



William L. Goodfellow, Jr., BCES, M.S.

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Professional Profile

Mr. William Goodfellow is a Principal Scientist and the Director of Exponent's Ecological and Biological Sciences practice. Mr. Goodfellow is a Board-Certified Environmental Scientist with special emphasis in Environmental Toxicology. He has more than 35 years of experience in environmental toxicology and causal effect assessments. His technical experience includes environmental assessment of chemical and biological contaminants in air, surface water, groundwater, soil and sediment, and their toxicological risk associated with potential contaminants of concern; performance of environmental compliance assessments and audits; design and performance of Toxicity Reduction Evaluations (TREs) for municipal and industrial discharges; assisting with treatability assessments of contaminated sediments, soils, and wastewater; researching and writing technical documents on federal and state water quality criteria, regulatory policies and other water pollution control issues; and conceptual and experimental evaluations on the toxicity, fate, and effects of chemicals in aquatic and terrestrial ecosystems; assessment of environmental damage resulting from point- and non point-source discharge; and assessment and remediation of potentially toxic sediment and dredge materials. He has considerable experience in addressing impacts from physical and chemical stressors such as metals, inorganic salts, dioxin/furans, PCBs, PFCs, PAHs, other chlorinated organics, solvents (TCE, PCE), munitions, pesticides/herbicides, surfactants, nutrients, ammonia, dissolved oxygen, pH, temperature, and habitat changes. Many of his projects involve aspects of historic reconstruction of chemical releases, divisibility and apportionment, and injury assessment. His projects involve regulatory drivers including Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), National Environmental Policy Act (NEPA), Clean Water Act (CWA), NPDES, Toxic Substances Control Act (TSCA), Endangered Species Act (ESA) and the respective state implementations of these federal initiatives as well as similar initiatives in other countries.

He has considerable experience in addressing agriculture and land-use management issues through ecological assessments of flora and fauna populations. Mr. Goodfellow's experience includes issues related to agricultural production and farming practices for crops such as rice, sugar cane, strawberry, grapes, corn, wheat, soybean, tree nuts, shrubs, and turf as well as cattle, dairy, swine, poultry, fish, and shellfish. He also has extensive experience in addressing nutrient and manure management issues, fertilizer production, land application of biosolids and fertilizers, invasive species, and genetically modified organisms (GMO).

Mr. Goodfellow is an internationally recognized expert in toxicology and TRE technology. He is a Past President of the international professional society, Society of Environmental Toxicology and Chemistry and a SETAC Fellow. He is an experienced consulting and testifying expert on a range of legal matters in civil and criminal actions involving environmental claims; spills, NRDA, remediation and insurance cost recovery; toxic tort; agricultural issues; and standard of care. Mr. Goodfellow has served on peer-review panels, advisory boards, task forces, and editorial committees for natural resources, toxicology, and TRE issues, as well as being widely published.

Academic Credentials & Professional Honors

M.S., Fishery Management, Frostburg State University, 1982

B.S., Biology, York College of Pennsylvania, 1979

A.S., Chemistry, York College of Pennsylvania, 1978

Executive Education Certification, University of Pennsylvania, Wharton School of Business;

Philadelphia, Pennsylvania; 2011 - Essentials of Management; 2005-2006; Implementing

Strategy; 2006; Leading and Influencing People; 2010; Strategic Persuasion Workshop: The Art and Science of Selling Ideas; 2011

Executive Education, Harvard Business School; Boston, Massachusetts; 2008 - Leading Professional Service Firms

Professional Recognition

Co-Editor-in-Chief, SETAC Globe (monthly international electronic magazine of the Society of Environmental Toxicology and Chemistry), 2014 – 2020

American Academy of Environmental Scientists Board of American Academy of Environmental Engineers and Scientists (AAEES), Environmental Committee, 2016 –Present

Presidential Award – SETAC, 2019, 2018, 2015, 2011, 2004, 2001

SETAC Fellow – November 2015

SETAC International Award, Herb Ward Excellence in Service Award, 2011

Industrial Chemical Advisory Council, South-Central Pennsylvania, 2002 – Present; Vice-Chairman, 2007–2010; Chairman, 2011 – 2020; advisory committee member.

Society of Environmental Toxicology and Chemistry – SETAC World Council (World Board of Directors), 2007 – 2014 and 2018 – Present; SETAC World Council, Vice President, 2012; President, 2013; Immediate Past President, 2014; Secretary/Treasurer, 2018 – Present; North America Board of Director, 2004-2011 and North America Executive Committee, 2006–2011, SETAC – North America-Secretary/Treasurer , 2007–2008; North America-Vice President, 2009; North America-President, 2010; North America Immediate Past President, 2011; North America-Finance Committee, 2006 – 2015; World Council-Finance Committee, 2007 – Present; Global Communication Committee-Chairman, 2014 – 2020

SETAC North America Endowment Trustee, 2007 – Present

Standard Methods Committee and Joint Task Group Member, Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 1985 – 2014

Meeting Chairman for the Gulf Oil Spill, Focus Topic Meeting, SETAC, Pensacola Beach, Florida, April 2011

Maryland Academy of Science, Standing Science Committee and Young Scientist Award Committee, 2007 – 2009

Delegate to “Pellston Workshop” on Biological Field Sampling: In-situ assessments, Portland, OR,

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November 2006

Meeting Chairman for the 26th Annual Meeting of the SETAC, Baltimore, MD, November 2005

Chairman of the Awards and Fellowship Subcommittee – SETAC, 2003 – 2006

Member of the SETAC Board of Director's Standing Program Committee, 2001 – 2003

Meeting Chairman 22nd Annual Meeting of the SETAC, Baltimore, MD, November 2001

Elected to Editorial Board, Environmental Toxicology and Chemistry, 1998 – 2002

Awards Committee—SETAC Founders Award, SETAC/EA Jeffrey Black Award, ACC Young Researchers Award, Procter and Gamble Pre-doctoral Award, ICC Significant Achievement Award and ICA/Chris Lee Award for Metals Research, SETAC, 1998 –2012

Licenses and Certifications

Board Certified Environmental Scientist, Environmental Toxicology (BCES), Certification Number, 13-60004, American Academy of Environmental Scientists Board of American Academy of Environmental Engineers and Scientists

Society of Environmental Toxicology and Chemistry (SETAC) Fellow

OSHA 40-hour Hazwoper Training, annual 8-hour refresher (December 2015)

Prior Experience

Vice President and Business Unit Director, EA Engineering, Science and Technology, Inc., 1984-2013 (other titles and responsibilities during tenure)

Associate Biologist, The Johns Hopkins University, Applied Physics Laboratory, 1982-1984

Research Assistant, University of Maryland, Appalachian Environmental Laboratory, 1979-1982

Biological Technician, Taxonomic Consultants, Inc., 1980-1982

Water Chemistry Technician, Texas Instruments, Inc., 1980

Quality Control and Research and Development Supervisor, National Brick Corporation, 1979

Biological Consultant, Dr. Robert F. Denoncourt, 1978-1979

Senior Laboratory Technician, Quality Control (part-time), Gent-L-Kleen, Inc., 1977-1979

Teaching Assistant, Summer Instructor for Chemistry Department, York College of Pennsylvania, 1977

Professional Affiliations

American Academy of Environment Engineers and Scientists (AAEES)

American Bar Association (ABA), Associate Member

American Chemistry Society (ACS)

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- Environmental Science Division

Chemical Industry Advisory Council

- Chairman CIAC

International Society of Arboriculture (ISA)

Society of Environmental Toxicology and Chemistry (SETAC)

- SETAC World Council Past President
- North America Past President
- SETAC-North America Past Treasurer
- SETAC-North America and SETAC World Council (SWC) Board of Directors
- SETAC-Endowment (Trustee)
- Publications Advisory Committee (SWC)
- Communications Committee (SWC)
- Sediment Advisory Group (SWC)
- Metals Advisory Group (SWC)

Society of Toxicology (SOT)

University of Michigan, Water Center-Advisory Council

Publications

Murray KJ, Brown K, Petrovich M, Drollette BD, Goodfellow WL. Tracking COVID-19 in the environment using genetic methods. Leveraging genetic methods to analyze environmental samples for SARS-CoV-2 and other novel analytes. Exponent, Inc. Alert. 9 June 2021.

Haddad RI, Goodfellow WL, Kane Driscoll SB, Deines AM. World Rivers Day 2020, Exponent's continuing work in rivers. Exponent, Inc. Alert. 8 October 2020.

Kulacki KJ, Revchuk A, Kane Driscoll SB, Goodfellow WL, Paulsen SC. California is the first state to define and regulate microplastics. A microplastic testing strategy for California Drinking Water starting in 2021. Exponent, Inc. Alert. 10 July 2020.

Brown K, Petrovich M, Murray KJ, Goodfellow WL. Sewage sleuthing: What waste can tell us about upstream events, including coronavirus? Exponent, Inc. Alert. 5 June 2020.

Menzie CA, Kashuba RO, Goodfellow WL. Implications of sample size, rareness, and commonness for derivation of environmental benchmarks and criteria from field and laboratory data. *Ecotoxicology and Environmental Safety* 2020 Volume 190: 110117, 1 March 2020.

Taylor AA, Tsuji JS, Garry MR, McArdle ME, Goodfellow WL, Adams WJ, Menzie CM. Critical review of exposure and effects: implications for setting regulatory health criteria for ingested copper. *Environ Manage* 2020. 65: 131 – 159.

Mebane CA, Sumpter JP, Fairbrother A, Augspurger TP, Canfield TJ, Goodfellow WL, Guiney PD, KeHuray A, Maltby L, Mayfield DB, McLaughlin MJ, Ortego L, Schlekot T, Scroggin RP, Verslichke TA. Scientific integrity issues in environmental toxicology and chemistry: improving research reproducibility,

credibility, and transparency. *Integrated Environmental Assessment and Management* 2019; 15(3): 320-344.

Chang E, Tsuji JS, Shields WJ, Johns MW, Goodfellow WL, Garry MR, Loccisano AE. Agency for Toxic Substances and Disease Registry (ATSDR) has released the 2018 draft toxicological profile for perfluorinated alkyl substances (PFAS). *Exponent, Inc. Alert*. 16 July 2019.

Haddad RI, Osteraas JD, Souri SJ, Goodfellow WL, McDonald BM, Paulsen SC, Fessler JR, Hicks JB, Kalmes RM, Martens JD, Miller AJ, Peraza DB, Roberts MA, Swanger LA, Travis JM, Bailey JR, Wright SA, Griffith M. Hurricanes Harvey, Irma, and Maria. *Exponent, Inc. Alert*. 19 September 2017.

McArdle ME, Goodfellow WL, Garry MR. EPA releases draft recreational water quality criteria for cyanotoxins. *Exponent, Inc. Alert*. 6 January 2017.

Canedo-Arguelles M, Hawkins CP, Kefford BJ, Schafer RB, Dyack BJ, Bruce S, Buchwalter D, Dunlop J, Fror O, Lazorchak J, Coring E, Fernandez HR, Goodfellow W, Gonzalez Achem AL, Hatfield-Dodds S, Karimov BK, Mensah P, Olson JR, Piscart C, Prat N, Ponsa S, Schulz CJ, Timpano AJ. Saving freshwater from salts: Ion-specific standards are needed to protect biodiversity. *Science* 2016; 351 (6276): 4-6.

Deines AM, Goodfellow, Jr. WL, Murray KJ. DNA testing and the next generation of environmental forensics. *Environmental Perspectives*, Volume 2, December 2015.

Liber K, Goodfellow W, Den Bestern P, Clements W, Galloway T, Gerhardt A, Green A, Simpson S. In situ-based effects measures: Considerations for improving methods and approaches. *Integrated Environmental Assessment and Management* 2007; 3(2): 246-258.

Norberg-King TJ, Ausley L, Burton D, Goodfellow W, Miller J, Waller WT (eds). *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. SETAC Press, Pensacola, FL, 455 pp, 2005.

Norberg-King TJ, Ausley LW, Burton DT, Goodfellow WL, Miller JL Waller WT. Introduction to toxicity reduction evaluations. Chapter 1, p 1-29. In: *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. SETAC Press, Pensacola, FL, 455 pp, 2005.

Goodfellow WL, Brils J, Burgess RM, Doi J, Downey PJ, Matthews DL, Norberg-King TJ, Phillips BM. Wastewater toxicity identification evaluations. Chapter 3, p 59-92. In: *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. SETAC Press, Pensacola, FL, 455 pp, 2005.

Burton DT, Norberg-King TJ, Ausley LW, Goodfellow WL, Miller JL, Waller WT. Workshop summary, recommendations, and conclusions. Chapter 5, p 115-126. In: *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. SETAC Press, Pensacola, FL, 455 pp, 2005.

Baummer JC, Goodfellow WL, McCulloch W. Large petroleum refinery/petrochemical production facility, Gulf Coast, USA. Case Study 6.24, p 299-306. In: *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. SETAC Press, Pensacola, FL, 455 pp, 2005.

Baummer JC, Goodfellow WL, McCulloch W. The military perspective, Fort Campbell, Kentucky, USA. Case Study 6.25, p 306-312. In: *Toxicity reduction and toxicity identification evaluations for effluents, ambient waters, and other aqueous media*. SETAC Press, Pensacola, FL, 455 pp, 2005.

Goodfellow WL, McCulloch W. Minimal toxicity necessary for an effective toxicity identification evaluation. Case Study 6.31, p 338-344. In: *Toxicity reduction and toxicity identification evaluations for effluents,*

ambient waters, and other aqueous media. SETAC Press, Pensacola, FL, 455 pp, 2005.

Goodfellow WL, Jr. The aquatic environment. In: Environmental Toxicity Testing. Thompson KC, Wadhia K, Loibner AP (eds), Blackwell Publishing, CRC Press, Oxford, United Kingdom, 388 pp, 2005.

Ferretti JA, Calesso DF, Lazorchak JM, Dolce TJ, Arnold J, Goodfellow WL, Smith ME, Serbst JR. Interlaboratory Comparison of a Reduced Volume Marine Sediment Toxicity Test Method Using the Amphipod *Ampelisca abdita*. Environmental Toxicology and Chemistry 2004; 23(3):632-637.

Goodfellow WL. Toxicity Testing and Bioavailability of Contaminants in Sediments. Chapter 5. In: Sediment Guidance Compendium. Electric Power Research Institute, Inc., Concord, California, Report 1005216, 2001.

Goodfellow WL. Treating water in wintery weather: How temperature affects biomass, receiving waters and sampling strategies. Pollution Engineering 2000; 32 (11):28-29.

Goodfellow WL, Ausley LW, Burton DT, Denton DL, Dorn PB, Grothe DR, Heber MA, Norberg-King T, Rodgers JH. Major Ion Toxicity in Effluents: A Review with Permitting Recommendations. Environmental Toxicology and Chemistry 2000; 19(1):175-182.

Reash RJ, Seegert GL, and Goodfellow WL. Experimentally-derived upper thermal tolerance for redbone suckers: revised 316(a) variance conditions at two generating facilities in Ohio. Environmental Science and Policy 2000, 3: S191-S196.

Botts JA, Goodfellow, WL, Collins, MA, Morris, TL, and Diehl, RA. Toxicity Reduction Evaluation Protocol for Municipal Waste Water Treatment Plants. Second edition updated EPA, Cincinnati, OH, August 1999. EPA/833B-99/002.

MacFarlane I, Goodfellow W, Reimold R. Tracking the status of endocrine disruptors in remediation. Soil and Water Contamination, California, March 1999.

Goodfellow W, Firstenberg C. Beyond compliance: Sampling as a management tool. World Dredging Mining & Construction 1998; 34 (8):12-13, 26.

Ausley L, Burton D, Denton D, Dorn P, Goodfellow W, Gulley J, Heber M, Norberg-King T, Rodgers J, Waller T. Tackling tough issues in whole effluent toxicity testing: Progress of the SETAC WET, 1997.

Chapman GA, Anderson BA, Bailer AJ, Baird RB, Berger R, Burton DT, Denton DL, Goodfellow WL, Jr., Heber MA, MacDonald LL, Norberg-King TJ, Ruffier PJ. Methods and appropriate endpoints. In: Whole Effluent Toxicity Testing: An evaluation of methods and prediction of receiving system impacts. Grothe DR, Dickson KL, Reed-Judkins DK (eds), Session 3: SETAC Press, Pensacola, FL, 346 pp, 1996.

Johnson GL, Goodfellow WL. Pollution Prevention. The Military Engineer 1996; 88(580):50-51.

Bradley TD, et al. 1996. Waste Water Sampling from Process and Quality Control Manual of Practice No. OM-1. Prepared by Task Force on Waste Water Sampling for Process and Quality Control, T.D. Bradley (chair), Goodfellow W co-author. Water Environment Federation, Alexandria, Virginia. 194 pp, 1996.

McCulloch WL, Goodfellow WL, Jr. Characterization, identification, and confirmation of total dissolved solids as effluent toxicants. In: Environmental Toxicology and Risk Assessment: 2nd Volume, ASTM STP 1261, Gorsuch JW, Dwyer FJ, Ingersoll CG, LaPoint TW (eds), ASTM, Philadelphia, PA, 1993.

Botts JA, Braswell JW, Morris TL, Welch MC, Goodfellow WL, Jr., Moore SB. Toxicity Reduction Evaluation Protocol for Municipal Waste Water Treatment Plants. Second edition, EPA, Cincinnati, OH, 1990.

Goodfellow WL, Jr., Rue WJ. Evaluation of a chronic estimation toxicity test using *Mysidopsis bahia*. In: Aquatic Toxicology and Hazard Assessment: 12th Volume, ASTM STP 1027, Cowgill UM, Williams LR (eds), ASTM, Philadelphia, PA, 1989.

Goodfellow WL, Jr., McCulloch WL, Botts JA, McDearmon AG, Bishop DF. Long-term multispecies toxicity and effluent fractionation study at a municipal wastewater treatment plant. In: Aquatic Toxicology and Hazard Assessments, 11th Volume, ASTM, STP 1007, Suter GW II, Lewis MA (eds), ASTM, Philadelphia, PA, 1989.

Zyman J, Braswell JW, Botts JA, Sullivan EC, Moore SB, Goodfellow WL, Jr. Toxicity Reduction Evaluation (for Municipal Waste Water Treatment Plants) Protocol. EPA, Water Engineering Research Laboratory, Cincinnati, OH, 1987.

Botts JA, Braswell JW, Sullivan EC, Goodfellow WL, Jr., Sklar BD, McDearmon AG. Toxicity reduction evaluation at the Patapsco Waste Treatment Plant. Final Report for Cooperative Agreement CR812790-01-1. EPA, Water Engineering Research Laboratory, Cincinnati, OH, 1987.

Botts JA, Braswell JW, Goodfellow WL, Jr., Bishop DF. Project summary of the toxicity reduction evaluation at the Patapsco Waste Water Treatment Plant, Baltimore, MD, U.S. Environmental Protection Agency, Water Engineering Research Laboratory, Cincinnati, OH, 1987.

Goodfellow WL, Jr., Morgan RP, Stauffer JR, Jr., Hocutt CH. An intergeneric hybrid, *Campostoma anomalum* x *Rhinichthys atratulus*, from the Youghiogheny River Drainage, West Virginia. *Biochemical Systematics and Ecology* 1986; 14:233-238.

Goodfellow WL, Jr., Klauda RJ, Graves WC. Test chamber for experiments with early life stages of fishes. *Progressive Fish-Culturist* 1985; 47:193-194.

Cooper KR, Burton DT, Goodfellow WL, Jr., Rosenblatt DH. Bioconcentration and metabolism of picric acid (2,4-6 trinitrophenol) and picramic acid (2-amino-4,6-dinitrophenol) in rainbow trout, *Salmo gairdneri*. *Journal of Toxicology and Environmental Health* 1984; 14:731-747.

Goodfellow WL, Jr., Hocutt CH, Morgan RP, II, Stauffer JR, Jr. Biochemical assessment of the taxonomic status of "*Rhinichthys bowersi*" (Pisces, Cyprinidae). *Copeia* 1984; (3):652-659.

Morgan RP, II, Goodfellow WL, Jr., Hocutt CH, Stauffer JR, Jr. Karyotype of *Nocomis micropogon*, *Rhinichthys cataractae*, and their supposed hybrid, *Rhinichthys bowersi* (Pisces, Cyprinidae). *Copeia* 1984; 4:991-992.

Burton DT, Cooper KR, Goodfellow WL, Jr., Rosenblatt DH. Bioconcentration, elimination and metabolism of ¹⁴C-picric acid and ¹⁴C-picramic acid in the American oyster (*Crassostrea virginica*). *Archives of Environmental Contamination and Toxicology* 1984; 13:653-663.

Goodfellow WL, Jr.. *Etheostoma exile*, the Iowa darter. Pennsylvania Inventory of Plant and Animal Species of Special Concern. Carnegie Museum of Natural History, Special Publication 1984; 10: 207-209.

Goodfellow WL, Jr., Smith RE, Jr. 1984. *Polyodon spathula*, the paddlefish. Pennsylvania Inventory of Plant and Animal Species of Special Concern. Carnegie Museum of Natural History, Special Publication 1984; 10: 230-231.

Goodfellow WL, Jr., Burton DT, Graves WC, Hall WL, Jr., Cooper KR. Acute toxicity of picric acid and picramic acid to rainbow trout, *Salmo gairdneri*, and American oyster, *Crassostrea virginica*. *Water Resources Bulletin* 1983; 19:641-648.

Stauffer JR, Jr., Gates JE, Goodfellow WL, Jr. Preferred temperature of two sympatric *Ambystoma* larvae: A proximate factor in niche segregation? *Copeia* 1983; (4):1001-1005.

Goodfellow WL, Jr., Burton DT, Cooper KR. Effect of picric and picramic acids on growth of rainbow trout, *Salmo gairdneri*, and the American oyster, *Crassostrea virginica*. *Chemosphere* 1983; 12(9/10):1259-1268.

Burton DT, Goodfellow WL, Jr., Cooper KR. Bioconcentration, elimination and metabolism of picric and picramic acid in fresh water fish and estuarine bivalves. Final Report, U.S. Army Toxic and Hazardous Materials Agency, Aberdeen Proving Ground, Maryland; U.S. Army Medical Research and Development Command, Fort Detrick, Maryland. Army MIPR 2506, 125 pp, 1983.

Mosher JA, Morgan RP, II, Goodfellow WL, Jr., Haug EA. Serum proteins of selected Falconiformes and Strigiformes. *Biochemical Systematics and Ecology* 1982; 10:373-376.

Goodfellow WL, Jr., Stauffer JR, Jr., Morgan RP, II, Hocutt CH, Esmond EF. Taxonomic status of *Rhinichthys bowersi*. U.S. Dept. of Agriculture, Forest Service, Elkins, West Virginia, 87 pp, 1982.

Goodfellow WL, Jr. Electrophoretic analysis of *Nocomis micropogon* (river chub), *Rhinichthys cataractae* (longnose dace), and their F1 hybrid (Cyprinidae). Master Thesis, University of Maryland, Appalachian Environmental Laboratory, Frostburg State College, Frostburg, MD, 1982.

Goodfellow WL, Jr., Morgan RP, II, Hocutt CH, Stauffer JR, Jr. Electrophoretic analysis of *Campostoma anomalum*, *Rhinichthys cataractae*, and their F1 offspring. *Biochemical Systematics and Ecology* 1982; 10:95-98.

Stauffer JR, Jr., Morgan RP, II, Hocutt CH, Goodfellow WL, Jr. Selected physical parameter analysis of the Youghiogheny River, Maryland. Maryland Dept. Health and Mental Hygiene, Annapolis, MD, 1981.

Goodfellow WL, Jr., Lebo JR. Fishes of the Town Creek Drainage, Bedford County, Pennsylvania and Allegheny County, Maryland. *Proceedings, Pennsylvania Academy of Science* 1981; 55:147-152.

Presentations

Abstracts published for professional societies and annual meetings

Goodfellow WL, McArdle ME. Boron ecotoxicology and ecotoxicity considerations for mitigation. EPRI's Virtual Water, Land, and Ecosystems & Coal Combustion Products — Environmental Issues Summit Meeting. Electric Power Research Institute. 14-16 June 2021.

Goodfellow WL, Kulacki KJ, Garrett Jr. WE, Ponstein JB. Effectively pivoting from in-person to virtual laboratory audits, managing through the global pandemic. SETAC North America, SciCon2, November 2020.

Guiney PD, Goodfellow WL, Canfield TJ. An overview of confirmation bias in science: Examples and opportunities for improvement. SETAC North America, SciCon2, November 2020.

McArdle M, Ryan S, Menzie CA, Taylor A, Kulacki K, Kierski M, Kashuba R, Goodfellow WL. Emerging frameworks and tools for environmental risk assessment. SETAC North America, SciCon2, November 2020.

Kashuba R, Menzie C, Staveley J, Palmquist K, Goodfellow W, Boehm P, Morrison AM. Applications of causal analysis: A tiered approach with emphasis on data reliability. SETAC North America, SciCon2, November 2020.

Goodfellow WL. Practical considerations in reviewing WET testing results and evaluation of outside laboratory operations and performance. NCASI Virtual Conference, October 2020.

Goodfellow WL, Canfield TJ, Guiney PD. Effectively presenting science information and results without advocating policy or preference. SETAC Europe SciCon Meeting, May 2020.

Goodfellow WL. Recommendations for practical considerations in reviewing WET testing results and laboratory operations. SETAC 40th Annual Meeting, 3-7 November 2019. Toronto, ON, Canada.

Goodfellow WL, Canfield TJ, Guiney PD. Practical examples to effectively presenting science information and results without advocating policy or preference. SETAC 40th Annual Meeting, 3-7 November 2019. Toronto, ON, Canada.

Palmquist K, Sparacio T, Goodfellow W. Habitat remediation strategies for mitigating salinity inputs to freshwater systems. SETAC 40th Annual Meeting, 3-7 November 2019. Toronto, ON, Canada.

Kulacki KJ, Driscoll SK, Kierski MW, Sanders JA, Goodfellow WL. Macroplastics in the environment. SETAC 40th Annual Meeting, 3-7 November 2019. Toronto, ON, Canada.

Menzie C, Kashuba R, Goodfellow WL. Assessments, remedies and remedy costs can be influenced by unreliable benchmark values. Sediment Management Workgroup, October 2019, Arlington, VA.

Goodfellow WL. Climate change and extreme weather events: Implications to pest management. Household & Chemical Products Association. Weather and Climate Impact on Pests. May 2, 2019, Mayflower Hotel, Washington, DC.

Kashuba R, Menzie C, Goodfellow W, Buonagurio, J. The effect of sample size on calculating sediment toxicity thresholds. Battelle Conference on the Remediation and Management of Contaminated Sediments. 7-11 February 2019. New Orleans, LA.

Goodfellow WL, Boehm PD, Cook LL, Pietari J Saba T. Improving rigor in polycyclic aromatic source fingerprinting. Battelle Conference on the Remediation and Management of Contaminated Sediments. 7-11 February 2019. New Orleans, LA.

Goodfellow WL, McArdle ME, Brown KI. Harmful Algae Blooms (HABs): A regional and nationwide concern. Presentation to the Illinois Pollution Control Board, Chicago, IL. December 5, 2018.

Kashuba R, Goodfellow WL, Royer LA, Gard NW. Risk threshold calculation for emerging contaminants – just because it is there, and we can now detect it, does it mean that it is toxic? Society for Risk Analysis. New Orleans, LA. December 2018.

Goodfellow WL, Kashuba R, Gard NW, Royer LA, Palmquist K. Assessment of chemical risk employing field investigations to address hazard and exposure: Identification and management of bias. SETAC 39th Annual Meeting, Sacramento, CA. November 2018.

Goodfellow WL, Paulsen S. Strategies for ecotoxicology assessment of physical, biological, and chemical stressors in ambient waters. SETAC 39th Annual Meeting, Sacramento, CA. November 2018.

Goodfellow WL, Deines AM. The Salton Sea: A real-life experiment in extreme freshwater salinization. SETAC 39th Annual Meeting, Sacramento, CA. November 2018.

Goodfellow WL, McArdle ME, Brown KI. Harmful Algae Blooms (HABs): A regional and nationwide concern. Presentation to the Chicago Bar Association, Chicago, IL. October 2, 2018.

Goodfellow WL, Paulsen SC, Marjanovic KC. Toxicity assessments for NPDES compliance: Traditional

TSD methods versus the TST approach. SETAC 38th Annual Meeting, Minneapolis, MN. November 2017.

Goodfellow WL, Masue-Slowey Y. Advancements in technologies often change previous norms for recycling strategies. SETAC 38th Annual Meeting, Minneapolis, MN. November 2017.

Kashuba R, Goodfellow WL. How statistical artifacts affect the reliability of toxicity thresholds calculated from distribution tails of field monitoring data. SETAC 38th Annual Meeting, Minneapolis, MN. November 2017.

Mebane C, Fairbrother A, Augspurger T, Canfield T, Goodfellow WL, Guiney PD, LeHuray A, Maltby L, Mayfield DB, McLaughlin M, Ortego LS, Schlekath TH, Scroggins RP, Sumpter JP, Verslycke T. 2017. Scientific integrity issues in environmental toxicology. SETAC 38th Annual Meeting, Minneapolis, MN. November 2017.

Goodfellow WL, Kashuba R, Menzie CA. Use of multiple sources of field data in assessment of streams and rivers. Ninth International Conference on Remediation and Management of Contaminated Sediments. New Orleans, LA. January 2017.

Goodfellow WL, McArdle ME, Kulacki KJ. Designing, performing, and reviewing toxicity tests for effective presentations in reports and journals. SETAC 7th World Congress and 37th Annual Meeting, Orlando, FL. November 2016.

Menzie C, William P, Cantor R, Cox T, Wenning R, Landis W, Reiss R, Goodfellow W. Joint SRA/SETAC Roundtable: Scientific Integrity in Publications. Society of Risk Analysis, Arlington, VA. December 2015.

Goodfellow WL. Developing Toxicity Identification Evaluation test strategies: When and how to make mid-evaluation changes. SETAC 36th Annual Meeting, Salt Lake City, UT, November 2015.

Goodfellow WL, Menzie C, Koshuba R. Expressing total dissolved solids toxicity as conductivity or individual ions? SETAC 36th Annual Meeting, Salt Lake City, UT, November 2015.

Goodfellow WL, Menzie C, Masure-Slowey Y. Is manure a RCRA Solid Waste? SETAC 36th Annual Meeting, Salt Lake City, UT, November 2015.

Goodfellow WL, Staveley J, Wentzel R, Canfield T, Maier K. Building environmental programming through tripartite representation: Successes and challenges. SETAC 36th Annual Meeting, Salt Lake City, UT, November 2015.

Goodfellow WL and Saba T. Hydraulic Fracturing: Data Analysis Tools to Evaluate Environmental and Ecological Risks. Professional Training Course. SETAC 36th Annual Meeting, Salt Lake City, UT, November 2015.

Goodfellow WL. Causal Analysis: Assessment of Complex Environmental Problems. Col. Unidad Modelo, Mexico City, Mexico. June 2015.

Goodfellow W, Booth P. Ecological Risk Assessment of Shale Oil/Shale Gas and Mining Operations. Two-day Short Course. SETAC Mexico Branch, Mexico City, Mexico. June 2015.

DeLeo P, Ciarlo M, Williams S, Greggs W, Goodfellow W. What's out there in consumer products and the environment? A survey of home and personal care product ingredients and related safety information. SETAC 34th Annual Meeting, Nashville, TN, November 2013.

Williams S, Ciarlo M, Greggs W, Horne C, Connors K, Brooks B, Goodfellow W, DeLeo P. A summary of public available primary and categorical human health hazard data for cleaning product ingredients.

SETAC 34th Annual Meeting, Nashville, TN, November 2013.

Williams S, Ciarlo M, Greggs W, Horne C, Connors K, Brooks B, Goodfellow W, DeLeo P. Cleaning products ingredient safety initiative: Process for acquiring publicly available human health hazard data and assessment of data availability. SETAC 34th Annual Meeting, Nashville, TN, November 2013.

Chanov M, McCulloch W, Connelly R, Goodfellow W. Case study: Zebra Mussel (*Dreissena polymorpha*) embryonic testing as a freshwater biomonitoring tool in the United States. SETAC 34th Annual Meeting, Nashville, TN, November 2013.

McCulloch W, Chanov M, Goodfellow W. Laboratory toxicity testing using three species to evaluate ion toxicity thresholds in industrial wastewaters. Presented at Major Ion Toxicity Workshop, US EPA Region V, Chicago, IL, April 2-4, 2012.

Goodfellow WL, Greenberg MS, Jr., Vigon B, Schiefer G. SETAC Gulf of Mexico Oil Spill Focused Topic Meeting: I. Summary on ecosystem assessment, risk and damage assessment and seafood safety and human health issue sessions. SETAC, 32nd Annual Meeting, Boston, MA, November 2011.

Greenberg MS, Jr., Goodfellow WL, Vigon B, Schiefer G. SETAC Gulf of Mexico Oil Spill Focused Topic Meeting: II. Summary on current response technology and capabilities. SETAC, 32nd Annual Meeting, Boston, MA, November 2011.

Goodfellow WL, McCulloch WL, Chanov MK. Case study of effluent discharged in transition zone of freshwater and estuaries. SETAC, 32nd Annual Meeting, Boston, MA, November 2011.

Goodfellow WL, Greenberg MS. Gulf Oil Spill focus topic meeting closing plenary and panel session. Gulf Oil Spill, Focus Topic Meeting, SETAC, Pensacola Beach, FL, April 2011.

Goodfellow WL, McCulloch WL, Chanov MK. Toxicant identification evaluations as an effective tool for managing effluents that are only sublethally toxic. SETAC, 31st Annual Meeting, Portland, OR, November 2010.

Goodfellow WL, Cheatwood C, Snead V, Papageorgis C, Neubauer J, Logan C. Proportional risk as a site management tool. SETAC-Europe, 20th Annual Meeting, Seville, Spain, May 2010.

Goodfellow WL, McCulloch WL, Purcell TW. How successful are toxicant identification evaluations of sublethally toxic effluents? SETAC, 30th Annual Meeting, New Orleans, LA, November 2009.

Ciarlo MC, Goodfellow WL, Papageorgis C, Derrick P. Evaluating dredged material suitability for habitat creation-tools and trends beyond the guidance. SETAC-Europe, 19th Annual Meeting, Goteborg, Sweden, May 2009.

Goodfellow WL, Ciarlo MC, McCulloch WL, Neubauer RJ, Baummer JC. Toxicity testing: integration of potential chemicals of concern using bioavailability. American Chemical Society, 237th National Meeting, Salt Lake City, UT, November 2009.

McCulloch WL, Leasure CW, Goodfellow WL, Derrick PA, Olsen KA. Upland plant bioaccumulation testing of a predominately clay sediment with naturally high cadmium content. SETAC, 29th Annual Meeting, Tampa, FL, November 2008.

Watlington KJ, Graham AM, Bouwer EJ, Baummer JC, Goodfellow WL, McCulloch WL. Bioassay testing of Baltimore harbor sediments spiked with Cr (VI). SETAC, 28th Annual Meeting, Milwaukee, WI, November 2007.

Barranco FT, Hinckley DA, Rue WJ, Pine FW, Goodfellow WL. Methods for evaluating and examining

groundwater trace metal transport from urban fill material to tidal surface water. SETAC 26th Annual Meeting, Baltimore, MD, November 2005.

Goodfellow WL, Rue WJ, McCulloch WL, Connelly RA, Dixon KM, Christensen L. The use of chronic in-situ toxicity assessment as part of site specific criterion development. SETAC, 25th Annual Meeting and Fourth SETAC World Congress, Portland, OR, November 2004.

Baummer JC, McCulloch WL, Hammer J, Meyer J, Goodfellow WL. Toxicity identification evaluation of nitrite in food processing wastewater. SETAC, 25th Annual Meeting and Fourth SETAC World Congress, Portland, OR, November 2004.

Baummer JC, McCulloch WL, Hammer J, Meyer J, Goodfellow WL. Acute toxicity of nitrite to *Ceriodaphnia dubia* and *Pimphales promelas*. SETAC, 25th Annual Meeting and Fourth SETAC World Congress, Portland, OR, November 2004.

Goodfellow WL, Baummer JC, McCulloch WL. Identification of specific ion toxicity testing (potassium) in three industrial effluents. SETAC, 24th Annual Meeting, Austin, TX, November 2003.

McCulloch WL, Boltz J, Derrick P, Goodfellow W, Mayhew D, Sohn V. Surrogate sediment evaluation: Risk assessment for a dredge material island restoration program. SETAC, 24th Annual Meeting, Austin, TX, November 2003.

Baummer JC, Shamas JY, McCulloch WL, Botts JA, Hockenbury MR, Goodfellow WL. Part I. Toxicity Identification evaluation procedures for phenolic compounds and solids in a pulp and paper mill effluent. SETAC, 23rd Annual Meeting, Salt Lake City, UT, November 2002.

McCulloch WL, Goodfellow WL, Sohn VA, Hartzell LA, Hartzell R. Experimental design concerns for large sediment toxicity testing programs. SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Norberg-King TJ, Ausley LW, Burton DT, Goodfellow WL, Miller J, Waller WT. Toxicity Identification Evaluation Workshop — Part I: What Works, what doesn't, and developments for effluents and aqueous media. SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Miller J, Ausley LW, Burton DT, Goodfellow WL, Norberg-King TJ, Waller WT. Toxicity Identification Evaluation Workshop — Part II: What works, what doesn't, and developments for effluents and aqueous media. SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Baummer JC, McCulloch WL, Goodfellow WL. Toxicity identification evaluation of a complex industrial effluent. SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Rodgers JH, Ausley LW, Denton DL, Dorn PB, Goodfellow WL, Gully J, Norberg-King TJ, Waller WT, Burton DT. Total maximum daily loads: After point sources, what can we do next? SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Sohn VA, Goodfellow WL, McCulloch WL. Selection of an appropriate reference toxicant for marine WET testing. SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Baummer JC, McCulloch WL, Goodfellow WL. Overprediction of acute toxicity by the Gas Research Institute Salinity Toxicity Relationship Model Computer Program. SETAC, 22nd Annual Meeting, Baltimore, MD, November 2001.

Goodfellow WL, Ausley LA, Burton DT, Denton DL, Dorn PB, Gully JR, Norberg-King NJ, Rodgers JH, Waller WT. Watershed management: Historical perspective to the future. SETAC, 21st Annual Meeting, Nashville, TN, November 2000.

Goodfellow WL, Khan A, Hartzell LA, McHellon J, Sewell GJ. Management of water and wastewater quality at Fort Campbell, Kentucky. SETAC, 21st Annual Meeting, Nashville, TN, November 2000.

Derrick PA, Pine FW, McCulloch WL, Rue WJ, Powell MW, Goodfellow WL, Peddicord RK, Correale CE, McKee JA. Evaluation of dredged material proposed for open-water placement at Site 104, Chesapeake Bay, Maryland. SETAC, 21st Annual Meeting, Nashville, TN, November 2000.

Rue WJ, Christensen LR, Dixon KD, Gustafson LN, McCulloch WL, Powell MW, Connelly RA, Goodfellow WL. Site-specific ammonia standard for Salt Creek. Integration of In-Situ Toxicity, Bioassessment and WET Results. SETAC, 21st Annual Meeting, Nashville, TN, November 2000.

Derrick PA, Goodfellow WL, Powell MW, Sohn VA. Theoretical bioaccumulation potential vs. measured bioaccumulation: Is TBP an effective screening tool? SETAC, 21st Annual Meeting, Nashville, TN, November 2000.

Baummer JC, McCulloch WL, Gustafson LN, Goodfellow WL, Rue WJ. Toxicity identification of non-polar organic components (surfactants) in an effluent dominated by nickel. SETAC, 21st Annual Meeting, Nashville, TN, November 2000.

Goodfellow WL, Barranco FR. Biological availability and its role in sediment toxicity. EPRI Sediment Seminar II, St. Simon's Island, GA, October 2000.

Botts JA, Goodfellow WL, Sohn VA, Spain TM, Hicks RC. Development of the toxicity tracking system for evaluating sources of complex intermittent, low-level organics toxicants. SETAC, 20th Annual Meeting, Philadelphia, PA, November 1999.

Goodfellow WL, Derrick PA-Creep, Peddicord RK, Firstenberg CE, Ward T, Sohn VA. Evaluation of sediment samples with cellulose acetate butylate (CAB) and polycarbonate. SETAC, 20th Annual Meeting, Philadelphia, PA, November 1999.

Goodfellow WL, Derrick PA-Creep, McCulloch WL, Sohn VA, Hartzell LA, Hartzell RS. Testing considerations for the evaluation of sediments with high clay characteristics. SETAC, 20th Annual Meeting, Philadelphia, PA, November 1999.

Goodfellow W, McCulloch W, MacFarlane I. Endocrine disruptors: Management impacts for water and wastewaters. Virginia Dischargers Association, Arlington, VA, 1999.

Goodfellow W, Firstenberg C, Creep DP, Fehring W. Daniel Island Marine Terminal Development Project: Dredged material characterization study. Western Dredging Association, Louisville, KY, 1999.

Botts J, Goodfellow W, Jr., Sohn V, Diehl R, Spain T, Routh. Toxicity tracking: An Alternative to exhaustive TIE studies. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Connelly RA, McCulloch WL, Goodfellow WL, Jr., Hartzell RS, Sohn VA, Bastian MV, Black JA. In situ testing: Development of an instream chamber. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Hartzell L, Goodfellow WL, Jr., Elseroad J. Toxicity testing considerations for low toxic strength effluents. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Sohn V, Goodfellow WL, Jr. Evaluation of "Green Sand" as a treatment option to remove manganese from an effluent. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Goodfellow WL, Jr., Botts J. Assessment of potential inhibition to a wastewater treatment plant as part of a pretreatment evaluation. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Goodfellow WL, Jr., McCulloch WL, Sohn V, Bastian M, Koerber A, Christensen L. The relationship of fluctuating dose on chronic toxicity of ammonia. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Goodfellow WL, Jr., McCulloch W, Sohn V, Hartzell L. Minimal toxicity necessary for an effective TIE. SETAC 19th Annual Meeting, Charlotte, NC, 1998.

Goodfellow WL, Jr., DeGraeve M, Smith G, Matthews M, McCulloch W, Pletl J. Whole effluent toxicity testing. SETAC Course, 19th Annual Meeting, Charlotte, NC, 1998.

Ausley L, Denton D, Norberg-King T, Arnold R, Matthews M, Peltier B, Goodfellow W, Pletl J. Whole effluent toxicity testing. Water Environment Federation, WEFTEC 98, Short-course Instructors, 71st Annual Meeting, Orlando, FL, 1998.

Goodfellow WL, Jr., Sohn V, Smith-Hartzell L, Black J, Hartzell R. Toxicological characterization of contaminated sediments using a multispecies approach. SETAC 18th Annual Meeting, San Francisco, CA, 1997.

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Barry T, deVlaming, Foe C, Goodfellow W, Norberg-King T, Miller J, Mount D. Pesticides in the toxicity identification evaluation process. SETAC, Short-Course Instructors, 18th Annual Meeting, San Francisco, CA, 1997.

Goodfellow W, Jr., McCulloch WL, MacFarlane ID, Black JA. Toxicity testing for determining cleanup levels. The 7th Southern States Annual Environmental Conference, Biloxi, MI, 1997.

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McCulloch WL, Smith L, Koerber A, Black J, Goodfellow W, Muessig P. Toxicological and behavioral evaluation of potential impacts of a zebra mussel control treatment strategy. SETAC 18th Annual Meeting, Washington, D.C., 1997.

Goodfellow WL, Jr., McCulloch WL. The use of toxicity reduction evaluations as a pollution prevention tool. ASTM, 7th Symposium on Environmental Toxicology and Risk Assessment, St. Louis, MO, 1997.

Goodfellow WL, McCulloch WL, Rue WJ, Black JA. Implementation issues associated with effluent dominated receiving waters. SETAC 17th Annual Meeting, Washington, D.C., 1996.

Goodfellow WL, Sohn V, Rickey M, Yost J. Identification of manganese as a toxicant in a groundwater

treatment system: Addressing naturally occurring toxicants. SETAC 17th Annual Meeting, Washington, D.C., 1996.

Johnson GE, Tyahla S, Goodfellow WL, Jasper K, Sewell G. 1996. Using the Toxicity Reduction Evaluation as a tool for implementing pollution prevention (P2) initiatives. American Defense Preparedness Association, 22nd Environmental Symposium, Orlando, FL, 1996.

Goodfellow WL, Bastain MV, McCulloch WL, Humphries K. Specific toxicant identification for a municipal wastewater treatment plant. Common components and problems encountered for TIEs. Pesticides in the Environment, Northern California SETAC, Sacramento, CA, June 1996.

McCulloch WL, Goodfellow WL, Black JA, Rue WJ. Management of effluent that produce minimally chronic or ephemeral toxicity: Lessons learned. SETAC, 16th Annual Meeting, Vancouver, Canada, 1995.

Goodfellow WL, Sohn VA, Kotulak MA. Performance of a second generation toxicity reduction evaluation. Presented at the 15th Annual Meeting, SETAC, Denver, CO, October 29-November 3, 1994.

Black JA, Goodfellow WL, McCulloch WL. Augmentation of necessary ions for the toxicology evaluation of low and high ionic strength effluents. SETAC 15th Annual Meeting, Denver, CO, October 29-November 3, 1994.

Bastian MV, Goodfellow WL. Source evaluation of specific toxicants identified as part of a municipal TRE. SETAC 15th Annual Meeting, Denver, CO, October 29-November 3, 1994.

Collins MA, Wilson EK, LaRocca CA, Goodfellow WL. Chronic toxicity identification evaluation analyses using *Mysidopsis bahia*. Water Environmental Federation, Chicago, IL, August 1994.

Goodfellow WL, McCulloch WL, Black JA, Kotulak MA, Sohn VA, Hartzell RS, Smith LA. Chronic toxicity identification evaluations: Common components, problems encountered and research needs for the future. Presented at the SETAC 14th Annual Meeting, Houston, TX, November 14-18, 1993.

Goodfellow WL, McCulloch WL, Gustafson L, Kotulak MA. A chronic toxicity reduction evaluation at a large military facility. SETAC 14th Annual Meeting, Houston, TX, November 14-18, 1993.

Goodfellow WL, McCulloch WL. Toxicity or physiological imbalance? Presented at Inorganic Salts TIE Meeting (work group), Houston, TX, November 14, 1993.

Goodfellow WL, Jr., McCulloch WL, Black JA, Kotulak MA, Sohn VA. Evaluation of effluents from industrial and municipal wastewater treatment plants — Correlation of chronic toxicity endpoints. SETAC 13th Annual Meeting, Cincinnati, OH, 1992.

Black JA, Goodfellow WL, Jr., McCulloch WL, Sohn VA, Kotulak MA. Toxicity test data quality: Interpretation of results. SETAC 13th Annual Meeting, Cincinnati, OH, 1992.

Goodfellow WL, Jr., McCulloch WL, Rue WJ. Toxicity identification evaluations: Recent municipal case studies. Presented as part of a short-course titled Recent Developments in Toxicity Reduction Evaluations. SETAC, 12th Annual Meeting, Seattle, WA, 1991.

Goodfellow WL, Jr., McCulloch WL, Braswell JW. An industrial toxicity reduction evaluation: From problem identification to resolution. SETAC, 12th Annual Meeting, Seattle, WA, 1991.

Goodfellow WL, Jr., McCulloch WL, Rue WJ, Botts JA, Morris TL. Toxicity reduction evaluations: Present status and future directions. Chesapeake System Research and Management Conference, Baltimore, MD, 1990.

McCulloch WL, Goodfellow WL, Jr., Rue WJ, Jr., Botts JA, Morris TL. Will ammonia in your effluent trigger your facility into a TRE? 21st Annual Conference of the Water and Waste Water Operators Association of Maryland, Delaware, and District of Columbia, and the Chesapeake Water Pollution Control Association, Ocean City, MD, June 19-27, 1990.

Morris TL, Botts JA, Braswell JW, Welch MC, Goodfellow WL, Jr. Toxicity reduction evaluation at the Linden Roselle Sewerage Authority Wastewater Treatment Plant. Environmental Protection Agency, Cincinnati, OH, 1990.

Botts JA, Morris TL, Kornegay BH, Sun WW, Goodfellow WL, Jr. Use of simulations to estimate the chronic effluent toxicity of future wastewater treatment plants. SETAC 11th Annual Meeting, Washington, D.C., November 11-15, 1990.

Goodfellow WL, Jr. McCulloch W. Determination of ammonia as a principal toxicant contributing to effluent toxicity. SETAC 11th Annual Meeting, Washington, D.C., November 11-15, 1990.

Goodfellow WL, Jr., McCulloch WL, Rue WJ, Jr. Chronic toxicity evaluation of effluent wastewaters. Presented at the New Jersey Water Pollution Control Federation Annual Meeting, Atlantic City, NJ, 1990.

Botts JA, Fillmore L, Durham E, Goodfellow WL, Jr., Pereira T, Bishop DF. Evaluation of the role of diazinon in the toxicity of a municipal wastewater treatment plant effluent. Proceedings of the 3rd National Pesticide Conference, Richmond, VA, November 1990.

Fillmore L, Botts JA, Pereira T, Goodfellow W, Jr., Bishop D, Cannell J. Implementation of the EPA Municipal TRE Protocol at the Fayetteville Waste Water Treatment Plant: A case study. Annual Conference of the North Carolina American Water Works Association and Water Pollution Control Association, November 1990.

Morris TL, Botts JA, Conley M, Goodfellow WL, Jr., Williams R. Tracing sources of effluent toxicity, a case study. 75th Annual Meeting of the New Jersey Water Pollution Control Association, Atlantic City, NJ May 1990.

Morris TL, Botts JA, Bishop DF, Goodfellow WL, Jr. Implementation of the EPA Municipal TRE Protocol: Case study examples. SETAC 11th Annual Meeting, Arlington, VA, November 11-15, 1990.

McCulloch WL, Rue WJ, Jr., Goodfellow WL, Jr. Toxicity reduction evaluations for municipal and industrial facilities — Case studies. Joint Annual Meeting of the Water and Waste Operators Association of Maryland, Delaware, and District of Columbia, and the Chesapeake Water Pollution Control Association, Ocean City, MD, 1989.

Goodfellow WL, Jr., McCulloch WL, Baummer JC. Evaluation of the acute toxicity of ammonia in estuarine waters. SETAC 10th Annual Meeting, Toronto, Canada, 1989.

McCulloch WL, Goodfellow WL, Jr. The influence of total dissolved solids on the interpretation of the TIE fractionation results. SETAC Advanced TIE/TRE Workshop, Toronto, Canada, 1989.

Rue WJ, Jr., Goodfellow WL, Jr., McCulloch WL, Botts JA. The use of toxicity testing and effluent fractionation in a municipal TI/RE. Presented at WPCF Specialty Conference on Toxicity Based Applications for National Pollutant Discharge Elimination System (NPDES) Permits and Laboratory Techniques, New Orleans, LA, April 17, 1989.

Rue WJ, Jr., Goodfellow WL, Jr., McCulloch WL, Gift JJ. TREs: Real-world experience gained over the last five years. New Jersey WPCA's 74th Annual Conference, Atlantic City, NJ, May 3, 1989.

Goodfellow WL, Jr., McCulloch WL, Rue WJ. The role of toxicity testing and toxicity reduction evaluations

in the NPDES permitting process. Joint Annual Meeting of the Water and Waste Operators Association of Maryland, Delaware, and District of Columbia, and the Chesapeake Water Pollution Control Association, Ocean City, MD, 1988.

Rue WJ, Jr., McCulloch WL, Goodfellow WL, Jr. The application of effluent fractionation as part of toxicity reduction evaluations. Annual Meeting of the New Jersey Water Pollution Control Federation, Atlantic City, NJ, 1988.

Goodfellow WL, Jr., McCulloch WL, and Rue WJ, Jr. Toxicity identification in a complex effluent: Municipal case study. SETAC 8th Annual Meeting, Environmental Risk: Recognition, Assessment, and Management, Pensacola, FL, 1987.

Goodfellow WL, Jr., McCulloch WL. A technique for the rapid evaluation of effluent acute toxicity. SETAC 8th Annual Meeting, Environmental Risk: Recognition, Assessment, and Management, Pensacola, FL, 1987.

Botts JA, Sullivan EC, Braswell JW, Goodfellow WL, Jr., McCulloch WL, McDearmon AG, Bishop DF. Toxicity reduction evaluation at a municipal wastewater treatment plant. Seminar on Waste Water Treatment for the United States/Soviet Bilateral Agreement, Cincinnati, OH, 1987.

Botts JA, Braswell JW, Goodfellow WL, Jr., Sklar BD, Bishop DF. Patapsco Waste Water Treatment plant toxicity reduction evaluation. International Conference on Innovative Biological Treatment of Toxic Waste Waters, Arlington, VA, 1986.

Klauda RJ, Goodfellow WL, Jr., Jepson MA. Influence of delayed initial feeding on mortality of striped bass larvae to arsenic and selenium. Annual Meeting, American Fisheries Society, Sun Valley, ID, 1985.

Rue WJ, Jr., Ferris JS, Fava JA, Goodfellow WL, Jr., McCulloch WL. Technical Considerations in effluent toxicity testing. ASTM, Aquatic Toxicology and Environmental Fate, 9th Symposium, Philadelphia, PA, 1985.

Chrostowski PC, Hinchey RE, Goodfellow WL, Jr., Ferris JS. Thermal effects on bioaccumulation: A thermodynamic approach. SETAC 5th Annual Meeting, Arlington, VA, 1984.

Goodfellow WL, Jr., Hocutt CH, Morgan RP, II, Stauffer JR, Jr. Evidence in support of species status for the Cheat Minnow, *Rhinichthys bowersi*. Proceedings, 61st Annual Meeting American Society of Ichthyologists and Herpetologists, Corvallis, OR, 1981.

Project Experience

Environmental Assessments

Mr. Goodfellow provided expert review and direction for environmental and risk assessments performed on personal care products; human, veterinary, and animal care products; fertilizers; herbicides; pesticides; and other inorganic and organic chemicals. Performed labeling analysis of agricultural products and product licensing assessments.

Mr. Goodfellow evaluated the effects on many recreational and commercially important fish stocks from pollution and habitat-related issues; species include rainbow trout, brown trout, brook trout, smallmouth and largemouth bass, striped bass, sturgeon, American oyster, Pacific oyster, scallops, hard clams, unionid mussels, snails, blue mussel, and blue crab. He has assessed the impacts of cooling-water intake and plant effluent to aquatic systems as part of 316(a) and (b) demonstrations. Assessed the removal or eradication of problem species from aquatic environments such as the zebra mussel, various biofouling organisms for cooling-water intakes in freshwater and estuarine/marine environments, menhaden, gizzard shad, and various plants and algae. Evaluated the effects of land-use and aquatic

activities to water resources as part of NEPA assessments. Assessed habitat and chemical impacts on populations of American and Pacific oysters and their increased susceptibility to diseases resulting from bacteria and viruses.

Determined the overall impacts of existing habitat and water quality conditions and the overall impacts of reintroducing commercially important fishery resources — such as paddlefish, striped bass, rainbow trout, Atlantic salmon, brook trout, American oyster, and hard clams — that at one time existed in the aquatic resource, as well as the environmental effects of the introduction of populations of brown trout, striped bass, white bass, white bass/striped bass hybrid, and many South American and African species (in the tropical and semi-tropical waters of Florida) to aquatic systems where the species do not normally exist. Performed risk analysis of drinking water for municipal water systems. Investigated the nutrient and toxic impact of municipal discharges to watersheds. Investigated environmental impact of nitrophenols to rainbow trout and American oyster, along with assessment of potential environmental hazard to humans after consumption of fish and oyster flesh using various assessment techniques.

Led or supported as a senior subject matter expert the environmental assessment of a several large steel mills in Indiana, West Virginia, and Maryland including the assessment of operations and the impacts to the environment. These assessments required the review of operations and the effects on wastewater treatment and effluent discharges, hazardous waste generation and disposal, sediment and surface water impacts, groundwater impacts, soil contamination, fugitive dust, coal pile run-off, slagging operations, as well as indirect discharges. Experience has involved terrestrial as well as freshwater and estuarine ecosystems. Operations reviews have incorporated coke operations, furnace operations, cooling water systems, milling operations (e.g., cold rolling, tin operations, cleaning/acid baths, etc.). Many of these reviews have been of existing operations as well as historic operations starting in the early 1900s.

Evaluated the process activities at electric generating systems including the assessment of effluent and wastewater chemistry, effluent temperature impacts, whole effluent toxicity, toxicity reduction evaluation, coal combustion residual treatment, dewatering, and remediation activities, as well as the assessment of wastewater treatment and chemical usage including surfactants and polymers.

Evaluated the industrial operations, waste handling practices, landfill operations, disposal and environmental compliance at facilities throughout the US and their impacts to third-party damages. These facilities included chemical and pesticide manufacturing, ordinance/munitions, and hazardous waste operations. Assessed the impacts to soil, surface water, and groundwater resources. Performed the assessment of nuisance claims at municipal and industrial landfills including odor, air quality, surface water and groundwater issues.

Performed facility reviews evaluating industrial and commercial activities by performing environmental system audits and investigating manufacturing operations and solid and liquid waste handling processes in order to assess impacts to soil, surface water, sediment, and groundwater. Led assessments for industries such as mining, pulp and paper manufacturing, and petroleum and chemical storage and refining and at facilities involved in the production of chemicals, pesticides, and ordinance/mutations, steel and other metals, as well as municipal wastewater treatment, landfill, and hazardous treatment facilities. Additionally performing these activities at U.S. Army, U.S. Navy, and U.S. Air Force installations.

Evaluated environmental impact of paper-mill effluents to aquatic organisms and humans, including toxicological and fish flavor impairment studies. Also evaluated potential effects of ambient and effluent water quality in relation to pertinent federal and state edge-of-mixing-zone standards for power facilities, industrial facilities, and municipal wastewater treatment plants. Determined acute and chronic toxicity of organophosphate and methiocarbonate pesticides to aquatic organisms. Evaluated impacts on fish and macrobenthic communities associated with acid mine and thermal pollution discharges, as well as future impacts due to siting of power and municipal sewage treatment plants. Designed and conducted treatability studies to assess ability of municipal and industrial wastewater treatment plants to treat and reduce effluent toxicity and meet pre-treatment requirements. Evaluated coliform contamination of large drinking-water distribution system. Program investigated potential cross connections, distribution system

flushing, storage tanks and reservoir, and coliform contamination within distribution system. Provided expert testimony for the ecological and human health of groundwater contamination related to ethylene dibromide and trichloroethylene.

Evaluated the impacts from airport, railroad, shipping and vehicle transportation activities to the environment including assessment of spills, maintenance, cargo storage, and tenant activities on terrestrial and aquatic systems.

Mr. Goodfellow has considerable international experience, including peer reviewer of several large environmental programs, including the Canadian Water Network, UK National Rivers Program, SETAC programs in South America, Africa, and the United Nations, as well as several World Bank and U.S. Agency for International Development programs. His specific project experience includes the environmental assessment of contaminated sediment in the waterways of Kottayam and Kochi (southern India), environmental issues related to oil and mining industry in Mexico, evaluation of industrial activities in Brazil, evaluation of impacts from aerial spraying to sugar cane fields and wastewater treatment of distillery wastes in Guatemala, as well as mining impacts in Canada, Chile, Venezuela, and Papua, New Guinea. Peer review of the overall program for the Canada Water Network, including evaluation of the research program, public outreach, and young professional training program. Environmental siting and permitting in Puerto Rico, Guam, and Egypt. Environmental assessment of ocean discharges in Puerto Rico. Development of Environmental Assessment and Environmental, Health, and Safety Manuals for Abu Dhabi Department of Transportation, Main Roads Division. Co-Chair for the Watersheds Consortium Management Committee for the Canada Water Network. Delegate to and Past President and Secretary/Treasurer of the SETAC World Council. Presented papers at the Brazilian Academy of Toxicology (Victoria, Brazil), SETAC-Europe meetings in Helsinki, Finland; Warsaw, Poland; Goteberg, Sweden; Seville, Spain; and Rome and Milan, Italy, as well as numerous papers in Canada.

Abu Dhabi, UAE Environmental Standards Manuals — Directed and provided senior technical review of the Environmental Impact Assessment Manual and the Environmental, Health and Safety Manuals. Other responsibilities included participation in workshops and stakeholder meetings at Abu Dhabi DOT. These manuals serve as the standards for the Abu Dhabi DOT.

Permitting and IFIM Assessment — Provided senior technical review and oversight for various permitting and special studies performed as part of the development of environmental documentation for a nuclear power generating station and the assessment for construction of a third unit.

Studies to Support an Alternative Water Intake in the Potomac River — Managed the National Environmental Policy Act (NEPA) and other associated permitting activities for development of an alternative water intake. Actively involved in water quality and biological studies to evaluate the feasibility of an alternative offshore water intake structure, including turbidity assessment, mussels relocation, ecological risks; and federal, state, and local permitting.

Agricultural Operations — As Principal, prepared a comment document of the environmental impact assessment of the proposed land use activity resulting from a Combined Animal Feeding Operation (CAFO) and dairy operation. Assessment included important and threatened terrestrial and aquatic species such as water fowl, seabirds, marine turtles, marine mammals, coral, invertebrates and plant species. Evaluated the potential impacts from the land-use activities of chicken/turkey, swine, horse, and cattle operations as part of environmental assessments. Reviewed the nutrient impacts from land application of biosolids and residuals to agricultural lands. Evaluated the impacts from veterinary products to agricultural operations. Evaluated the plantings for wetland and terrestrial ecosystems from habitat and contaminant stressors. Performed assessment of various crops damaged by land-use activities, spills, and chemical usage, as well as caused by wind and hail to a large commercial vineyard.

Mining and Shale Oil/Gas Extraction — Provided senior technical review of environmental assessments of several development projects, located in the northern Rocky Mountains. The assessment was used to determine whether expansion of the operations would have a significant effect on native mammals. Also

evaluated the modeled water quality parameters against EPA and Environment Canada water quality criteria. Additional consulting included multi-day stakeholders meetings with First Nations on their reservation to present these assessments. Evaluated the environmental impacts from coal mining and shale oil/gas extraction in the Appalachian Mountains and Mid-Atlantic region to terrestrial and aquatic ecosystems. He has extensive experience in addressing the effects of mining and extraction on aquatic and terrestrial ecosystems throughout the United States and Canada such as the site inspection of abandoned gold and silver mines in Oregon; water quality and toxicological assessments of Red Dog Mine (AK), Miggs Mine (WI), Humboldt Pit Mine (NV), Metike Mining (WV, KY, MD), and Kemess Mine (Canada); and the effects of acid mine drainage and milling wastes on surface waters.

Directed the preparation of affected environment and future without-project conditions for the environmental impact statement for the Brazos Island Harbor Channel Improvement Project in Brownsville, Texas. Sensitive resource areas included Bahia Grande (part of the Laguna Atascosa National Wildlife Refuge), South Bay (a designated Coastal Preserve that is part of the Gulf Ecological Management Site), Laguna Madre (a shallow-water hypersaline lagoon), Padre Island (a National Seashore and important sea turtle nesting area), and the Lower Rio Grande Valley National Wildlife Refuge. The studies supported the proposed channel improvements (widening and/or deepening) and potential opportunities to restore more than 6,500 acres of tidal marsh in Bahia Grande.

Aviation Services — As Principal, provided environmental support services for large capital construction programs such as planning and environmental assessment of infrastructure projects; new terminal and access and interior roadway networks; functional assessment of stream system in accordance with USACE protocol for determining mitigation requirements; participated in permitting wetland fill for capital projects development, including new concourses and runways; develop permit-specific Compliance Guides for use by contractors during construction; preparation of NEPA documents for concourse, internal automated people-mover system, roadways, and infrastructure systems; technical review of environmental impact statement for new runways under preparation by the Federal Aviation Administration; development of compliance database tracking permit and NEPA status of construction activities; geographic information system, including topography; wetlands; rare, threatened, and endangered habitats; streams; archaeological sites; construction projects; and infrastructure; creation and management of website with compliance and geographic information system data; seasonal ecological surveys to characterize terrestrial and aquatic habitats and determine the presence of rare, threatened, and endangered species; support public outreach activities, including planning and hosting public outreach workshops for proposed construction projects; and development of sitewide hydrologic and hydraulic models for predicting floodplain changes and stormwater management requirements attendant to project planning.

Impingement and Entrainment Baseline Studies in Maryland, New York, Pennsylvania, Ohio, West Virginia, Wisconsin, and Virginia — Directed baseline studies identified in Proposal for Information Collection. Mobilized new field offices and responsible for hiring 54 field staff to support baseline studies for power plants, to comply with new regulations implemented by EPA under Section 316(b) of the Clean Water Act. Studies include monitoring of impingement and entrainment abundance, and seasonal sampling of the fish community in the vicinity of each facility using a variety of fisheries gear.

Sub-Aqueous Blast Monitoring Plan — Developed scope of studies for monitoring program for blasting bedrock as part of navigational channel improvement/deepening the Mid-Atlantic bight. Designed and implement monitoring program for measurement of pressure-wave characteristics in the aquatic environment associated with impacts to biological resources.

Comprehensive Coliform Contamination Remediation Evaluation — Principal scientist responsible for assessment of coliform contamination within the distribution system at a large military facility. Developed specific test and operating procedures for monitoring of drinking-water distribution system in the future. Identified the source of contamination and helped repair the public image of the Air Force Base with regard to coliform contamination.

Bacterial Source Tracking — Directed the source evaluation of coliform contamination with in several sewer systems. Developed strategy for sample collection, reviewed laboratory analysis, as well as directed the risk communication of the studies. The objective of this program was to assess the origination of fecal material and identify if it was of human origin, domestic animal, avian, or other wildlife. This information was important to determine if the fecal coliform detections were a result of damaged sewer infrastructure. Directed projects to assess the impacts of recreational use as part of a watershed management system and protection of drinking water resources and water quality. The majority of these meetings had public meetings or risk communication.

Antibiotic Resistant Assessment—Principal Scientist for the assessment of antibiotic resistant impacts from the use of mycelium substrate from antibiotic product operations as a fertilizer. As part of this risk evaluation, prepared a white paper on available literature, developed a regulatory benchmarking assessment and prepared a data gap and future needs analysis.

Evaluated the land application activities for municipal and industrial operations, including the impact assessment of metals, PCBs, PFCs, PAH, pesticides, herbicides, munitions, and nutrients to soil, groundwater, and surface waters.

Environmental Systems/Compliance Audits

Performed the environmental compliance audits and assessments for many facilities including industrial/manufacturing facilities, entertainment facilities, bulk storage terminals, refineries, transportation terminals, ports and airports, military facilities and bases, landfills, and municipalities (pretreatment and treatment works). Have also performed quality control/assurance assessments of laboratory and other operations. Audits have included on-site inspections and system reviews; review of regulatory submissions; and assessment of actions taken from findings and notice of violations, historical records review in facility, corporate and agency files.

Industrial Operations Review—As part of the TRE process, have directed and performed operations process review and wastewater treatment plant evaluations for numerous industrial facilities including utilities, chemical manufacturing, oil refineries, pulp paper facilities, fuel storage facilities, iron and steel mills, electronic manufacturing facilities, personal care products manufacturing facilities, pharmaceutical manufacturing facilities, agricultural products and food processing plants, mining and ore processing facilities, air and rail transportation industry, and shipbuilding/repair facilities. These evaluations included a detail review of the industries processes, chemical uses, water use, solid waste generation and their resulting wastewaters and treatment.

Ecotoxicology and Toxicity Reduction Evaluations

Mr. Goodfellow's specific toxicological experience includes the investigation of bioaccumulation, tissue distribution, metabolism, and depuration of organic and inorganic chemicals in fish, macroinvertebrates, birds, mammals and plants. He has directed the assessment of chemical constituents of personal care products and evaluated the toxicological impacts of organic and inorganic contaminants in surface water, groundwater, and sediments. Mr. Goodfellow has conducted acute and chronic bioassays on a variety of freshwater and estuarine vertebrates and invertebrates, and has investigated organic and inorganic compounds in effluents, as well as and single-chemical exposures. He has evaluated bioaccumulation of single chemicals and selected components of effluents, sediments, dredge materials, and soils to freshwater, estuarine, marine, and terrestrial organisms. Evaluated the observation of fish and other aquatic organism impacts from chemical applications to the aquatic environment, land-use activities and associate non-point run-off of chemicals and industrial and municipal effluent discharges. His research also included the evaluation of sublethal effects of organic and inorganic compounds to various aquatic organisms during long term exposure.

Mr. Goodfellow developed and managed Water Effect Ratio and Biological Translator studies for freshwater and marine/estuarine organisms. Served as Project Manager for the Referee Laboratory

program for the Whole Effluent Toxicity (WET) Program. He has developed and conducted more than 90 TREs for numerous industrial, municipal, and federal facilities. His responsibilities included characterizing effluents' chemical constituents and associated toxicity, assessing the variability of effluent, identifying components causing toxicity in effluent, and developing strategy for removal of toxicity from effluent. Directed engineering activities associated with TREs, including plant performance evaluations, housekeeping surveys, source identification evaluations, and treatability studies/refractory toxicity assessments. Performed TIEs of various toxic samples using fractionation procedures such as those outlined in EPA's TIE Procedural manuals. Co-wrote original and revised TRE municipal protocol manual. Participated as panel member for Technical Peer Review of EPA's effluent assessment program. Participated on the Steering Committee and as a panel member in a TIE workshop for determination of the state of the science for TIEs. Co-editor of a compendium on TIEs for aquatic media. Taught short courses and seminars on TRE strategy, methods, and research needs for the future. Invited delegate to SETAC Education Foundation-sponsored Pellston Workshop to address the science of WET testing, and co-author of resulting book on WET testing.

Industrial Operations Review — As part of the TRE process, have directed and performed operations process review and wastewater treatment plant evaluations for numerous industrial facilities including chemical manufacturing, oil refineries, pulp paper facilities, fuel storage facilities, iron and steel mills, electronic manufacturing facilities, personal care products manufacturing facilities, pharmaceutical manufacturing facilities, agricultural products and food processing plants, mining and ore processing facilities, air and rail transportation industry, and shipbuilding/repair facilities. These evaluations included a detail review of the industries processes, chemical uses, water use, solid waste generation and their resulting wastewaters and treatment.

Agricultural Products and Food Processing — Directed the environmental evaluation of agricultural product manufacturing facilities such as nitrogen and phosphorus based fertilizer operations, lime processing/encapsulation manufacturing units and CAFO operations for cattle, swine, and poultry. These evaluations included detailed operations review, understanding of the chemical use and processing, and waste disposal. Evaluated food processing operations and use of aerobic and anaerobic digestion of wastestreams including plant and animal processing operations. Assessed the inhibition of methane production as part of anaerobic treatment by physical and chemical variables. Developed land management plans for the application of manure and wastewater treatment biosolids as part of soil augmentation and nutrient controls. Performed an environmental assessment of potential impacts from a large thermal reaction/release at a nitrogen based fertilizer storage facility. Contributing author of technical monograph on environmental toxicity relating to the fertilizer industry and ammonia-nitrogen/nutrient issues.

Construction Material Assessment — Assessed the acute and chronic toxicity of various construction materials and ballast to freshwater and estuarine organisms. Materials evaluated included slag from steel making processes, concrete from bridge decommissioning and the use in freshwater and marine reef building, grindings from asphalt road resurfacing, concrete made with bottom and fly ash material, fill materials from mining operations, as well as rock and ballast from various quarries. Evaluated the toxicity of various products used from dust control and soil compaction to freshwater and marine organisms. These products were petroleum based, biological/enzyme based, as well as inorganic salts.

Personal Care Products — Assessment of Human Health Risk and Development of a Public Information Program — Directed an assessment of the human health risk of personal care products used by the cleaning industry. Attended project meetings in collaboration with academic institutions, and provided senior technical review of work products.

Seafood Safety — Principal Scientist for the evaluation of freshwater and marine seafood safety and radionuclide levels (Cesium) in fish products resulting from a nuclear power plant discharge.

Development of Technical Comments for Draft Ambient Water Quality Criteria for Chesapeake Bay — Reviewed Phase I draft criteria documents prepared by EPA Chesapeake Bay Program for dissolved

oxygen, water clarity, chlorophyll a, and designated uses. Developed comments on the technical basis and potential implementation issues associated with the proposed dissolved oxygen criteria, with particular reference to the Potomac River. Participated in an ongoing interagency and stakeholder work group to review and address issues submitted during comment periods related to dissolved oxygen criteria, designated uses, and implementation procedures.

Evaluation of Perchlorate Toxicity to Aquatic and Terrestrial Species — As Senior Toxicologist, oversaw an assessment of the acute and chronic toxicity of perchlorate to selected freshwater aquatic species and a terrestrial plant (lettuce) species.

Evaluation of Aqueous Film-forming Foam (AFFF) to Aquatic and Terrestrial Species — As Senior Toxicologist, directed the assessment of the acute and chronic toxicity of various formulations of AFFF to *Ceriodaphnia dubia*, *Daphnia magna*, fathead minnows, opossum shrimp and sheepshead minnow using standardized test protocols. Also assisted in the development of performance specifications used in procurement activities. Evaluated the assessment of AFFF releases as part of fire-fighting training and hanger operations including the potential impacts to terrestrial and aquatic ecosystems.

Bioaccumulation of Dioxin from Effluent Samples — Served as Senior Toxicologist and mobilized field program to evaluate potential accumulation of dioxin from effluent samples by freshwater fishes. Evaluated potential impairment of taste for edible fillets from walleyes and rainbow trout exposed to various concentrations of final effluent from wastewater treatment plant. Developed temporary field laboratory operations on site.

Toxicological and Behavioral Response of Trout to Intermittent Chlorination — Senior Toxicologist assessing the toxicity to rainbow trout exposed to intermittent doses of chlorine to simulate the treatment reservoir water to eliminate zebra mussels. A companion study was also performed to determine rainbow trout avoidance behavior of potentially encountered chlorine concentrations.

Hexavalent Chromium Characterization — Directed a hexavalent chromium characterization program, developing best management options to control hexavalent chromium contamination and land use activities.

Sediment and Dredged Material Assessments

Mr. Goodfellow has evaluated the toxicological effects of sediments, sludges, dredged materials, and soils to freshwater and marine organisms, as well as terrestrial invertebrates and plants. Evaluated the bioaccumulation of metals organic compounds including dioxin, furans, PFCs, PCB, and PAHs to freshwater and marine organisms. Assessed the ecological risk of inorganic and organic compounds in sediments. Performed sediment toxicity identification evaluation (TIE) analyses of sediment elutriates, pore water, and municipal sewage sludges. Managed large sediment programs as part of an environmental impact study, including vibracoring samples, analyzed testing, toxicity testing, and bioremediation assessment. Past member of the Sediment Advisory Panel (Maryland) and also SETAC Global Sediment Interest Group.

Sediment Evaluation — Directed studies to assess the ecological risk of elevated cadmium concentrations in Miocene clays proposed for dredging to deepen a major Harbor Federal Navigation Channel. Studies were designed to assess the potential impact (ecological risk) of exposing sediment with elevated cadmium as a result of dredging and to assess the potential impact (ecological risk) of upland placement of the dredged material at the existing upland placement areas. Project included sediment profile imaging and side-scan sonar surveys to identify areas with exposed Miocene clays and to characterize the physical characteristics of the channel bottom; benthic community evaluation to characterize the benthic organisms using the existing bottom substrates (clays, fine-medium sands, coarse sands, and silty sands) as habitat; collection of low-cadmium and high-cadmium sediments using vibracoring equipment; collection and analysis of reference sediment; collection and analysis of upland reference soil; collection and analysis of dredging and receiving water; porewater analysis; standard and

effluent elutriate testing; Simplified Laboratory Runoff Procedure; aquatic bioaccumulation studies to assess uptake of cadmium by aquatic organisms; plant uptake studies to assess cadmium uptake by plants in the upland placement sites; and ecological risk assessment of impacts in the riverine and upland environment. Results of the studies indicated low risk for riverine impacts and suggested that management options (i.e., capping) be implemented for upland placement areas to avoid risk to wildlife receptors.

Dredge Point Monitoring — Directed studies designed to assess sediment plumes that originate from clamshell dredging operations. The focus of the monitoring was to identify total suspended solids and chemical constituents in the sediment plume, define the rate of dilution of the plume, and identify the distance over which the plume dissipates to background levels. The monitoring consisted of current meter deployment and the use of an acoustic Doppler current profiler and optical backscatter unit to identify the centerline and densest area of the plume. Water samples were collected at max flood, max ebb, high slack, and low slack on the plume centerline at 40, 80, and 160 m away from the point of dredging at the depth of greatest density. The physical and chemical water-column data were used in conjunction with the USACE-Waterways Experiment Station DREDGE model. Results will be used to assess dredging as a "source" for total maximum daily loads in impaired waterways.

Sediment Quality Characterization — Assessed the extent and degree of contamination in sediments consisting of collecting sediment cores to 12 ft below the sediment surface and testing the sediments for a suite of organic and inorganic contaminants (metals, pesticides, polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and dioxin/furan congeners).

Chemical And Biological Testing of Natural Clay — Managed sampling program for ecotoxicological and analytical testing of red clay formations in the navigation channels in the Newark Bay/Staten Island Kills Complex. Because of the complex and unique characteristics of the test media, the project involved whole-sediment and bioaccumulation testing with both raw clay and prepared clays that were treated with various concentrations of total organic carbon (a food source for the test organisms).

Technical Support of Litigation

Provided consulting and expert report for agricultural impacts from chemical spill from train derailment. Chemicals of concern dicyclopentadiene (DCPD) and other PAHs.

Provided expert report, rebuttal report and testimony of historic and on-going steel mill operations on the environmental impacts and remediation activities necessary to mitigate third-party damages of surface water, soil, and groundwater resources. Chemicals of concern included PCBs, PAHs, metals, and benzene.

Provided testimony for effluent toxicity assessments, toxicity reduction evaluations and NPDES compliance for a large pulp and paper mill.

Provided review of science and engineering assessment and mitigation for two separate animal feed manufacturing facilities to achieve compliance for water quality permits.

Provided litigation support for hazardous waste disposal from water filtration operation.

Provided expert opinion of herbicide spray operations on rail right-of-ways and third-party property damages.

Provided expert opinion and rebuttal report on disinfection operations and microorganism infection risks to ridership for a water park.

Provided expert opinion, rebuttal reports, and testimony for land use and stormwater management impacts to third party property damage.

Provided expert opinion as to the causation of a large fish kill and impacts from algaecide treatment of lake and reservoir resources for the elimination of harmful algae blooms and impacts to drinking water quality.

Provided expert report, rebuttal report, and testimony on expected and intended impacts to soil, groundwater, and surface waters from historic operations of chemical, pesticide, and ordinance/munitions manufacturing as well as associated waste handling and compliance activities.

Provided expert report and testimony on the aquatic and terrestrial ecotoxicity of an emerging contaminant that was manufactured since the 1950s, but only recently became a chemical of concern.

Provided litigation support for the evaluation of nuisance wildlife attraction due to solid waste management practices.

Prepared comment document as part of NEPA assessment to address a proposed land use activity resulting from a Combined Animal Feeding Operation (CAFO) and dairy operation.

Prepared written report in support of the assessment of surface water impacts and loss of beneficial use as part of a citizen suit.

Provided written and oral testimony to the New York City Council on the environmental effectiveness of recycling expanded polystyrene (EPS) foam.

Provided expert report for the assessment of ammonia discharged from a wastewater treatment facility to a large freshwater and estuarine ecosystem. In addition prepared rebuttal report of other experts with regards to ecotoxicity, ecological risk and fishery assessment of a large estuary.

Provided expert report, rebuttal reports, and testimony on agricultural plant varieties as part of a patent-use litigation.

Provided expert consulting services for the evaluation of genetically modified organisms and possible contamination of a fertilizer product.

Provided expert consulting services for aquatic organism impacts from mining and harmful algae bloom in an ecosystem with a substantial sport fishery (muskellunge), endangered and threatened unionid mussels, and species of special interest (muddy puppy).

Provided expert consulting services for the impact of an industrial chemical release to a WWTP and the resulting fish kill.

Directed expert consulting services for the assessment of a large industrial operations with regards to soil, sediment, groundwater and surface water impacts.

Provided an expert report and rebuttal reports for the assessment of seafood safety and cesium levels resulting from a nuclear power plant discharge.

Provided expert report, rebuttal report, and testimony on hazard assessment and human health risk assessment for a Superfund site. Testimony was provided as written testimony and deposition.

Provided expert testimony on water quality issues and sediment toxicity related to a major watershed.

Provided expert testimony on water quality issues related to ammonia, total dissolved solids, and discharge to a large river system.

Provided technical guidance and supported activities associated with deposition concerning effluent toxicity and a toxicity reduction evaluation.

Provided technical guidance for NPDES violations on behalf of dischargers.

Provided technical guidance on biomonitoring permit requirements and toxicity reduction evaluations on behalf of dischargers.

Supported administrative NPDES permit appeals and permit negotiations on behalf of counsel for municipal and industrial discharges. Support included participation in administrative hearings on NPDES permits.

Peer Reviewer

Co-Editor-in-Chief. SETAC Globe. An international electronic magazine, published monthly. Pensacola, FL. 2014 – 2020.

Peer review of various studies used in U.S. EPA ambient water quality criteria (Aluminum). Office of Water, Washington, DC. June – September 2018.

Instructor—Project Management for Scientists. Short Course presented at SETAC Europe Annual Meeting, Rome, Italy. May 2018.

Instructor — TSCA One-Year Out. Chemical Watch Workshop, Arlington, VA. October 2017

SETAC World Congress Planning Committee, Spot Light Session and Plenary Speaker Subcommittee, Abstract Review Subcommittee, Fund-raising Subcommittee. September 2015-2016

Battelle Sediment Conference (for 2017) Planning Committee. January 2016-2017

Advisory Council, University of Michigan-Water Center. Ann Arbor, MI. 2013-present

Chair for the Watersheds Consortium Management Committee for the Canada Water Network, 2012-2016

Member of Research Management Committee, Canada Water Network, May 2012-2016

Instructor — SETAC Short Course. Hydraulic Fracturing: Data Analysis Tools to Evaluate Environmental and Ecological Risk. November 2015

Instructor — SETAC Mexico Short Course. Ecological Risk Assessment for Shale Oil/Shale Gas and Mining Operations. Mexico Branch, Mexico City. June 2015

Co-Meeting Chair for SETAC Focus Topic Meeting on the Gulf Oil Spill, Pensacola Beach, FL, April 2011

Peer Reviewer for Canadian Water Network-September 2007 and 2011, Toronto, Ontario, Canada

Peer Reviewer for the U.S EPA Freshwater Ammonia Water Quality Criteria, March 2009

Peer Reviewer for U.S. EPA Sediment TIE Guidance Manual, September/October 2006

Steering Committee Member, In situ testing workshop, SETAC, Pensacola, FL, 2003-2004

Member of Steering Committee for Whole Effluent Expert Technical Panels, SETAC/SETAC Foundation, 1996-2004

Panel Member — Technical Peer Review of U.S. EPA's Effluent Assessment Program, June 1991

Instructor — SETAC Short Course. Whole Effluent Toxicity Testing Training Course. November 1998, November 1999, and November 2000

Instructor — SETAC Short Course. TIEs/TREs. November 1998, November 1999, and November 2000

Instructor — Water Environment Federation Short Course. WEFTEC 98. Whole Effluent Toxicity Testing Training Course. October 1998

Instructor — SETAC Short Course. Recent Developments in the Identification and Reduction of Effluent Toxicity, November 1991

Instructor — 1-day seminar on TREs, presented for E.I. duPont de Nemours and Company. April 1990

Panel Member — TRE Research Meeting to identify and analyze toxicity reduction approaches and methods, 1987

Instructor-SETAC Short Course. Pesticides in the TIE Process. November 1997

Manuscript Peer Reviews — Water Pollution Control Federation Journal, Transactions for American Fisheries Society, Biochemical Systematics and Ecology, Copeia, Pennsylvania Academy of Sciences, Toxicological Sciences, Archives of Environmental Contamination and Toxicology, Water, Air and Soil Pollution, Ecotoxicology and Environmental Safety, Environmental Toxicology and Chemistry, Environmental Science and Technology, Integrated Environmental Assessment and Management, Marine Pollution Bulletin, and Chemosphere