Ćosović, B., Hršak, D., Vojvodić, V., and Krznarić, D. (1996). Transformation of organic matter and bank filtration from a polluted stream. *Water Research,* 30(12), 2921–2928.

Côté, M.M., Emelko, M.B., Dickson, S.E., and Thomson, N.R. (2009) Demonstrating effective *in situ* filtration during riverbank filtration: impacts of transport surrogates. In Review: *Ground Water*.

Croué, J-P., Debroux, J-F., Amy, G. L., Aiken, G. R., and Leenheer, J. A. (1999). Natural organic matter: Structural characteristics and reactive properties. In *Formation and Control of Disinfection By-Products in Drinking Water* (ed. P.C. Singer), Denver: American Water Works Association.

Darmendrail, D. (1988). Processus biogeochimiques susceptibles d'etre impliques dans l'effet filtre des berges lors de l'alimentation des nappes par les cours d'eau *Hydrogeologie,* 3,187–196.

De Boer, D.H., and Stone, M., (1999). Fractal dimensions of suspended solids in streams: comparison of sampling and analysis techniques. *Hydrological Processes,* 13,249-254.

De Boer, D.H., Stone, M. and Lévesque, L.M.J. (2000). Fractal dimensions of individual particles and particle populations of suspended solids in streams. *Hydrological Processes,* 14,653-667.

Doussan, C., Ledoux, E., and Detay, M. (1998). River-groundwater exchanges, bank filtration, and groundwater quality: ammonium behavior. *Journal of Environmental Quality,* 27, 1418-1427.

Doussan, C., Ledoux, E., Poitevin, G., and Detay, M. (1995). River - Groundwater Relationships and Bank Filtration - an Emphasis On Nitrogen Species Behavior and Evolution. *Houille Blanche-Revue International De L'Eau,* 50, 16–21.

Doussan, C., Poitevin, G., Ledoux, E., and Detay, M. (1997). River bank filtration: modelling of the changes in water chemistry with emphasis on nitrogen species. *Journal of Contaminant Hydrology,* 25, 129–156.

Droppo, I.G. (2001). Rethinking what constitutes suspended sediment. *Hydrological Processes* 15(9),1551-1564.

Droppo, I.G. and Stone, M. (1994). In-channel surficial fine-grained sediment laminae (Part I): Physical characteristics and formational processes. *Hydrological Processes,* 8(2), 101-112.

Droppo I.G. Irvine K.N., and Jaskot C. (2002). Flocculation/aggregation of cohesive sediments in the urban continuum: Implications for stormwater management. *Environmental Technology,* 23(1,1), 27-41.

Droppo, I.G., Leppard, G., Flanigan, D.T., and Liss, S.N. (1997). The freshwater floc: A functional relationship of water and organic and inorganic floc constituents affecting suspended sediment properties. *Water, Air, and Soil Pollution,* 99, 43-53.

Dünnbier, U., Heberer, T., and Reilich, C. (1997). Occurrence of bis(chlorophenyl) acetic acid (DDA) in surface and ground water in Berlin. *Fresenius' Environmental Bulletin,* 6, 753–759.

This is a preview. Click here to purchase the full publication.

Dyer, K.R. and Manning, A.J. (1999). Observation of the size, settling velocity and effective density of flocs and their fractal dimensions. *Journal of Sea Research,* 41,87-95.

Emelko, M.B., Schmidt, P.J., and Roberson, J.A. (2008). Quantification of Uncertainty in Microbial Data: Reporting and Regulatory Implications. *Journal of the American Water Works Association,* 100(3), 94-104.

Findlay, S. and Sobczak, W.V. (2000). Microbial communities in hyporheic sediments. In *Streams and Ground Waters* (Jones, J.B. and Mulholland, P.J., eds), pp. 287-306. London: Academic Press.

Fuller, C.C. and Harvey, J.W. (2000). Reactive uptake of trace metals in the hyporheic zone of a mining-contaminated stream, Pinal creek, Arizona. *Environmental Science and Technology,* 34, 1150-1155.

Gerlach, M. and Gimbel, R. (1999). Influence of humic substance alteration during soil passage on their treatment behavior. *Water Science and Technology,* 40, 231–239.

Gibert, J., Fournier, F., and Mathieu, J. (1997). *Ground Water/Surface Water Ecotone.* New York: Cambridge University Press.

Gollnitz, W. D., Clancy, J. L., and Garner, S. C. (1997). Reduction of microscopic particulates by aquifers. *Journal of the American Water Works Association,* 89, 84–93.

Grass, B., Mayer, H., Nolte, J., Preuss, G., and Zullei-Seibert, N. (2000). Studies on the metabolism of hydroxybenzonitrile herbicides: I. Mass spectrometric identification. *Pest Management Science,* 56, 49–59.

Harremoes, P. (1988). Stochastic models for estimation of extreme pollution from urban runoff. *Water Res.,* 22, 1017-1026.

Heaney, J.P. and Huber, W.C. (1984). Nationwide Assessment of Urban Runoff Impact on Receiving Water Quality. *Journal of the American Water Resources Association,* 20(1), 35–42.

Heberer, T., Dünnbier, U., Reilich, C., and Stan, H.J. (1997). Detection of drugs and drug metabolites in groundwater samples of a drinking water treatment plant. *Fresenius' Environmental Bulletin,* 6, 438–443.

Hiscock, K.M. and Grischek, T. (2002). Attenuation of groundwater pollution by bank filtration. *Journal of Hydrology,* 266, 139–144.

Hoehn, E. and von Gunten, H. R. (1989). Radon in groundwater – a tool to assess infiltration from surface waters to aquifers. *Water Resources Research,* 25(8), 1795–1803.

Hogan, D.M. and Walbridge, M.R. (2007). Best management practices for nutrient and sediment retention in urban stormwater runoff. *Journal of Environmental Quality,* 36(2), 386-395.

House, M.A., Ellis, J.B., Herricks, E.E., Hvitved-Jacobsen, T., Seager, J., Lijklema, L., Aalderink, H. and I.T. Clifforde. (1993). Urban drainage--impacts on receiving water quality. *Water Sci. Technol.,* 27(12), 117-158.

Horowitz, A.J., Rinella, F.A., Lamothe, P., and Miller, T.L. (1990). Variations in suspended sediment and associated trace element concentrations in selected riverine cross sections. *Environmental Science and Technology,* 24, 1313-1320.

This is a preview. Click here to purchase the full publication.

Horowitz, A.J., Elrick, K.A., and Smith, J.J. (2001). Estimating suspended sediment and trace element fluxes in large river basins: methodological considerations as applied to the NASQAN program. *Hydrological Processes*, 15(7), 1107-1132.

Hunt, H., Schubert, J., and Ray, C. (2002). Conceptual design of riverbank filtration systems. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 19–28. Dordrecht: Kluwer Academic Publishers.

Irmscher R. and Teermann, I. (2002). Riverbank filtration for drinking water supply-a proven method, perfect to face today's challenges. *Water Science and Technology: Water Supply,* 2, 5–6, 1–8.

Jackson, R.B., Carpenter, S.R., Dahm, C., McKnight, D., Naiman, R., Postel, S., and Running, S. (2001). Water in and changing world. *Ecological Applications*, 11(4), 1027-1045.

Jacobs, L. A., von Gunten, H. R., Keil, R., Kuslys, M. (1988). Geochemical changes along a river-groundwater infiltration flow path: Glattfelden, Switzerland. *Geochimica et Cosmochimica Acta,* 52, 2693–2706.

Jarvie, H.P. Whitton, B.A., and Neal, C. (1998). Nitrogen and phosphorus in east coast British rivers: Speciation, sources and biological significance. *Science of the Total Environment* ,210-210/211, 79-109.

Jarvie, H. P., Neal, C., and Withers, P. J. A. (2006). Sewage-effluent phosphorus: A greater risk to river eutrophication than agricultural phosphorus? *Science of the Total Environment,* 360(1-3), 246-253.

Jiang, S.C and Chu, W. (2004). PCR detection of pathogenic viruses in southern California urban rivers. *Journal of Applied Microbiology*, 97, 17-28.

Johnson, M. P. (2001). Environmental impacts of urban sprawl: A survey of the literature and proposed research agenda. *Environment and Planning A,* 33(4), 717-735.

Jüttner, F. (1995). Physiology and biochemistry of odorous compounds from freshwater cyanobacteria and algae. *Water Science and Technology,* 31, 211–217.

Jüttner, F. (1999). Efficacy of bank filtration for the removal of fragrance compounds and aromatic hydrocarbons. *Water Science and Technology,* 40, 123–128.

Kaushal, S.S., Groffman, P.M., Band, L.E., Shields, C.A., Morgan, R.P., Palmer, M.A., Belt, K.T., Swan, C.M., Findlay, S.E.G., and Fisher, G.T. (2008). Interaction between urbanization and climate variability amplifies watershed nitrate export in Maryland. *Environmental Science and Technology,* 42, 16:5872-5878.

Klein, R.D. (1979). Urbanization and stream quality impairment. *Water Resources Bulletin,* 15(4), 948-963.

Krauskopf, K.B. (1995). Introduction to geochemistry. McGraw-Hill, Inc., New York.

Krishnappan, B.G., Marsalek, J., Watt, W.E., Anderson, B.C. (1999). Seasonal size distributions of suspended solids in a stormwater management pond. *Water Science and Technology,* 39(2), 127-134.

This is a preview. Click here to purchase the full publication.

Kulig, A. (2000). Flood damages and inundated land reclamation. In *Flood issues in Contemporary Water Management* (J. Marsalek, W.E. Watt, E. Zeman and F. Sieker, eds.), NATO Science Series, Environmental Security, Vol. 71, Kluwer Academic Publishers, Dordrecht, The Netherlands, 401-404.

Kühn, W. and Mueller, U. (2000). Riverbank filtration: an overview. *Journal of the American Water Works Association,* 92, 60–69.

Lau, Y.L. (1995). Relative importance of mean velocity and bed shear on biofilm accumulation in open-channel flows. *Water Science and Technology*, 32(8), 193-198.

Lawler, D.M., Petts, G.E., Foster, I.D.L., and Harper, S. (2006). Turbidity dynamics during spring storm events in an urban headwater river system: The Upper Tame, West Midlands, UK. *Science of the Total Environment,* 360 (1-3),109-126.

LeBlanc, R. T., Brown, R.D., and FitzGibbon, J.E. (1997). Modeling the effects of land use change on the water Temperature in unregulated urban streams. *Journal of Environmental Management,* 49(4),445-469.

Leopold, L.B. (1968). *Hydrology for Urban Land Planning: A Guidebook on the Hydrologic Effects of Urban Land Use* (Geological Survey Circular 554 ed.). Washington: United States Geological Survey.

Lopes, T.J. Fossum, K.D., Phillips, J.V., and Monical, J.E. (1995). Statistical summary of selected physical, chemical, and microbial characteristics, and estimates of constituent loads in urban stormwater, Maricopa County, Arizona. USGS, Earth Science Information Center, Open File Reports Section, Box 25286, MS 517, DENVER, CO 80225 (USA).

Loveland, J.P., Ryan, J.N., Amy, G.L., and Harvey, R.W. (1996). The reversibility of virus attachment to mineral surfaces. *Colloids and Surfaces A: Physicochemical and Engineering Aspects,* 107, 205–221.

Ludwig, U., Grischek, T., Nestler, W., and Neumann, V. (1997). Behaviour of different molecular-weight fractions of DOC of Elbe River water during river bank infiltration. *Acta hydrochimica et hydrobiologica,* 25, 145–150.

Mälzer, H.J., Schubert, J., Gimbel, R., and Ray, C. (2002). Effectiveness of riverbank filtration sites to mitigate shock loads. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 229–259. Dordrecht: Kluwer Academic Publishers.

Marsalek, J. and Schroeter, H. (1988). Annual loadings of toxic contaminants in urban runoff from the Canadian Great Lakes Basin. *Water Pollution Research Journal of Canada,* 23(3), 360-378.

Marsalek, J., Barnwell, T.O., Geiger, W.F., Grottker, M., Huber, W.C., Saul, A.J., Schilling W., and Torno, H.C. (1993). Urban drainage systems: design and operation. *Water Science and Technology,* 27(12), 31-70.

Marsalek, J. and Chocat, B. (2002). International report on stormwater management. *Water Science and Technology,* 46(6-7), 1-17.

Marsalek, J. and Rochfort, Q. (2004) Urban wet-weather flows: sources of fecal contamination impacting on recreational waters and threatening drinking-water sources. *Journal of Toxicology and Environmental Health, Part A,* 67, 1765-1777.

This is a preview. Click here to purchase the full publication.

Marsalek, J., Jimenez-Cisneros, B., Karamouz, M., Malmquist, P.-A., Goldenfum, J., and Chocat, B. (2008). Urban water cycle processes and interactions. Taylor & Francis Group, Leiden, The Netherlands.

McCarthy, J. F., Williams, T.M., Liang, L., Jardine, P.M., Jolley, L.W., Taylor, D.L., Palumbo, A.V., and Cooper, L.W. (1993). Mobility of Natural Organic Matter in a Sandy Aquifer. *Environmental Science and Technology,* 27, 667–676.

Medema, G. J., Juhasz-Holterman, M. H. A., and Luijten, J. A. (2000). In *Proc. of the Int. Riverbank Filtration Conference*; Julich, W., Schubert, J., Eds.; IAWR: Dusseldorf, Germany.

Meybeck, M. and Helmer, R. (1989). The quality of rivers: From pristine stage to global pollution. *Paleogeography, Paleoclimatology and Paleoecology,* (Global and planetary change section) 75,283-309.

Meybeck, M. (1998). Man and river interface: multiple impacts on water and particulate chemistry illustrated in the seine River basin. *Hydrobiologia,* 373: 1-20.

Miettinen, I.T., Martikainen, P.J., and Vartiainen, T. (1994). Humus transformation at the bank filtration water plant. *Water Science and Technology,* 30(10), 179–187.

Miettinen, I.T., Martikainen, P.J., and Vartiainen, T. (1998). Mutagenicity and amount of chloroform after chlorination of bank filtered water. *The Science of the Total Environment,* 215(1), 9-17.

Miettinen, I.T., Vartiainen, T., and Martikainen, P.J. (1997). Changes in water microbial quality during bank filtration of lake water. *Canadian Journal of Microbiology,* 43(12), 1126–1132.

Mitchell, B. (2005). Integrated water resource management, institutional arrangements, and land-use planning. *Environment and Planning A,* 37(8), 1335-1352.

Mitchell, B. and Hollick, M. (1993). Integrated catchment management in Western Australia: transition from concept to implementation. *Environmental Management*, 17,735-743.

Nessim, Y. and Gehr, R. (2006). Fouling mechanism in a laboratory-scale UV disinfection system. *Water Environment Research,* 78(12), 2311-2323.

Novotny, V. and Brown, P. (2007). Cities of the future. IWA Publishing, London, UK.

Ongley E. D., Krishnappan B.G., Droppo I.G., Rao, S.S., and. Maguire R.J. (1992). Cohesive sediment transport: emerging issues for toxic chemical management. *Hydrobiologia,* 235/236(1), 1573-5117.

Ontario Ministry of the Environment (2001). Terms of Reference - Hydrogeological Study to Examine Groundwater Sources Potentially Under Direct Influence of Surface Water.

Pardue, J.H., Moe, W.M., McInnis, D., Thibodeaux, L.J., Valsaraj, K.T., Maciasz, E., Van Hefrden, I., Korevec, N., and Yuan, Q.Z. (2005). Chemical and microbiological parameters in New Orleans floodwater following Hurricane Katrina. *Environmental Science and Technology,* 39(22), 8591-8599.

Paul, M. J., and Meyer, J. L. (2001). Streams in the urban landscape. *Annual Review of Ecology and Systematics,* 32,333-365.

This is a preview. Click here to purchase the full publication.

Petts, G.E. (1984). *Impounded Rivers: Perspectives for Ecological Management*. Chichester England: John and Wiley & Sons.

Petts, G. (1988). Accumulation of fine sediments within substrate gravels along two regulated rivers. *Regulated Rivers,* 2,141-153.

Piet, G. J. and Zoeteman, B.C. J. (1980). Organic Water Quality Changes During Sand Bank and Dune Filtration of Surface Waters in The Netherlands. *Journal of the American Water Works Association,* 72, 400–404.

Ray, C. (2004). Modeling RBF efficacy for mitigating chemical shock loads. *Journal of the American Water Works Association,* 96(5), 114-18.

Ray, C. (2008). Worldwide potential of riverbank filtration. *Clean Technologies and Environmental Policy*, 10,223–225.

Ray, C., Soong, T.W., Roadcap, G.S., and Borah, D.K. (1998). Agricultural chemicals: effects on wells during floods. *Journal of the American Water Works Association,* 90(7), 90-100.

Ray, C., Grischek, T., Schubert, J., Wang, J.Z., and Speth, T.F. (2002a). A perspective of riverbank filtration. *Journal of the American Water Works Association,* 94(4),149-160.

Ray, C., Melin, G., and Linsky, R.B. (2002b). *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 1–18. Dordrecht: Kluwer Academic Publishers.

Ray, C., Soong, T.W., Lian, Y.Q., and Roadcap, G.S. (2002c). Effect of flood-induced chemical load on filtrate quality at bank filtration sites. *Journal of Hydrology,* 266, 235–258.

Rosenshein, J. S. (1988). Region 18, Alluvial Valleys. In *Hydrogeology: The Geology of North America* (Back, W., Rosenshein, J. S., Seaber, P. R., eds.), Vol. O-2. Boulder: The Geological Society of America.

Ryan, J. N., Elimelech, M., Ard, R. A., Harvey, R. W., and Johnson, P.R. (1999). Bacteriophage PRD1 and silica colloid transport and recovery in an iron oxide-coated sand aquifer. *Environmental Science and Technology,* 33, 63–73.

Schalchli, U. (1992). The clogging of coarse gravel river beds by fine sediment. *Hydrobiologia* 235/236, 189-197.

Schijven, J., Berger, P., and Miettinen, I. (2002). Removal of pathogens, surrogates, indicators, and toxins using riverbank filtration. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 73–116. Dordrecht: Kluwer Academic Publishers.

Schmitt, D. Saraviaa, F., Frimmela, F.H., and Schuessler, W. (2003). NOM-facilitated transport of metal ions in aquifers: importance of complex-dissociation kinetics and colloid formation. *Water Research,* 37, 3541–3550.

Schubert, J. (2002a). German experience with riverbank filtration systems. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 35–48. Dordrecht: Kluwer Academic Publishers.

Schubert, J. (2002b). Hydraulic aspects of river bank filtration—field studies. *Journal of Hydrology,* 266(3-4), 145-161.

Schwarzenbach, R.P., Giger, W., Hoehn, E., and Schneider, J.K. (1983). Behavior of organic compounds during infiltration of river water to groundwater. Field studies. *Environmental Science and Technology,* 17, 472–479.

This is a preview. Click here to purchase the full publication.

Shamrukh, M. and Abdel-Wahab, A. (2008). Riverbank filtration for sustainable water supply: application to a large-scale facility on the Nile River. *Clean Technologies and Environmental Policy*, 10,351-358.

Shantz, M., Dowsett, E., Canham, E., Tavenier, G., Stone, M., and Price, J. (2004). The effect of drawdown on suspended solids and phosphorous export from Columbia Lake, Waterloo, Canada. *Hydrological Processes*, 18,865-878.

Sontheimer, H. J. (1980). Experience With Riverbank Filtration Along the Rhine River. *Journal of the American Water Works Association,* 72,386–390.

Stainton, R. and Stone, M. (2003). Nitrogen transport dynamics in shallow groundwater at the stream-riparian buffer interface in an urbanizing catchment. *Journal of Environmental Planning and Management,* 46(4), 475-491.

Stone, M. and Marsalek, J. (1996). Trace element composition and speciation in urban street sediment: Sault Ste Marie, Canada. *Water, Air, and Soil Pollution,* 87(1-4), 149-169.

Stone, M. and Droppo, I.G. (1994). In-channel surficial fine-grained sediment laminae (Part II): Chemical characteristics and implications for contaminant transport in fluvial systems. *Hydrological Processes,* 8(2), 113-124.

Stone, M. and Haight, M. (2000). Distribution of organic pollutants in separated size fractions of suspended river sediment. In: *The Role of Erosion and Sediment Transport in Nutrient and Contaminant Transfer*, Ed. M. Stone, IAHS Pub. No. 263, 159-166.

Stone. M. and Krishnappan, B.G. (1997). Transport characteristics of tile-drain sediments from an agricultural watershed. *Water, Air, and Soil Pollution,* 99(1-4), 89-103.

Stone. M. and Krishnappan, B.G. (2002). The effect of irrigation on tile sediment transport in a headwater stream. *Water Research,* 36(14), 3439-3448.

Stone, M. and Saunderson, H. (1992). Particle size characteristics of suspended sediment in southern Ontario rivers tributary to the Great Lakes. *Hydrological Processes,* 6,189-198.

Stone, M., Krishnappan, B.G., and Emelko, M.B. (2008). The effect of bed age and shear stress on the size distribution and particle morphology of eroded cohesive sediment deposits in an annular flume. *Water Research,* 42(15, 4179-4187.

Stuyfzand, P. J. (1989). Hydrology and water quality aspects of Rhine bank groundwater in the Netherlands. *Journal of Hydrology,* 106, 341–363.

Suedel, B.C., Steevens, J.A., Kennedy, A.J., Brasfield, S.M., and Ray, G.L. (2007). *Environmental Science and Technology,* 41(7), 2594-2601.

Tufenkji, N. (2007). Modeling microbial transport in porous media: Traditional approaches and recent developments. *Advances in Water Resources,* 30, 1455-1469.

Tufenkji, N. and Elimelech, M. (2004). Correlation equation for predicting single-collector efficiency in physicochemical filtration in saturated porous media. *Environmental Science and Technology,* 38, 529-536.

Tufenkji, N., Ryan, J.N., and Elimelech, M. (2002). The Promise of Bank Filtration. *Environmental Science and Technology*, 36, 422a-428a.

This is a preview. Click here to purchase the full publication.

USEPA (1983). Results of the Nationwide Urban Runoff Program Volume I – Final Report. Water Planning Division, US EPA, Washington, D.C.

USEPA (2006). Long Term 2 Enhanced Surface Water Treatment Rule. Final Rule. *Federal Register*, 71(3), 654.

USGS Circular 1225. The quality of our nations waters – nutrients and pesticides.

Van Buren, M. A., Watt, W. E., and Marsalek, J. (1997). Application of the log-normal and normal distributions to stormwater quality parameters. *Water Research,* 31(1), 95-104.

Verstraeten, I.M., Heberer, T., and Scheytt, T. (2002). Occurrence, Characteristics, Transport, and Fate of Pesticides, Pharmaceuticals, Industrial Products, and Personal Care Products at Riverbank Filtration Sites. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 175-227. Dordrecht: Kluwer Academic Publishers.

von Gunten, H. R., and Kull, T. P. (1986). Infiltration of inorganic compounds from the Glatt River, Switzerland, into a groundwater aquifer. *Water, Air, and Soil Pollution,* 29, 333–346.

von Gunten, U. and Zobrist, J. (1993). Biogeochemical changes in groundwater-infiltration systems: Column studies. *Geochimica et Cosmochimica Acta,* 57, 3895–3906.

von Gunten, H. R., Karametaxas, G., Krähenbühl, U., Kuslys, M., Giovanoli, R., Hoehn, E., and Keil, R. (1991) Seasonal biogeochemical cycles in riverborne groundwater. *Geochimica et Cosmochimica Acta,* 55(12), 3597–3609.

Wang, J.Z. (2002). Riverbank filtration case study at Louisville, Kentucky. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 117-145. Dordrecht: Kluwer Academic Publishers.

Wang, J.Z., Hubbs, S.A., and Song, R. (2002). *Evaluation of Riverbank Filtration as a Drinking Water Treatment Process*. Denver: AWWA and AWWARF.

Weatherbe, D.G., and Sherbin, I.G. (1994). Urban drainage control demonstration program of Canada's Great Lakes Cleanup Fund. *Water Science and Technol*ogy, 29, 455-462.

Weiss, W.J., Bouwer, E.J., Aboytes, R., LeChevallier, M.W., O'Melia, C.R., Le, B.T., and Schwab, K.J. (2005). Riverbank filtration for control of microorganisms: Results from field monitoring. *Water Research,* 39, 1990-2001.

Weiss, W.J., Bouwer, E.J., Ball, W.P., O'Melia, C.R., Aboytes, R., and Speth, T.F. (2004). Riverbank filtration: Effect of ground passage on NOM character. *Journal of Water Supply: Research and Technology-AQUA,* 53(2), 61-83.

Weiss, W.J., Bouwer, E.J., Ball, W.P., O'Melia, C.R., Arora, H., and Speth, T.F. (2002). Reduction in disinfection byproduct precursors and pathogens during riverbank filtration at three Midwestern United States drinking-water utilitites. In *Riverbank Filtration: Improving Source Water Quality* (C. Ray, G. Melin, and R.B. Linsky, eds.), pp 147-174. Dordrecht: Kluwer Academic Publishers.

Weiss, W.J., Bouwer, E.J., Ball, W.P., O'Melia, C.R., Arora, H., and Speth, T.F. (2003b). Comparing RBF with Bench-Scale Conventional Treatment for Precursor Reduction. *Journal of the American Water Works Association,* 95(12), 67-80.

This is a preview. Click here to purchase the full publication.

Weiss, W.J., Bouwer, E.J., Ball, W.P., O'Melia, C.R., LeChevallier, M.W., Arora, H., and Speth, T.F. (2003a). Riverbank filtration: Fate of disinfection by-product precursors and select microorganisms. *Journal of the American Water Works Association,* 95(9), 68-81.

Wett, B., Jarosch, H., and Ingerle, K. (2002). Flood induced infiltration affecting a bank filtrate well at the River Enns, Austria. *Journal of Hydrology,* 266, 222–234.

Wiedemeier, T.H., Wilson, J.T., Kampbell, D.H., Miller, R.N., and Hansen, J.E. (1999). Technical protocol for implementing intrinsic remediation with long-term monitoring for natural attenuation of fuel contamination dissolved in groundwater: U.S. Air Force Center for Environmental Excellence, v. 1 & 2, A324248, A324247a, A324247b.

Yao, K.M., Habibian, M.T., and O'Melia, C.R. (1971). Water and waste water filtration - concepts and applications. *Environmental Science and Technology,* 5, 1105-1112.

Yoder, C. (1989) The development and use of biocriteria for Ohio surface waters. In: Flock, G.H. (Ed.) Proceedings of the National Conference on Water Quality Standards for the 21st Century, U.S. EPA, Office of Water, Washington, D.C., 139-146.

Younger, P.L., Mackay, R., and Connorton, B.J. (1993). Streambed sediment as a barrier to groundwater pollution: insights from fieldwork and modelling in the river Thames basin. *Journal of the Institution of Water and Environmental Management,* 7, 577-585.

This is a preview. Click here to purchase the full publication.

CHAPTER 8

Use of Functionalized Filter Medium for Nutrient Removal in Stormwater Ponds

Ni-Bin Chang, Ph.D., P.E., F.ASCE, F.EAS
Professor, Department of Civil, Environmental and Construction Engineering
University of Central Florida, Orlando, Florida, USA

Marty Wanielista, Ph.D., P.E., D.WRE
Director, Stormwater Management Academy
University of Central Florida, Orlando, Florida, USA

Mikhal Moberg, Fahim Hossain, and Ammarin Daranpob
Former Graduate Students, Department of Civil, Environmental and Construction Engineering, University of Central Florida, Orlando, Florida, USA

ABSTRACT: Many best-management practices (BMPs) currently used in urban regions have been developed to minimize flood risk, sustain downstream ecosystems, and secure the quality of groundwater sources either directly or indirectly. One such BMP is the reuse of stormwater by removing nutrients from the nutrient-laden "first flush" water collected in wet or dry ponds; this practice has led to the development of multifunctional sorption materials. In the interests of sustainable infrastructure, this chapter describes a design philosophy for proper use of functionalized green sorption or filter media placed in stormwater ponds for nutrient removal. The chapter includes a thorough literature review of past uses of green sorption media and also describes the results of a laboratory column test conducted to mimic a field environment and evaluate the feasibility of the design philosophy. This approach to stormwater treatment has "green" implications because it includes recycled material in the sorption media to promote treatment efficiency and effectiveness. Such design strategies may be extended to enhance the sustainability of low-impact developments such as rain gardens, bioswales, and green roofs where plants, sorption media, and soils naturally filter nutrients and other pollutants from stormwater.

8.1 INTRODUCTION

Nutrients such as ammonia, nitrite, nitrate, and phosphorus are common contaminants in water bodies worldwide. Directly or indirectly, these nutrients have acute and chronic harmful effects on humans and ecosystems. Ammonia can exist in aqueous solution in the form of ammonium ions or ammonia gas. Ammonium ions (NH_4^+) are much more toxic than ammonia gas (NH_3); however, the form present depends on the pH (Crites and Tchobanoglous, 1998). According to the United States Environmental Protection Agency (USEPA), unionized ammonia is extremely toxic for salmonid and nonsalmonid fish species (USEPA, 1993). The presence of 0.10–10.00 mg/L of ammonia can cause fish mortality and negatively affect fish health and reproduction

This is a preview. Click here to purchase the full publication.