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

Michael Collins Agronomy Department University of Kentucky Lexington, KY 40546

Clyde DeRossett Ky Dept of Surface Mining Prestonsburg, KY 41653

Lela Barnhisel 3134 Montavesta Rd Lexington, KY 40502

National Executive Committee (NEC) Chairpersons

President

George F. Vance Bruce A. Buchanan Gary W. Wendt Denver Harper Barry Stewart James A. Burger Tim Richmond Josip R. Galetovic David R. Chenoweth Neil Humphries

Past-President President-Elect Chairperson Eastern Section Past- Chairperson Eastern Section Chairperson-Elect Eastern Section Chairperson Western Section Past-Chairperson Western Section Chairperson-Elect Western Section At-Large Representative

Richard I. Barnhisel

Executive Secretary of ASMR

David Ditsch University of Kentucky Robinson Substation Quicksand, KY 41363

Charles Rhoades Forestry Department University of Kentucky Lexington, KY 40546

Thomas Nieman Landscape Architecture University of Kentucky Lexington, KY 40546

Technical Division

Richard Vincent Ecology **Forestry &** Wildlife James A. Burger Geotechnical Engineering Gennaro Marino Intern. Tailings & Reclamation Tim Richmond Stuart Bengson Land Use Planning & Design Susan Wessman Soils & Overburden Robert Darmody Water

Management Robert Kleinmann

PAPER TITLE

PAGE NO.

ITRC-What Does it Mean to Me?	1
Sampling Strategies for TMDL of AMD-affected Streams.	10
A Preliminary Stream Assessment for Watershed Restoration.	27
The Use of Multiple and Synergistic Reclamation Technologies to Improve	41
Water Quality From Kyanite Mine Tailings.	
Ecological Recovery of the River Pelenna (South Wales) Following Passive	58
Treatment of Abandoned Mine Drainage.	
Mill Run: Recovery of a Small Stream in Western Maryland using	84
Limestone Sand Application and Pulse Limestone Bed Technology.	
Effects of Biosolids Application on Ground Water Nitrate-N Levels in Sand	99
and Gravel Mine Reclamation in Virginia.	
Reclamation on Land Disturbed by Surface Mining in Romania.	115
Long-term Plant Community Responses to Topsoil Replacement Depth on	130
Reclaimed Mined Land.	
Evaluation of Seleniferous Plants and Soils within Disturbed & Native	141
Lands.	
Native Shrub Establishment in Colorado.	163
Aquatic Plant Establishment on Nickel Tailings Five Years after Flooding.	178
Effects of Nickel Mining Activities on Water Quality	190
Plant Growth and Soil Metal Concentrations A Spatial Effects Model.	194
Initial Survival of Commercial Hardwoods on Reclaimed Minesoils in West	212
Virginia.	
Field Assessment of Mine Site Quality for Establishing Hardwoods in the	226
Appalachians.	
Reclaiming Wildlife Habitat at the Buckskin Mine.	241
The Use of Airborne Magnetic and EM Conductivity Surveys to Locate	259
Groundwater Flow Paths at the Sulphur Bank Mercury Mine Superfund	
Site	
Water Treatment Issues and Biotreatment Solutions for the Landusky Mine,	275
Montana Spent Ore Heap Leach Pads.	
Physical Limnology and Geochemistry of Two Circum-neutral pH Mine Pit	309
Lakes in NE Washington.	
Surface Mine Pool Reclamation with Direct Ash Placement.	325
An Evolution of Reclamation Approaches Through the Life of a southern	344
Ontario Gravel Pit.	
Abandoned Land Reclamation Planning in Coastal Area in North-East of	361

China.

Cililia.	
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	429
Approach to Bat Conservation Through Mine Land Reclamation.	
Use of Reclaimed Mine Land by Disturbance-Oriented Avian Species:	438
Implications for Conservation and Management.	
Re-Creating Woodland and Heathland on Slate Waste in Wales.	449
A Preliminary Model to Predict Rainfall Use Efficiency of Pastures on Open-	459
cut Coal Mines in Central Queensland, Australia.	
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	496
Oxides in a Complete Mix Reactor.	
Recovery of Marketable Iron Oxide From Mine Drainage.	517
Use of Steel Slag Leach Beds for the Treatment of Acid Mine Drainage: The	527
McCarty Highwall Project.	
Recirculating - Reducing and Alkalinity Producing System (RERAPS) for	539
the Treatment of Acidic Coal Pile Runoff.	
Spatial-temporal Variation of Reclaimed Soils Filled with Fly Ash.	558
Alkaline Industrial By-product Effects on Plant Growth in Acidic-	568
Contaminated Soil Systems.	
A Method for Evaluating the Risk of Backfilling Coal Mines with Coal	582
Combustion Byproducts and Steel Slag.	
Monitoring of Cover and Watershed Performance for Soil Covers Placed	602
Over Saline-Sodic Shale Overburden from Oilsands Mining.	
Modeling of Water Movement Within Reclamation Covers on Oilsands	622
Mining Overburden Piles.	
Evaluation of Sulfide Materials in Virginia Highway Corridors.	645
Flora of the Fonde Surface Mine Demonstration Area, Bell County,	674
Kentucky.	
Invasive Species – An Emerging Issue for Mining and Reclamation.	702
Litter Decomposition on Directly Revegetated Tailings at the Kidston Gold	708
Mine, North Queensland, Australia.	
Acid Rock Drainage in a Vertical Flow Wetland I: Acidity Neutralization	723
and Alkalinity Generation.	
Passive Treatment of Low-pH, Ferric Iron-Dominated Acid Rock Drainage	752
in a Vertical Flow Wetland II: Metal Removal	
Case Studies of Passive Treatment Systems: Vertical Flow Systems.	776

The Use of Wetlands to Remove Nickel from Mine Drainage - Is Perpetual	798
Treatment Really Possible?	
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
A New Millennium of Passive Treatment of Acid Rock Drainage: Advances in Design and Construction Since 1988.	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	1019
Combustion Waste.	1020
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
Visual Demonstration of Water Distribution Patterns in Vertical Flow Systems.	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,	1059
Swatara Creek at Ravine, Pennsylvania.	1061
New Method to Estimate Size and Longevity of Anoxic Limestone Drains.	1062
	1064
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.	1068
	1072
Effects of Iron Solids and Bacteria on Iron Oxidation Rates in Mine	1101
Drainage.	1106
Iron Oxide in Net Alkaline CO ₂ -Rich Mine Waters.	1133
Linking Forest Production and Soil Carbon Accumulation on Surface Mine Lands: A Literature Review.	1137
Assessment of Risk of Adverse Effects of Cattle Exposure to Selenium on Southwestern Coal Mines.	1138
Influence of Variable Topsoil Replacement Depths on Soil and Plant Characteristics at A Coal Mine in Northeastern Wyoming.	1157
Soil Development in Two Ohio Minesoils Under Continuous Grass Cover for Twenty-five Years Following Reclamation.	1158
Undergraduate Minor and Graduate Certificate Programs in Reclamation and Restoration Ecology.	1173
A Case Study in Hydrology, Geology, Chemistry and History: The Construction of I-80 and the Genesis of Mine Drainage to Jonathan Run.	1183
Soil Ecological Indicators of Surface Mineland Reclamation Success.	1184
Geochemical Modeling of Deep Coal Mine Discharge: Irwin Syncline,	1185
Pennsylvania, USA	
Water Quality and Hydrology of a Natural Wetland Receiving Mine Drainage: Is it Biogeochemistry or Dilution?	1186
Reclamation Technique Affects Tree Root Development on Reclaimed Surface Mined Lands.	1187
Longitudinal Study of Four Successive Alkalinity Producing Systems in Western Pennsylvania.	1189
Strontium Isotopes Ratios as Tracers of Water Movement in a Grouted Mine.	1190
Development and Evaluation of Sequential Extraction Procedures for Iron- Rich Precipitates Associated with Coal Mine Drainage.	1192
Acid Mine Drainage Treatment via Alkaline Injection Technology	1193
A Deterministic Model for Predicting Alkalinity from Limestone for Design of AMD Passive Treatment Systems	1200
Preliminary Analysis of Spoil Settlement at a Mountain-Top-Removal Coal Mine: Star Fire Tract, Eastern Kentucky Coal Field	1201
Iron Oxidation in Semi-Passive Treatment Systems	1206