EPA Office of Water
Water Research Update
July-December 2013 No. 2013-2

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Protecting Aquatic Life and Human Health from Chemicals and Microbes in Water

From EPA

EPA Expands List of Safer Chemical Ingredients. 130 chemicals added to EPA's Safer Chemical Ingredients List.

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Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality. Information on emerging contaminants, such as antimicrobials and hormones that may affect water quality.

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Launch of ChemView Tool. Tool improves public access to health and safety data on Toxic Substances Control Act chemicals.

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From Collaborators

USGS – Factors Affecting Public-Supply-Well Vulnerability to Contamination: Understanding Observed Water Quality and Anticipating Future Water Quality. Circular 1385. Insight on vulnerability of public-supply wells to contamination.

Go to Report or oh.water.usgs.gov

WRF Workshop Report: Potential Impacts and Significance of Elevated ^{131}I on Drinking Water Sources. Bartrand, T.A. and J.S. Rosen, 2013. WRF Project No. 4486. State of knowledge about Iodine-131 (^{131}I) in drinking and wastewaters, including significance of elevated levels of ^{131}I in source water.

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USGS – Real-time Monitoring Pays Off for Tracking Nitrate Pulse in Mississippi River Basin to the Gulf of Mexico. On-line tool provides real-time nitrate monitoring.

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Nitrate in the Mississippi River and Its Tributaries, 1980–2010: An Update. Murphy, J.C., et al., 2013. Scientific Investigations Report 2013-5169. Nitrate levels continue to increase in Mississippi River, but signs of progress in Illinois River.

Go to Report or pubs.er.usgs.gov

Critical Aspects of EPA's IRIS Assessment of Inorganic Arsenic: Interim Report. National Research Council. Evaluates issues in assessing cancer and non-cancer effects of oral exposure to inorganic arsenic; offers recommendations.

Go to Report or www.nap.edu

State of the Science and Research Needs for Opportunistic Pathogens in Premise Plumbing. Pruden, A. et al., 2013. WRF Project No. 4379. State of science and research needs for opportunistic pathogens in premise plumbing. 5 models: *Legionella pneumophila*, *Mycobacterium avium* complex, *Pseudomonas aeruginosa*, *Acanthamoeba* spp., and *Naegleria fowleri*.

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From Journals

Development of Methods to Detect Occurrence and Effects of Endocrine-Disrupting Chemicals: Fueling a Fundamental Shift in Regulatory Ecotoxicology. Ankley, G.T. and C.R Tyler, 2013. *Environmental Toxicology and Chemistry,* 32(12), 2661-2662.

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Direct and Indirect Effects of Climate Change on the Risk of Infection by Water-Transmitted Pathogens. Sterk, A., et al., 2013. *Environmental Science & Technology,* 47(22), 12648-12660.

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Formation, Precursors, Control, and Occurrence of Nitrosamines in Drinking Water: A Review. Krasner, S., et al., 2013. *Water Research,* 47(13), 4433-4450.

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Histopathological Analysis of Fish from Acorn Fork Creek, Kentucky, Exposed to Hydraulic Fracturing Fluid Releases. Papoulias, D.M., and A.L. Velasco, 2013. *Southeastern Naturalist,* 12(4), 92-111.

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Microbial Community Changes in Hydraulic Fracturing Fluids and Produced Water from Shale Gas Extraction. Mohan, A., et al., 2013. *Environmental Science & Technology,* 47(22), 13141-13150.

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Pharmaceutical Contaminants of Emerging Concern in the Environment. Metcalfe, C.D., 2013. *Environmental Toxicology and Chemistry,* 32(8), 1683-1684.

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Quantification of Pharmaceuticals, Personal Care Products, and Perfluoroalkyl Substances in the Marine Sediments of Puget Sound, Washington, USA. Long, E.R. et al., 2013. *Environmental Toxicology and Chemistry,* 32(8), 1701-1710.

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Quantifying Groundwater's Role in Delaying Improvements to Chesapeake Bay Water Quality. Sanford, W.E., and J.P. Pope, 2013. *Environmental Science & Technology,* 47(23), 13330-13338.

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Science-Based Decision-Making on Complex Issues: Marcellus Shale Gas Hydrofracking and New York City Water Supply. Eaton, T. T., 2013. *Science of the Total Environment,* 461, 158-169.

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Triclosan Occurrence in Freshwater Systems in the United States (1999-2012): A Meta-Analysis. Perez et al., 2013. *Environmental Toxicology and Chemistry,* 32(7), 1479-1487.

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Discharge-Based QMRA for Estimation of Public Health Risks From Exposure to Stormwater-Borne Pathogens in Recreational Waters in the United States. McBride, G., et al., 2013. *Water Research,* 47(14), 5282-5297.

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Evaluating Nanoparticle Breakthrough During Drinking Water Treatment. Chalew, T.E.A., et al., 2013. *Environmental Health Perspectives,* 121(10), 1161-1166.

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Factors Affecting Catalysis of Copper Corrosion Products in NDMA Formation from DMA in Simulated Premise Plumbing. Zhang, H., and S.A. Andrews, 2013. *Chemosphere,* 93(11), 2683-2689.

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Geologic Sequestration of Carbon Dioxide: Implications for Public Water Systems. Drago, J. A., and Carpenter, A. T., 2013. *Journal American Water Works Association,* 105(11), 52-57.

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Prenatal Nitrate Intake from Drinking Water and Selected Birth Defects in Offspring of Participants in the National Birth Defects Prevention Study. Brender, J.D., et al., 2013. *Environmental Health Perspectives,* 121(9), 1083-1089.

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Probabilistic Analysis of Risks to UD Drinking Water Intakes from 1,4-Dioxane in Domestic Wastewater Treatment Plant Effluents. Simonich, S.M., 2013. *Integrated Environmental Assessment and Management,* 9(4), 554-559.

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Differential Chemical Profiling to Identify Zonation By-Products of Estrone-Sulfate and First Characterization of Estrogenicity in Generated Drinking Water. Bourgin, M., et al., 2013. *Water Research,* 47(11), 3791-3802.

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Water Quality Assessment and Analysis of Spatial Patterns and Temporal Trends. Gazzaz, N.M., et al., 2013. *Water Environment Research,* 85(8), 751-767.

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Emerging Pollutants – Part I: Occurrence, Fate and Transport. da Silva, A.K. et al, 2013. *Water Environment Research,* 1978-2021(44).

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Chlorination of Bromide-Containing Waters: Enhanced Bromate Formation in the Presence of Synthetic Metal Oxides and Deposits Formed in Drinking Water Distribution Systems. Liu, C., et al., 2013. *Water Research,* 47(14), 5307-5315.

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Climate Change and Watershed Mercury Export: A Multiple Projection and Model Analysis. Golden, H.E., C.D. Knightes, G.M. Davis, et al., 2013. *Environmental Toxicology and Chemistry,* 32(9), 2165-2174.

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Enhanced Chlorine Dioxide Decay in the Presence of Metal Oxides: Relevance to Drinking Water Distribution Systems. Liu, C., et al., 2013. *Environmental Science & Technology,* 47(15), 8365-8372.

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Mercury Exposed: Advances in Environmental Analysis and Ecotoxicology of a Highly Toxic Metal. Wiener, J.G., 2013. *Environmental Toxicology and Chemistry,* 32(10), 2175-2178.

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Pyrethroid Insecticides in Municipal Wastewater. Weston, D., et al., 2013. *Environmental Toxicology and Chemistry,* 32(11), 2460-2468. Detections included permethrin, bifenthrin, cypermethrin, and cyhalothrin.

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Distribution of Pyrethroid Insecticides in Secondary Wastewater Effluent. Parry, E. and T.M. Young, 2013. *Environmental Toxicology and Chemistry,* 32(12), 2686-2694.

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Modeling the Potential Effects of Atrazine on Aquatic Communities in Midwestern Streams. Bartell, S., et al., 2013. *Environmental Toxicology and Chemistry,* 32(10), 2402-2411.

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Recommendations Following a Multi-Laboratory Comparison of Microbial Source Tracking Methods. Stewart, J., et al., 2013. *Water Research,* 47(18), 6829-6838.

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Serum Perfluorooctanoic Acid and Perfluorooctane Sulfonate Concentrations in Relation to Birth Outcomes in the Mid-Ohio Valley, 2005-2010. Darrow, L.A., et al., 2013. *Environmental Health Perspectives,* 121(10), 1207-1213.

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Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water and Other Nonrecreational Water – United States, 2009-2010. Hilborn, E., and T.J. Wade, et al., 2013. *Morbidity and Mortality Weekly Report,* 62(35), 714-720.

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Development of Short, Acute Exposure Hazard Estimates: A Tool for Assessing the Effects of Chemical Spills in Aquatic Environments. Bejarano, A.C., 2013. *Environmental Toxicology and Chemistry,* 32(8), 1918-1927.

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Effect of Incubation Temperature on the Detection of Thermophilic Campylobacter Species from Freshwater Beaches, Nearby Wastewater Effluents, and Bird Fecal Droppings. Khan, I., et al., 2013. *Applied and Environmental Microbiology,* 79(24), 7639-7645.

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Organic Phosphorus in the Aquatic Environment. Baldwin, D., 2013. *Environmental Chemistry,* 10(6), 439-454.

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Toxicities of Oils, Dispersants and Dispersed Oils to Algae and Aquatic Plants: Review and Database Value to Resource Sustainability. Lewis, M., and R. Pryor, 2013. *Environmental Pollution,* 180, 345-367.

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Use of Reconstituted Waters to Evaluate Effects of Elevated Major Ions Associated with Mountaintop Coal Mining on Freshwater Invertebrates. Kunz, J.L., TJ. Norberg-King, et al., 2013. *Environmental Toxicology and Chemistry,* 32(12), 2826-2835.

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Hyporheic Zone Denitrification: Controls on Effective Reaction Depth and Contribution to Whole-Stream Mass Balance. Harvey, J.W., et al., 2013. *Water Resources Research,* 49(10), 6298-6316.

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Low-Risk Cyanobacterial Bloom Sources: Cell Accumulation Within Full-Scale Treatment Plants. Zamyadi, A., et al., 2013. *Journal American Water Works Association,* 105(11), 65-66.

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Simplifying Complexity: Mixture Toxicity Assessment in the Last 20 Years. Altenburger, R., 2013. *Environmental Toxicology and Chemistry,* 32(8), 1685-1687.

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Priorities to Improve the Ecological Risk Assessment and Management for Pesticides in Surface Water. Brock, T.C.M., 2013. *Integrated Environmental Assessment and Management,* 9(3), e64-e74.

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A Comparative Study of Trichloroethylene (TCE) Degradation in Contaminated Groundwater (GW) and TCE-Spiked Deionised Water Using Zero Valent Iron (ZVI) Under Various Mass Transport Conditions. Thangavadivel, K., et al., 2013. *Water Air and Soil Pollution,* 224(12).

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Monochloramine cometabolism by *Nitrosomonas europaea* Under Drinking Water Conditions. Maestre, J., et al., 2013. *Water Research,* 47(13), 4701-4709.

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Microbiome of Free-Living Amoebae Isolated from Drinking Water. Delafont, V., et al., 2013. *Water Research,* 47(19), 6958-6965.

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Recent and Upcoming Meetings

GWPC 2013 Spotlight Series - Stray Gas Incidence & Response Forum; Unconventional Oil & Gas Water Management Forum. July 9-11, 2013 in Grapevine, TX.

Go to Meeting Page or www.gwpc.org

Review of the IRIS Process. November 5-6, 2013, Washington, DC.

Go to Meeting Page or www.nas.edu

SETAC North America 34th Annual Meeting. November 17-21, 2013 in Nashville, TN.

Go to Meeting Recording or www.setac.org

Briefing on New and Emerging Information Related to Hydraulic Fracturing. November 20, 2013 - teleconference.

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GWPC 2014 UIC Conference. January 21-23, 2014 in New Orleans, LA.

Go to Meeting Page or www.gwpc.org

Groundwater and Salt Town Hall: Restoring the Equilibrium After Severe Weather Events (#801). February 19, 2014 - webinar.

Go to Meeting Page or www.ngwa.org

2014 WateReuse California Annual Conference. March 16-18, 2014 in Newport Beach, CA.

Go to Meeting Page or www.watereuse.org

29th Annual WateReuse Symposium. September 7-10, 2014 in Dallas, TX.

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GWPC 2014 Annual Forum. October 6-8, 2014 in Seattle, WA.

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SETAC North America 35th Annual Meeting. November 9-13, 2014 in Vancouver, BC, Canada.

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Innovative and Affordable Tools and Technologies for Sustainable Public Health Protection

From EPA

EPA Releases Strategies Supporting for Efficient Water Use. Information on issues related to water supply availability and variability, and energy efficiency.

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Drinking Water Infrastructure Needs Survey and Assessment: Fifth Report to Congress. EPA 816-R-13-006. Funding and operational needs of public water systems estimated at $384 billion for drinking water infrastructure through 2030.

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From Collaborators

Transformation of Amines to Nitrosamines on Activated Carbons. Huang, C., 2013. WRF Project No. 4343. Strategies for water industry to minimize undesirable nitrosamine formation associated with AC adsorbents.

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Feasibility Study on Model Development to Estimate and Minimize Greenhouse Gas Concentrations and Carbon Footprint of Water Reuse and Desalination Facilities. Hokanson, D.R., et al., 2013. Interprets literature to assist utilities with water reuse and desalination to estimate GHG emissions and carbon footprint.

Go to Report or www.watereuse.org

Evaluation of Impact of Nanoparticle Pollutants on Water Reclamation. WateReuse Association. WRF-07-04-01. Obtains preliminary information on fate and impact of manufactured nanomaterials in key water reclamation unit processes.

Go to Report or www.watereuse.org

Management Practice for Drinking Water Pipelines: Synthesis Report. Sinha, S.K., 2013. WERF Project No: INFR9SG09mpdw. Literature and current practice review; focus on application of management practice in evaluating and predicting pipe condition, analyzing risk, and prioritizing renewal activities.

Go to Report or www.iwapublishing.com

Saving Water & Energy Together: Helping Utilities Build Better Program. Young, R., 2013. Report Number E13H. Examines energy-water nexus and recommends program models and frameworks for utilities.

Go to Report or www.allianceforwaterefficiency.org

Pilot-Scale Oxidative Technologies for Reducing Fouling Potential in Water Reuse and Drinking Water Membranes. Stanford et al., 2013. Evaluates oxidative technologies as pretreatment for RO membrane feed water to address issues with organic fouling.

Go to Report or www.watereuse.org

Predictive Models to Aid in Design of Membrane Systems for Organic Micropollutant Removal. Drewes, J. 2013. Models to predict rejection of a wide variety of organic compounds by NF and RO membranes.

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Review of Nanomaterial Research and Relevance for Water Reuse. Li Q., 2013. Reviews applications of nanomaterials in water reuse; summarizes existing research on ecological and health risks they could pose.

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Toolbox for Water Utility Energy and Greenhouse Gas (GHG) Emission Management. McGuckin, R. 2013. WERF Project No: CC3C10. Evaluates process models, impact assessment methods, and performance indicators for evaluating energy use and emissions.

Go to Report or www.werf.org

Application of Filters for Evaluating Lead and Copper Concentrations in Tap Water. Cantor, A.F. et al., 2013. WRF Project No. 4415. Results of stakeholder meeting addressing revisions to the Lead and Copper Rule.

Go to Report or www.waterrf.org

National and California Treatment Costs to Comply With Potential Hexavalent Chromium MCLs. Seidel, C. et al., 2013. WRF Project No. 4432. Estimates costs for 4 technologies: reduction, coagulation, filtration; strong base anion exchange; weak base anion exchange; and reverse osmosis.

Go to Report or www.waterrf.org

Selective Salt Recovery from Reverse Osmosis Concentrate Using Interstage Ion Exchange. WateReuse Association. WRF-06-010E. Tested use of sequential cation and anion exchange between two RO stages.

Go to Report or www.watereuse.org

Key Issues in Seawater Desalination in California: Marine Impacts. Pacific Institute. Provides design recommendations for desalination intakes and outfalls.

Go to Report or pacinst.org/publications

Condition Assessment for Drinking Water Pipelines: Synthesis Report. Sinha, S.K., 2013. WERF Project No: INFR9SG09cadw. Condition assessment methodologies and technologies are reviewed and compared.

Go to Report or www.iwapublishing.com

Desalination Engineering: Planning and Design. Voutchkov, N., 2013. Provides comprehensive information on planning and engineering of brackish and seawater desalination projects.

Go to Report or www.watereuse.org

Update by Algae of Dissolved Organic Nitrogen from BNR Treatment Plant Effluents. Neethling, J.B., 2013. WERF Project No: NUTR1R06e. Recalcitrant or very slowly reactive forms of DON can be separated from the bioavailable effluent DON with an XAD-8 resin cartridge.

Go to Report or www.werf.org

Research Progress on Environmental, Health, and Safety Aspects of Engineered Nanomaterials. National Research Council. State of research: market and regulatory conditions; criteria for evaluating progress on environmental, health, and safety aspects of nanotechnology.

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From Journals

Alternative Electrode Materials and Ceramic Filter Minimize Disinfection Byproducts in Point-of-Use Electrochemical Water Treatment. Yoon, Y., et al., 2013. *Environmental Engineering Science,* 30(12), 742-749.

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Analysis of N-Nitrosamines and Other Nitro(So) Compounds in Water by High-Performance Liquid Chromatography with Post-Column UV photolysis/Griess Reaction. Lee, M., et al., 2013. *Water Research,* 47(14), 4893-4903.

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Impact of Biosolids Recycling on Groundwater Resources. McFarland, M.J., 2013. *Water Environment Research,* 85(11), 2141-2146.

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A Cantilever Biosensor-Based Assay for Toxin-Producing Cyanobacteria *Microcystis aeruginosa* using 16S rRNA. Johnson, B. N., and R. Mutharasan, 2013. *Environmental Science & Technology,* 47(21), 12333-12341.

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Economic Valuation of Environmental Benefits of Removing Pharmaceutical and Personal Care Products From WWTP Effluents by Ozonation. Molinos-Senante, M., et al., 2013. *Science of the Total Environment,* 461, 409-415.

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Emerging Pollutants – Part II: Treatment. Bell, K.Y., 2013. *Water Environment Research,* 2022-2071(50).

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Performance of Human Fecal Anaerobe-Associated PCR-Based Assays in a Multi-Laboratory Method Evaluation Study. Layton, B., et al., 2013. *Water Research,* 47(18), 6897-6908.

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Performance of Viruses and Bacteriophages for Fecal Source Determination in a Multi-Laboratory, Comparative Study. Harwood, V., et al., 2013. *Water Research,* 47(18), 6929-6943.

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Striking the Balance between Nutrient Removal, Greenhouse Gas Emissions, Receiving Water Quality, and Costs. Falk, M.W. et al., 2013. *Water Environment Research,* 85 (12), 2307-2316.

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Optimizing Booster Chlorination in Water Distribution Networks: A Water Quality Index Approach. Islam, N., et al., 2013. *Environmental Monitoring and Assessment,* 185(10), 8035-8050.

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Quantifying the Effect of Buffer Strips for Pathogen Removal. Cinque, K., and N. Jayasuriya, 2013. *Journal American Water Works Association,* 105(7), 41-42.

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Removal of Arsenic from Groundwater by Using a Native Isolated Arsenite-Oxidizing Bacterium. Kao, A., et al., 2013. *Journal of Contaminant Hydrology,* 155, 1-8.

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Removal of Emerging Contaminants in Sewage Water Subjected to Advanced Oxidation with Ozone. Ibanez, M., et al., 2013. *Journal of Hazardous Materials,* 260, 389-398.

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Removal of Estrogenic Compounds from Aqueous Solutions Using Zeolites. Liu, J. and S.A. Carr, 2013. *Water Environment Research,* 85(11), 2157-2163.

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The Ecotoxicological Impact of Metal Oxide Nanoparticles on Pool Algae in the Presence and Absence of Disinfection Byproducts: A New Research Direction for the Public Health and Safety of Engineered Nanoparticles Used in Consumer Products. Joo, S. H., 2013. *Water Air and Soil Pollution,* 224(9).

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Nitrate and Phosphate Removal through Enhanced Bioretention Media: Mesocosm Study. Palmer, E., et al., 2013. *Water Environment Research,* 85(9), 823-832.

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Recreational Water Quality Response to a Filtering Barrier at a Great Lakes Beach. Przybyla-Kelly, K., et al., 2013. *Journal of Environmental Management,* 129, 635-641.

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Planning for an Uncertain Future: Climate Change Sensitivity Assessment toward Adaptation Planning for Public Water Supply. Bardsley, T. et al., 2013. *Earth Interactions,* 17, 1-26.

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Activated Carbon Mitigates Mercury and Methylmercury Bioavailability in Contaminated Sediments. Gilmour, C., et al., 2013. *Environmental Science & Technology,* 47(22), 13001-13010.

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Operation of Remote Mobile Sensors for Security of Drinking Water Distribution Systems. Perelman, L., and A. Ostfeld, 2013. *Water Research,* 47(13), 4217-4226.

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Innovative Biological Water Treatment for the Removal of Elevated Ammonia. Lytle, D., et al., 2013. *Journal American Water Works Association,* 105(9), 87-88.

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Transport of Oxidized Multi-Walled Carbon Nanotubes through Silica Based Porous Media: Influences of Aquatic Chemistry, Surface Chemistry, and Natural Organic Matter. Yang, J., et al., 2013. *Environmental Science & Technology,* 47(24), 14034-14043.

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Recent and Upcoming Meetings

WateReuse Symposium. September 15-18, 2013 in Denver, CO.

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WEFTEC, the Water Environment Federation's Annual Technical Exhibition and Conference. October 5-9, 2013 in Chicago, IL.

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2013 Water Quality Technology Conference and Exposition. November 3-7, 2013 in Long Beach, CA.

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American Water Summit 2013: Accelerating Change. November 5-6, 2013, Washington, DC.

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9th Annual WERF Research Forum: Implementing the Next Generation Water Resource Recovery Facility. January 28-29, 2014 in New Orleans, LA.

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14th National Conference Disasters and Environment - Science, Preparedness, and Resilience. January 28-30, 2014 in Washington, DC.

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WEF Midyear Meeting. January 29-February 1, 2014 in New Orleans, LA.

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AWWA/AMTA Membrane Technology Conference & Exposition. March 10-13, 2014 in Las Vegas, NV.

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WaterPro Conference. October 6-8, 2014 in Seattle, WA.

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NWRA Annual Conference. November 12-14, 2014 in Coronado, CA.

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Ecological Systems Approach to Protect and Restore Sustainable Water Quality and Water Quantity on a Watershed Basis

From EPA

WATERS OF THE UNITED STATES PROPOSED RULE. In March 2014, EPA and the Army Corps of Engineers jointly released a proposed rule to clarify protection under the Clean Water Act for streams and wetlands that form the foundation of the nation's water resources.

Watershed Modeling to Assess the Sensitivity of Streamflow, Nutrient, and Sediment Loads to Potential Climate Change and Urban Development in 20 U.S. Watersheds. Climate change impacts on streamflow and water quality.

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Reassessment 2013: Assessing Progress Made Since 2008. Hypoxia Task Force reports on progress and need to accelerate reduction of nutrient pollution in Mississippi River and Gulf of Mexico.

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Aquatic Life Ambient Water Quality Criteria For Ammonia – Freshwater 2013. Final national recommended water quality criteria for protection of aquatic life from toxic effects of ammonia in freshwater.

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Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence. Review of peer reviewed literature to inform rulemaking to enhance protection of the nation's waters by clarifying CWA jurisdiction.

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National Stormwater Calculator. Desktop application that estimates annual amount of rainwater and frequency of runoff from a specific site anywhere in U.S.

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Toolkit of Resources to Provide States with Flexibility in Adopting and Implementing Numeric Nutrient Criteria. Provides states with flexibility in adopting and implementing numeric nutrient criteria.

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From Collaborators

Literature Synthesis on Climate Change Implications for Water and Environmental Resources. Technical Memorandum 86-68210-2013-06. Summary of recent literature on current and projected effects of climate change on hydrology and water resources.

Go to Report or www.usbr.gov

Modeling Guidance for Developing Site-Specific Nutrient Goals. DePinto, J.V., 2013. WERF Project No: LINK1T11. Guidance and tools for use of models to set waterbody-specific nutrient goals, including Numeric Nutrient Criteria and allowable loadings.

Go to Report or www.werf.org

USFWS/NOAA – Status and Trends of Wetlands in the Coastal Watersheds of the Conterminous United States 2004 to 2009. Continuing coastal wetlands losses in U.S.

Go to Report or www.fws.gov/wetlands/Documents/search.asp

Federal Agencies Release Sea Level Rise Planning Tool for Parts of New York and New Jersey Impacted by Hurricane Sandy. Tool from U.S. Global Change Research Program, NOAA, Army Corps of Engineers, and FEMA.

Go to Tool

State of the Climate 2012. Blunden, J., and D.S. Arndt, 2013. *Bulletin of the American Meteorological Society,* 94, 8, S1-S238. Update on global climate indicators, notable weather events, and other environmental data from last calendar year.

Go to Report or www.noaa.gov

Lower Rio Grande Basin Study. Evaluates impacts of climate change on water demand and supply imbalances along the Rio Grande.

Go to Report or www.usbr.gov/newsroom

Swimming Upstream: Freshwater Fish in a Warming World. National Wildlife Federation. Threats to freshwater fish from climate change; protection strategies.

Go to Report or www.nwf.org

DELTA WATERS: Research to Support Integrated Water and Environmental Management in the Lower Mississippi River. National Research Council. Guidance for the Water Institute of the Gulf on integrated water resources management.

Go to Report or www.nap.edu

USGS – Ecological Health in the Nation's Streams, 1993-2005. Circular 1391. National assessment finds ecological health of streams is reduced by streamflow modifications and contaminants.

Go to Report or pubs.er.usgs.gov

Oceans and Marine Resources in a Changing Climate. U.S. Global Change Research Program. Report summarizes climate change impacts on U.S. oceans and marine resources.

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Water Quality Impacts of Extreme Weather-Related Events. Stanford, B.D., 2013. WRF Project No. 4324. Identifies and characterizes water quality impacts of extreme weather related events; provides lessons learned.

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Abrupt Impacts of Climate Change: Anticipating Surprises. National Research Council. Examines abrupt climate change and its potential impacts; recommends development of an Abrupt Change Early Warning System.

Go to Report or www.nap.edu

Effects of Wildfire on Drinking Water Utilities and Best Practices for Wildfire Risk Reduction and Mitigation. Sham, C.H. et al., 2013. WRF Project No. 4482. Impacts of wildfire on drinking water quality; lessons learned for prevention and preparedness.

Go to Report or www.werf.org

NOAA – Understanding Uncertainties in Future Colorado River Streamflow. Vano, J.A., et al., 2013. Explains the wide range in estimates of future flows; framework for comparison.

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From Journals

Industrial Steam Systems and the Energy-Water Nexus. Walker, M., et al., 2013. *Environmental Science & Technology,* 47(22), 13060-13067.

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Surface Water Quality Is Improving due to Declining Atmospheric N Deposition. Eshleman, K., et al., 2013. *Environmental Science & Technology,* 47(21), 12193-12200.

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Saturated Area Dynamics and Streamflow Generation from Coupled Surface-Subsurface Simulations and Field Observations. Weill, S., et al., 2013. *Advances in Water Resources,* 59, 196-208.

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Denitrification and Indirect N2O Emissions in Groundwater: Hydrologic and Biogeochemical Influences. Jahangir, M., et al., 2013. *Journal of Contaminant Hydrology,* 152, 70-81.

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Measuring Environmental Sustainability of Water in Watersheds. Hester, E. T., and J.C. Little, 2013. *Environmental Science & Technology,* 47(15), 8083-8090.

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Realizing Ecosystem Services: Wetland Hydrologic Function Along A Gradient Of Ecosystem Condition. McLaughlin, D. L., and M.J. Cohen, 2013. *Ecological Applications,* 23(7), 1619-1631.

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Revealing the Spatial Variability of Water Fluxes at the Groundwater-Surface Water Interface. Binley, A., et al., 2013. *Water Resources Research,* 49(7), 3978-3992.

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Understanding the Sources and Fate of Nitrate in a Highly Developed Aquifer System. Murgulet, D., and G.R. Tick, 2013. *Journal of Contaminant Hydrology,* 155, 69-81.

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Vertical Distribution Profiles and Diagenetic Fate of Synthetic Surfactants in Marine and Freshwater Sediments. Corada-Fernandez, C., et al., 2013. *Science of the Total Environment,* 461, 568-575.

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A Method to Consider Whether Dams Mitigate Climate Change Effects on Stream Temperatures. Null, S., et al., 2013. *Journal of the American Water Resources Association,* 49(6), 1456-1472.

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Distribution and Concentrations of Petroleum Hydrocarbons Associated with the BP/Deepwater Horizon Oil Spill, Gulf of Mexico. Sammarco, P., et al., 2013. *Marine Pollution Bulletin,* 73(1), 129-143.

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Recent and Upcoming Meetings

Subsurface Characterization, Modeling, Monitoring, and Remediation of Fractured Rocks. September 30 - October 1, 2013 in Irvine, CA.

Go to Meeting Page or www.nas.edu/

AWRA Annual Water Resources Conference. November 4-7, 2013 in Portland, OR.

Go to Meeting Page or www.awra.org

NRC Committee on Mississippi River Water Quality Science and Interstate Collaboration. November 18-19, 2013 in St. Louis, MO.

Go to Meeting Page or www.nas.edu

The National Ground Water Association's 2013 Expo. December 3-6, 2013 in Nashville, TN.

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NGWA Conference on Hydrology and Water Scarcity in the Rio Grande Basin (#5034). February 25-26, 2014 in Albuquerque, NM.

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Water, Climate, Food, and Energy Conference. March 3-7, 2014 in Chapel Hill, NC.

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2014 AOC Annual Conference: Accelerating Progress in BUI Removals and AOC Delisting. March 18-19, 2014 in Chicago, IL.

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