RECLAMATION WITH A PURPOSE

June 9-13, 2002
Lexington, Kentucky

ASMR
American Society of Mining and Reclamation
19th Annual National Conference

IALR
International Affiliation of Land Reclamationists
6th International Conference
RECLAMATION WITH A PURPOSE

Proceedings of a joint conference of

ASMR
American Society of Mining and Reclamation
19th Annual National Conference

and

IALR
International Affiliation of Land Reclamationists
6th International Conference

June 9-13, 2002
Lexington, Kentucky

R. Barnhisel & M. Collins, Editors
2002 19th National ASMR Organizing Committee

Meeting Chairperson
Richard I. Barnhisel
Agronomy Department
University of Kentucky
Lexington, KY 40546

David Ditsch
University of Kentucky
Robinson Substation
Quicksand, KY 41363

Michael Collins
Agronomy Department
University of Kentucky
Lexington, KY 40546

Charles Rhoades
Forestry Department
University of Kentucky
Lexington, KY 40546

Clyde DeRossett
Ky Dept of Surface Mining
Prestonsburg, KY 41653

Thomas Nieman
Landscape Architecture
University of Kentucky
Lexington, KY 40546

Lela Barnhisel
3134 Montavesta Rd
Lexington, KY 40502

National Executive Committee (NEC)
Chairpersons

George F. Vance           President
Bruce A. Buchanan        Past-President
Gary W. Wendt            President-Elect
Denver Harper             Chairperson Eastern Section
Barry Stewart             Past-Chairperson Eastern Section
James A. Burger           Chairperson-Elect Eastern Section
Tim Richmond              Chairperson Western Section
Josip R. Galetovic        Past-Chairperson Western Section
David R. Chenoweth        Chairperson-Elect Western Section
Neil Humphries            At-Large Representative

Richard I. Barnhisel      Executive Secretary of ASMR

Technical Division

Ecology               Richard Vincent
Forestry & Wildlife    James A. Burger
Geotechnical Engineering Gennaro Marino
Intern. Tailings & Reclamation Tim Richmond
Land Use Planning & Design Susan Wessman
Soils & Overburden     Robert Darmody
Water Management       Robert Kleinmann
<table>
<thead>
<tr>
<th>PAPER TITLE</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITRC-What Does it Mean to Me?</td>
<td>1</td>
</tr>
<tr>
<td>Sampling Strategies for TMDL of AMD-affected Streams.</td>
<td>10</td>
</tr>
<tr>
<td>A Preliminary Stream Assessment for Watershed Restoration.</td>
<td>27</td>
</tr>
<tr>
<td>The Use of Multiple and Synergistic Reclamation Technologies to Improve</td>
<td>41</td>
</tr>
<tr>
<td>Water Quality From Kyanite Mine Tailings.</td>
<td></td>
</tr>
<tr>
<td>Ecological Recovery of the River Pelenna (South Wales) Following Passive</td>
<td>58</td>
</tr>
<tr>
<td>Treatment of Abandoned Mine Drainage.</td>
<td></td>
</tr>
<tr>
<td>Mill Run: Recovery of a Small Stream in Western Maryland using Limestone</td>
<td>84</td>
</tr>
<tr>
<td>Sand Application and Pulse Limestone Bed Technology.</td>
<td></td>
</tr>
<tr>
<td>Effects of Biosolids Application on Ground Water Nitrate-N Levels in Sand</td>
<td>99</td>
</tr>
<tr>
<td>and Gravel Mine Reclamation in Virginia.</td>
<td></td>
</tr>
<tr>
<td>Reclamation on Land Disturbed by Surface Mining in Romania.</td>
<td>115</td>
</tr>
<tr>
<td>Long-term Plant Community Responses to Topsoil Replacement Depth on</td>
<td>130</td>
</tr>
<tr>
<td>Reclaimed Mined Land.</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Seleniferous Plants and Soils within Disturbed &amp; Native</td>
<td>141</td>
</tr>
<tr>
<td>Lands.</td>
<td></td>
</tr>
<tr>
<td>Native Shrub Establishment in Colorado.</td>
<td>163</td>
</tr>
<tr>
<td>Aquatic Plant Establishment on Nickel Tailings Five Years after Flooding.</td>
<td>178</td>
</tr>
<tr>
<td>Effects of Nickel Mining Activities on Water Quality</td>
<td>190</td>
</tr>
<tr>
<td>Plant Growth and Soil Metal Concentrations A Spatial Effects Model.</td>
<td>194</td>
</tr>
<tr>
<td>Initial Survival of Commercial Hardwoods on Reclaimed Minesoils in West</td>
<td>212</td>
</tr>
<tr>
<td>Virginia.</td>
<td></td>
</tr>
<tr>
<td>Field Assessment of Mine Site Quality for Establishing Hardwoods in the</td>
<td>226</td>
</tr>
<tr>
<td>Appalachians.</td>
<td></td>
</tr>
<tr>
<td>Reclaiming Wildlife Habitat at the Buckskin Mine.</td>
<td>241</td>
</tr>
<tr>
<td>The Use of Airborne Magnetic and EM Conductivity Surveys to Locate</td>
<td>259</td>
</tr>
<tr>
<td>Groundwater Flow Paths at the Sulphur Bank Mercury Mine Superfund Site</td>
<td></td>
</tr>
<tr>
<td>Water Treatment Issues and Biotreatment Solutions for the Landusky Mine,</td>
<td>275</td>
</tr>
<tr>
<td>Montana Spent Ore Heap Leach Pads.</td>
<td></td>
</tr>
<tr>
<td>Physical Limnology and Geochemistry of Two Circum-neutral pH Mine Pit</td>
<td>309</td>
</tr>
<tr>
<td>Lakes in NE Washington.</td>
<td></td>
</tr>
<tr>
<td>Surface Mine Pool Reclamation with Direct Ash Placement.</td>
<td>325</td>
</tr>
<tr>
<td>An Evolution of Reclamation Approaches Through the Life of a southern</td>
<td>344</td>
</tr>
<tr>
<td>Ontario Gravel Pit.</td>
<td></td>
</tr>
<tr>
<td>Abandoned Land Reclamation Planning in Coastal Area in North-East of</td>
<td>361</td>
</tr>
</tbody>
</table>
China.
A Subsidence Engineering Investigation at the Wildlife Prairie Park. 386
Stability Monitoring of a Coal Mining Excess Spoil Fill. 411
Preliminary Vegetative Analyses of Mine Drainage Impacted Marshes. 422
North American Bats and Mines Project: A Cooperative Interagency
Approach to Bat Conservation Through Mine Land Reclamation. 429
Use of Reclaimed Mine Land by Disturbance-Oriented Avian Species:
Implications for Conservation and Management. 438
Re-Creating Woodland and Heathland on Slate Waste in Wales. 449
A Preliminary Model to Predict Rainfall Use Efficiency of Pastures on Open-
cut Coal Mines in Central Queensland, Australia. 459
Characterization of an Acid Mine Drainage Site in Southern Illinois. 472
Heterogeneous Oxidation of Ferrous Iron for Treatment of Mine Drainage. 487
Innovative Treatment of Alkaline Mine Drainage Using Recirculated Iron
Oxides in a Complete Mix Reactor. 496
Recovery of Marketable Iron Oxide From Mine Drainage. 517
Use of Steel Slag Leach Beds for the Treatment of Acid Mine Drainage: The
McCarty Highwall Project. 527
Recirculating – Reducing and Alkalinity Producing System (RERAPS) for
the Treatment of Acidic Coal Pile Runoff. 539
Spatial-temporal Variation of Reclaimed Soils Filled with Fly Ash. 558
Alkaline Industrial By-product Effects on Plant Growth in Acidic-
Contaminated Soil Systems. 568
A Method for Evaluating the Risk of Backfilling Coal Mines with Coal
Combustion Byproducts and Steel Slag. 582
Monitoring of Cover and Watershed Performance for Soil Covers Placed
Over Saline-Sodic Shale Overburden from Oilsands Mining. 602
Modeling of Water Movement Within Reclamation Covers on Oilsands
Mining Overburden Piles. 622
Evaluation of Sulfide Materials in Virginia Highway Corridors. 645
Flora of the Fonde Surface Mine Demonstration Area, Bell County,
Kentucky. 674
Invasive Species – An Emerging Issue for Mining and Reclamation. 702
Litter Decomposition on Directly Revegetated Tailings at the Kidston Gold
Mine, North Queensland, Australia. 708
Acid Rock Drainage in a Vertical Flow Wetland I: Acidity Neutralization
and Alkalinity Generation. 723
Passive Treatment of Low-pH, Ferric Iron-Dominated Acid Rock Drainage
in a Vertical Flow Wetland II: Metal Removal. 752
The Use of Wetlands to Remove Nickel from Mine Drainage - Is Perpetual Treatment Really Possible?  
798
Efficiency of a Scale Model Vertical Flow and Aerobic Wetland System in Treating Acid Mine Drainage  
818
Improvement of Water Quality by Land Reclamation and Passive Systems at an Eastern U.S. Copper Mine.  
830
Mined Land Reclamation in the Northern Great Plains: Have We Been Successful?  
842
Linking Research and Regulatory Policy to Enable Advances in Reclamation Practice.  
866
A Brief Overview of Control and Treatment Technologies for Acid Mine Drainage.  
879
Reclamation of Prime Agricultural Lands After Coal Surface Mining: The Midwestern Experience.  
900
Vertical Flow Pond Piping System Design Considerations.  
916
935
Remediation of the Tar Creek Superfund Site: An Update.  
952
Long Term Land Use Planning for Drastically Disturbed Land.  
961
The EPA Rocky Mountain Regional Hazardous Substance Research Center.  
972
Twenty-Plus Years After SMCRA: Reflecting On The Results.  
992
Establishment of a Vegetative Cover to Control Acidic Drainage from Coal Combustion Waste.  
1019
Rehabilitation of the Old Bevier Passive Treatment Wetland, Macon County, Missouri  
1021
Growth and Nutrient Uptake of Arbuscular Mycorrhizal Maize in Different Depths of Soil Overlying Coal Ash.  
1046
1048
Soil Water Percolation and Erosion on Uncompacted Surface Mine Soil in Eastern Kentucky.  
1049
Restoration and Monitoring of Aquatic Quality in a Coal-mined Watershed, Swatara Creek at Ravine, Pennsylvania.  
1059
New Method to Estimate Size and Longevity of Anoxic Limestone Drains.  
1061
Multi-Component Passive Treatment System: A Case Study.  
1065
Socioeconomic Analyses to Prioritize Restoration of Streams Impacted by Mine Drainage.  
1066
Fabricated Soils for Landscape Restoration.  
1067
Problems in Acidity and Alkalinity Measurements in Mine Drainage.

Effects of Iron Solids and Bacteria on Iron Oxidation Rates in Mine Drainage.

Iron Oxide in Net Alkaline CO2-Rich Mine Waters.

Linking Forest Production and Soil Carbon Accumulation on Surface Mine Lands: A Literature Review.

Assessment of Risk of Adverse Effects of Cattle Exposure to Selenium on Southwestern Coal Mines.


Soil Development in Two Ohio Minesoils Under Continuous Grass Cover for Twenty-five Years Following Reclamation.

Undergraduate Minor and Graduate Certificate Programs in Reclamation and Restoration Ecology.

A Case Study in Hydrology, Geology, Chemistry and History: The Construction of I-80 and the Genesis of Mine Drainage to Jonathan Run.

Soil Ecological Indicators of Surface Mineland Reclamation Success.

Geochemical Modeling of Deep Coal Mine Discharge: Irwin Syncline, Pennsylvania, USA

Water Quality and Hydrology of a Natural Wetland Receiving Mine Drainage: Is it Biogeochemistry or Dilution?

Reclamation Technique Affects Tree Root Development on Reclaimed Surface Mined Lands.

Longitudinal Study of Four Successive Alkalinity Producing Systems in Western Pennsylvania.

Strontium Isotopes Ratios as Tracers of Water Movement in a Grouted Mine.


Acid Mine Drainage Treatment via Alkaline Injection Technology

A Deterministic Model for Predicting Alkalinity from Limestone for Design of AMD Passive Treatment Systems

Preliminary Analysis of Spoil Settlement at a Mountain-Top-Removal Coal Mine: Star Fire Tract, Eastern Kentucky Coal Field

Iron Oxidation in Semi-Passive Treatment Systems