. E Shutes, *D. M Revitt* and *L. N. L Scholes*, Urban Pollution Research Centre, Middlesex University, London, UK; *M. Forshaw* and *B. Winter*, Environment Agency, Howbery Park, Wallingford, UK
- 9:10 **Siting and Sizing of (RE) Constructed Wetlands for Watershed Planning and Management**
Luca Palmeri, Dipartimento dei Processi Chimici dell'Ingegneria, University of Padua, Padova, Italy and Ecosystem Research Center, Christian-Albrechts-University of Kiel, Kiel, Germany; *Giuseppe Bendoricchio*, Dipartimento dei Processi Chimici dell'Ingegneria, University of Padua, Padova, Italy
- 9:30 **Eutrophication Control in Large Reservoirs Using Constructed Wetland Systems – Integrated Aquatic Plant Management**
Eneas Salati Filho, Institute for Applied Ecology, Piracicaba, SP, Brazil; *Daniel Antonio Salati Marcondes*, São Paulo Power Company-CESP, São Paulo, SP, Brazil; *João Marcelo Elias*, Center of Environmental Studies-CEA / University of São Paulo State, Rio Claro, SP, Brazil; *Sandra Furlan Nogueira*, Center of Nuclear Energy for Agriculture, CENA / São Paulo University, Piracicaba, SP, Brazil
- 9:50 **The Constructed Wetlands Technology for De-Eutrophication of Aquatic Ecosystems**
F. V. Stolberg and *Yu. I. Vergeles*, Department of Urban Environmental Engineering & Management, State Academy of Municipal Economy, Kharkiv, Ukraine
- 10:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 10:30 **Treatment of Backwash Water Associated with the Operation of a Potable Water Supply Well Field**
Craig D. Martin, **Keith D. Johnson** and *G. A. Moshiri*, Wetland Sciences, Inc., Gulf Breeze, FL, USA
- 10:50 **Suspended Solids Removal in Stormwater Wetlands: Quantifying the Role of Aquatic Macrophytes**
Tony H. F. Wong, Department of Civil Engineering, Monash University & Cooperative Research Centre for Catchment Hydrology, Australia; *Peter F. Breen*, Melbourne Water Corporation and Cooperative Research for Freshwater Ecology, Australia; *Sara Lloyd* and *Tracey Walker*, Department of Civil Engineering, Monash University & Cooperative Research Centre for Catchment Hydrology, Australia; *Britta Dahnke*, Department of Civil Engineering, University of Essen, Germany; *Richard Wootton*, Department of Civil Engineering, Monash University & Cooperative Research Centre for Catchment Hydrology, Australia
- 11:10 **Application of a Constructed Wetland for Non-Point Source Pollution Control**
C. M. Kao and *H. Y. Lee*, Institute of Environmental Engineering, National Sun Yat-Sen University, Kaohsiung, Taiwan; *C. K. Wen*, Department of Environmental Engineering, National Chen-Kung University, Tainan, Taiwan
- 11:30 **Metals in Combined Conventional and Vegetated Road Runoff Control Systems**
H. Pontier and **J. B. Williams**, School of Biological Sciences, University of Portsmouth, Portsmouth, UK; *E. May*, Department of Civil Engineering, University of Portsmouth, Portsmouth, UK
- 11:50 Adjourn (lunch is on your own)

Tuesday, November 14, 2000 (continued)

Concurrent Session I -Nitrogen Removal and Transformations – part I

Windsor Salons V-VII

Chair: *John White*, University of Florida

pm

- 1:30 **Designs for Nitrogen Removal - Minot's Constructed Wetland - 10 Years Later**
Donald A. Hammer, Hammer Resources, Inc., Norris, TN, USA; *David L. Burckhard*, Water & Wastewater Department, City of Minot, Minot, ND, USA
- 1:50 **High Rate Vertical Bed for Nitrification**
M. Green, *E. Artzi*, *S. Tarre* and *O. Lahav*, Faculty of Agricultural Engineering, Technion, Haifa, Israel
- 2:10 **Nitrogen Removal of Artificial Pond Underlaid Grassland Surface Layer**
Masayuki Hojito, National Grassland Research Institute, Senbonmatsu, Nishinasuno, Tochigi, Japan; *Yasuyuki Kouda*, Konsen Agricultural Experiment Station, Nakashibetsu, Hokkaido, Japan

- 2:30 **Nitrogen Removal in a Combined System: Vertical Vegetated Bed Over Horizontal Flow Sand Bed**
S. Kantawanichkul and *P. Neamkam*, Department of Environmental Engineering, Chiang Mai University, Chiang Mai, Thailand; *R.B.E. Shutes*, Urban Pollution Research Centre, Middlesex University, London, UK
- 2:50 **Development of a Quick and Low Cost Method for Nitrate Removal**
R. Díaz, J. García and *R. Mujeriego*, Environmental Engineering Division, School of Civil Engineering, Technical University of Catalonia, Barcelona, Spain
- 3:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 3:30 **Comparison of Design Strategies for Nitrogen Removal from Animal Waste Using Constructed Wetlands**
S. K. Liehr, Biological & Agricultural Engineering Department, North Carolina State University, Raleigh, NC, USA; *C. Anastasiou*, Civil Engineering Department, North Carolina State University, Raleigh, NC, USA; *J. J. Classen* and *J. M. Rice*, Biological & Agricultural Engineering Department, North Carolina State University, Raleigh, NC, USA
- 3:50 **Denitrification in Free Water Surface Wetlands Receiving Carbon Supplements**
Peter S. Burgoon, Water Quality Engineering, Inc., Wenatchee, WA, USA
- 4:10 **Removal of Nutrients from Combined Sewer Overflows and Lake Water in a Vertical-Flow Constructed Wetland System**
Lisbeth Gervin, Copenhagen Water, Department of Environment, Copenhagen, Denmark; *Hans Brix*, Department of Plant Ecology, University of Aarhus, Risskov, Denmark
- 4:30 **Effect of Hemi-Marsh Reconfiguration on Nitrogen Transformations in a Southern California Treatment Wetland**
J. J. Sartoris and *J. S. Thullen*, U.S. Geological Survey, Midcontinent Ecological Science Center, Denver, CO, USA; *L. B. Barber*, U.S. Geological Survey, National Research Program, Boulder, CO, USA
- 4:50 Adjourn

Tuesday, November 14, 2000 (continued)

Concurrent Session II - Pathogen Removal

Windsor Salons VIII and IX

Chair: *Joe Schaefer*, University of Florida

pm

- 1:30 **Microbial Indicator Removal in On-Site Constructed Wetlands for Wastewater Treatment in the Southeastern US**
E. C. Barrett, Research Triangle Institute, Research Triangle Park, NC, USA; *M. D. Sobsey*, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA; *C. H. House*, Department of Forestry, North Carolina State University, Raleigh, NC, USA; *K. D. White*, Department of Civil Engineering, University of South Alabama, Mobile, AL, USA
- 1:50 **Retention of Microbiological Organisms in Constructed Wetlands**
Ulrich Hagendorf and *Klaus Diehl*, Federal Environmental Agency, Langen, Germany; *Irmgard Feuerpfeil* and *Annette Hummel*, Federal Environmental Agency, Research Unit Bad Elster, Bad Elster, Germany; *Regine Szewczyk*, Federal Environmental Agency, Berlin
- 2:10 **Removal of Bacterial Indicators and Pathogens from Dairy Wastewater by a Treatment System**
M. M. Karpiscak, Office of Arid Lands Studies, University of Arizona, Tucson, AZ, USA; *L. R. Sanchez*, Department of Soil, Water and Environmental Science, University of Arizona, Tucson, AZ, USA; *R. J. Freitas*, Department of Agricultural Biosystems Engineering, University of Arizona, Tucson, AZ, USA; *C. P. Gerba*, Department of Soil, Water and Environmental Science, University of Arizona, Tucson, AZ, USA
- 2:30 **Removal of Helminthic Eggs and Protozoan Cysts from Urban Wastewater Using Constructed Wetlands in Arid Climate**
L. Mandi, *M. Abissy*, *O. Amahmid* and *Kh. Bouhoum*, Department of Biology, Faculty of Science Semlalia, University Cadi Ayyad, Marrakech, Morocco

- 2:50 **Distribution and Removal of Faecal Coliforms in a Constructed Wetland in Uganda**
T. O. Okurut, National Water and Sewerage Corporation, Kampala, Uganda; *J. J. A. van Bruggen*, IHE Delft, DA Delft, The Netherlands
- 3:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 3:30 **Removal Kinetics and Viability of Bacteria in Horizontal Subsurface Flow Constructed Wetlands**
A. Warren, Department of Zoology, Natural History Museum, London, UK; *O. Decamp*, Oceanic Institute, Makapu'u Point, Waimanalo, HI, USA; *E. Ramirez*, ENEP Iztacala UNAM, Tlalnepantla, Mexico D.F., Mexico
- 3:50 **Protozoan Predation as a Mechanism for the Removal of *Cryptosporidium* Oocysts from Wastewaters in Constructed Wetlands**
R. Stott, Dept. Civil Engineering, University of Portsmouth, Portsmouth, UK; *E. May*, School of Biological Sciences, University of Portsmouth, Portsmouth, UK; *E. Matsushita*, Biologie Cellulaire Et Physiologie, Université Pierre et Marie Curie, Paris, France; *A. Warren*, Department of Zoology, Natural History Museum, London, UK
- 4:10 **Pathogen Reductions in Constructed Wetlands Treating Swine Wastewater**
V. R. Hill and *M. D. Sobsey*, Department of Environmental Sciences & Engineering, School of Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA
- 4:30 **Occurrence and Die-Off of Indicator Organisms in the Sediment in Two Constructed Wetlands**
Thor Axel Stenström and *Anneli Carlander*, Department of Water and Environmental Microbiology, Swedish Institute for Infectious Disease Control, Solna, Sweden
- 4:50 **Distribution and Retention of Faecal Coliforms in the Nakivubo Wetland in Kampala, Uganda**
F. Kansiime, Makerere University Institute of Environment & Natural Resources, Kampala, Uganda; *J. J. A. van Bruggen*, IHE Delft, DA Delft, The Netherlands
- 5:10 Adjourn

Tuesday, November 14, 2000 (continued)

Concurrent Session III - Surface Flow Wetland Systems

Windsor Salon X and XI

Chair: *Amy Parker*, University of Georgia

pm

- 1:30 **Fifteen Years of Performance and Utilization of a Free Surface Constructed Wetland, Arcata, California, USA**
Robert Gearheart and *Brad Finney*, Environmental Resources Engineering Department, Humboldt State University, Arcata, CA, USA
- 1:50 **Long-Term Results from the Orange County Florida Eastern Service Area Reclaimed Water Wetlands Treatment System**
Larry N. Schwartz, Camp Dresser & Mckee Inc., Maitland, FL, USA; *Peter M. Wallace*, Ecosystem Research Corporation, Gainesville, FL, USA; *James T. Wittig*, Camp Dresser & Mckee Inc., Maitland, FL, USA; *Gerhard K. Gruending*, Peru, NY, USA; *Paula M. Gale*, The University of Tennessee Martin, Department of Agriculture and Natural Resources, Martin, TN, USA; *G. Ronnie Best*, United States Geological Survey, Restoration Ecology Branch, FIU, Miami, FL, USA; *Tim Madhanagopal*, Eastern Water Reclamation Facility, Orange County Utilities, Orlando, FL, USA
- 2:10 **Ekeby Wetland – The Largest Constructed SF Wetland in Sweden**
Leif W Linde and *Roland Alsbro*, Eskilstuna Energi & Miljo, Eskilstuna, Sweden
- 2:30 **Long-Term Performance Summary for the Boot Wetland Treatment System**
J. R. Martin, CH2M HILL, Gainesville, FL, USA; *C. H. Keller*, CH2M HILL, Tampa, FL, USA; *R. A. Clarke, Jr.*, CH2M HILL, Gainesville, FL, USA; *R. L. Knight*, Environmental Consultant, Gainesville, FL, USA
- 2:50 **Brevard County, Florida South Central Regional Constructed Wetlands**
Craig A. Ferguson, PBS&J - Water/Wastewater Department, Winter Park, FL, USA; *Richard H. Marten*, Brevard County Water Resources Department, Viera, FL, USA

- 3:10 Refreshment break - *Windsor Salons I-IV, poster room*
- 3:30 **Diel Changes in Iron Concentrations in Surface-Flow Constructed Wetlands**
R. R. Goulet and *F. R. Pick*, Ottawa-Carleton Institute Of Biology, University Of Ottawa, Ottawa, Ontario, Canada
- 3:50 **Brighton Treatment Wetlands: Steps to Acceptance by Town and Agencies**
John Pries, CH2M Gore & Storrie Limited, Waterloo, Ontario, Canada; *Jim Phillips*, Corporation of the Town of Brighton, Brighton, Ontario, Canada
- 4:10 **Optimisation of Natural Wastewater Treatment Technologies in the MHEA® Experimental Centre in M'Diq, Mediterranean Coast of Morocco**
M. Radoux, *D. Cadelli*, and *M. Nemcova*, Fondation Universitaire Luxembourgeoise, Station Expérimentale de Viville, Viville, Belgium; *A. Ennabili* and *J. Ezzahri*, Centre Expérimental MHEA® de M'diq, M'diq, Morocco; *M. Ater*, University Abdelmalek Essaadi, Faculté des Sciences de Tétouan, Tétouan, Morocco
- 4:30 **Temporal Variations in N and P Removal in a SF Wastewater Treatment Wetland in Temperate Climate**
K. Sundblad Tonderski, Department of Biology, Linköping University, Linköping, Sweden
- 4:50 **The Performance of a Tropical Constructed Wetland System: The Case of the Carnivore/Splash Constructed Wetland, Nairobi, Kenya**
Mwakio P. Tole and *Kelvin Khisa*, School of Environmental Studies, Moi University, Eldoret, Kenya
- 5:10 Adjourn

Tuesday, November 14, 2000 (continued)

Poster Session 6:00pm - 8:00pm

Windsor Salons I-IV

- 5:10pm Conference registration office opens closes
- 6:00pm Poster reception
- 7:00pm Poster presenters present by their material for discussion
Poster papers and presenters are listed by category at the end of this program
- 8:00pm Poster presenter's breakdown poster material
 Program is concluded for the day

Wednesday, November 15, 2000

- 8:00am Conference registration office opens - *Westminster*
 Continental breakfast – *Windsor Foyer*

Concurrent Session I - Subsurface Flow Wetland Systems (part II)

Windsor Salon X and XI

Chair: *Sarah Liehr*, North Carolina State University

am

- 8:30 **Constructed Wetlands for Wastewater Treatment in Italy: State-Of-The Art and Obtained Results**
F. Masi, IRIDRA S.r.l., Firenze, Italy; *G. Bendoricchio*, Department of Chemical Process in Engineering, University of Padua, Padova, Italy; *G. Conte*, IRIDRA S.r.l., Firenze, Italy; *G. Garuti*, ENEA - Section of Wastewater Treatment and Water Cycle, Bologna, Italy; *A. Innocenti*, Department of Plant Ecology, University of Turin, Torino, Italy; *D. Franco*, Landscape Ecologist, Venezia, Italy; *L. Pietrelli*, ENEA CNR Casaccia, Roma, Italy; *G. Pineschi*, Ministry of the Environment, ARS Dept, Roma, Italy; *B. Pucci*, IRIDRA S.r.l., Firenze, Italy; *F. Romagnoli*, Ass. MAG6 Reggio Emilia, Loc. Biancana, Casina (Re), Italy

- 8:50 **Subsurface-Flow Constructed Wetlands Treatment in the Plains: Five Years of Experience**
M. F. Dahab, University of Nebraska-Lincoln, Department of Civil Engineering, Lincoln, NE, USA; *R. Y. Surampalli*, US Environmental Protection Agency, Region VII, Kansas City, KS, USA
- 9:10 **Application of Constructed Wetlands for Wastewater Treatment in Nepal**
Roshan R. Shrestha, Environment and Public Health Organization (ENPHO), Kathmandu, Nepal; *Raimund Haberl*, and *Johannes Laber*, Institute for Water Provision, University of Agricultural Sciences, Vienna, Austria; *Rajesh Manandhar*, Environment and Public Health Organization (ENPHO), Kathmandu, Nepal; *Josef Mader*, Institute for Water Provision, University of Agricultural Sciences, Vienna, Austria
- 9:30 **Vertical Flow-Horizontal Flow Constructed Wetlands Combined Treatment System Design and Performance**
C. H. House, Biological & Agricultural Engineering, N. C. State University, Raleigh, NC, USA; *S. W. Broome*, Soil Science Department, N. C. State University, Raleigh, NC, USA
- 9:50 **Phragmites Reed Beds: Constructed Wetlands for Municipal Wastewater Treatment**
Jonathan S. Begg, *R. L. Lavigne*, and *P. L. M. Veneman*, Department of Plant and Soil Sciences, University of Massachusetts, Amherst, MA, USA
- 10:10 Refreshment break - *Windsor Foyer*
- 10:30 **Reciprocating Constructed Wetlands for Treating Industrial, Municipal and Agricultural Wastewater**
Leslie Behrends, *Laura Houke*, *Earl Bailey*, and *Pat Jansen*, Tennessee Valley Authority, Muscle Shoals, AL, USA; *Donald Brown*, Environmental Protection Agency, Cincinnati, OH, USA
- 10:50 **Treatment Garden: A Recirculating Constructed Wetland for Individual Houses**
Selma C. Ayaz, TÜBITAK-Marmara Research Center, Kocaeli, Turkey; *Lutfi Akça*, Environmental Engineering Department, Istanbul Technical University, Ayazaga, Istanbul, Turkey
- 11:10 **Treatment and Recycling of Nutrients from Household Wastewater in Willow Wastewater Cleaning Facilities with No Outflow**
Peder Gregersen, Centre of Recycling, Ølgod, Denmark; *Hans Brix*, Department of Plant Ecology, University of Aarhus, Nordlandsvej, Risskov, Denmark
- 11:30 **Seasonal Differences in Removal Efficiencies Using *Scirpus Lacustris* for Wastewater Treatment**
F. Soto, *M. García* and *E. Bécares*, Area de Ecología, Facultad de Biología, Universidad de León, 24071 León, Spain.
- 11:50 **Algal Turf Scrubbing: Potential Use for Wastewater Treatment**
Rupert Craggs, National Institute of Water and Atmospheric Research, Hamilton, New Zealand
- 12:10 Adjourn (lunch is on your own)

Wednesday, November 15, 2000 (continued)

Concurrent Session II - Industrial Waste Waters (part I)

Windsor Salons VIII and IX

Chair: *Tom Ferraro*, Ecology and Environment, Inc

am

- 8:30 **A Review of Constructed Wetland Treatment Technology for Industrial Wastewater Treatment**
Joseph D. Husband, *Craig D. Martin*, and *Keith D. Johnson*, Wetland Sciences, Gulf Breeze, FL, USA
- 8:50 **Treatment Performance of a Molasses Based Distillery Effluent in a Biofilm-Reed Bed Constructed Wetland in Central India**
S. K. Billore, *N. Singh*, *H. K. Ram*, *J. K. Sharma*, and *Vijai P. Singh*, Institute of Environment Management and Plant Sciences, Vikram University, Ujjain, MP, India; *R. M. Nelson*, Nelson Environmental Consultants, Wilmington, NC, USA; *P. Dass*, Institute of Environment Management and Plant Sciences, Vikram University, Ujjain, MP, India
- 9:10 **Use of Constructed Wetlands for Acid Mine Drainage Abatement and Stream Restoration**
F. J. Brenner, Biology Department, Grove City College, Grove City, PA, USA

- 9:30 **Hydrological, Geochemical, and Microbiological Processes Affecting Chromium Transport Through Pyrolusite Coated-Sand**
Hillol Guha, Hemispheric Center for Environmental Technology, Florida International University, Miami, FL, USA; *K. Jayachandran*, Department of Environmental Studies & SERC, Florida International University, Miami, FL, USA; *F. Maurrasse*, Department of Geology, Florida International University, Miami, FL, USA
- 9:50 **Retention of Selected Heavy Metals: Cd, Cu, Pb in a Hybrid Wetland System**
H. Obarska-Pempkowiak, Faculty Hydro & Environmental Engineering, Technical University of Gdańsk, Gdańsk, Poland
- 10:10 Refreshment break - *Windsor Foyer*
- 10:30 **Water Quality Assessment of a Surface Flow Constructed Wetland Treating Oil Refinery Wastewater**
Anne Simi, Wetlands Research and Development Group, Department of Chemical Engineering, The University of Queensland, Brisbane, QLD, Australia
- 10:50 **The Integration of Constructed Wetlands into a New Treatment System for Airport Runoff**
D. Michael Revitt, Urban Pollution Research Centre, Middlesex University, London, UK; *Peter Worrall*, Penny Anderson Associates, Buxton, Derbyshire, UK; *David Brewer*, Heathrow Airport Ltd, Harlington, Middlesex, UK
- 11:10 Discussion
- 11:30 Adjourn (lunch is on your own)

Wednesday, November 15, 2000 (continued)

Concurrent Session III - Ecological Considerations (part I)

Windsor Salons V-VII

Chair: *Ronnie Best*, U. S. Geological Survey

am

- 8:30 **Determining Ecologically Acceptable Nutrient Loads to Natural Wetlands for Water Quality Improvement**
Lawrence W. Keenan and *Edgar F. Lowe*, St. Johns River Water Management District, Palatka, FL, USA
- 8:50 **Surmounting the Engineering Challenges of Everglades Restoration**
G. F. Goforth, South Florida Water Management District, West Palm Beach, FL, USA
- 9:10 **Changes in Plant Biomass and Nutrient Removal Over 3 Years in a Constructed Free Water Surface Flow Wetland in Cairns, Australia**
Margaret Greenway, School of Environmental Engineering and Co-Operative Research Centre for Catchment Hydrology, Griffith University, Brisbane, QLD, Australia; *Anne Woolley*, Department of Natural Resources, Brisbane, QLD, Australia
- 9:30 **Performance of Two Macrophyte Species in Experimental Wetlands Receiving Variable Loads of Anaerobically Treated Municipal Wastewater**
D. M. L. Da Motta Marques; *G. R. Leite*; and *S. G. T. Giovannini*, Instituto de Pesquisas Hidráulicas, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil
- 9:50 **Variation of Water Quality in the Nakivubo Wetland, Kampala - Uganda**
F. Kansime, Institute of Environment and Natural Resources, Makerere University, Kampala, Uganda; *M. Nalubega*, Faculty of Technology, Civil Engineering Department, Makerere University, Kampala, Uganda; *J. J. A. van Bruggen*, IHE, Delft, DA Delft, The Netherlands; *L. Lijklema*, Department of Water Quality Management and Aquatic Ecology, Wageningen Agricultural University, DD Wageningen, The Netherlands
- 10:10 Refreshment break - *Windsor Foyer*
- 10:30 **Achieving Multiple Benefits from a Constructed Wetland**
J. H. Reitberger, Dupont Nylon, Victoria, TX, USA; *L. E. Mokry*, Alan Plummer Associates, Inc., Arlington, TX, USA; *R. L. Knight*, Environmental Consultant, Gainesville, FL, USA

- 10:50 **Ecological Characteristics of a Natural Wetland Receiving Secondary Effluent**
J. R. Martin and *R. A. Clarke, Jr.*, CH2M HILL, Gainesville, FL, USA; *R. L. Knight*, Environmental Consultant, Gainesville, FL, USA
- 11:10 **Artificial Wetland Treatment Technology and It's Use in the Amazon Rain Forests of Ecuador**
R. L. Lavigne, New England Waste Systems, Inc., Leeds, MA, USA; *J. Jankiewicz*, Highland Water District, Highland, NY, USA
- 11:30 **Natural Wastewater Treatment in Hungary**
A. Szabó, A. Osztoics and *F. Szilágyi*, Department of Sanitary and Environmental Engineering, Technical University of Budapest, Budapest, Hungary
- 11:50 Adjourn (lunch is on your own)

Wednesday, November 15, 2000 (continued)

Concurrent Session I - Ecological Considerations (part II)

Windsor Salons V-VII

Chair: *Tom Crisman*, University of Florida

pm

- 1:30 **Design Strategies for Effective Mosquito Control in Constructed Treatment Wetlands**
Robert L. Knight, Environmental Consultant, Gainesville, FL, USA; *William E. Walton*, Department of Entomology, University of California, Riverside, CA, USA; *George O'Meara*, Florida Medical Entomology Laboratory, Institute of Food and Agricultural Sciences, University of Florida, Vero Beach, FL, USA; *William K. Reisen*, Arbovirus Field Station, University of California-Davis, Bakersfield, CA, USA; *Roland Wass*, City of Phoenix, Water Services Department, Phoenix, AZ, USA
- 1:50 **Rerating Capacity of a Constructed Wetland Treatment System**
Jo Ann Jackson, PBS&J, Winter Park, FL, USA; *Mark Sees*, City Of Orlando, Christmas, FL, USA
- 2:10 **The Emissions of Greenhouse Gases from Constructed Wetland for Wastewater Treatment**
P. Gui, K. Xu, M. Mizuochi, and *R. Inamori*, National Institute for Environmental Studies, Tsukuba, Japan; *P. Tai* and *T. Sun*, Institute of Applied Ecology, Chinese Academy of Science, Shenyang, P. R. China; *Y. Inamori*, National Institute for Environmental Studies, Tsukuba, Japan
- 2:30 **Constructed Wetlands: A Viable Buffer System for "Natural" Wastewater Disinfection**
P. Verlicchi, and *L. Masotti*, Department of Engineering, University of Ferrara, Ferrara, Italy
- 2:50 **River Water Quality Improvement by Natural and Constructed Wetland Systems in the Tropical Semi-Arid Region of Northeast Brazil**
B. S. O. De Ceballos, Department of Civil Engineering-Environmental and Sanitation Area, Federal University of Paraíba, Campina Grande, Paraíba, Brazil; *H. Oliveira* and **C. M. B. S. Meira**, Technological Science Center, State University of Paraíba, Campina Grande, Paraíba, Brazil; *A. König* and *A. O. Guimarães*, Department of Civil Engineering-Environmental and Sanitation Area, Federal University of Paraíba, Campina Grande, Paraíba, Brazil; *J. T. De Souza*, Technological Science Center, State University of Paraíba, Campina Grande, Paraíba, Brazil
- 3:10 Adjourn

Wednesday, November 15, 2000 (continued)

Concurrent Session II - Industrial Waste Waters (part II)

Windsor Salons VIII and IX

Chair: *Taufiq Aziz*, Florida Department of Environmental Protection

pm

- 1:30 **The Performance Evaluation, Through Modelling, of a Constructed Wetland Integrated in an Agro-Industrial Ecological Engineering System**
Luís de Lemos and **Pedro Antunes**, Departamento de Ambiente, ESTV, Campus Politécnico, Viseu, Portugal

- 1:50 **Chemical Industry's Constructed Wetland - An Environmental Education Success Story**
J. A. Snyder, DuPont Nylon, Victoria, TX, USA; *L. E. Mokry*, Alan Plummer Associates, Inc., Arlington, TX, USA
- 2:10 **Treatment of Laboratory Wastewater in Subsurface and Surface Flows of Tropical Constructed Wetlands**
Ami A. Meutia, Research and Development Center for Limnology, Indonesian Institute of Sciences, Cibinong, Indonesia
- 2:30 **Removal of Explosives in Constructed Wetlands**
Elly P. H. Best, *Jerry L. Miller*, and *Steven L. Larson*, U. S. Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS, USA
- 2:50 Adjourn

Wednesday, November 15, 2000 (continued)

Concurrent Session III - Nitrogen Removal and Transformations (part II)

Windsor Salon X and XI

Chair: *Peter Burgoon*, Water Quality Engineering, Inc.

pm

- 1:30 **Modelling Nitrogen Transformations in Surface Flow Wastewater Treatment Wetlands in Sweden**
Sofia Kallner, Department of Biology, Linköping University, Linköping, Sweden; *Hans B. Wittgren*, Department of Water and Environmental Studies, Linköping University, Linköping, Sweden
- 1:50 **Nitrogen and Phosphorus Budget in Rewetted Fens**
A. Lenz, Ingenieurbüro Lenz, Ringelai, Germany
- 2:10 **Characteristics of Inorganic Nitrogen Uptake in Aquatic Plant (*Zizania Latifolia*)**
Keijiro Enari, *Kouichi Kurosaka*, *Chanwoo Lee*, *Kazuo Izaki* and *Masatomo Nakayama*, Department of Civil Engineering, Tohoku Institute of Technology, Sendai, Japan
- 2:20 **Nutrient Removal in Cascade Constructed Wetlands of Gravel and Soil Beds for Sewage Treatment**
Lei Yang and *Hui-Ting Chang*, Department of Marine Environment and Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan, Republic of China
- 2:50 **Constructed Wetlands for Wastewater Treatment in Portugal: Inventory and Performance**
V. N. Dias, Verdisglobal, Lisboa, Portugal; *N. Silva*, DRA – Centro, Coimbra; *H. Serra*, Etarplan, Porto; *M. M. Inácio*, and *A. S. Vaz*, Verdisglobal, Lisboa, Portugal
- 3:10 Adjourn

Wednesday, November 15, 2000 (continued)

- 3:30pm- Business meeting
5:00pm *Located in plenary session room, Windsor Salons V-VII, for those who would like to attend*
- 5:00pm Conference registration office closes
- 7:00pm Dinner with a Special Mystery Production - *Windsor Ballroom*
10:00pm Program is concluded for the day

Thursday, November 16, 2000

8:00am Conference registration office opens - *Westminster*
Continental Breakfast - *Windsor Foyer*

Plenary Session - Global Issues

Windsor Salons V-VII

Chair: *Ramesh Reddy*, University of Florida

am

8:30 **National Policy Issues in Design and Management of Constructed Wetlands as Related to Water Quality & Habitat Value**

Robert Bastian, United States Environmental Protection Agency, OWM, Washington, DC, USA

9:00 **Using Wetlands for Water Quality Improvement in Agricultural Watersheds; The Importance of a Watershed Scale Approach**

W. G. Crumpton, Department of Botany, Iowa State University, Ames, IA, USA

9:30 **State of the Art for Animal Wastewater Treatment in Constructed Wetlands**

P. G. Hunt and *M. E. Poach*, United States Department of Agriculture, Agricultural Research Service, Florence, SC, USA

10:00 Refreshment break - *Windsor Foyer*

10:30 **The Walt Disney Company's Research and Operational Experience with Treatment Wetlands**

Ted W. McKim, Reedy Creek Energy Services, Lake Buena Vista, FL, USA; *Benedict R. Schwegler, Jr.*, Walt Disney Imagineering, Glendale, CA, USA; *Thomas A. DeBusk*, Azurea, Inc., Rockledge, FL, USA

11:00 **Treatment Wetlands as Habitat for Wildlife and Humans**

Robert L. Knight, Environmental Consultant, Gainesville, FL, USA; *Ronald A. Clarke, Jr.*, CH2M HILL, Gainesville, FL, USA; *Robert K. Bastian*, United States Environmental Protection Agency, OWM, Washington, DC, USA

11:30 Open discussion

11:45 Concluding remarks

12:00 **Conference concluded**

Friday, November 17, 2000

6:30am Continental breakfast for tour registrants – *Lobby Level, Crickets*

7:00am– Post-conference Everglades Nutrient Removal Project Field Trip
7:00pm *Buses depart from front lobby, outside front door* (Lunch provided)

Monday, November 13, 2000 and Tuesday, November 14, 2000

Poster Sessions - 6:00pm-8:00pm

Windsor Salons I-IV

Phosphorus Removal and Transformations

Treatment Options for Enhanced Phosphorus Removal from Constructed Wetland Effluent

Kevin Grace and *Thomas A. DeBusk*, DB Environmental Laboratories, Inc., Rockledge, FL, USA; *Michael Chimney*, South Florida Water Management District, West Palm Beach, FL, USA

Stability of Phosphorus in Calcareous Sediments from a Treatment Wetland Dominated by Submersed Aquatic Vegetations

Debbie Irons and *Forrest Dierberg*, DB Environmental Laboratories, Inc., Rockledge, FL, USA; *K. R. Reddy* and *William DeBusk*, Wetland Biogeochemistry Lab, Soil and Water Science Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, USA

Effect of Ecosystem Scale on Phosphorus Removal in Wetlands Dominated by Submersed Aquatic Vegetation

Scott Jackson and *Forrest Dierberg*, DB Environmental Laboratories, Rockledge, FL, USA; *Kathleen C. Pietro*, South Florida Water Management District, West Palm Beach, FL, USA

Phosphorus Retention Capacity of Potential Co-Treatment Substrates for Constructed Wetland System

J. W. Leader and *K. R. Reddy*, Wetland Biogeochemistry Lab, Soil and Water Science Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, USA

Phosphorus Sorbents in Treatment Wetlands – Investigation of Iron Rich Sand, Shell Sand and the Light Weight Aggregate Filtralite-P

Trond Mæhlum and *Roger Roseth*, Norwegian Centre for Soil and Environmental Research, Ås, Norway

The Effect of Dry-Out and Reflooding on Decomposition Rates in Peat Sediments

Christy Combs, *Jana Newman*, *Tammy Lynch*, and *Mohamed Moustafa*, Ecological Technologies Division, South Florida Water Management District, West Palm Beach, FL, USA

Agricultural Waste Waters

Design and Performance of a Horizontal Flow Constructed Wetland for Treatment of Dairy and Agricultural Wastewater in the “Chianti” Countryside

B. Pucci, *G. Conte*, and *N. Martinuzzi*, IRIDRA S.r.l, Florence, Italy; *L. Giovannelli*, A.R.P.A.T. (Regional Environmental Protection Agency) - Dept. of Prato, Prato, Italy; *F. Masi*, IRIDRA S.r.l, Florence, Italy

Evaluation of the Non-Point Source Pesticide Removal by a Natural Wetland

C. M. Kao, Institute of Environmental Engineering, National Sun Yat-Sen University, Kaohsiung, Taiwan; *M. J. Wu*, Institute of Marine and Agricultural Research, Inc., Raleigh, NC, USA

The Application of Constructed Wetland to Effluent Purification in Pig Farm

Wang Junsan, *Chen Yuhua*, and *Shen Qian*, South China Institute for Environmental Science, NEPA, Guangzhou, P. R. China

Engineered Free Water Surface Wetland Systems for the Treatment of Municipal Wastewater and Farmstead Runoff – Case Studies

Anna Crolla, *Sarah Hurd*, *Claude Weil*, *Chris Kinsley*, and *Olivier Fankhauser*, Ontario Rural Wastewater Centre, Collège d'Alfred of the University of Guelph, Alfred, Ontario, Canada

Treatment of Swine Wastewater in Wetlands with Natural and Agronomic Plants

P. G. Hunt, United States Department of Agriculture, Florence, SC, USA; *A. A. Szogi*, Washington State University, Yakima, WA, USA; *F. J. Humenik* and *J. M. Rice*, North Carolina State University, Raleigh, NC, USA; *T. A. Matheny* and *K. C. Stone*, United States Department of Agriculture, Florence, SC, USA

Post-treatment of Slaughterhouse Waste Stabilisation Pond Effluent Using an Artificial Wetland System

Carlos Nobuyoshi Ide, *Kennedy Francis Roche* and *Leila Imolene Marques*, Department of Hydraulics and Transport, Federal University of Mato Grosso do Sul, CCET, MS, Brazil

Design and Implementation of a Full-Scale, On-Farm Constructed Wetland for Treating Swine Wastewater

J. M. Rice, Office of Animal Waste Management Programs, North Carolina State University, Raleigh, NC, USA; *W. G. Eddins*, Cavanaugh and Associates PA, Winston-Salem, NC, USA; *F. J. Humenik*, Office of Animal Waste Management Programs, North Carolina State University, Raleigh, NC, USA; *M. S. Cavanaugh, Jr.*, Cavanaugh and Associates PA, Winston-Salem, NC, USA; *P. G. Hunt*, United States Department of Agriculture, Agricultural Research Service, Coastal Plains Plant, Soil and Water Research Center, Florence, SC, USA; *J. S. Hill*, Cavanaugh and Associates PA, Winston-Salem, NC, USA; *D. M. Rashash*, North Carolina Cooperative Extension Service, Jacksonville, NC, USA

Design and Prediction of Constructed Wetland Treatment for Swine Wastewater

K. C. Stone and *P. G. Hunt*, United States Department of Agriculture, Agricultural Research Service, Coastal Plains Soil, Water, and Plant Research Center, Florence, SC, USA; *F. J. Humenik* and *J. M. Rice*, CALS Waste Management Programs, NC State University, Raleigh, NC, USA

Subsurface Flow Wetland Systems

Assessment of the Efficiency of Constructed Wetland System – Pilot Plant - For Tertiary Treatment

E. Salati Filho, Instituto de Ecologia Aplicada, Piracicaba, SP, Brazil; *D. S. Marcondes*, Companhia Energética do Estado de São Paulo, São Paulo, SP, Brazil; *Eneida Salati*, Escola de Engenharia de São Carlos – Centro de Recursos Hídricos e Ecologia Aplicada - Universidade de São Paulo, São Carlos, São Paulo, Brazil; *J. M. Elias*, Centro de Estudos Ambientais, Universidade do Estado de São Paulo, Rio Claro, SP, Brazil; *S. F. Nogueira*, Centro de Energia Nuclear Para Agricultura - Universidade de São Paulo, Piracicaba, SP, Brazil

Efficiency of Purification of Municipal Wastewater on Organic Soil Irrigation Fields

Z. Stepniewska, Department of Environmental Biochemistry and Chemistry, Catholic University of Lublin, and Institute of Agrophysics Polish Academy of Sciences, Lublin, Poland; *W. Stepniewski*, Institute of Agrophysics Polish Academy of Sciences, and Institute of Environmental Protection Engineering, Technical University, Lublin, Poland; *M. Pasztelan*, Institute of Agrophysics Polish Academy of Sciences, Lublin, Poland

Constructed Wetlands Application Based on M.H.E.A. System for Rural Population Wastewater Treatment

G. Ansola, *R. Cortijo*, *J.M. González* and *E. Luis*, Area de Ecología, Universidad de León, Campus De Vegazana S.N., León, Spain

Experimental Results on M.H.E.A. Constructed Wetland Pilot System

J. M. González, *G. Ansola* and *E. Luis*, Area de Ecología, Universidad de León Campus de Vegazana S.N., León, Spain

Performance of a Sub-Surface Horizontal Flow Constructed Wetland in Polishing Upward Flow Anaerobic Sludge Blanket Pre-Treated Domestic Wastewater Under Tropical Conditions - A Case Study In Dar es Salaam, Tanzania

M. E. Kaseva, Department of Environmental Engineering, University College of Lands and Architectural Studies (UCLAS), Dar es Salaam, Tanzania; *T. S Mbwette*, *J. H. Katima* and *D. A. Mashauri*, Faculty of Engineering, University of Dar es Salaam, Dar es Salaam, Tanzania

Feasibility of Using Calla Lily in Subsurface Flow Wetlands for Domestic Wastewater Treatment

Marco A. Belmont and *Chris D. Metcalfe*, ERS, Trent University, Peterborough, Ontario, Canada

Heavy Metal Accumulation in Subsurface Flow Constructed Wetlands Treating Domestic Wastewater

Tore Krogstad, Department of Soil and Water Sciences, Agricultural University of Norway, Aas, Norway; *Petter D. Jenssen*, Department of Engineering, Agricultural University of Norway, Aas, Norway

Hydraulic Investigations on a Vertical Downflow/Upflow Constructed Wetland for Surface Water Treatment

Johannes Laber, *Raimund Haberl*, *Reinhard Perfler* and *Günter Langergraber*, Dept. for Sanitary Engineering and Water Pollution Control, University of Agricultural Sciences Vienna, Vienna, Austria

Vertical-Flow Constructed Wetland for the Treatment of Glycol-Laden Stormwater Runoff at Lester B. Pearson International Airport

Randy McGill and *Darshan Basran*, Greater Toronto Airport Authority (GTAA), Toronto, Ontario, Canada; *Robert Flindall*, CH2M Gore & Storrie Limited, North York, Ontario, Canada; *John Pries*, CH2M Gore & Storrie Limited, Waterloo, Ontario, Canada

Optimization and Modelling

Reduction in Nutrient Leaching from Sandy Soils by Si-rich Materials

Vladimir Matichenkov and *David Calvert*, Indian River Research and Education Center, IFAS, University of Florida, Fort Pierce, FL, USA; *George Snyder*, Everglades Research and Education Center, Institute of Food and Agricultural Sciences, University of Florida, Belle Glade, FL, USA; *Benita Whalen* and *Yongshan Wan*, South Florida Water Management District, West Palm Beach, FL, USA

A Comparison of Constructed Wetlands Used to Treat Domestic Wastes: Conventional, Drawdown, and Aerated Systems

Aimee Mathys, North American Wetland Engineering, Forest Lake, MN, USA; *G. Parkin*, Department of Civil & Environmental Engineering, University of Iowa, Iowa City, IA, USA; *S. Wallace*, North American Wetland Engineering, Forest Lake, MN, USA

An Improved Model for Wetland Tracer Study Analysis

Timothy M. Werner, Traverse City, MI, USA; *Robert H. Kadlec*, Wetland Management Services, Chelsea, MI, USA

Development of a Conceptual Model for Vertical Flow Wetland Metabolism

E. Giraldo and *E. Zárate*, CIIA, Centro de Investigaciones en Ingeniería Ambiental, Departamento de Ingeniería Civil y Ambiental, Universidad de Los Andes, Santafé de Bogotá, Colombia

Casteaur: A Simple Tool to Assess the Transfer of Radionuclides in Waterways

K. Beaugelin-Seiller and *P. Boyer*, Laboratory of Environmental Modelling, Department of Laboratory Environmental Research, Division of Environmental Protection, IPSN, centre de Cadarache, St. Paul les Durance cedex, France; *J. Garnier-Laplace* and *C. Adam*, Laboratory of Radioecological Research, Department of Laboratory Environmental Research, Division of Environmental Protection, IPSN, centre de Cadarache, St. Paul les Durance cedex, France

Oxygenology of Treatment Wetlands and Its Environmental Effects

W. Stepniewski, Department of Environment Protection Engineering, Technical University of Lublin, and Institute of Agrophysics Polish Academy of Sciences, Lublin, Poland; *Z. Stepniewska*, Institute of Agrophysics Polish Academy of Sciences, and Catholic University of Lublin, Dept. of Environ. Chemistry, Lublin, Poland

Importance of Phytoplankton on the Kinetics of Radionuclide Binding onto Particles During a Summer Bloom Event in a Watercourse

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Periphyton-Based Stormwater Treatment Forecast Model

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Spatial Characterization and Nutrient Modeling of a Wastewater Treatment Wetland in the Georgia Piedmont

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Experimental and Theoretical Investigation into Optimization of Hydraulic and Phosphorus Removal Performance in a South Florida Treatment Wetland

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A Design Model for the Treatment of Landfill Leachate Using a Submerged Bed System and Reed Canarygrass

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Plant Root Aeration: A Source of O₂

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Development of the Method and the Device for Remote Sensing of Vegetation

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Intelligent Sensors for Water-Quality Monitoring

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Review of Design and Management of Constructed Wetlands throughout the Uk

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Stormwater

Performance of Constructed Wetland System for Public Water Supply

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Bradley Creek Ecosystem (North Carolina) Adjacent to A Golf Course: The Concept of Buffer Zone and Constructed Wetlands for Oligotrophication

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Nitrogen and Phosphorus Variation in Shallow Groundwater and Assimilation in Plants in Complex Riparian Buffer Zones

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Kalmar Dämme; A Constructed Wetland Processing Airport Run-off

Jan Herrmann and *Ann-Karin Thorén*, Department of Marine Sciences, University of Kalmar, Kalmar, Sweden

Nitrogen Removal and Transformations

Evidence of Nitrogen Removal by Submerged Flow Constructed Wetlands in Italy

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Distribution of Ammonium-N in the Water-Soil Interface of a Surface-Flow Constructed Wetland for Swine Wastewater Treatment

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Enhanced Nitrogen Removal in Free Water Surface Wetlands

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Biomass Production and NP Retention in *Typha subulata* and *Zizaniopsis bonariensis* in Experimental Constructed Wetlands

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Nitrate Movement and Removal in Two Riparian Wetlands with Contrasting Hydrological Settings

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An Enclosure System to Measure Ammonia Volatilized from Constructed Wetlands

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Nutrient Plant Uptake and Biomass Yields in a Tropical Constructed Wetland

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Pathogen Removal

Soil Microorganisms to Assess the Impact of Pollution on Health and Productivity of Wetland Ecosystems

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Polyacrylamide and Related Compounds Remove Coliform Bacteria from Animal Wastewater in Surface Flow

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Bacterial Dynamics in the Sub-Surface Constructed Wetland

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Biota Participating in Wastewater Treatment in Horizontal Flow Constructed Wetlands

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Removal of Pathogenic Bacteria and Nutrients from Wastewater with Biological Filters

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Surface Flow Wetland Systems

Evolution and Role of Pseudo-Natural Wetland Systems in Attenuation of Pollution: A Case Study in Dar es Salaam City, Tanzania

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The Comparative Balance-Sheet of a Constructed Wastewater Wetland

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Experimental Wetland System Units for an RBC Plant in the North of Italy

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Tropical Waterhyacinth in Constructed Wetlands as a Seasonal Water Treatment Possibility in Moderate Climate Zones

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Pilot Plant Operation of a Duckweed-covered Sewage Lagoon in Sana'a, Yemen

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Duckweed Growth Kinetics on Two Growth Solutions under Different Light Intensity

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Constructed Wetlands: Evapotranspiration Studies in Sub-Tropical Queensland, Australia

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Treatment Wetlands for Upgrading the Capacity of the Municipal Wastewater Lagoons at the Town of Brighton

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Seasonal Variation in Purification Efficiency in Treatment Wetlands in Estonia

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Evaluation of Sewage Treatment System on Constructed Wetlands

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Wetlands for Wastewater Treatment: Experimental Study on a Field-Scale SFS

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Constructed Wetland for Water Pollution Control in Southern Italy

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The City of West Palm Beach Wetlands Based Indirect Potable Reuse Project

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Appropriate Wastewater Treatment Systems and Reuse in Rural Middle East Areas

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Industrial Waste Waters

Constructed Wetlands in the ABIRER-System as an Essential Part of a Production Integrated Sewage Treatment Effort for Wineries

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Nutrient and Heavy Metal Uptake and Storage in Constructed Wetland Systems in Arizona

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Distribution of Heavy Metals in a Constructed Wetland Treating Municipal Sewage

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Investigation of Copper Adsorption to Peat Using the Simple Metal Sorption Model

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Design and Performance of Experimental Constructed Wetlands Treating Coke Plant Effluents

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The Effect of Refinery Effluent on the Aquatic Macrophytes *Scyrrpus Californicus*, *Typha Subulata* and *Zizaniopsis Bonariensis*

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Heavy Metal Contents of Artificial Inundated Grassland in the Fresh Water Marsh of the River Weser Near Bremen, Germany

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Strategies for the Sustainable Disposal of Smelter Waste Waters: Integrating the Use of Filamentous Algae and Biofilms for Nutrient Removal in Constructed Ponds

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Remediation of a Lead and Cadmium Contaminated Site through a Wetland

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Efficiency of a System of Flooded Constructed Wetland Area for Residuary Water Treatment

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Treatment Wetlands for Chlorinated Alkenes: Concept, Benefits and Design Process

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Comparative Field Studies on the Use of Bivalves and Bryophytes as Bioindicators of Radiocontamination for Freshwaters within the Context of Metallic Pollution (Cd and Zn)

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Removal of Lead, Copper and Nickel by Three Macrophytes Cultured in a Hydroponic, Thin-Film Rhizosphere System

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Design of a Constructed Wetland System for the Treatment of Olive Oil Wastewater in the Mediterranean

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The Treatment of Landfill Leachates in Engineered Wetlands

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Treatment Wetlands for Landfill Leachates – Case Studies from Cold Temperate Climate

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Evaluation of Chromium Accumulation in Different Crops Grown in Highly Contaminated Sites

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Wheat Jane: Bioremediation of Acid Mine Drainage in Wetland Systems

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The Removal of Oil-derived Hydrocarbons by a Novel, Experimental Constructed Wetland

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Four Years Experiences of Constructed Wetland (CW) Performance Treating Landfill Leachate

Danijel Vrhovšek, Tjaša Bulc, Maja Zupančič and Alenka Sajn-Slak, Limnos, Water Ecology Group, Podlimbarskega, Ljubljana, Slovenia

Ecological Considerations

Algal Growth Inhibition Effects of 4 Allelopathic Polyphenols Released By *Myriophyllum Spicatum*

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The Self Cleansing Capacity of a Tropical River Receiving Waste Waters

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Plant Bioassay to Assess Removal of Boron from Mexico City Municipal Water

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Wetland Plant Establishment and Growth on Water-Covered Mine Tailings in Northeast Ontario, Canada

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A New Method (Helesoid System) for the Treatment of Domestic Waste Water by Using Natural Compounds (e.g. Oyster Shell) Containing CaCO₃

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Wetland and Water Pollution Management in Bangladesh

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Protection of Surface Water against Contamination by Wetland Systems in Poland

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A Resource-Based Approach to Improving Water Supply and Management in Lagos Nigeria

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Groundwater Potentials in Water Supply Scheme: Case Study of Badagry, Lagos State, Nigeria

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Feasibility of Constructed Wetlands Designed for the Mogan-Eymir Basin

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Constructed Wetlands for Wastewater Treatment in Central Italy

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Artificial Wetlands: Viable Options for Rural, Suburban, and Urban Areas in Mexico City

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Wetland Deterioration by Untreated Sewage in a Central Mexican Plain

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Combination of Constructed Wetland System with Urban Garden Architecture

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Technical and Political Challenges for the Development of the Constructed Wetland Technology: A World Overview

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Pedo-chemical Indicators for Eutrophication and Eutrophy in Tidal Flat and Salt Marsh Soils of the German North Sea Coast and Lagoon Mangrove Soils of Baja California Sur, Mexico

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Evaluation of Plankton Communities Between 1994 and 1999 of Manuel Ávila Camacho Dam, Puebla, México

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Effects of Wastewater Discharge on the Nutrient Content and Biomass Production of *Cyperus Papyrus* Growing in the Nakivubo Wetland, Kampala - Uganda

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Identifying the Best Age for *Pistia stratiotes* to Remove Nutrients from a Eutrophic River

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Identifying and Monitoring of the Existing Wastewater Sector in Azerbaijan: Problems, Options, Solutions

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The Use of Constructed Wetlands for Complementary Treatment of Wastewater and River Rehabilitation in Israel

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Restoring Wetlands to Improve Water Quality in Upper Klamath Lake, Oregon

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