

## Curriculum Vita of Steven Paul Esling

### I. Personal

- A. Date and Place of Birth: November 1, 1953  
Chicago, Illinois
- B. Present Home Address: 2754 Springer Ridge Road  
Carbondale, Illinois 62902  
Phone: (618) 549-4679
- C. Present University Position: Associate Professor and Chair  
Department of Geology

### II. Education

- 1975 B.S. Illinois State University (Geology with High Honors)
- 1982 M.S. University of Iowa (Mathematics)
- 1984 Ph.D. University of Iowa (Geology)

### III. Professional Experience

- 6/76-8/76 United States Geological Survey, Champaign, Illinois
- 8/76-5/78 Teaching Assistant, University of Iowa
- 8/76-5/82 Research Assistant to Dr. George Hallberg, Iowa Geological Survey
- 8/78-5/79 Research Assistant to Dr. Lon Drake, University of Iowa
- 5/79-8/80 Fellow, University of Iowa
- 8/80-8/81 Research Assistant to Dr. Lon Drake, University of Iowa
- 9/81-8/82 Guided Correspondence Instructor, University of Iowa
- 8/82-5/84 Instructor, Southern Illinois University Carbondale
- 7/84-7/89 Assistant Professor, Southern Illinois University Carbondale
- 7/89-6/02 Associate Professor, Southern Illinois University Carbondale
- 6/02-Present Chair, Department of Geology; Co-Director, Environmental Resources and Policy Program, Southern Illinois University Carbondale

#### IV. Teaching Experience

##### A. Teaching Interests and Specialties:

Introductory Hydrogeology  
Groundwater Modeling  
Contaminant Transport  
Glacial and Quaternary Geology  
Quantitative Methods in Geology (Geostatistics)  
Environmental Geology  
Earth Science (GEA 110)  
Science for Primary Teachers (SCI 504)  
Science for Elementary School Teachers (SCI 503A, 503B)

##### B. Teaching and Training Grants:

Mini-Sabbatical to Aid Instruction, Southern Illinois University at Carbondale, to attend a field course in Hydrology and Water Resource Evaluation at Ohio University, Athens, Ohio, June and July, 1985.

##### D. Current Graduate Faculty Status: Direct Dissertation

##### E. Number of Masters and Ph.D. Committees: 105

##### F. Names of students who have completed Master's Theses under my direction:

Sally Averil	Richard Graham	Barbara Graves
W. Brian Hughes	Elizabeth Henderson	Catherine Pauvlik
Thomas Van Biersel	Mark Stafford	Kenneth Black
Benjamin Hayes	Lynne Oliver	Thomas Leonard
Mary Lannon	Anna Maxwell Dennis	Jeffrey Brammer
Matthew Riggs	Pamela Aubuchon	Nancy Rorick
James Durbin	Stephen Varsa	Timothy McDonald
Claire Trent	Merryn Fielding	Christopher Hemingway
Andrew Limmer	Erin Ryan	Eric Chatterson
Angela Strong	Todd Lannert	Dave LaBrecque
Sue Miller	John Keller	Ken Miller
Cynthia Johnston	Melissa McGuire	Brian Scheidt
Dipanjan Ghosh	Greg Shofner	Kristen Krug
Darren Ficklin	Rashmi Mantha	Douglas Kolb

##### G. Names of students who have completed Doctoral Dissertations under my direction:

John Keller

## V. University Service

### A. Department Committees:

Scholarship Committee (1982-1983, 1985-1998)  
Graduate Admissions and Assistantship Committee (1982-1985, Chair, 1983-1984, 2000-2003)  
Graduate Brochure Committee (1983-1987, Chair, 1985-1988)  
Computer Committee (1987-1988, Chair, 1988-2002)  
Search Committee for Open Geomorphology Position (1990)  
Search Committee for Open Process Geomorphology Position, Chair (1991)  
Search Committee for Open Geomorphology Position (1996)  
Ad Hoc Committee on Undergraduate Teaching Equipment (1989, 1992)  
Curriculum Committee (1991-2002)  
Preliminary Counseling Conference Committee (1991-2002)  
Geology Club Advisor (1992-2002)  
Search Committee for Open Paleobiologist Position (1998)  
Search Committee for Open Structural Geologist Position, Chair (2000-2002)  
Undergraduate Advisor (2003)  
The Chair of Geology is an ex-officio member of all committees in the Department

### B. College and University Committees:

Library Affairs Advisory Committee (1984-1987, Chair, 1985-1987)  
Illinois Mining and Mineral Resources Research Institute Fellowship and Scholarship Committee (1986-1988)  
Committee for the Special Analytical Study on Equipment for Undergraduate Instruction (1989-1990)  
Committee to Establish the Illinois Groundwater Consortium Research Direction (1990)  
Department of Mining Engineering Internal Review Committee (1990-1991)  
College of Science Outstanding Researcher Committee (1991-1992)  
Mathematics, Engineering, and Physical Sciences Special Research Committee (1993-1995)  
Doctoral Fellowship Panel (1994-1999)  
Committee to Evaluate Thesis and Dissertation Guidelines (1994-1996)  
Faculty Senate (1998-2000)  
Department of Geography Internal Review Committee (1999)  
Department of Mining Engineering Internal Review Committee (2000-2001)  
Outstanding Dissertation Award Committee (2001-2003)  
Graduate Council (2004-2007)  
Parking Committee (2006)  
Department of Radio Television Internal Review Team (2007)  
Center for Health Law and Policy Internal Review Team (2007)  
Negotiating Team; Graduate Assistant Contract (2007)  
Negotiating Team; NTT Faculty Contract (2008)  
Sexual Harassment Policy Committee (2008)  
College of Science Budget Committee (2001-2008)  
Negotiating Team; NTT Faculty Contract (2010-2011)

Negotiating Team; Faculty Contract (2010-2011)

## **VI. Professional Service**

### **A. Membership in Professional Associations:**

American Geophysical Union  
Geological Society of America  
Illinois Groundwater Association  
Midwest Friends of the Pleistocene  
National Association of Groundwater Scientists and Engineers  
The Society of Sigma Xi

### **C. Consultantships:**

Consulted the St. Clair County Board on groundwater issues related to quarry expansion (2010)

Consulted Exxon Mobil Corporation on groundwater contamination issues (2005)

Consulted Thompson Coburn LLP on geologic factors impacting groundwater contamination from wells in Illinois (2005)

Consulted Rapps Engineering on groundwater modeling (2003)

Consulted the Saline Valley Conservancy District on Groundwater Issues (2004-2011)

Consulted for the American Resources Group, Inc. on the Quaternary geology of the Farm Creek Section (1998).

Consulted Mining Interests on Groundwater Problems Associated with Mining (1996-1997).

Consulted the Illinois Department of Nuclear Safety on Hydrogeology (1994-2002).

Consulted for the Illinois Low Level Radioactive Waste Siting Commission (1991-1992).

Consulted for the Illinois Department of Mines and Minerals on the feasibility of brine injection in a location in southern Illinois (1988).

Consulted for Energy Resources of Indiana on possible contamination of shallow groundwater resources from brine injection, Crawford County, Illinois (1987).

Consulted for the American Resources Group, Inc. on the Quaternary geology of southern Illinois (1986-1987).

Consulted for the Environmental Simulations Lab, Southern Illinois University at Carbondale on computer-aided instruction (1984-1987).

Consulted for the Army Corps of Engineers on the paleohydrology of the Mississippi River near Alton, Illinois (1983).

Consulted for the Iowa Geological Survey on the numerical analysis of sinkhole growth (1982).

Consulted for Archaeologists at the University of Iowa on the Quaternary geology of southeast Iowa (1980).

#### D. Manuscripts Reviewed:

Water Resources Bulletin.

Prentice-Hall, Englewood Cliffs, New Jersey (2 book manuscripts)

West Virginia University Energy and Water Research Center

Merrill Publishing Company, Columbus, Ohio (1 book manuscript)

Particulate Science and Technology

Ground Water

United States Geological Survey Water Resources Research Program

American Chemical Society - The Petroleum Research Fund

Oak Ridge Associated Universities Junior Faculty Enhancement Program

Illinois Groundwater Consortium

Quaternary Research

NSF

Journal of Geological Education

Illinois Waste Management and Research Center

#### E. Presentations at Professional Meetings:

New complexities of the high terrace of Lake Calvin. Presented to the Iowa Academy of Science, Simpson College, Iowa, April, 1980, (with G.R. Hallberg, T.J. Bicki, and T.E. Fenton).

Delineation of Iowa aquifers potentially impacted by agricultural drainage wells. Presented to the Iowa Academy of Science, Coe College, Iowa, April, 1981, (with L. Drake and R. Graeff).

Morphological delineation of an oil brine plume within a shallow aquifer in Bond County, Illinois, using earth resistivity measurements. Presented to the Annual Meeting of the Geological Society of America, Reno, Nevada, November, 1984, (with T.P. Van Biersel and P.C. Reed).

Iowa agricultural wells - a hydrogeologic first approximation. Presented to the Midwest Groundwater Conference, University of Kansas, Lawrence, Kansas, October, 1984, (with L. Drake).

Development of the Mississippi River from the late Illinoian through the early Holocene as recorded in terrace remnants along the lower Iowa and Cedar River valleys, southeast Iowa. Presented to the Working Conference on the Pleistocene Geology and Evolution of the Upper Mississippi River Valley, Winona, Minnesota, August, 1985, (with G.R. Hallberg).

Teaching software for the environmental sciences. Presented to the Envirosoft Conference, Newport Beach, South Carolina, November, 1986, (with L.L. Malinconico, D.M. Sharpe, and T. Larson).

The effects of longwall mining subsidence on the hydrogeology and groundwater chemistry of a shallow unconfined aquitard in southern Illinois. Presented to the North-Central Geological Society of America Annual Meeting, St. Paul, Minnesota, April, 1987, (with C. Pauvlik).

Application of a numerical model to brine contamination at the Beaver Creek Oil Field in Bond County, Illinois. Presented to the 32nd Annual Midwest Groundwater Conference, Madison, Wisconsin, October, 1987, (with B.R. Hayes).

The effects of longwall mining subsidence on the groundwater conditions of a shallow unconfined aquitard in southern Illinois. Presented to the National Symposium on Mining Hydrology, Sedimentation, and Reclamation, Springfield, Illinois, December, 1987, (with C. Pauvlik).

Instructional simulations for environmental sciences. Presented to the University Council on Water Resources, Hilton Head, South Carolina, 1987, (with D. Sharpe, L.L. Malinconico, T. Larson, and C.A. Struss).

Integrated courseware for instruction in physical geology and earth sciences. Presented to the Geological Society of America Annual Meeting, Denver, Colorado, November, 1988, (with L.L. Malinconico, D. Sharpe, T.A. Larson, and C.A. Struss).

Agricultural drainage wells in Iowa. Invited Paper presented at the American Association for the Advancement of Science 155th Annual Meeting, San Francisco, CA, January 14-19, 1989, (with L.D. Drake)

A free-drainage lysimeter design for quantifying infiltration and sampling water in the unsaturated zone. Poster Session presented at the Annual Meeting of the Geological Society of America, St. Louis, MO, November 6-9, 1989 (with J. Brammer).

The hydrogeology and geochemistry of an abandoned surface coal mine containing acid and neutral lakes. Presented at the Annual Meeting of the Geological Society of America, St. Louis, MO, November 6-9, 1989, (with A.M. Dennis and R.N. Guillemette).

Field Determination of Coal Refuse Hydrology. Presented to the 1989 National Mine Land Reclamation Center Workshop on Acid Mine Drainage, Morgantown, WV, December 12-13, 1989.

Free-drainage lysimeters for the determination of infiltration through coal refuse sites: A preliminary evaluation. Presented to the First Midwest Region Reclamation Conference, Carbondale, IL, July 18-19, 1990 (with R. Caudle).

Analytic models for predicting the effects of refuse injection into underground mines. Presented to the Third Conference on Ground Control Problems in the Illinois Coal Basin, Mt. Vernon, IL, August 8-10, 1990 (with S. Jones).

The Relation Between Material Properties of Glacial Till and the Bulk Saturated Hydraulic Conductivity. Presented to the First Illinois Groundwater Consortium Research Planning Conference, Springfield, IL, April 2, 1991 (with N. Rorick, K. Hedinger, and T. McDonald).

Graphic Groundwater, a Three-Dimensional Finite-Difference Groundwater Flow Model Running under the Windows 3.0 Environment. Presented to the Illinois Groundwater Association, Chicago, Illinois, March 26, 1992, (with D. Sharpe and T. Larson).

Research on the Bulk Saturated Hydraulic Conductivity of Glacial Till: Multiple Well and Single Well Test Methods. Presented to the Illinois Groundwater Consortium, Springfield, Illinois, April 28, 1992, (with S. Jones, N. Rorick, and T. McDonald).

Reclamation of Abandoned Strip Mines Using Coal Combustion Residues as Fill: Hydrogeologic Evaluation of the Forsythe-Energy #5 Test Site. Presented to the 14th Annual Abandoned Mine Land Conference, Chicago, August 23-27, 1992, (with James Durbin and Bradley Paul).

Reclamation of Abandoned Strip Mines Using Coal Combustion Residues as Fill: Materials Characterization for a Test at Forsythe-Energy #5. Presented to the 14th Annual Abandoned Mine Land Conference, Chicago, August 23-27, 1992, (with Bradley Paul, Frank Pisani, and Karthik Krishnamurthy).

Improving Piezometer (Slug) Test Analyses with Radial Finite Difference Flow Models. Presented to the Joint Meeting of the Illinois Groundwater Association and the Illinois-Indiana Section of the American Institute of Professional Geologists, Starved Rock State Park, October 15-16, 1992.

In-Situ Determination of Hydraulic Conductivity of Illinoian Till. Presented to the Joint Meeting of the Illinois Groundwater Association and the Illinois-Indiana Section of the American Institute of Professional Geologists, Starved Rock State Park, October 15-16, 1992, (with N. Rorick).

Determining the Bulk Saturated Hydraulic Conductivity of Fractured Low-Permeable Materials with a Single Well Test. Presented to the Annual Meeting of the Geological Society of America, October 26-29, 1992, (with T. McDonald and N. Rorick).

Field-Saturated Hydraulic Conductivity of Surficial Deposits along the Southern Extent of the Illinoian glaciation, Southern Illinois. Poster Session Presented to the Annual Meeting

of the Geological Society of America, October 26-29, 1992, (with T. McDonald and R. Padgett).

The University's Role in a New National Mapping Effort. Presented to the Committee on Geology and Public Policy Forum, Annual Meeting of the Geological Society of America, October 26-29, 1992.

Research on the Bulk Saturated Hydraulic Conductivity of Glacial Till: Guelph Permeameter Tests and Numeric Methods. Presented to the Illinois Groundwater Consortium, Makanda, Illinois, April 1, 1993, (with T. McDonald, P. Townsend, and N. Rorick).

Infiltration through Coal Refuse in Southern Illinois: Uncovering Lateral Flow by Applying Multiple Field Techniques. Presented to the Midwest Groundwater Conference, 38th Annual Meeting, October 6-8, 1993, Champaign, Illinois, (with T. McDonald).

The National Geologic Mapping Act. Presented to the National Association of Geology Teachers Regional Meeting, Charleston, Illinois, April 17, 1993 (invited talk)

Measuring the Bulk Saturated Hydraulic Conductivity of Glacial Diamicton: Weak Assumptions in Field Tests Affect Measurement Accuracy. Presented to the Northwestern University Geology Department Seminar, Evanston, Illinois, April 9, 1993 (invited talk).

Assessing the Groundwater and Surface Water Components of the Hydrologic Budget at an Active Coal Refuse Site, Southern Illinois: Implications from Single Rare Hydrologic Events. Presented to the National Mine Land Reclamation Center Conference, Collinsville, Illinois, April 21-22, 1993 (with T. McDonald).

Use of Coal Combustion By-Products as Fill in Reclamation: Impacts on Groundwater. Presented to the National Mine Land Reclamation Center Conference, Collinsville, Illinois, April 21-22, 1993 (with B. Paul).

Determining Groundwater Recharge through Coal Refuse by Monitoring the Complete Hydrologic Budget with Multiple Field Techniques. Presented to the Northern Illinois University Geology Colloquium, DeKalb, Illinois, March 25, 1994 (invited talk).

Use of Coal Combustion By-Products as a Substitute Fill in Mine Reclamation: Preliminary Assessment of Groundwater Impacts. Presented to the National Mine Land Reclamation Center Conference, Springfield, Illinois, April, 1994 (with B. Paul).

Methods for Characterizing the Hydrogeology of an Underground Mine for Disposal of Coal Combustion Residues. Presented to the Joint Meeting of the Illinois Groundwater Association and the Illinois-Indiana Section of the American Institute of Professional Geologists, Starved Rock State Park, October 9-10, 1996, (with Ed Mehnert and Tim McDonald).



Instruments for Monitoring the Vadose Zone of Sites Reclaimed with Coal Combustion By-Products. Presented to the Coal Combustion By-Products Interactive Forum, Hosted by the Office of Surface Mining, Reclamation and Enforcement, U.S. Department of the Interior, Southern Illinois University, October 30, 1996.

Groundwater Conditions around a Coal-Combustion Residue Site in Southern Illinois. Presented to the Thirteenth Annual Meeting of the American Society of Surface Mining and Reclamation, Knoxville, TN, May 18-23, 1996 (with M. Fielding and B. Paul).

Field scale hydraulic and pneumatic coal combustion byproduct injection – Part II. Presented to the 1997 International Ash Utilization Symposium, Lexington, KY, October 20-22, 1997 (with Y.P. Chugh, B. Paul, H. Sevim, T. McDonald, D. Dutta, E. Thomasson, and E. Mehnert)

An Investigation of Temporal Changes in Soil Permeability within the Vadose Zone in Areas Inundated by Floods. Presented to the Illinois Groundwater Consortium, Makanda, Illinois, April 2, 1998, (with T. McDonald and B. DeVantier).

Monitoring Mines Reclaimed with Mixtures of Spoil and Coal Combustion Residues. Presented to the Illinois Clean Coal Institute Contractors Meeting, Champaign, IL, July 28, 1998, (with B. Paul)

Field and Laboratory Permeability Determination in Vadose Zone Soils from Areas Inundated by Floods. Presented to the Illinois Groundwater Consortium, Makanda, Illinois, April 1, 1999, (with B. DeVantier, T. McDonald and K. Adhikary).

Reliable Capture Zone Analysis with Limited Data. Presented to the Illinois Environmental Protection Agency, Springfield, Illinois, November 22, 1999.

Hydrologic Monitoring of Sites Reclaimed with CCBs. Presented at the Technical Interactive Forum on the Use and Disposal of Coal Combustion By-Products at Coal Mines, Morgantown, West Virginia, April 12, 2000 (with B. Paul).

An Investigation of Temporal Changes in Soil Permeability within the Vadose Zone of Areas Inundated by Floods. Presented to the Illinois Groundwater Consortium, Carbondale, Illinois, April 13, 2000, (with B. DeVantier, Xun Zeng, and T. McDonald).

An Apparatus for Rapid Gravimetric Analysis of Particle Size Distribution. Presented to the Illinois Groundwater Consortium, Carbondale, Illinois, April 9, 2001.

#### F. Other:

Sigma Xi Treasurer (2005-2008)

Awarded Groundwater Science Award by the Illinois Groundwater Association, Fall Meeting, October 20, 2000.

National Science Foundation, Course and Curriculum Development, review panel, July 26-29, 1999, Washington, DC.

Illinois Groundwater Association Chairman, 1998

National Science Foundation, Course and Curriculum Development, review panel, July 21-24, 1997, Washington, DC.

Great Lakes Geologic Mapping Forum; Geologic Hazards Panel, Low-Level Nuclear Waste Disposal, March 24, 1997, Indianapolis, IN.

Illinois Groundwater Association Vice Chairman, 1997

Member of the Mine Hydrology Division, American Society of Surface Mining and Reclamation, 1996-1998.

Mining Hydrology Short Course for Chinese Students, Summer, 1996, Southern Illinois University.

National Science Foundation, Course and Curriculum Development, review panel, July 22-25, 1996, Washington, DC.

Session Chair, Coal Combustion By-Products Interactive Forum, Session 6, Monitoring and Evaluation, Hosted by the Office of Surface Mining, Reclamation and Enforcement, U.S. Department of the Interior, Southern Illinois University, October 29, 31, 1996.

Associate Editor, Water Resources Bulletin, American Water Resources Association, 1996-2001.

Illinois Groundwater Association Director, 1995-1996

Co-leader (with M.D. Blum) of the Midwest Friends of the Pleistocene 42nd Annual Field Conference, May 19-21, 1995, in southern Illinois.

Geological Society of America Penrose Conference, Fractured Unlithified Aquitards: Origins and Transport Processes, Racine Wisconsin, June 16-20, 1994, invited participant.

Mining Hydrogeology Short Course, March 14-17, 1994, Southern Illinois University.

Member of the Illinois Geologic Mapping Advisory Committee, Southern Illinois University at Carbondale Representative, December, 1989-2001.

Hydrology with Applications to Mining, Short Course for Practicing Professionals, October 25-26, 1990, Southern Illinois University.

American Society of Surface Mining and Reclamation, Committee on Mine Hydrology of the Geotechnical Engineering Division, Chair, 1993-1996.

Mining Hydrology Short Course, Illinois Mining Institute Annual Meeting, Collinsville, Illinois, September 22-23, 1993.

NMLRC Hydrology - Impacts and Assessment Panel, NMLRC Conference, Collinsville, Illinois, April 22, 1993.

Session Chair, Hydrogeology I, Geological Society of America, Annual Meeting, Cincinnati, Ohio, October 26-29, 1992.

Leader of a field trip on the Quaternary History of the Cache Valley in Southern Illinois for the Big Rivers Area Geological Society, November, 1987.

Host and Field Trip Leader of the Illinois Quaternary Association Meeting held in Carbondale, Illinois, October 10, 1987. (with D. Ritter and R.C. Kochel).

Coordinator, Small Operators Assistance Program, 1986-1988.

Co-leader of a field trip sponsored by the Iowa Academy of Science, April 28, 1984, on the Natural History of the Lake Calvin Basin in southeast Iowa.

## **VII. Community Service**

Assisted residents of southern Illinois on groundwater problems including well installation, farm pond construction, and potential environmental impact from a proposed landfill.

President, Southern Illinois Soccer Club (2006-2008)

Member of the Board of the Friends of Morris Library (1987-2003).

Member of the Executive Board of the Friends of Morris Library; Chairman of the Membership Committee (1989-1991), President of the Board (1991-1996).

Science fair judge, Unity Point School, Carbondale, Illinois (1988).

Member of the Water Hazard Assessment Committee, The Greater Egypt Regional Planning Commission, Carbondale, Illinois, 1987-1988 (task to assist in the development of educational material on the protection of groundwater resources).

Public presentation on groundwater in southern Illinois, Southern Illinois Earth Science Club, Benton, Illinois, April 13, 1989.

Science fair judge, Illinois Junior Academy of Sciences, Regional Fair, Carbondale, Illinois, March 31, 1990.

Public presentation on groundwater research to the Illinois Junior Science and Humanities Symposium, Carbondale, Illinois, April 3, 1990.

Science fair judge, Illinois Junior Academy of Sciences, Regional Fair, Carbondale, Illinois, March 23, 1991.

Lecture on rocks and minerals to Lincoln School Program for Gifted Students, October, 1991.

Science fair judge, Illinois Junior Academy of Sciences, Regional Fair, Carbondale, Illinois, April 4, 1992.

Science fair judge, Illinois Junior Academy of Sciences, Regional Fair, Carbondale, Illinois, March 27, 1993.

## **VIII. Research**

### **A. Research Interests and Specialties:**

Hydrogeology of Quaternary deposits  
Mine Reclamation  
Quaternary stratigraphy  
Groundwater modeling

### **B. Current Research Projects:**

Mapping and stratigraphy of the Quaternary deposits of Illinois  
  
Hydrology aspects of reclamation of surface and underground coal mines  
  
Hydrologic test modeling

### **C. Research Grants Applied for:**

1. The Effects of Longwall Mining Subsidence on Groundwater Conditions at Old Ben Mine 25, West Frankfort, Illinois. Submitted to: Old Ben Coal Co., Lexington, Kentucky, August, 1985 (with C.M. Pauvlik).
2. An Integrated Approach to Courseware Development and Dissemination. Submitted to The Comprehensive Fund for the Improvement of Post-Secondary Education, US Department of Education, April 1985 (with D. M. Sharpe and L. L. Malinconico, Jr.).
3. Environmental Impact Study for Longwall Mining Beneath Perennial Streams. Submitted to Old Ben Coal Co., Lexington, Kentucky, May, 1985 (with Y.P. Chugh, R. Caudle, and R. Sweigard).
4. Surficial Geology of the Creal Springs and Eddyville Quadrangles in Southern Illinois. Submitted to the Illinois State Geological Survey, January, 1985.

5. Surficial Geology and Geophysical Mapping in the Stonefort and Waltersburg Quadrangles in Southern Illinois. Submitted to the Illinois State Geological Survey, January, 1986 (with L.L. Malinconico, Jr.).
6. Surficial Geology and Geophysical Mapping in the Glendale and Goreville Quadrangles in Southern Illinois. Submitted to the Illinois State Geological Survey, January, 1987 (with L.L. Malinconico, Jr.).
7. Acquisition of a Hydraulic Soil Probe. Submitted to the National Science Foundation, October, 1986 (with R. Craig Kochel, L.L. Malinconico, Jr., D. Ritter, and J. Sexton).
8. A Method to Determine the Bulk Vertical Hydraulic Conductivity of Fractured Saturated Glacial Till. Submitted to the US Geological Survey, January, 1987.
9. Hydrogeologic Study of Wolf Lake. Submitted to Trojan Corporation, Spanish Fork, Utah, May, 1987 (with H. Hesketh).
10. Meaningful Learning in Introductory Earth Sciences through Hypercourseware. Submitted to The Comprehensive Fund for the Improvement of Post-Secondary Education, US Department of Education, November, 1987 (with D. M. Sharpe and L. L. Malinconico, Jr.).
11. Development of a Methodology for Field Determination of Hydrologic System Components on Abandoned Coal Refuse Sites. Submitted as part of a package from Southern Illinois University for consideration in the National Mined Land Reclamation Consortium, November, 1987 (with R. Caudle).
12. Statistical Analysis of the SOAP Data Base. Submitted to the Illinois Department of Mines and Minerals, September, 1987 (with J.W. Chen).
13. Hydrogeologic Study of Wolf Lake, Continuation and Expansion of the Study. Submitted to Trojan Corporation, Spanish Fork, Utah, May, 1987 (with H. Hesketh).
14. Hydrogeologic Study of Wolf Lake, Continuation and Expansion of the Study. Submitted to Fuss and O'Neill, Inc., Manchester, Connecticut, August, 1988 (with H. Hesketh).
15. Development of a Methodology for Field Determination of Hydrologic System Components on Abandoned Coal Refuse Sites. Submitted as part of a package from Southern Illinois University for consideration in the National Mined Land Reclamation Consortium, December, 1988 (with L.L. Malinconico, Jr. and R. Caudle).
16. A Proposal for an Investigation of the Universal Soil Loss Equation Slope Steepness and Slope Length Factors for Surface-Mined Land. Submitted to the U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement, April, 1989. (with L.L. Malinconico, Jr. and D. M. Sharpe).

17. A Preliminary Technical and Environmental Evaluation of Underground Waste Disposal of Utility Waste. Submitted to AMAX Coal Industries, Inc., Indianapolis, IN, June, 1989 (with Y. Chugh, C. Muchmore, J. Nawrot, H. Sevim).
18. Assessing the Groundwater and Surface Water Components of the Hydrologic Budget on a Reclaimed and Unreclaimed Coal Refuse Site. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1989 (with L.L. Malinconico, Jr. and R. Caudle).
19. Application of Analytic Models to Predict Hydrologic Conditions Associated with Refuse Injection into Underground Coal Mines. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1990 (with S. Jones).
20. Application of Analytic Models to Predict Hydrologic Conditions Associated with Refuse Injection into Underground Coal Mines. Submitted to AMAX Coal Industries, Inc., Indianapolis, IN, November, 1990 (with S. Jones).
21. Educational Software for University Courses in Environmental Sciences: A Joint Project to Improve Education - Southern Illinois University at Carbondale and University of the State of Rio De Janeiro, Brazil. Submitted to University Affiliations Program, United States Information Agency, Washington, D.C., February, 1990 (with D.M. Sharpe and M. Macciolo).
22. The Relation Between Material Properties of Glacial Till and the Bulk Saturated Hydraulic Conductivity. Submitted to the Illinois Groundwater Consortium and the U.S. Department of Agriculture, April, 1990.
23. A Joint Project on Curriculum Development and Reform in the Environmental Sciences. Submitted to University Affiliations Program, United States Information Agency, Washington, D.C., February, 1991 (with D.M. Sharpe and M. Macciolo).
24. The Relation Between Material Properties of Glacial Till and the Bulk Saturated Hydraulic Conductivity; Second Year Support. Submitted to the Illinois Groundwater Consortium and the U.S. Department of Agriculture, April, 1991.
25. Mining Hydrology with Emphasis on Impacts Associated with Refuse Injection into Underground mines on Groundwater. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, September, 1991 (with S. Jones).
26. An Interagency Demonstration of the Use of Coal Combustion Residues in Reclamation of Abandoned Strip Mines. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1991 (with B. Paul).

27. Surface Mine Land Reclamation Enhancement Through Disposal of Coal Processing and Utilization Wastes: Year Three. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1991 (with P.K. Davis and J.G. Smith).
28. Preliminary Environmental Assessment of the Suitability of an Abandoned Surface Mine for the Disposal of Coal Utilization Refuse. Submitted to the Abandoned Mine Land Reclamation Council, February, 1992.
29. Assessing Risk of Contamination from Agricultural Chemicals by Testing the Bulk Intrinsic Permeability and Effective Porosity of Vadose Zone Materials. Submitted to the Illinois Groundwater Association and the U.S. Department of Agriculture, May, 1992 (with B. DeVantier).
30. Surficial Geologic Mapping in southern Illinois. Submitted to the Illinois Geological Survey, January, 1992.
31. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines. Submitted to the U.S. Department of Energy/METC, December, 1992 (with Y. Chugh, B. Paul, H. Sevim, R. Honaker, and N. Ghafoori).
32. Seed Money Project on the Use of Coal Combustion By-products for Acid Seep Abatement. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1992 (with B. Paul).
33. An Interagency Demonstration of the Use of Coal Combustion Residues in Reclamation of Abandoned Strip Mines: Second Year. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1992 (with B. Paul).
34. Development of Environmental Geoscience Computer Laboratory. Submitted to the National Science Foundation, November, 1992 (with M. Blum, M. Berry, R. Fifarek, D. Ravat, and J. Sexton).
35. Surficial Geologic Mapping of the Pomona and Cobden Quadrangles in Southern Illinois. Submitted to the Illinois Geological Survey, March, 1993.
36. An Interagency Demonstration of the Use of Coal Combustion Residues in Reclamation of Abandoned Strip Mines; Third Year. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1993 (with B. Paul).
37. Development of Environmental Geoscience Computer Laboratory. Submitted to the National Science Foundation, ILI Program, November, 1993 (with M. Blum, M. Berry, R. Fifarek, D. Ravat, and J. Sexton).

38. A Computer Program to Model Bioventing of Organic Contaminants in Unsaturated Geologic Materials. Submitted to the USEPA., February, 1993 (with B. DeVantier).
39. Relating the Surficial Geologic Materials to the Bulk Intrinsic Permeability of Vadose Zone Materials: Quantifying Potential for Groundwater Contamination from Agricultural Chemicals. Submitted to the Illinois Groundwater Association and the U.S. Department of Agriculture, April, 1993 (with B. DeVantier and T. McDonald).
40. Development of Environmental Geoscience Computer Laboratory. Submitted to the National Science Foundation, ILI Program, November, 1993 (with M. Blum, M. Berry, R. Fifarek, D. Ravat, and J. Sexton).
41. Preliminary Investigation: Agrichemicals in the Cache River Valley Aquifer. Submitted to the Illinois Groundwater Association and the U.S. Department of Agriculture, February, 1994 (with A. Dennis).
42. Use of Fluidized Bed Combustion By-Products for Liners and Alkali Substitutes. Submitted to the Illinois Department of Energy and Natural Resources/Illinois Clean Coal Institute, February, 1994 (with B. Paul).
43. Field Monitoring and Laboratory Scale-Up Procedures for the Prediction of Groundwater Impacts from the use or Disposal of Combustion Residues at Mine Sites. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1994 (with B. Paul; two years at \$115,000).
44. An Assessment and Comparison of Subsidence Impacts due to Longwall Mining at Shallow Depths with and without an Abandoned Overlying Partially Extracted Coal Seam. Submitted as part of a package from Southern Illinois University for consideration in the National Mine Land Reclamation Consortium, November, 1994 (with P. Dutta; two years at \$109,263).
45. Investigation of Temporal Changes in Intrinsic Permeability within the Vadose Zone of Areas Inundated by Recent Mississippi River Floods. Submitted to the Illinois Groundwater Association and the U.S. Department of Agriculture, February, 1995 (with B. DeVantier and T. McDonald; two years at \$105,662).
46. Surficial Geologic Mapping of the Brownfield Quadrangle in Southern Illinois. Submitted to the Illinois State Geological Survey, March, 1995 (with D. LaBrecque, one year at \$2,500).
47. Use of FBC Ash and SO<sub>2</sub> Control By-Products for Liners and Alkali Substitutes. Submitted to the ICCI/BECA, February, 1995 (with B. Paul and H. Sevim, one year at \$71,108).



48. Development and Demonstration of a New Approach for Waste Coal Slurry Management Using Natural Utilization By-Products. Submitted to IDCCA/ICCI, May, 1995 (with Y.P. Chugh and B. Paul, Esling portion, two years at \$42,274).
49. Field Monitoring and Laboratory Scale-Up Procedures for the Prediction of Groundwater Impacts from the Use or Disposal of Combustion Residues at Mine Sites-Year 1. Submitted to the National Mine Land Reclamation Center-Midwestern Region/USBOM, 1996 (with B. Paul and H. Sevim, two years at \$124,078).
50. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines, Environmental Characterization, Phase 2. Submitted to the U.S. Department of Energy/METC, March, 1996 (with Y. Chugh, E. Thomasson, B. Paul, H. Sevim, and D. Dutta).
51. A Cooperative Program for Developing Recharge Area Maps for Groundwater Wells Supplying Small Rural Communities. Submitted to HEECA, May, 1996 (with L. Barrows, Illinois State University, one year at \$26,436 for SIUC).
52. Monitoring of Mines Reclaimed with Mixtures of Spoil and Coal Combustion Residue. Submitted to IDCCA/ICCI, July, 1996, (with B. Paul for \$29,648)
53. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines, Environmental Characterization, Phase 3. Submitted to the U.S. Department of Energy/METC, March, 1997 (with Y. Chugh, E. Thomasson, B. Paul, H. Sevim, and D. Dutta).
54. Proposal for a Grant in Aid of Hydrogeology Research in the Department of Geology, Southern Illinois University at Carbondale. Submitted to Saigh Foundation, August, 1997 (with T. McDonald for \$30,382).
55. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines, Environmental Monitoring. Submitted to the U.S. Department of Energy/METC, November, 1997 (with Y. Chugh for \$37,878).
56. A Large Scale Development and Demonstration of a New Approach for Raised Coal Slurry Management Yielding Coal Combustion By-Products. Submitted to IDCCA, October, 1998 (with Y. Chugh and B. Paul for \$311,896)
57. The Transport of Boron from Coal Combustion Products Through Mine Spoil and Strata. Preproposal submitted to the Indiana Division of Reclamation (with B. Paul), SMART Program; also submitted to the Combustion Byproducts Recycling Consortium. August, 2001 (with B. Paul for \$50,000)
58. Feasibility Study of Dewatering Fine Coal Waste Disposal Areas. Submitted to IDCCA, Coal Combustion Resource Institute, August, 2001 (with Y. Chugh)

59. Development of an Expanded Groundwater Flow Model to Facilitate Planning by the Saline Valley Conservancy District. Submitted to the Saline Valley Conservancy District, June, 2005

D. Research Grants Funded:

1. The Effects of Longwall Mining Subsidence on Groundwater Conditions at Old Ben Mine 25, West Frankfort, Illinois. Old Ben Coal Co., Lexington, Kentucky, August, 1985 to August, 1986, Funded for \$2,465, (with C.M. Pauvlik).
2. An Integrated Approach to Courseware Development and Dissemination. The Comprehensive Fund for the Improvement of Post-Secondary Education, U.S. Department of Education, April 1985 to September, 1988, Funded for \$327,622, (with D. M. Sharpe and L. L. Malinconico, Jr.).
3. Surficial Geology of the Creal Springs and Eddyville Quadrangles in Southern Illinois. Illinois State Geological Survey, October, 1984 to September, 1985, Funded for \$2,072.
4. Surficial Geology and Geophysical Mapping in the Stonefort and Waltersburg Quadrangles in Southern Illinois. Illinois State Geological Survey, October, 1985 to September, 1986, Funded for \$2,872, (with L.L. Malinconico, Jr.).
5. Surficial Geology and Geophysical Mapping in the Glendale and Goreville Quadrangles in Southern Illinois. Illinois State Geological Survey, October, 1986 to September, 1987, Funded for \$1,494, (with L.L. Malinconico, Jr.).
6. Acquisition of a Hydraulic Soil Probe. National Science Foundation, October, 1986, Funded for \$13,437, (with R. Craig Kochel, L.L. Malinconico, Jr., D. Ritter, and J. Sexton).
7. Hydrogeologic Study of Wolf Lake. Trojan Corporation, Spanish Fork, Utah, June, 1987 to October, 1988, Funded for \$47,990 (with H. Hesketh).
8. Development of a Methodology for Field Determination of Hydrologic System Components on Abandoned Coal Refuse Sites. U.S. Bureau of Mines, July, 1988 to September, 1988, Funded for \$32,400, (with R. Caudle).
9. Statistical Analysis of the SOAP Data Base. Illinois Department of Mines and Minerals, October, 1987 to September, 1988, Funded for \$20,000 (with J.W. Chen).
10. Development of a Methodology for Field Determination of Hydrologic System Components on Abandoned Coal Refuse Sites (Continuation). U.S. Bureau of Mines, July, 1989 to June, 1990, Funded for \$35,121 (with L.L. Malinconico, Jr. and R. Caudle).
11. A Preliminary Technical and Environmental Evaluation of Underground Waste Disposal of Utility Waste at AMAX's Wabash Mine. AMAX Coal Industries, Inc., Indianapolis,

- IN, June, 1989 to August, 1990, Funded for \$30,891 (with Y. Chugh, C. Muchmore, J. Nawrot, H. Sevim).
12. Assessing the Groundwater and Surface Water Components of the Hydrologic Budget on a Reclaimed and Unreclaimed Coal Refuse Site. U.S. Bureau of Mines, July, 1990 to June, 1991, Funded for \$28,289 (with L.L. Malinconico, Jr. and R. Caudle).
  13. The Relation Between Material Properties of Glacial Till and the Bulk Saturated Hydraulic Conductivity. Illinois Groundwater Consortium and the U.S. Department of Agriculture, June, 1990 to June, 1991, Funded for \$44,578.
  14. Application of Analytic Models to Predict Hydrologic Conditions Associated with Refuse Injection into Underground Coal Mines. AMAX Coal Industries, Inc., Indianapolis, IN, December, 1990, Funded for \$2,500 (with S. Jones).
  15. The Relation Between Material Properties of Glacial Till and the Bulk Saturated Hydraulic Conductivity; Second Year Support. Illinois Groundwater Consortium and the U.S. Department of Agriculture, July, 1991 to June, 1992, Funded for \$25,760.
  16. Application of Analytic Models to Predict Hydrologic Conditions Associated with Refuse Injection into Underground Coal Mines. National Mine Land Reclamation Consortium and U.S. Bureau of Mines, July, 1991 to June, 1992, Funded for \$21,221 (with S. Jones).
  17. An Interagency Demonstration of the Use of Coal Combustion Residues in Reclamation of Abandoned Strip Mines. National Mine Land Reclamation Consortium and U.S. Bureau of Mines, July, 1992 to June, 1993, Funded for \$34,026 (with B. Paul).
  18. Surface Mine Land Reclamation Enhancement Through Disposal of Coal Processing and Utilization Wastes: Year Three. National Mine Land Reclamation Consortium and U.S. Bureau of Mines, July, 1992 to June, 1993, Funded for \$24,722 (with P.K. Davis and J.G. Smith).
  19. Preliminary Environmental Assessment of the Suitability of an Abandoned Surface Mine for the Disposal of Coal Utilization Refuse. Abandoned Mine Land Reclamation Council, March, 1992 to September, 1992, Funded for \$16,090.
  20. Surficial Geologic Mapping in southern Illinois. Illinois Geological Survey, Open Award Period, Funded for \$4,250.
  21. An Interagency Demonstration of the Use of Coal Combustion Residues in Reclamation of Abandoned Strip Mines; Second Year. National Mine Land Reclamation Consortium and U.S. Bureau of Mines, July, 1993 to June, 1994, Funded for \$42,026 (with B. Paul).
  22. Surficial Geologic Mapping of the Pomona and Cobden Quadrangles in Southern Illinois: Illinois Geological Survey, Open Award Period, Funded for \$4,500.

23. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines; U.S. Department of Energy/METC, October, 1993 to March, 1996, Funded for \$1,011,043 (with Y. Chugh, E. Thomasson, B. Paul, H. Sevim, R. Honaker, and N. Ghafoori; The portion of this grant under my responsibility was \$189,088).
24. Use of Fluidized Bed Combustion By-Products for Liners and Alkali Substitutes; IDENR/ICCI, September, 1994 to August, 1995, Funded for \$99,020 (with B. Paul).
25. An Interagency Demonstration of the Use of Coal Combustion Residues in Reclamation of Abandoned Strip Mines; Third Year. National Mine Land Reclamation Consortium and U.S. Bureau of Mines, July, 1994 to June, 1995, Funded for \$42,921 (with B. Paul).
26. Development of Environmental Geoscience Computer Laboratory; NSF/ILI, Open Period, Funded for \$26,686 (with M. Blum, M. Berry, R. Fifarek, D. Ravat, and J. Sexton).
27. Acquisition of a Mobile B53 Drill Rig, Peabody Coal Company, Open Period, Estimated value \$30,000.
28. Surficial Geologic Mapping of the Brownfield Quadrangle in Southern Illinois, Illinois State Geological Survey, June through December, 1995, Funded for \$2,500.
29. Use of FBC Ash and SO<sub>2</sub> Control By-Products for Liners and Alkali Substitutes, CCI/BECA, September, 1995 through August, 1996, Funded for \$71,108 (with B. Paul).
30. Development and Demonstration of a New Approach for Waste Coal Slurry Management Using Natural Utilization By-Products, IDCCA/ICCI, August, 1995 through July, 1997 (with Y.P. Chugh and B. Paul, Esling portion, two years at \$42,274).
31. Monitoring of Mines Reclaimed with Mixtures of Spoil and Coal Combustion Residue, IDCCA/ICCI, September, 1996 through August, 1997, Funded for \$29,648, (with B. Paul).
32. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines, Environmental Characterization, Phase 2; U.S. Department of Energy/METC, April, 1996 to March, 1997, (with Y. Chugh, E. Thomasson, B. Paul, H. Sevim, and D. Dutta; The portion of this grant under my responsibility was \$41,610).
33. Investigation of Temporal Changes in Intrinsic Permeability within the Vadose Zone of Areas Inundated by Recent Mississippi River Floods, Illinois Groundwater Association and the U.S. Department of Agriculture, September, 1996 through August, 1998, Funded for \$59,485 (with B. DeVantier and T. McDonald).
34. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines, Environmental Characterization, Phase 3; U.S. Department of Energy/METC, April, 1997 to March, 1998, Funded for \$500,000 (with Y. Chugh, E. Thomasson, B. Paul, H. Sevim, and D. Dutta; The portion of this grant under my responsibility was \$60,884).

35. Monitoring of Mines Reclaimed with Mixtures of Spoil and Coal Combustion Residue, Second Year, IDCCA/ICCI, August, 1997 through August, 1998, Funded for \$29,648, (with B. Paul).
36. Well Head Delineations in Southern Illinois; Illinois Environmental Protection Agency, September, 1997 to August, 2001, Funded for \$50,800.
37. Investigation of Temporal Changes in Intrinsic Permeability within the Vadose Zone of Areas Inundated by Recent Mississippi River Floods (Second Year), Illinois Groundwater Association and the U.S. Department of Agriculture, September, 1998 through August, 1999, Funded for \$47,400 (with B. DeVantier and T. McDonald).
38. Management of Dry Gas Desulfurization (FGD) By-Products in Underground Mines, Phase 4: Environmental Monitoring; U.S. Department of Energy/METC, September, 1998 to August, 1999 (with Y. Chugh for \$37,878).
39. Development of an Expanded Groundwater Flow Model to Facilitate Planning by the Saline Valley Conservancy District, Saline Valley Conservancy District, July, 2005 through June, 2006, Funded for \$22,747.

## **IX. Publications**

### Published Papers

- Roosa, D.M., E.A. Bettis, S.P. Esling, and J.C. Prior, 1984. Natural history of the Lake Calvin Basin of southeast Iowa. Iowa Natural History Association Field Trip Guidebook, 2, 25 p.
- Hallberg, G.R., T.J. Kemmis, N.C. Wollenhaupt, S.P. Esling, E.A. Bettis, and T.J. Bicki, 1984. The overburden, Quaternary stratigraphy of the Conklin Quarry. in Underburden-Overburden, an examination of Paleozoic and Quaternary Strata at Conklin Quarry near Iowa City, Iowa (edited by B.J. Bunker and G.R. Hallberg), Geological Society of Iowa Guidebook, 41, p. 25-62.
- Pauvlik, C.M. and S.P. Esling, 1987. The effects of longwall mining subsidence on the groundwater conditions of a shallow, unconfined aquitard in southern Illinois. 1987 National Symposium on Mining Hydrology, Sedimentation, and Reclamation, Proceedings, University of Kentucky, Office of Continuing Education Engineering, p 189-196.
- Drake, L. and S.P. Esling, 1988. Regional hydrogeology of agricultural drainage wells in Iowa. Geological Society of America, Bulletin, V. 100, No. 7, p. 1131-1139.
- Esling, S.P., and L. Drake, 1988. Erosion of strip-mine spoil in Iowa and its implications for erosion models. Geomorphology, V. 1, No. 4, p. 279-296.

- Esling, S.P., W.B. Hughes, and R.C. Graham, 1989. Analysis of sediment properties within the Cache Valley, southern Illinois and implications to the late Pleistocene-Holocene development of the Ohio River Valley. *Geology*, V. 17, p. 434-437.
- Esling, S.P., L. R. Follmer, E.D. Henderson, M.S. Lannon, and M.H. Riggs, 1991. The surficial geology of the Stonefort, Creal Springs, and Eddyville Quadrangles in southern Illinois. A Chapter in Bulletin 96, Illinois State Geological Survey, p. 45-59.
- Henderson, E.D., M.S. Lannon, S.P. Esling, M.H. Riggs, and L.R. Follmer, 1992. Quaternary Geology of the Eddyville 7.5 Minute Quadrangle. Illinois State Geological Survey; Open File Series, 1992-8.
- Riggs, M.S., M.S. Lannon, S.P. Esling, and L.R. Follmer, 1992. Quaternary Geology of the Creal Springs 7.5 Minute Quadrangle. Illinois State Geological Survey; Open File Series, 1992-7.
- Lannon, M.S., S.P. Esling, M.S. Riggs, and L.R. Follmer, 1992. Quaternary Geology of the Stonefort 7.5 Minute Quadrangle. Illinois State Geological Survey; Open File Series, 1992-9.
- Drake, L., and S.P. Esling, 1989, Pollution potential and regulation of Agricultural Drainage Wells, Iowa, USA. *Water Quality Bulletin*, V. 14, No. 3, p. 145-151; 167.
- Esling, S.P., W.B. Hughes, and R.C. Graham, 1989. Analysis of sediment properties within the Cache Valley, southern Illinois and implications to the late Pleistocene-Holocene development of the Ohio River Valley: Reply to a comment by Elizabeth K. Leach. *Geology*, V. 17, p. 1160-1161.
- Esling, S.P., and R. Caudle, 1990. Free-drainage lysimeters for the determination of infiltration through coal refuse sites: A preliminary evaluation. Proceedings of the First Midwest Region Reclamation Conference, National Mine Land Reclamation Center-Midwestern Region, Coal Extraction and Utilization Center, Southern Illinois University at Carbondale, p 3.1-3.9.
- Esling, S.P., and S.W. Jones, 1990. Analytic models for predicting the effects of refuse injection into underground mines. Proceedings of the Third Conference on Ground Control Problems in the Illinois Coal Basin, Y.P. Chugh, ed., Southern Illinois University at Carbondale, p.83-91.
- Esling, S.P., N. Rorick, K. Hedinger, and T. McDonald, 1991. The relation between material properties of glacial till and the bulk saturated hydraulic conductivity. Proceedings of the First Annual Conference, Illinois Groundwater Consortium, Springfield, IL, April 2, p. 59-69.
- Esling, S.P., S. Jones, N. Rorick, and T. McDonald, 1992. Research on the bulk saturated hydraulic conductivity of glacial till: multiple well and single well test methods.

Proceedings of the Second Annual Conference, Research on Agricultural Chemicals in Illinois Groundwater: Status and Future Directions II, Illinois Groundwater Consortium, Springfield, IL, April 27-28, p. 82-98.

Esling, S.P., 1992. The University's role in a new national geologic mapping effort. *GSA Today*, V. 2, No. 12, p. 263-264.

Durbin, J, and S. Esling, and B. Paul, 1992. Reclamation of abandoned strip mines using coal combustion residues as fill: hydrogeologic evaluation of the Forsythe-Energy #5 Test Site. 14th Annual Abandoned Mine Land Conference, New Trends - Utilization of Recycled Materials and Waste Products in Mine Reclamation, Addendum to the Proceedings.

Paul, B., S. Esling, F. Pisani, and K. Krishnamurthy, 1992. Reclamation of Abandoned Strip Mines Using Coal Combustion Residues as Fill: Materials Characterization for a Test at Forsythe-Energy #5. Proceedings, 14th Annual Abandoned Mine Land Conference, New Trends - Utilization of Recycled Materials and Waste Products in Mine Reclamation, p. 361-380.

Esling, S.P., T. McDonald, P. Townsend, and N. Rorick, 1993. Research on the bulk saturated hydraulic conductivity of glacial till: Guelph permeameter tests and numeric methods. Proceedings of the Second Annual Conference, Research on Agricultural Chemicals in Illinois Groundwater: Status and Future Directions III, Illinois Groundwater Consortium, Makanda, IL, March 31-April 1, p. 132-158.

Esling, S.P., T. McDonald, and L.L. Malinconico, Jr., 1993. Assessing the groundwater and surface water components of the hydrologic budget at an active coal refuse site, Southern Illinois: Implications from single rare hydrologic events. Proceedings of the NMLRC Symposium 1993, (Y.P. Chugh and D. Davin, editors), p. 57-73.

Paul, B., and S.P. Esling, 1993. Use of coal combustion by-products as fill in reclamation: impacts on groundwater. Proceedings of the NMLRC Symposium 1993, (Y.P. Chugh and D. Davin, editors), p. 171-187.

Paul, B., and S.P. Esling, 1994. Use of coal combustion by-products as a substitute fill in mine reclamation: preliminary assessment of groundwater impacts. in *Management of High Sulfur Coal Combustion Residues: Issues and Practices* (Y.P. Chugh and G. Beasley, editors), p. 167-181.

Esling, Steven, 1996. Instruments for Monitoring the Vadose Zone of Sites Reclaimed with Coal Combustion By-Products. in the Proceedings, Coal Combustion By-Products Interactive Forum, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of the Interior, Southern Illinois University.

Esling, Steven, M. Fielding, and B. Paul, 1996. Groundwater conditions around a coal-combustion residue site in southern Illinois. Successes and Failures: Applying Research Results to Insure Reclamation Results, Proceedings of the American

Society of Surface Mining and Reclamation, Thirteenth Annual Meeting, May 18-23, Knoxville, TN, p.703-712.

Chugh, Y.P., B. Paul, S. Esling, H. Sevim, T. McDonald, D. Dutta, E. Thomasson, and E. Mehnert, 1997. Field scale hydraulic and pneumatic coal combustion byproduct injection – Part II. Pushing the Envelope, Proceedings of the 1997 International Ash Utilization Symposium, October 20-22, Lexington, KY, p.495-508.

Esling, S.P., B. DeVantier, and T. McDonald, 1998. An investigation of temporal changes in soil permeability within the vadose zone of areas inundated by floods. Research on Agricultural Chemicals in Illinois Groundwater: Status and Future Directions, Proceedings of the Eight Annual Illinois Groundwater Consortium Conference, April 1-2, 1998, Makanda, IL, p. 186-201.

DeVantier, B.A., S.P. Esling, T. McDonald, and K. Adhikary, 1999. Field and laboratory permeability determination in vadose zone soils from areas inundated by floods. Research on Agricultural Chemicals in Illinois Groundwater: Proceedings of the Ninth Annual Illinois Groundwater Consortium Conference, April 1, 1999, Makanda, IL, p. 62-76.

Esling S.P., B.A. DeVantier, X. Zeng, and T. McDonald, 2000. An investigation of temporal changes in soil permeability within the vadose zone of areas inundated by floods. Research on Agricultural Chemicals in Illinois Groundwater: Status and Future Directions, Proceedings of the Tenth Annual Illinois Groundwater Consortium Conference, April 13, 2000, Makanda, IL, p. 1-11.

Esling, S.P., and Paul, B., 2001. Hydrologic Monitoring at Three Mine Sites Reclaimed with Mixtures of Spoil and Coal Combustion Residues in Illinois. Proceedings of The Use and Disposal of Coal Combustion By-Products at Coal Mines: A Technical Interactive Forum, April 10-13, 2000, Morgantown, West Virginia, U.S. Department of Energy, The National Energy Technology Center, p. 212-220.

Esling, S.P., Keller, J.E., and Miller, K.J., 2008. Reducing capture zone uncertainty with a systematic sensitivity analysis. *Ground Water*, 46(4), 570-578.

Esling, S.P., and Keller, J.E., 2009. A user interface for the Kansas Geological Slug test model. *Ground Water*, 47(4), 587-590.

#### Published Abstracts

Esling, S.P., G.R. Hallberg, T.J. Bicki, and T.E. Fenton, 1980. New complexities of the high terrace of Lake Calvin. Iowa Academy of Science, Abstracts of Papers, 92nd Session, Simpson College, Iowa.

Graeff, R., S.P. Esling, and L. Drake, 1981. Delineation of Iowa aquifers potentially impacted by agricultural drainage wells. Iowa Academy of Science, Abstracts of Papers, 93rd Session, Coe College, Iowa.



- Van Biersel, T.P., P.C. Reed, and S.P. Esling, 1984. Morphological delineation of an oil brine plume within a shallow aquifer in Bond County, Illinois, using earth resistivity measurements. Annual Meeting of the Geological Society of America, Abstracts with Programs, V. 16, No. 7.
- Esling, S.P. and L. Drake, 1984. Iowa agricultural drainage wells - a hydrogeologic first approximation. Midwest Groundwater Conference, 29th Annual Meeting, Program with Abstracts, Lawrence, Kansas, p. 10.
- Esling, S.P. and Hallberg, G.R., 1985. Development of the Mississippi River from the Late Illinoian through the early Holocene as recorded in terrace remnants along the lower Iowa and Cedar Rivers, southeast Iowa. Pleistocene Geology and Evolution of the Upper Mississippi Valley (a Working Conference), Abstracts and Field Trip Guide, R.S. Lively, Coordinator, Sponsored by the Minnesota Geological Survey and the University of Minnesota, p. 55-57.
- Malinconico, L.L., Jr., D.M. Sharpe, S.P. Esling, and T. Larson, 1986. Teaching software for the environmental Sciences. (Abstract) Envirosoft 86, Newport Beach, November 19-21, 1986.
- Pauvlik, C.M. and S.P. Esling, 1987. The effects of longwall mining subsidence on the hydrogeology and groundwater chemistry of a shallow, unconfined aquitard in southern Illinois. 21st Annual Meeting of the North-Central Section, Geological Society of America, Abstracts with Programs, V. 19, No. 4, p 238.
- Hayes, B.R. and S.P. Esling, 1987. Application of a numerical model to brine contamination at the Beaver Creek Oil Field in Bond County, Illinois. Midwest Groundwater Conference, 32nd Annual Meeting, Program with Abstracts, Madison, Wisconsin.
- Sharpe, D., L.L. Malinconico, Jr., S.P. Esling, T. Larson, and C.A. Struss, 1987. Instructional simulations for environmental sciences. Proceedings of the University Council on Water Resources, Inc., 1987 Annual Meeting, p. 181.
- Malinconico, L.L., S.P. Esling, D.M. Sharpe, T.A. Larson, and C.A. Struss, 1988. Integrated courseware for instruction in physical geology and earth sciences. Annual Meeting of the Geological Society of America, Abstracts with Programs, V. 20, No. 7.
- Drake, L.D. , and S.P. Esling, 1989. Agricultural Drainage Wells in Iowa. American Association for the Advancement of Science, 155th National Meeting, Abstracts of Papers, p. 75...
- Brammer, J.; and S.P. Esling, 1989. A Free-drainage lysimeter design for quantifying infiltration and sampling water in the unsaturated zone. Annual Meeting of the Geological Society of America, Abstracts with Programs, V. 21, No. 7.

- Dennis, A. Maxwell; R.N. Guillemette, and S.P. Esling, 1989. The hydrogeology and geochemistry of an abandoned surface coal mine containing acid and neutral lakes. Geological Society of America, Abstracts with Programs, V. 21, No. 7.
- Esling, S.P., and R. Caudle, 1989. Development of a methodology for field determination of hydrologic system components on abandoned and reclaimed coal refuse sites. Acid Mine Drainage Workshop, The National Mine Land Reclamation Center, West Virginia University, Morgantown, WV, p. 41.
- Esling, S.P., 1992. Improving piezometer (slug) test analyses with radial finite difference flow models. Joint Meeting of the Illinois Groundwater Association and the Illinois-Indiana Section of the American Institute of Professional Geologists, Program with Abstracts, Starved Rock State Park, October 15-16. p. 9.
- Rorick, N. and S.P. Esling, 1992. In-situ determination of hydraulic conductivity of Illinoian Till. Joint Meeting of the Illinois Groundwater Association and the Illinois-Indiana Section of the American Institute of Professional Geologists, Program with Abstracts, Starved Rock State Park, October 15-16. p. 5.
- Esling, S.P., T.A. McDonald, and N. Rorick, 1992. Determining the bulk saturated hydraulic conductivity of fractured low-permeable materials with a single well test. Annual Meeting of the Geological Society of America, Abstracts with Programs, V. 24, No. 7, p. 201.
- McDonald, T.A., R.J. Padgett, and S.P. Esling, 1992. Field-saturated hydraulic conductivity of surficial deposits along the southern extent of the Illinoian glaciation, southern Illinois. Annual Meeting of the Geological Society of America, Abstracts with Programs, V. 24, No. 7, p. 300.
- McDonald, T.A. and S.P. Esling, 1993. Infiltration through coal refuse in southern Illinois: Uncovering lateral flow by applying multiple field techniques. Midwest Groundwater Conference, 38th Annual Meeting, Program with Abstracts, Champaign, Illinois, p. 54.
- Varsa, S.R., and S.P. Esling, 1994. Potential for groundwater contamination from yard waste composting facilities in Illinois: An example from southern Illinois. Rocky Mountain Conference on Analytical Chemistry, Abstracts.
- Esling, S.P., McDonald, T., and Mehnert, E., 1996. Methods for characterizing the hydrogeology of an underground mine for disposal of coal combustion residues. Joint Meeting of the Illinois Groundwater Association and the Illinois-Indiana Section of the American Institute of Professional Geologists, Program with Abstracts, Starved Rock State Park, October 9-10 p. 7.

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## Scientific Reports

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- Esling, S.P. and J. Nott, 1980. Geologic overview of Louisa County, Iowa and vicinity. in the Southeast Iowa Lake Calvin Area Paleo-Indian Survey Final Report, R. Shutler, Jr. and T. Charlton, Directors, p. 24-46.
- Esling, S.P., 1984. The paleohydrology of the Mississippi River at replacement Lock and Dam 26. Final Report to the US Army Corps of Engineers, St. Louis District, St. Louis, Missouri, 50 p.
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