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

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## Professional Profile

William Goodfellow Jr., BCES, is a principal scientist and director of the Ecological & Biological Sciences practice at Exponent. He has more than 35 years of experience in environmental toxicology, ecological risk assessment, and environmental regulatory compliance. He specializes in the ecotoxicology of per- and polyfluoroalkyl substances (PFAS) and other contaminants of emerging concern; toxicity reduction evaluations (TREs); litigation support under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act (CWA); and causal effect assessments for industrial, agricultural, municipal, and energy sector clients. He is a Board-Certified Environmental Scientist (BCES), with special emphasis in environmental toxicology.

Mr. Goodfellow's technical experience includes environmental and toxicological risk assessment of chemical and biological contaminants in air, surface water, groundwater, soil, and sediment; performance of environmental compliance assessments and audits; assisting with treatability assessments of contaminated sediments, soils, and wastewater; researching and writing technical documents on federal and state water quality criteria, regulatory policies, environmental assessments, and other water pollution mitigation issues; 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 discharges; and assessment and remediation of potentially toxic sediment and dredge materials.

Mr. Goodfellow has considerable experience addressing impacts from physical and chemical stressors, including contaminants of emerging concern, legacy pollutants, and habitat changes. Many of his projects involve historical reconstruction of chemical releases, divisibility and apportionment, and injury assessment under regulatory drivers including CERCLA, the Resource Conservation and Recovery Act (RCRA), the National Environmental Policy Act (NEPA), the CWA, the Toxic Substances Control Act (TSCA), the 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 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, cotton, corn, wheat, soybean, beans, asparagus, peas, pepper, potatoes, tomatoes, tree nuts, shrubs, and turf, as well as cattle, dairy, swine, poultry, fish, and shellfish. He also has extensive experience addressing nutrient and manure management issues; fertilizer production; land application of biosolids, residuals, and fertilizers; invasive species; and genetically modified organisms (GMO). Mr. Goodfellow has experience in pest management and control practices as well as addressing nuisance pests and animals in housing and dormitory situations.

Mr. Goodfellow is an internationally recognized expert in environmental assessment, toxicology, risk assessment, and TRE technology. He is a past president of the Society of Environmental Toxicology and

Chemistry (SETAC), an international professional society, and a SETAC Fellow. He is an experienced consulting and testifying expert on a range of legal matters in civil, criminal, and arbitration actions involving environmental claims; spills, natural resource damage assessments (NRDAs), 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, environmental assessment, toxicology, and TRE issues, as well as being widely published.

### Environmental Toxicology and Ecological Risk Assessment

Mr. Goodfellow has provided expert analysis, review, and direction for environmental and ecological risk assessments performed on personal care products; human, veterinary, and animal care products and pharmaceuticals; fertilizers; herbicides; pesticides; and other inorganic and organic chemicals. His analyses have been in support of the preparation of environmental assessments (EAs) and performing labeling analysis of agricultural products and product licensing assessments. His experience also includes the toxicological evaluation and assessment of associated risks of chemicals and complex mixtures (including effluent discharges) to aquatic and terrestrial ecosystems.

### Contaminants of Emerging Concern Assessment

Mr. Goodfellow has extensive experience with the evaluation of emerging chemicals and their potential impact on the environment. His experience includes PFAS, pharmaceuticals, personal care products, microplastics, 6PPD, and 6PPD-Q in association with point and non-point discharges, application of biosolids, stormwater, and solid and liquid waste disposal. These assessments include both the assessment of toxicity as well as an understanding of the fate and transport of emerging contaminants in terrestrial and aquatic environments.

### Metals and Legacy Organic Compounds Analysis

Mr. Goodfellow has considerable experience addressing impacts from physical and chemical stressors such as metals, mercury and organomercury, inorganic salts, dioxin/furans, PCBs, PAHs, other chlorinated organics, solvents (TCE, PCE), munitions, pesticides/herbicides, surfactants, nutrients, ammonia, dissolved oxygen, pH, temperature, and habitat changes. This experience includes fate and transport of pollutants and other stressors, toxicity of constituents as single chemicals as well as mixtures, and the assessment and development of specific management strategies.

### Environmental Permitting and Toxicity Reduction Evaluations

Mr. Goodfellow has extensive experience in the development, submission, review, and auditing of environmental permits for aquatic discharges and land-use activities, including the development and review of environmental assessments (EA) and environmental impact assessments (EIA). He is also experienced in the design and performance of TREs for municipal and industrial discharges. He co-wrote the original and revised TRE municipal protocol manual, and he has developed and conducted more than 100 TREs for numerous industrial, municipal, and federal facilities. His responsibilities included characterizing effluents' chemical constituents and associated toxicity, assessing the variability of effluents, identifying components causing toxicity in effluents, and developing strategies for removing toxicity from effluents.

## 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

Professional Recognition

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

Presidential Award – SETAC, 2021, 2019, 2018, 2015, 2011, 2004, 2001

SETAC Exceptional Paper Award – June 2020. Paper title “Scientific Integrity Issues in Environmental Toxicology and Chemistry: Improving Research Reproducibility, Credibility, and Transparency.”

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

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; Co-Chairman, 2021 – present; advisory committee member.

Society of Environmental Toxicology and Chemistry – SETAC World Council (World Board of Directors), 2007 – 2014 and 2018 – 2023; SETAC World Council, Vice President, 2012; President, 2013; Immediate Past President, 2014; Secretary/Treasurer, 2018 – 2023; 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, 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 by the Environmental Scientists Board of American Academy of Environmental Engineers and Scientists

## 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)

• Environmental Science Division

Chemical Industry Advisory Council

• Co-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

• SWC Past Treasurer

• SETAC-North America Endowment (Trustee)

• Metals Interest Group (SWC)

• Aquatic Toxicity Testing Interest Group (SWC) – Steering Committee

Society of Toxicology (SOT)

## Publications

Conrad Jr. JW, Goodfellow Jr. WL. (editors). "Environmental Science Deskbook. 2026 Edition," Environmental Law Series. Thomson Reuters, Eagon, MN, ISBN: 979-8-350-23884-6. 799 p.

Goodfellow Jr. WL. "Chapter 6: Surface Water Quality and Wastewater Treatment," pp. 347-484. In: Conrad Jr. JW, Goodfellow Jr. WL (editors). Environmental Science Deskbook. 2026 Edition. Environmental Law Series. Thomson Reuters, Eagon, MN, ISBN: 979-8-350-23884-6. 799 p.

Conrad Jr. JW, Goodfellow Jr. WL. (editors). Environmental Science Deskbook. 2025 Edition. Environmental Law Series. Thomson Reuters, Eagon, MN, ISBN: 978-1-668-79257-5. 785 p.

Goodfellow Jr. WL. Chapter 6: Surface Water Quality and Wastewater Treatment. pp. 343-480. In: Conrad Jr. JW, Goodfellow Jr. WL (editors). Environmental Science Deskbook. 2025 Edition. Environmental Law Series. Thomson Reuters, Eagon, MN, ISBN: 978-1-668-79257-5. 785 p.

Conrad Jr. JW, Goodfellow Jr. WL. (editors). Environmental Science Deskbook. 2024 Edition. Environmental Law Series. Thomson Reuters, Eagon, MN, ISBN: 979-8-3502-8757-8. 826 p.

Goodfellow Jr. WL. Chapter 6: Surface Water Quality and Wastewater Treatment. pp. 341-476. In: Conrad Jr. JW, Goodfellow Jr. WL (editors). Environmental Science Deskbook. 2024 Edition. Environmental Law Series. Thomson Reuters, Eagon, MN, ISBN: 979-8-3502-8757-8. 826 p.

Menzie CA, Kierski MW, Goodfellow W, Kashuba R. Chapter 27. Tiered Environmental Causal Analysis. In: Paustenbach DJ (editor). Human and Ecological Risk Assessment: Theory and Practice, Volume 2. Third Edition. John Wiley & Sons, Inc. DOI: 10.1002/9781119742975.ch27. pp 1009-1030. 2024.

O'Reilly K, Goodfellow W. EPA seeks to address PFAS discharges using NPDES permits. American Bar Association, Section of Environment, Energy, and Resources. Water Quality and Wetlands.

Taylor AA, Tsuji JS, McArdle ME, Adams WJ, Goodfellow, WL. Recommended Reference Values for risk assessment of oral exposure to copper. Risk Analysis 2022, 1-8. DOI: 10.1111/risa.13906.

Steele AN, Kulacki KJ, Fleming ML, Goodfellow WL. Whole effluent toxicity assessments and experimental considerations for evaluating coagulation agents and polymers for wastewater treatment of coal combustion. Proceedings of the 2022 World of Coal Ash.

Steele AN, Kulacki KJ, Fleming ML, Goodfellow WL. Whole effluent toxicity assessments and experimental considerations for evaluating coagulation agents and polymers for wastewater treatment of coal combustion. Proceedings of the 2022 World of Coal Ash.

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, LeHuray A, Maltby L, Mayfield DB, McLaughlin MJ, Ortego L, Schlekat T, Scroggin RP, Verslchke 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.

Canedo-Arguelles M, Hawkins CP, Kefford BJ, Schafer RB, Dyack BJ, Brucet S, Buchwalter D, Dunlop J, Fror O, Lazorchak J, Coring E, Fernadez 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 redhorse 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.

**Thought Leadership and Alerts**

Goodfellow W, Higgens M, Kulacki K, Prescott V, Poindexter C. The Evolving Regulatory Landscape for PFAS in Biosolids. Exponent, Inc. Industrial Analysis. 4 June 2026.

Anderson J, Goodfellow W, Rackl S, Thomas T, Robrock K. EPA Moves to Reshape PFAS Drinking Water Standards. Exponent, Inc. Alert. 1 June 2026.

Goodfellow W, Gobeil A, Pitt J, Buss H. EPA & NOAA Release Microfiber Pollution Report. Exponent, Inc. Alert. 26 July 2024.

Robrock K, Goodfellow W, Saba T, Morrison AM, Rackl S, Paulsen S, Pitts B. EPA Designates Two PFAS as CERCLA Hazardous Substances. Exponent, Inc. 24 April 2024.

Valenca R, Caviness G, Kulacki K, Goodfellow, W. EPA to release biosolids screening tool for risk assessment. Exponent, Inc. Alert. 2 October 2023.

Deines A, Wechsung A, McArdle M, Kytomaa H, Goodfellow W. For environmental permits, new thresholds after Debt Limit Deal. Exponent, Inc. Alert. 8 June 2023.

Goodfellow W, Saba T, Kulacki K, Fleming M, Paradis O, Steele A. EPA seeks to regulate legacy coal ash disposal sites. Exponent, Inc. Alert. 5 June 2023.

White C, Parker S, Streifel B, Millions D, Robrock K, Petrovich M, Saba T, Goodfellow, W, O'Reilly K. EPA proposes designating two PFAS as hazardous substances. Exponent, Inc. Alert. 12 September 2023.

Tsuji JS, McArdle ME, Goodfellow WL. Recommending a health protective Reference Value for copper. Exponent, Inc. Alert. 15 March 2022.

Fleming M, Gunnell J, Steele A, Goodfellow W. EPA takes action on coal ash disposal practices. Exponent, Inc. Alert. 9 February 2022.

Goodfellow WL, Paulsen SC, Racki SM, O'Reilly K, Pitts BS. EPA releases preliminary effluent guidelines as part of new rulemaking initiatives. Categories include per- and polyfluoroalkyl substances (PFAS),

nutrients, and other wastewater discharge limitations. Exponent, Inc. Alert. 21 October 2021.

Fleming ML, McArdle ME, Goodfellow WL. “Waters of the United States” reset to pre-2015 definition. Exponent, Inc. Alert. 11 October 2021.

Morrison AM, Menzie CA, Goodfellow WL, Reiss R. EPA re-developing guidance for cumulative risk assessments. Exponent, Inc. Alert. 27 September 2021.

Steele AN, Fleming ML, Goodfellow WL. GOA finding eReporting of NPDES data incomplete and inaccurate. Exponent, Inc. Alert. 14 September 2021.

Goodfellow WL, Gard NW, Steel AN. The PFAS challenge: Understanding the risk and potential impacts on ecosystems. Exponent Live. 12 August 2021.

Fleming ML, McArdle ME, Goodfellow WL. Federal jurisdiction of the Clean Water Act to be revisited. Exponent, Inc. Alert. 12 July 2021.

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.

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.

### Presentations

Abstracts published for professional societies and annual meetings

Stoler A, Goodfellow W. What is Biodiversity and Why Should We Be Measuring It? SETAC Europe 36th Annual Meeting, Maastricht, The Netherlands. 17-21 May 2026.

Guiney PD, Goodfellow WL, Canfield TJ. The SETAC Experience Debating Scientific Integrity: Toxicology Desperately Needs a Reformation to Restore Scientific Integrity! Roundtable Session. Society of Toxicology, 65th Annual Meeting, San Diego, CA. 22-25 March 2026.

Goodfellow WL, Guiney PD, Canfield TJ. Who Controls the Microphone? Recapturing the Public Trust. SETAC North America 46th Annual Meeting, Portland, OR. 16-20 November 2025.

Kulacki K, Goodfellow WL, James J. Fate, Transport and Risk Assessment of Dicyclopentadiene in an Agricultural Setting: A Case Study following a Train Derailment. SETAC North America 46th Annual Meeting, Portland, OR. 16-20 November 2025.

Goodfellow WL. Impact of Personal Care Products in the Environment: Focus on Wastewater Treatment Processes and Wastewater Permitting. Personal Care Product Council. 2025 Science Symposium & Expo. Arlington, VA. October 28, 2025.

Daniel L, Kreutzer D, Goodfellow W, Hoelzle T, McGartland A, Tomasi T, Demeter R. Plenary Session: Current Lay of the Land – Where We Are in Law, Science, Economics, and Policy. Ad-Hoc Industry Natural Resource Management Group State-of-the-Practice. Washington, DC. July 22, 2025

Kulacki K, James J, and Goodfellow Jr. W. Assessment of Potential Risk from a Spill of Resin Oil Heavies on Agricultural Lands. NAC SETAC, Burlington VT. June 12-13, 2025.

Jappen OP, Goodfellow WL, Gobeil A. The science behind PFAS: A deep dive into testing methodologies, remediation, and regulatory impacts. ACI's Summit on PFAS Regulation, Compliance, and Litigation. New York, NY. May 28, 2025.

Hamilton JC, Brodkey AA, Goodfellow WL, Weir I. Technically speaking: The expert perspective. Project development; environmental, social and governance; and quantum issues. Institute for Transactional Arbitration (ITA). 3rd ITA Conference on International Arbitration in the Mining Sector. Toronto, CN. 5-6 March 2025.

Goodfellow WL, Kulacki KJ. Wastewater management strategies: What happens if your water quality becomes "too good". SETAC North America 45th Annual Meeting. 20-24 October 2024. Fort Worth, TX.

Guiney PD, Canfield TJ, Goodfellow WL. Combating misinformation-disinformation in environmental science: Potential opportunities and responsibilities for scientists. SETAC North America 45th Annual Meeting. 20-24 October 2024. Fort Worth, TX.

Kulacki K, Goodfellow W. Evaluating risks from cosmetics and personal care products: Use of (in) appropriate testing frameworks. SETAC North America 45th Annual Meeting. 20-24 October 2024. Fort Worth, TX.

Goodfellow WL, McArdle ME, Staveley J. Environmental Assessments: Calculating Predicted Environmental Concentrations (PECs) for Aquatic Animal Drugs. 30th Annual US Fish and Wildlife Service, Aquaculture Drug Approval Coordination Workshop. Bosman, MT. 25 July 2024.

Goodfellow WL. The rapid advancement of science misinformation: How serious is it, how can we detect it, and what we should do as scientist when we encounter it. New York Society of Cosmetic Chemists. 3 June 2024. Hoboken, NJ.

Goodfellow WL, Kulacki KJ, Steele AN. Strategies to address marginal and intermittent toxicity in effluent dominated systems. SETAC Europe 34th Annual Meeting. 5-9 May 2024. Seville, Spain.

Goodfellow WL, Guiney PD, Canfield TJ. The role of deliberate and unintentional misinformation in science and communication: What does it look like and how to guard against it. SETAC North America 44th Annual Meeting. 12-16 November 2023. Louisville, KY.

Steele AN, Goodfellow WL. Behavioral endpoints as lines of evidence: Current use in regulations and considerations for assessment of toxicity. SETAC North America 44th Annual Meeting. 12-16 November 2023. Louisville, KY.

Kulacki K, Fleming M, Goodfellow WL. End of life repercussions for cosmetics and PCPs: Are the appropriate decision frameworks being used? SETAC North America 44th Annual Meeting. 12-16

November 2023. Louisville, KY.

Fite L, Hart M-T, Goodfellow W. CAFO permitting after Maui – What happens now? American Agricultural Law Association. 44th Annual AALA Agricultural Law Education Symposium, Charlotte, NC. 9-11 November 2023.

Steele A, Goodfellow W. Considerations for the use of behavioral endpoints and methods as a line of evidence in regulatory toxicity testing. SETAC Europe 33rd Annual Meeting, 30 April-4 May 2023. Dublin, Ireland.

McArdle ME, Goodfellow WL, Folcik AM, Adams WJ, Smith E. Recommended oral reference values for risk assessment of copper. Society for Risk Analysis Annual Meeting. 4-8 December 2022. Tampa, FL.

Kulacki KJ, Goodfellow WL, Steele AN. Strategies for toxicity identification evaluations when standard tests and species do not resolve the toxicity. SETAC North America 43rd Annual Meeting, 13-17 November 2022. Pittsburgh, PA.

Guiney PD, Canfield T, Goodfellow WL. Science under attach: Why we should all care about censorship in science. SETAC North America 43rd Annual Meeting, 13-17 November 2022. Pittsburgh, PA.

McArdle ME, Folcik AM, Goodfellow WL, Adams WJ. Evaluating appropriate oral reference values for risk assessment of copper. SETAC North America 43rd Annual Meeting, 13-17 November 2022. Pittsburgh, PA.

Goodfellow WL, Kulacki KJ, Steele AN. The use of novel tests with non-standard species and methods to resolve toxicity as part of TIEs. SETAC Europe Annual Meeting,15-19 May 2022. Copenhagen, Denmark.

Kulacki KJ, Steele AN, Fleming M, Goodfellow WL. Whole effluent toxicity (WET) assessment and experimental considerations for evaluating coagulation agents and polymers for wastewater treatment of coal combustion products. World of Coal Ash, 16-19 May 2022. Covington, KY.

Goodfellow, W, Kierski M, Drollette B, Getzinger G. Land application of biosolids: Effective management with focus on emerging contaminants. SETAC North America, SciCon4, November 2021.

Goodfellow W, Fleming M, Steele A, Kulacki K. Experimental considerations for assessing coagulation agents and polymers for wastewater treatment of coal combustion products. SETAC North America, SciCon4, November 2021.

Canfield T, Goodfellow W, Guiney P. Science consensus: Pros and cons of conflating science and consensus. SETAC North America, SciCon4, November 2021.

Kulacki K, Steele A, Fleming M, Goodfellow W. Assessment of potential effluent toxicity from ash basin dewatering operations. SETAC North America, SciCon4, November 2021.

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, Schlekat 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, Wentsel 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 (Dreisena 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 tonic 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.

Bastian M, Goodfellow W, Rue W, McCulloch W, Black J, Koerber A, Christensen L, Paulson C. Assessment of ammonia effects from municipal discharges to a freshwater system with high salinity. SETAC, Abstract, 18th Annual Meeting, San Francisco, CA, 1997.

Barry T, deVlaming V, Foe C, Goodfellow W, Norberg-King T, Miller J, Mount D. Pesticides in the toxicity identification evaluation process. SETAC, Short-Course Instructors SETAC, Abstract, 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.

DeVlaming V, Barry T, Foe C, Goodfellow W, Jr., Norberg-King T, Miller J, Mount D. Pesticides in the toxicity identification evaluation process. SETAC, Short Course, 18th Annual Meeting, San Francisco, CA, November 16, 1997.

Bastian M, Goodfellow W, Jr., Rue W, McCulloch W, Black J, Christensen L, Paulson C. Assessment of the impact of municipal effluent discharges to a fresh water system with high salinity. SETAC, 18th Annual Meeting, San Francisco, CA, 1997.

Ausley L, Burton D, Denton D, Dorn P, Goodfellow W, Jr., Gully J, Heber M, Norberg-King T, Rodgers J, Waller T. Tackling touch issues in whole effluent toxicity testing: Progress of the SETAC WET Steering Committee. SETAC, 18th Annual Meeting, San Francisco, CA, 1997.

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

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, Hinchee 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

Mr. Goodfellow's specific toxicological experience includes the investigation of acute and chronic toxicity, 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 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. He has evaluated the observation of fish and other aquatic organism impacts from chemical applications to the aquatic environment, land-use activities, and associated non-point run-off of chemicals and industrial and municipal effluent discharges. His research also includes the evaluation of sublethal effects of organic and inorganic compounds to various aquatic organisms during long-term exposure.

## Environmental Toxicology and Ecological Risk Assessments

- 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.
- 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.
- 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 program's 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.
- Evaluated the effects on many recreational and commercially important fish stocks from pollution and habitat-related issues; species included Atlantic salmon, coho salmon, Chinook salmon, cut-throat trout, rainbow trout, steelhead 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.
- Assessed the impacts of cooling-water intake and plant effluent to aquatic systems as part of Clean Water Act 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.
- 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, coho salmon, Chinook salmon, rainbow trout, steelhead 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.
- Evaluated the associated impacts from land-use and irrigation activities to two endangered fish species in Oregon.
- 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 several large steel mills in Indiana, Ohio, Pennsylvania, West Virginia, and Maryland, including the

assessment of operations and the impacts to the environment. These assessments required reviewing operations and the effects on wastewater treatment and effluent discharges, slag and fly ash recycling in Portland cement, hazardous waste generation and disposal, sediment and surface water impacts, groundwater impacts, soil contamination, fugitive dust, and coal pile run-off, as well as indirect discharges. Involved terrestrial as well as freshwater and estuarine ecosystems. Operations reviews incorporated coke operations, furnace operations, cooling water systems, milling operations (e.g., cold rolling, tin operations, cleaning/acid baths, etc.). Many of these reviews covered current and historical 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, biofouling management, dewatering, and remediation activities, as well as the assessment of wastewater treatment and chemical usage including surfactants and polymers.
- Evaluated industrial operations, waste handling practices, landfill operations, disposal activities, and environmental compliance at facilities throughout the U.S. and their impacts to third-party damages. These facilities included chemical and pesticide manufacturing; ordnance/munitions; coal-fired, gas, and nuclear power plants; and hazardous waste operations. Assessed the impacts to soil, surface water, and groundwater resources. Evaluated the associated environmental permitting requirements.
- Performed the assessment of nuisance claims at municipal and industrial landfills including odor, air quality, surface water, and groundwater issues.
- Performed environmental system audits and investigated manufacturing operations and solid and liquid waste handling processes at industrial and commercial facilities to assess impacts to soil, surface water, sediment, and groundwater. Led assessments for industries such as mining, pulp and paper manufacturing, recycling, and petroleum and chemical storage and refining and at facilities involved in the production of chemicals, pesticides, ordnance/munitions, steel, and other metals, as well as municipal wastewater treatment, landfill, and hazardous treatment facilities. Additionally, performed these activities at U.S. Army, U.S. Navy, and U.S. Air Force installations.
- 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 analysis of the ecological and human health impacts 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.

- Performed environmental assessments (EA) and environmental impact assessments (EIAs) on behalf of the U.S. Department of Interior and Bureau of Land Management for many U.S. national parks, historic monuments, scenic areas, and other related land-use activities.
- Mining and Shale Oil/Gas Extraction — Provided senior technical review of environmental assessments of several development projects located in the northern Rocky Mountains. 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.
- Evaluated the impacts from a large gold mining operation and associated impacts to groundwater, surface water, and stream invertebrates and fishes from operational and reclamation activities. Additional consulting included multi-day stakeholder 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.
- Extensive experience in addressing the effects of mining and extraction on aquatic and terrestrial ecosystems throughout the U.S. 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), Buckhorn Mountain Mine (WA), 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.
- 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 EPA regulations implemented under Section 316(b) of the Clean Water Act. Studies included 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.

### Contaminants of Emerging Concern

- Assessed the toxic impact of 6PPD and 6PPD-Q to fishes in California and the Pacific Northwest, including salmonid species.
- Assessed the ecotoxicology of PFAS to aquatic and terrestrial organisms associated with solid waste disposal and effluent discharges, including the bioavailability and bioaccumulation of PFAS.
- 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.

- 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.

### Metals and Legacy Organic Compounds

- Hexavalent Chromium Characterization — Directed a hexavalent chromium characterization program, developing best management options to control hexavalent chromium contamination and land-use activities.
- 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, PCBs, PAHs, and dioxin/furan congeners).
- 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 catfish, walleyes, and rainbow trout exposed to various concentrations of final effluent from wastewater treatment plants. Developed temporary field laboratory operations on site.
- 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.
- Chlor-alkali Chemical and Polyvinyl Chloride Manufacturing Facilities — Performed environmental assessments for several facilities including evaluation of site operations, waste management of solid and liquid wastes, environmental damages, groundwater and surface water chemical characterization, and environmental toxicology. Evaluated environmental issues including inorganic mercury and organic methylmercury contamination of groundwater, rivers and streams, estuaries, and wetlands.
- Evaluated the land application activities for municipal and industrial operations, including the impact assessment of metals, PCBs, PFCs, PAHs, pesticides, herbicides, munitions, and nutrients to soil, groundwater, and surface waters.

### Environmental Permitting and Toxicity Reduction Evaluations

- 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.
- Directed engineering activities associated with TREs, including plant performance evaluations, housekeeping surveys, source identification evaluations (TIEs), 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.

- 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 coauthor of resulting book on WET testing.
- Analyzed wastewater treatment at pulp and paper facilities, including the performance of toxicity reduction evaluations. Evaluated environmental impact of paper-mill effluents to aquatic organisms and humans, including toxicological and fish flavor impairment studies.
- Evaluated the effects of land-use and aquatic activities on water resources as part of NEPA assessments.
- Conducted the environmental compliance audits and assessments for many facilities including industrial/manufacturing facilities, entertainment facilities, bulk storage terminals, manufacturing facilities, refineries, transportation terminals, ports and airports, military facilities and bases, landfills, and municipalities (pretreatment and treatment works).
- Performed chemical and bacteriological quality control/assurance assessments of laboratory and other operations.
- Performed as a compliance monitor for animal breeding and testing facilities. Audits have included on-site inspections and system reviews; review of regulatory submissions; and assessment of actions taken from findings and notices of violation, historical records review in facility, corporate, and agency files.
- Industrial Operations Review — As part of the TRE process and environmental assessments, 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 detailed reviews of the industrial processes, chemical uses, water use, solid waste generation and their resulting wastewaters and treatment.
- 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.
- Provided NEPA assessments for the National Security Administration on various facility siting assessments within Maryland, Virginia, and Washington DC.

- Provided environmental assessment for solar and battery storage projects in Massachusetts, Mississippi, New York, Pennsylvania, Virginia, and West Virginia as part of obtaining condition use permits.

### International Environmental Programs Consulting

Mr. Goodfellow has considerable international experience, including peer reviewer of several large environmental programs, including the Canadian Water Network, the UK National Rivers Program, and 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 international project experience includes:

- Environmental impact assessment of contaminated sediment and their associated risk in the waterways of Kottayam and Kochi (southern India).
- Assessed the fate and transport of radionuclides from a nuclear power plant in Japan in freshwater and marine fisheries. Assessed the tissue concentration of radionuclides in commercial fish and shellfishes.
- Addressed environmental issues related to the oil and mining industry in Mexico and mining related impacts in Brazil, Canada, Chile, Greenland, Venezuela, and Papua New Guinea.
- Evaluation of chemical manufacturing and pulp and paper industrial activities in Brazil.
- Evaluation of impacts from aerial spraying to sugar cane fields and wastewater treatment of distillery wastes in Guatemala.
- 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.
- Assessment of facility operations for possible bacteriological contamination in Viet Nam.
- Development of environmental assessment and environmental, health, and safety manuals for the Abu Dhabi Department of Transportation, Main Roads Division.
- Co-Chair for the Watersheds Consortium Management Committee for the Canada Water Network.
- Delegate to, past president, and secretary/treasurer of the SETAC World Council.
- Presented papers at the Brazilian Academy of Toxicology (Victoria, Brazil), SETAC-Europe meetings in Dublin, Ireland; Copenhagen, Denmark; Helsinki, Finland; Maastricht, The Netherlands; Warsaw, Poland; Goteberg, Sweden; Seville, Spain; and Rome and Milan, Italy, as well as numerous papers in Canada. Presented invited lecture in Mexico City, Mexico.
- Performed an assessment of adequacy of submitted documents as part of an EIA for large extraction project within the European Union.
- 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.

**Soil, Sediment, and Dredged Material Assessments**

- 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, PFAS, PCBs, 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, porewater, and municipal sewage sludges.
- Managed large sediment programs as part of an environmental impact study, including vibracoring samples, toxicity testing, and bioremediation assessment. Provided permitting services for marine construction projects including Section 401 certifications, 402 and 404 permits, Coastal Zone Assessments (CZA), endangered species assessment, Section 9 and 10 assessments, and MS4 permits.
- Past member of the Sediment Advisory Panel (Maryland) and 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- 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 (SLRP); 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 originated 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 were used to assess dredging as a “source” for total maximum daily loads in impaired waterways.
- 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). Evaluated potential toxicity of soil amendments; pesticide use and disposal; and on-land spills from transportation activities, chemical manufacturing, refineries, and landfills using terrestrial and aquatic organisms. Assessed the potential impacts from herbicide and pesticide spraying activities to crop production and residues.

### Other Technical Ecological Consulting

- Pest Management and Nuisance Pest and Animal Assessment — Provided technical development and review of pest management plans and implementation programs for U.S. Army and Air Force installations, including management of offices, housing, and dormitory spaces. Provided expert testimony for the assessment and control of nuisance animals in a large apartment complex, military housing, and department of corrections facility. Direct experience in the assessment of pesticides and herbicides for pest control of invertebrate and plant species. Invited key-note speaker on pest management and changing climate considerations.
- Aviation Services — As principal, provided environmental support services for large capital construction programs such as planning and environmental assessment of infrastructure projects and new terminal and access and interior roadway networks; performed functional assessment of stream system in accordance with U.S. Army Corps of Engineers (USACE) protocol for determining mitigation requirements; participated in permitting wetland fill for capital projects development, including new concourses and runways; developed permit-specific compliance guides for use by contractors during construction; prepared NEPA documents for concourse, internal automated people-mover system, roadways, and infrastructure systems; reviewed environmental impact statement for new runways under preparation by the Federal Aviation Administration; developed 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; created and managed website with compliance and geographic information system data; administered seasonal ecological surveys to characterize terrestrial and aquatic habitats and determine the presence of rare, threatened, and endangered species; supported public outreach activities, including planning and hosting public outreach workshops for proposed construction projects; and developed sitewide hydrologic and hydraulic models for predicting floodplain changes and stormwater management requirements attendant to project planning.
- 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 implemented 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 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 within several sewer systems. Developed strategy for sample collection, reviewed laboratory analysis, and directed the risk communication of the studies. The objective of this program was to assess

the origination of fecal material and identify whether it was of human origin, domestic animal, avian, or other wildlife. This information was important to determine whether 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 included public audiences or risk communication.

- Bacterial Contaminated Manufacturing Facility — Provided senior technical oversight of a facility in Asia with bacterial contamination in their production operation. Activities included sampling and analysis assessment, source control, and development of revised safety protocols for the facility that were adopted throughout the company's Asian operations.
- 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.
- 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 the food processing, transportation, and handling procedures for organic food production. Evaluated food processing operations and use of aerobic and anaerobic digestion of waste streams 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.
- Agricultural Operations — As principal, prepared a comment document on 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 waterfowl, 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 design and operation of a manure transfer management system and the potential impacts from operations.
- 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.
- Provided NEPA assessments on pesticides, animal care products, and genetically modified organisms.

- 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, and 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, and inorganic salts.

### Technical Support of Litigation

As part of litigation, Mr. Goodfellow has prepared expert reports, depositions, written or oral testimony, and provided declarations, including matters in public hearings as well as arbitration, local, state, and federal proceedings. Technical support provided in the general subjects listed below.

### Toxic Tort and Environmental Risk Assessment

- Retained as an expert for ecotoxicology and risks associated with communication tower maintenance activities.
- Retained as an expert to evaluate impacts from emerging contaminants of concern discharged to an estuarine environment.
- Retained as an expert for environmental impacts from formaldehyde.
- Retained as an expert for the evaluation of assessment of oyster impacts on lease held oyster beds. Critically reviewed the sampling and analysis plan.
- Provided expert report and rebuttal report on disinfection operations and microorganism infection risks to ridership for a water park.
- Provided expert report, rebuttal report, and testimony on expected and intended impacts to soil, groundwater, and surface waters from historical operations of chemical, pesticide, and ordnance/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 (PFAS) that was manufactured since the 1950s but only recently became a chemical of concern.
- Directed expert consulting services for the assessment of a large industrial operation 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, written testimony, and deposition on hazard assessment and human health risk assessment for a Superfund site.

### Industrial Operations and Auditing

- Provided expert and rebuttal reports for environmental issues for a pulp and paper mill conversion project as part of an American Arbitration Association matter.
- Retained as an expert evaluating claims from chemical manufacturing facilities and environmental concerns in Romania and Wales as part of international arbitration.

- Retained as an expert for ecological and human health risks associated with large solar farms.
- Provided an expert declaration for the wastewater toxicity and impacts of influent wastewater treatability at an industrial wastewater treatment facility.
- Provided expert report, rebuttal report, and testimony regarding historical and ongoing 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, ammonia, cyanide, and benzene.
- Provided litigation support for hazardous waste disposal from water filtration operations.
- 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).

### Environmental Permitting and Compliance

- Retained as an expert for the evaluation of National Pollutant Discharge Elimination System (NPDES) stormwater permitting issues resulting from a citizen suit.
- Retained as an expert for Clean Water Act (CWA) compliance activities associated with animal care facilities.
- Retained as an expert for ecological and human health risks associated with large solar farms.
- Provided an expert declaration of risks associated with sensitive products stored in warehousing operations at a remediated former steel mill.
- Retained as an expert for the evaluation of recycled wastewater and impacts from land application of treated wastewater.
- Provided an expert report for an environmental impact analysis (EIA) for a development project assessing a large natural resource extraction project.
- Provided consulting, expert report, and testimony for assessing environmental permitting needs for a large transportation project.
- Provided consulting and testimony at administrative hearing for the assessment of solar panel farm impacts on agriculture land and communities in Mississippi, New York, Pennsylvania, Virginia, and West Virginia.
- Provided testimony for effluent toxicity assessments, toxicity reduction evaluations, and NPDES compliance for a large pulp and paper mill.
- Provided expert report, rebuttal report, and testimony for land-use and stormwater management impacts to third-party property damage.
- Prepared export report of the assessment of surface water impacts and loss of beneficial use from a chemical manufacturing facility 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; prepared rebuttal report of other experts with regards to ecotoxicity, ecological risk, and fishery assessment of a large estuary.
- Provided expert consulting services for the impact of an industrial chemical release to a wastewater treatment plant (WWTP) and the resulting fish kill.

- Provided technical guidance and supported activities associated with deposition concerning effluent toxicity and a toxicity reduction evaluation (TRE).
- Provided technical guidance for NPDES violations on behalf of dischargers.
- Provided technical guidance on biomonitoring permit requirements and TREs 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.

### Land-use Activities and Biosolids, Residuals, and Manure Management

- Retained as a consulting expert for land-application of biosolids.
- Provided an expert report for the environmental assessment of dairy operations and the land-application of manure.
- Retained as an expert for assessing land-use, water withdrawal, dredge, and fill activities for a third-party dispute.

### Ecological, Biodiversity, and Endangered Species

- Retained as an expert for ecological impacts to a lake ecosystem from land-use activities.
- Provided expert and rebuttal reports for evaluation of oxidant chemicals associated with stormwater runoff and ecotoxicology impacts to endangered fishes in California and the Pacific Northwest.
- Retained as an expert for environmental impacts for endangered species from land-use activities.
- Retained as an expert for the evaluation of lake water quality and the impacts to endangered species.
- Provided an expert report for the ecological and ecotoxicology assessment of a large lake and assessment of stressors to endangered aquatic species and harmful algae blooms.
- Provided expert report 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 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.

### Agricultural Issues and Pest Management

- Provided an expert report for assessing appropriate seed handling and limitations from specific farming practices.
- Provided an expert report and testimony for nuisance animal infestation at a state operated correctional facility and the potential impacts associated with inmate residents.
- Provided expert services in association with tree health and associated personal and property damages.

- Retained as a consulting and rebuttal witness for the evaluation of tree health and property damage.
- Retained as a consulting and rebuttal expert witness for the evaluation of debris removal and replanting from a wildfire.
- Retained as an expert to evaluate plant pathology and exclusion provisions for viroids infesting the plants.
- Provided expert assessment of plant virus infections and their impacts to world-wide delivery.
- Provided an expert report for the assessment of health and safety in agricultural processing and grain elevator storage operations.
- Provided an expert report for an alleged nuisance animal infestation matter at an Air Force base.
- Provided expert and rebuttal reports for an injury occurring on a levee bike/pedestrian path alleged to have resulted from algae growth on the surface water flow crossing the levee.
- Retained as an expert for assessing adverse wildlife interactions with residents in a golf course and surrounding resort and residential properties.
- Retained as an expert to assess the impacts of a fertilizer product on plant performance in a nursery.
- Provided consulting and expert report for evaluation of agriculture crop loss from herbicide application.
- Provided consulting, expert report, and testimony on food and grain handling to maintain organic food certification.
- Provided consulting and expert report for agricultural impacts from chemical spill from train derailment. Chemicals of concern included dicyclopentadiene (DCPD) and other PAHs.
- Provided review of science and engineering assessment and mitigation for two separate animal feed manufacturing facilities to achieve compliance with water quality permits.
- Provided litigation support for hazardous waste disposal from water filtration operations.
- Provided expert report on herbicide spray operations on rail rights-of-way and third-party property damages.
- 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.
- 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.

## Additional Education & Training

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.

## Peer Reviews

SETAC North America Meeting Planning Committee. Scientific and Plenary Speaker Subcommittee. January 2021-November 2022.

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.