

John E. McCray

List of Publications

Graduate-Student or Post-Doctoral Student Authors are Underlined

Textbooks (1)

Lee, K., Fetter, C.W., **McCray, J.E.**, 2002. *Hydrogeology Laboratory Manual, 2nd Edition*, Prentice Hall, Upper Saddle River, NJ.

Manuscripts in Review (2)

Geza M. Murray, K.E., **McCray J.E.** 2009. Watershed scale impacts of nitrogen from onsite wastewater systems: parameter sensitivity and model calibration *ASCE J. Environ. Engineering*, accepted pending minor revisions.

Geza M. and **McCray J.E.**, 2009. Phosphorus transport and reaction in a small mountain watershed, in preparation for *J. Environ. Qual.*

Manuscripts in Preparation: (11)

McCray, J.E., Tick, G., Annable, M., Brusseau, M.L., Falta, R., Gierke, J., Jawitz, J., Knox, R., Sabatini, D., Innovative Source-Zone Remediation Studies at Hill and Dover A.F.B: Lessons Learned, *Ground Water* (invited paper).

Smith, S.M., Kolm, K.E., Varien, M.D., Hitzman, M., **McCray, J.E.**. Comparison of paleohydrological and prehistoric settlement population dynamics, Central Mesa Verde Region, Colorado in preparation for *Nature*.

McCray, J.E., van Genuchten, M. TH. Use of Richards Equation to simulate unsaturated flow at larger scales, a review, *Vadose Zone J. (Invited)*.

Deardorff, J., **McCray, J.E.**, Nummedal, D., 2009. Risk-based method to screen saline aquifers for CO₂ sequestration potential, in preparation for *ES&T*.

Geza, M., McCray, J.E., Development of multiple hydraulic biozones during wastewater infiltration in sand, in preparation for *Water Resour. Res.*

Christensen, K., Altman, P., Schaeffer, C., **McCray, J.E.**. Dissolution of DNAPL in an experimental 3-D sandstone fractured network, in preparation for *Water Resources Research*.

McCray, J.E. Influence of NAPL-mixture dissolution on contaminant plume centroid movement, in preparation for *Ground Water*.

Smith, M., Silva, J.A.K., Marr, J.M., **McCray, J.E.**. Use of polymers for heterogeneity control and electron donors during bioremediation, in preparation for *Environ. Sci. Technol.*

Silva J.A.K., **McCray, J.E.**, Experimental determination of transport parameters used in simulating polymer-flooding in heterogeneous porous media, in preparation for *Water Resour. Research*

Rothe, N.K., J.E. McCray, K.S. Lowe, and J. Munakata-Marr. Operational parameters for septic tanks: Meta- and field-data analysis. In preparation for *J. Environ. Engng.*

Lowe, K.S., D.N. Huntzinger, S. Van Cuyk, R.L. Siegrist, **J.E. McCray**. Performance evaluation of wastewater renovation by sandy porous media biofilters, in preparation for *ASCE J. Environ. Engineering*.

Guest Editorials and Commentary (5)

McCray, J.E., Thyne, G.D., 2009. Joint sustainability of water resources and petroleum-energy production, Editorial, *Ground Water*, 47(5), 11.

McCray, J.E., Boving, T.B., 2007. Urban Watershed Hydrology, *J. Amer. Water Resour. Assoc.*, 43(4), 839-840.

McCray, J.E., Christopherson, S.H., 2008. Onsite wastewater systems and interactions with the environment, *ASCE J. Hydrologic Engineering*, 13(8), 653-654.

Boving T.B., and **J.E. McCray**, 2007. Issues in urban hydrology: The emerging field of urban contaminant hydrology, *J. Contaminant Hydrology*, 91 (1-2), 1-3.

McCray, J.E., Thyne, G.D., Boving, T., 2003. Contaminant characterization, transport, and remediation in complex multiphase systems, *Vadose Zone J.*, 2(2), 115.

Peer-Reviewed Journal Papers in Print or in Press (48)

Geza, M., **McCray, J.E.**, Poeter, E.P. 2009. Quantifying predictive uncertainty for a mountain-watershed model, *J. Hydrology*, 376, 170–181.

Skold, M., Thyne, G., Drexler, J., **McCray, J.E.**, 2008. Solubility enhancement of seven metal contaminants using carboxymethyl-beta-cyclodextrin (CMCD), *J. Contaminant Hydrology*, 107, 108-113.

Schaeffer, C., E., Callaghan, A.V., King, J., **McCray, J.E.**, 2008. DNAPL morphology and dissolution in discretely fractured sandstone blocks, *Environ. Sci. Technol.*, 43(6), 1877–1883.

Skold, M.E., Thyne, G.D., Drexler, J.W., **McCray, J.E.** 2008. A geochemical model for lead complexation by carboxymethyl- β -cyclodextrin (CMCD). *J. Contaminant Hydrology*, 93, 203-215.

Smith, M M., Silva, J.A.K., Munakata-Marr, J., **McCray, J. E.**, 2008. Compatibility of polymers and chemical oxidants for enhanced groundwater remediation. *Environ. Sci. Technol.*, 42 (24) 9296-9301.

Skold, M.E., Thyne, G.D., **McCray, J.E.**, Drexler, J.W., Macalady, D., 2008. Enhanced solubilization of a metal-organic contaminant mixture (Pb, Sr, Zn, and PCE) by cyclodextrin. *Environ. Sci. Technol.* 42, 8930-8934.

Geza, M., **McCray, J.E.**, 2008. Effects of soil data resolution on SWAT model stream flow and water quality predictions. *J. Environmental Management*, 88, 393-406.

McCray, J.E., Nieber, J., Poeter, E.P., 2008. Ground-water mounding in the vadose zone from onsite wastewater systems: Analytical and numerical tools, *ASCE J. Hydrologic Engineering*, 13(8), 702-709.

Poeter, E.P., **McCray, J.E.**, 2008. Modeling water-table mounding to design cluster and high-density wastewater soil absorption systems, *ASCE J. Hydrologic Engineering*, 13(8), 710-719.

Boving, T.B., Blanford, W.J., **McCray, J.E.**, Divine, C.E., Brusseau.M.L., 2008. Comparison of line-drive and push-pull flushing schemes, *Ground Water Monit. Remed.*, 28(1), 75–86.

Gurdak, J.J., **McCray, J.E.**, Thyne, G.D., Qi, S.L., 2007. Latin-hypercube approach to estimate uncertainty in ground-water vulnerability, *Ground Water*, 45(3), 348-361.

Heatwole, K.K., **McCray, J.E.**, 2007. Modeling potential vadose-zone transport of nitrogen from onsite wastewater systems at the development scale, *J. Contaminant Hydrology*, 91, (1-2), 184-201.

Skold, M.E., Thyne, G.D., **McCray, J.E.**, 2007. Using UCODE_2005 and PHREEQC to determine thermodynamic constants from experimental data, *Ground Water*, 45(3), 368-373.

- Lipson, D.L., **McCray, J.E.**, Thyne, G.D., 2007. Using PHREEQC to simulate solute transport in fractured bedrock, *Ground Water*, 45(4), 468–472.
- Lemons, P.J., **McCray, J.E.**, 2007. Modeling hydrology in a small Rocky Mountain watershed serving large urban populations, *J. Amer. Water Resources Assoc. (JAWRA)*, 43(4), 875-887.
- Gurdak, J.J., Hanson, R.T., McMahon, P.B., Bruce, B.W., **McCray, J.E.**, Thyne, G.D., 2007. Climate variability controls on unsaturated water and chemical movement, High Plains aquifer, United States, *Vadose Zone Journal*, 6, 533–547.
- Bumgarner, J., **McCray, J.E.**, 2007. Estimating biozone hydraulic conductivity in wastewater soil-infiltration systems using inverse numerical modeling, *Water Research*, 41 (11), 2349-2360.
- Boving, T.B., Barnett, S.M., Perez G., Blanford, W.J., **McCray, J.E.**, 2007. Remediation with cyclodextrin: recovery of the remedial agent by membrane filtration, *Remediation J.*, 17(3), 21-36.
- Santi, P., **McCray, J.E.**, Martens, J., 2006. Investigating cross-contamination of aquifers, *Hydrogeology Journal*, 14(1), 51-68.
- Statom, R.A., **McCray, J.E.**, Thyne, G.D., 2006. Conceptual model for landfill hydrologic transport developed using chloride tracer data and dual-domain modeling, *Environmental and Engineering Geosciences*, 12(1), 67–78.
- McCray, J.E.**, Kirkland, S.L., Siegrist, R.L., Thyne, G.D., 2005. Transport-model input parameters for onsite-wastewater nutrients, *Ground Water* 43(4), 628-639.
- Beach, D.N., **McCray, J.E.**, Lowe, K.S., Siegrist, R.L., 2005. Temporal changes in hydraulic conductivity of sand porous-media biofilters during wastewater infiltration: Experimental evaluation, *J. Hydrology*, 311, 230-243.
- Murray, K.E., and **McCray, J.E.**, 2005, Development and application of a regional-scale pesticide transport and groundwater vulnerability model, *Environ. Engng. Geoscience*, 11(3), 271-284.
- Poeter, E. **J. McCray**, G. Thyne, and R. Siegrist, 2005, Designing Cluster and High-Density Wastewater Soil Absorption Systems to Control Groundwater Mounding, *Small Flows Quarterly*, Fall 2005, 7(4), 36-48.
- Divine, C.E., **McCray, J.E.**, 2004. Estimation of membrane diffusion coefficients and equilibration times for LDPE passive diffusion samplers, *Environ. Sci. Technol.*, 38(6); 1849-1857.
- Divine, C.E., McCray, J.E., Boving, T., Blitzer, D., Wolf Martin L., Brusseau, M.L., Blanford, W., 2004. Partitioning tracer tests as remediation metric: Case study at Naval Amphibious Base Little Creek (NABLC), Virginia. *Remediation Journal*, 14(2): 7-31.
- Statom, R., Thyne, G.D., **McCray, J.E.**, 2004. Temporal changes in leachate chemistry of a municipal solid waste landfill cell in Florida, *Environ. Geology*, 45(7), 982-991.
- Siegrist, R.L., **McCray, J.E.**, Lowe, K.S., 2004. Wastewater infiltration into soil and the effects of infiltrative surface architecture. *Small Flows Quarterly Journal*. 5(1):29-39.
- Dugan, P.J., **McCray, J.E.**, Thyne, G.D., 2003. Influence of cyclodextrin on NAPL-water partition coefficients with implications for post-remediation NAPL characterization using partitioning tracer tests, *Water Resources Research*, 39(5), 1.1-1.7.
- Divine, C.E., Sanford, W., **McCray, J.E.**, 2003. Helium and neon tracers to measure residual DNAPL: Laboratory investigation, *Vadose Zone Journal*, 2(3), 382-388.
- Beach, D.N., **McCray, J.E.**, 2003. Numerical modeling of unsaturated flow in wastewater soil absorption systems, *Ground Water Monitoring Remediation*, 23(2), 64-72.
- Darwish, M.I.M., **McCray, J.E.**, Zitha, P.L., Currie, P.K., 2003. Polymer- enhanced DNAPL flushing from low-permeability media: An experimental study, *Ground Water Monitoring Remediation*, 23(2), 92-101.
- Seo, H.S., and **McCray, J.E.** 2002. Interfacial tension of chlorinated aliphatic DNAPL mixtures as a function of organic-phase composition, *Environmental Sci. Technol.* 36 (6), 1292-1298.

McCray, J.E., Dugan, P.J., 2002. Nonideal equilibrium dissolution of trichloroethene from a decane-based NAPL mixture: Experimental and modeling investigation, *Water Resources Res.*, 38(7), 2.1-9.

Schlosser, S.A., McCray, J.E., Murray, K.E., Austin, B.A., 2002. A subregional-scale method to assess aquifer vulnerability to pesticides, *Ground Water*, 40(4), 361-367.

Güler, C., Thyne, G.D., McCray, J.E., Turner, A. K., 2002. Evaluation of the graphical and multivariate statistical methods used for classification of water-chemistry data, *Hydrogeology Jour.*, 10(4), 455-474.

Schlosser, S.A., McCray, J.E., 2002. Sensitivity of a pesticide leaching potential index model to variations in hydrologic and pesticide-transport properties, *Environ. Geosciences*, 9(2), 66-73.

McCray, J.E., Neville, C.J., 2002. Uncertainties associated with using analytical models for soil-vapor-extraction pump-tests, *Acta Universitatis Carolinae Geologica*, 46(2/3), 454-457.

McCray, J.E., Bai, G., Brusseau, M.L., Miller, R., 2001. Biosurfactant-enhanced solubilization of NAPL mixtures, *J. Contam. Hydrol.*, 48(1), 45-68.

McCray, J.E., Boving, T., Brusseau, M., 2000. Enhanced dissolution of hydrophobic organic compounds with implications for aquifer remediation, *Ground Water Monitoring Remed.*, 20(1), 94-103.

McCray, J.E., 2000. Mathematical modeling of air sparging for subsurface remediation: State of the art, *J. Hazardous Materials*, 72, 237-263, (*invited paper*).

Cain, R.B., Johnson, G., **McCray, J.E.**, Blanford, W., Brusseau, M.L., 2000. Partitioning tracer tests for evaluating remediation performance, *Ground Water*, 38(5), 752-761.

Boving, T.B., **McCray, J.E.**, 2000. Cyclodextrin-enhanced remediation of organic and metal contaminants in porous media and groundwater, *Remediation J.*, 10(2), 59-83 (*invited paper*).

McCray, J.E., Brusseau, M.L., 1999. Cyclodextrin-enhanced in situ flushing of multiple-component immiscible organic-liquid contamination at the field scale: Analysis of dissolution behavior, *Environ. Sci. Technol.* 33 (1), 89-95.

McCray, J.E., Brusseau, M.L., 1998. Cyclodextrin-enhanced in-situ flushing of multiple-component immiscible organic-liquid contamination at the field scale: Mass removal effectiveness, *Environ. Sci. Technol.*, 32 (9): 1285-1293.

McCray, J.E. and Falta, R.W., 1997. Numerical simulation of air sparging for remediation of NAPL contamination, *Ground Water*, 35(1): 99-110.

McCray, J.E. and Falta, R.W., 1996. Defining the air sparging radius of influence for ground water remediation, *J. Contaminant Hydrology*, 24(1): 25-52.

Peer Reviewed Books or Book Chapters (6)

McCray, J.E., Geza M., Murray, K.E., Poeter E.P., Morgan, D.S., 2009. *Modeling Onsite wastewater Systems at the Watershed scale: A User guide*, IWA Publishing, London, U.K. (ISBN 978-1-84339-528-7/1-84339-528-2).

Smith, S.M., Kolm, K.E., Varien, M.D., McCray, J.E., 2008. Emergence and collapse of early villages: Models of central Mesa Verde archaeology, in *Origins of Human Behavior and Culture*, Editors: Kohler, T.A., Varien, M.D., University of California Press, Berkeley CA.

Smith, H.L., McCray, J.E., Thyne, G.D., Lowe, K.S., Bagdol, J., Siegrist, R.L., 2003. Groundwater characterization of the Blue River Watershed, Colorado to assess the potential impacts of anthropogenic pollutants, In: *Engineering Geology in Colorado - Contributions, Trends, and Case Histories*, Association of Engineering Geologists, Denver, CO.

Gurdak, J.J., McCray, J.E., 2005. Groundwater Vulnerability to Pesticides: An Overview of Approaches and Methods of Evaluation, Paper #GW-45, in *The Encyclopedia of Water*, J. H. Lehr (Ed.), John Wiley & Sons, Inc., New York.

McCray, J.E., Bryan, K., Cain, R., Johnson, G., Blanford, B., Brusseau, M., 1999. Field test of cyclodextrin for enhanced in-situ flushing of immiscible organic liquids: Comparison to water flushing, In: *Innovative Subsurface Remediation: Field Testing of Physical, Chemical, and Characterization Technologies*, p.136-152, American Chemical Society, Washington, D.C.

Brusseau, M.L, **McCray, J.E.**, Johnson, G., Wang, X., Wood, A.L., Enfield, C., 1999. Field Test of cyclodextrin for enhanced in-situ flushing of multiple-component immiscible organic liquid contamination: Project overview and initial results, In: *Innovative Subsurface Remediation: Field Testing of Physical, Chemical, and Characterization Technologies*, p. 118-135, American Chemical Society, Wash. D.C.

Peer Reviewed Conference Proceedings (6)

Lindstrom, K.A., **McCray, J.E.**, Thyne, G.D., 2007. Modeling of Phosphorus Reactions during Wastewater Infiltration using Analytical and Numerical Modeling Techniques, *On-site Wastewater Treatment: Proceedings of the 11th National Symposium on Individual and Small Community Sewage Systems*, Amer. Soc. Agricul. Biological Engr., St. Joseph, MI.

Geza M., **McCray, J.E.** 2007. Modeling the Effect of Population Growth on Stream Nutrient Concentration in Turkey Creek Watershed using WARMF Model.. *On-site Wastewater Treatment: Proceedings of the 11th National Symposium on Individual and Small Community Sewage Systems*, Amer. Soc. Agricul. Biological Engr., St. Joseph, MI.

Tucholke, M.B., **McCray, J.E.**, Thyne, G.D., Waskom, R.M., 2007. Correlating denitrification rates to soil texture using hierarchical cluster analysis, *On-site Wastewater Treatment: Proceedings of the 11th National Symposium on Individual and Small Community Sewage Systems*, Amer. Soc. Ag. Bio. Engineers, St. Joseph, MI.

Lemons, P.J., **McCray, J.E.**, 2004. Watershed-Scale Transport Modeling of Onsite Wastewater Pollutants in the Blue River Drainage Basin, In: *On-site Wastewater Treatment: The Tenth National Symposium on Individual and Small Community Sewage Systems*, Amer. Soc. Ag. Engineers Publ., St. Joseph, MI.

Huntzinger, D., **McCray, J.E.**, van Cuyk, S., Siegrist, R.L., 2001. Numerical modeling of unsaturated flow and transport in on-site wastewater treatment systems as affected by soil clogging, *On-site Wastewater Treatment: Proceedings of the 9th National Symposium on Individual and Small Community Sewage Systems*, Amer. Soc. Ag. Engineers Publ. 701P0101, St. Joseph, MI.

McCray, J.E. and Falta, R.W., 1995. Air sparging for subsurface remediation of dense nonaqueous phase liquids, in: *Amer. Institute Chem. Eng. Sympos. Ser.*, 91 (306): 50-57, AICHE, Wash. D.C.

Invited Presentations (17)

McCray, J., 2009. Simple models to assess mounding on low-permeability layers: uncertainty analysis and risk-based decision making, presented at the Oregon Onsite Wastewater Organization (O2WA) Annual Conference, Oregon State Univ., Corvallis, Or. **(Invited)**.

McCray, J., Lowe, K., 2009. Role of onsite wastewater systems in sustainable water use and beneficial reuse, presented at the Oregon Onsite Wastewater Organization (O2WA) Annual Conference, Oregon State Univ., Corvallis, Or. **(Invited)**

McCray, J., 2008. Tools to assessing the performance of soil treatment units for nitrogen, phosphorus, selected emerging organic contaminants, and virus, presented at the Maryland Onsite Wastewater Professionals Association, Talbot County Community Center, Easton, MD, August 26, 2008. **(Invited)**

McCray, J., Geza, M., Murray, K., 2008. Guide to watershed modeling for assessment of onsite wastewater system impacts, presented at the Maryland Onsite Wastewater Professionals Association, Talbot County Community Center Easton, MD, August 26, 2008. **(Invited)**.

McCray, J., Geza, M., Murray, K., 2008. Watershed-scale assessment for onsite wastewater systems: Model uncertainty analysis, calibration, and risk-based decision making, presented at The 21st Century Watershed Technology: Improving Water Quality and Environment International Conference, Amer. Soc. Agricul. Biological Engineers, March 29-April 3, 2008, University of Concepcion, Chile (**Invited**).

McCray, J., Geza, M., 2008. Site and watershed scale modeling to assess multiple sources of N pollution, Expert Panel at the Annual National Onsite Wastewater Recycling Association (NOWRA) Conference, Memphis TN (**Invited**).

McCray, J.E., Oldham, G., Drewes, J., 2006. Investigation of nonequilibrium physical, chemical, and microbiological transport processes for emerging organic contaminants using models and laboratory tracer tests, Geol. Soc. Amer., *Abstracts with Programs*, 38(7). (**Invited**)

Smith, S.M., Kolm, K.E., **McCray, J.E.**, 2006. Drought Effects on Prehistoric Settlements: Paleohydrologic Modeling of Spring Discharge, Canyon of the Ancients National Monument, Southwest Colorado; Longmont, CO., Geol. Soc. Amer., *Specialty Meeting, Managing Drought and Water Scarcity in Vulnerable Environments: Creating a Roadmap for Change in the United States (18-20 September)*; GSA *Specialty Meetings Abstracts with Programs*, Abstract No: 109045, ISSN 1556-4800, No. 3. (**Invited**)

Lin, H., Bales, R., Gochis, D., Hornbuckle, B., Johnson, B., Krajewski, W., **McCray, J.**, McDonnell, J., Murray, K., Newman, B., Reed, P., Simpkins, B., Thyne, G., Wohl, E., Lall, U., 2005. Soils and the CUAHSI Vision and Beyond, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H34D-03 (**Invited**)

McCray, J., Poeter, E., Thyne, G., Siegrist, R.L., 2006. Design guidelines to minimize groundwater mounding below high-density onsite wastewater systems, Abstract, Presented at the 9th Annual DOWRA (Delaware Onsite Wastewater Recycling Association) Conference, Harrington Delaware, (**Invited**)

McCray, J., 2006. Groundwater mounding below high-density onsite wastewater systems, Presented at the Annual OOWA (Oregon Onsite Wastewater Association) Conference, Newport Oregon, (**Invited**)

Heatwole, K.K., **McCray, J.**, 2006. Modeling nitrogen transport and transformation in the vadose zone and aquifers, presented at the University of Minnesota, Statewide Meeting for Onsite Professionals and Regulators (**Invited**).

McCray, J., 2006. Modeling tools to evaluate water-resources pollution from onsite wastewater systems, University of Wyoming, Wyoming Department of Environmental Quality, Statewide Meeting for Onsite Professionals and Regulators (**Invited**).

McCray, J.E., 2005. Evolution of contaminant plumes from multicomponent DNAPL sources, presented at the Annual Meeting of the Colorado Ground Water Association, Denver CO, (**Invited**)

McCray, J.E. Lemonds, P.J., 2002. Assessment of the effects of onsite wastewater system effluent on the Dillon Reservoir Watershed, Colorado, using a watershed-scale model (SWAT), Presented at the *Annual Meeting of the Colorado Environmental Health Association*, Vail, CO (**Invited**).

McCray, J.E., Siegrist, R.L., Lowe, K.S., 2002. Science and engineering of onsite wastewater Systems: An overview of research at Colorado School of Mines, *Proceedings of the 4th Southwest On-Site Wastewater Management Conference and Exhibition*, Arizona County Directors of Environmental Health Services Association, Phoenix, AZ (**Invited**).

McCray, J.E., Kirkland S., Siegrist, R.L. van Cuyk, S., Mudd, P.J., 2001. Cumulative effects of wastewater pollutants at the watershed scale, presented at the annual meeting of the Colorado Environmental Health Association, Glenwood Springs, CO (**Invited**).

Book and Software Reviews Published in Journals (7)

McCray, J.E., 2007. Review of *Hydrology* (by W. Brutsaert), *Environmental & Engr. Geoscience*, 13(1), 93-94; DOI: 10.2113/gseegeosci.13.1.93.

McCray, J.E., 2007. Software review: HYDRUS 3D, *Southwest Hydrology*, 6(1), 41.

McCray, J.E., 2006. Software review: Watershed Analysis Risk Management Framework, *Southwest Hydrology*, 5(2), 41.

McCray, J.E., Cohen, R.M., 2003. Software Spotlight, NAPLANAL: A software package for the estimation of NAPL saturation and composition from typical soil chemical analyses, *Ground Water*, 41(3), 298-299.

McCray, J.E., 2003. Software review of Petrasim, *Southwest Hydrology*, 2(3), 37.

McCray, J.E., 2002. Book Review: Applied contaminant transport modeling, *Ground Water*, 40(5), 460.

Lemons, P.J., **McCray, J.E.**, 2003. Software review of Soil Water Assessment Tool (SWAT), *Southwest Hydrology*, 2(1), 37.

Non-Peer-Reviewed Conference Proceedings (20)

Wunsch, A., J.E. McCray, K.S. Lowe, R. Furrer, 2009. Analyzing wastewater-N and P concentrations in soil treatment units using multivariate statistics, *Proceedings of the National Onsite Wastewater Recycling Association (NOWRA), 18th Annual Technical Education Conference*, Laurel MD

Wunsch, A., McCray, J.E., Geza, M., Radcliffe, D.E., 2009. Modeling soil treatment units with HYDRUS-2D, Constructed Wetlands module (CW2D), *Proceedings of the National Onsite Wastewater Recycling Association (NOWRA), 18th Annual Technical Education Conference*, Laurel MD.

Geza M., **McCray, J.E.**, Lowe, K.S., Tucholke, M.B., Wunsch, A., Roberts, S., 2009. A simple tool for predicting nutrient removal in soil treatment units, *Proceedings of the National Onsite Wastewater Recycling Association (NOWRA) 18th Annual Technical Education Conference*, Laurel MD.

Heatwole, K.K., **McCray, J.E.**, 2009. An analytical model for predicting the extent of plumes Originating from onsite wastewater soil dispersal systems , *Proceedings of the National Onsite Wastewater Recycling Association (NOWRA) 18th Annual Technical Education Conference*, Laurel MD.

Siegrist, R.L., Lowe, K.S., **McCray, J.E.**, Marr, J., Drewes, J.E., Spear, J.R., Tomares, J.M.B., 2007. Advancing the science and engineering and integration of onsite wastewater systems, Invited paper, *Proceedings of the Onsite '07, International Conference*, Armidale, Australia.

Lemons, P.J., **McCray, J.E.**, 2004. Modeling phosphorus loading in an urban drinking water source watershed, *Proceedings of WEFTEC 07*, Water Environment Federation, San Diego CA.

Geza, M., **McCray, J.E.**, 2007. Modeling the effect of discharges from septic and sewers on stream nutrient loading in turkey creek watershed using WARMF and SWAT, *Proceedings of the National Onsite Wastewater Recycling Association (NOWRA) 16h Annual Technical Education Conference*, Laurel MD.

Tucholke, M.B., **McCray, J.E.**, Thyne, G.D., Waskom, R.M., 2007 Variability in denitrification rates: literature review and analysis, *Proceedings of the National Onsite Wastewater Recycling Association (NOWRA) 16h Annual Technical Education Conference*, Laurel MD.

Silva, J.A.K., Smith, M.S., **McCray, J.E.**, 2007. Water-soluble polymers to enhance sweep efficiencies of in situ remediation amendments. Presented at the 2007 Ground Water Summit, Albuquerque, New Mexico, April 29-May 3, National Ground Water Assoc., Westerville OH.

Smith, M.S., Silva, J.A.K., **McCray, J.E.**, 2007. Polymer-oxidant compatibility for use as a combined groundwater remediation treatment, presented at the 2007 Ground Water Summit, Albuquerque New Mexico, April 29-May 3, National Ground Water Assoc., Westerville, OH

Heatwole, K., **McCray, J.E.**, 2006. A simple model for predicting nitrate plumes, *Proceedings of the NOWRA Annual Mtg*, Denver CO, National Onsite Wastewater Recycling Association (NOWRA), Laurel, MD.

Doyle, S., **McCray, J.E.**, Lowe, K.S., Thyne, G.D., 2005. Modeling phosphorus reaction and transport at an experimental onsite wastewater site, In: *Proceedings of the NOWRA Annual Mtg*, Cleveland, OH., National Onsite Wastewater Recycling Association (NOWRA), Laurel, MD.

Divine, C.E., Rask, B., **McCray, J.E.**, 2003. A conceptual hydrologic model for pumping tests conducted in a basalt-interbed hydrostratigraphic unit, *Proceedings of NGWA Northwest Focus Conference*, Anchorage, AK.

McCray, J. E., Downs, W., Falta, R. W., Housley L. T, 2004. Contaminant vapor transport in a deep vadose zone: influences of barometric pressure, diffusion, and density-driven flow, in *Groundwater Flow Understanding from Local to Regional Scales, Proceedings of XXXIII Congress Inter. Assoc. Hydrologists & 7th Congress ALHSUD*, Zacatecas, Mexico, October, 11-15.

Lemons, P.J. and **McCray, J.E.**, 2004. Modeling phosphorus transport in the Blue River Watershed, Summit County, Colorado, *Proceedings of the First Interagency Conference on Research in the Watersheds*, U.S.D.A, U.S Geol. Survey, Bureau of Land Manag., Natural Resour. Conservation Serv., U.S. E.P.A, U.S. Forest Serv., Consortium of Universities for the Advancement of Hydrologic Science, October 28-30, 2003, Benson, AZ

McCray, J.E., Downs, W., Falta, R.W., Housely, L.T., 2003. Modeling atmosphere-induced pressure fluctuations and chemical vapor transport in a heterogeneous fractured vadose zone, in: *Proceedings of Modflow and More 2003: Understanding Through Modeling*, International Ground Water Modeling Center, Golden CO.

Siegrist, R.L., K.S. Lowe, **J.E. McCray**, D. Beach, and S. VanCuyk. 2002. Accelerated loading methods to evaluate long-term performance of soil PMBs used for wastewater treatment. *Proceedings of the 11th Northwest On-Site Wastewater Conference*, Seattle, WA, April 3-4, 2002.

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