

Long-term Management of the Spirit Lake/Toutle River System in Southwest, Washington

Committee

Gregory B. Baecher

Chair

Gregory Baecher (NAE) is the Glenn L. Martin Institute Professor of Engineering in the Department of Civil and Environmental Engineering at the University of Maryland, College Park. His primary area of expertise is in infrastructure protection with particular concern to waterways. His research also focuses on geoenvironmental engineering, reliability and risk analysis, and environmental history. Dr. Baecher has served on various NRC committees including water security planning for the Environmental Protection Agency; Committee on Science and Technology for Countering Terrorism, and is a past member of the Water Science and Technology Board. He was elected to the National Academy of Engineering in 2006. He received his BSCE in civil engineering from the University of California and his M.Sc. and Ph.D. degrees in civil engineering from the Massachusetts Institute of Technology.

John J. Boland

Member

John Boland is an engineer and economist and is professor emeritus in the Department of Geography and Environmental Engineering at the Johns Hopkins University. His fields of research include water and energy resources, environmental economics, benefit-cost analysis, and public utility management. Dr. Boland has studied resource problems in more than 20 countries, has published more than 200 papers and reports, and is a co-author of two books on water demand management and three more on environmental management. He has served on several National Academy of Sciences, Engineering, and Medicine committees and is a founding member and past chair of the Water Science and Technology Board. Dr. Boland received his B.E.E. (electrical engineering) degree from Gannon University, his M.S. in governmental administration from the George Washington University, and his Ph.D. degree in environmental economics from the Johns Hopkins University.

Thomas Dunne

Member

Thomas Dunne (NAS) is a professor of geomorphology and hydrology at the Bren School of Environmental Science and Management at the University of California, Santa Barbara. He conducts field and theoretical research in fluvial geomorphology and in the application of hydrology, sediment transport, and geomorphology to landscape management and hazard analysis. He has worked in many parts of the world including Kenya, where he studied the effects of land use on hill-slope erosion and river-basin sedimentation and how climate and hydrology affect long-term hill-slope evolution. At the University of Washington, he focused on land sliding and debris flows as well as tephra erosion and debris-flow sedimentation resulting from the eruption of Mount St. Helens. The resource management issues he studied in the Pacific Northwest include the impacts of gravel harvesting on river channels and floodplains and the impacts of timber harvesting on erosion and sedimentation. Since joining the Bren School in 1996, Dr. Dunne has studied erosion in the Andes and hydrology, sediment transport, and floodplain sedimentation in the Amazon River Basin of Brazil and Bolivia and the Central Valley of California. He earned a B.A. in geography from Cambridge University and a Ph.D. in geography from The Johns Hopkins University.

Youssef Hashash

Member

Youssef Hashash is the William J. and Elaine F. Hall Professor of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. After receiving his undergraduate and graduate degrees, he worked in Dallas, Texas and San Francisco, California on a number of underground construction projects in the U.S. and Canada. Dr. Hashash joined the faculty of the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign in 1998. He has taught courses in geotechnical engineering, numerical modeling in geomechanics, geotechnical earthquake engineering, tunneling in soil and rock, and excavation support systems. His research focus includes deep excavations in urban areas, earthquake engineering, continuum and discrete element modeling, and soil-structure interaction. He also works on geotechnical engineering applications of visualization, augmented reality, imaging, and drone technologies. He has published over 200 articles and is co-inventor on four patents. His research group developed the software program DEEPSOIL that is used worldwide for evaluation of soil response to earthquake shaking. He received his B.S., M.S., and Ph.D. degrees in civil engineering from MIT.

John Kupfer

Member

John Kupfer is professor and chair in the Department of Geography and senior associate faculty in the Environment and Sustainability Program at the University of South Carolina. As a landscape ecologist and biogeographer, his research couples field work with spatial analysis and modeling using geographic information systems to explore the interactive effects of landscape transformation, non-native species, and disturbances such as flooding, fire, and hurricanes on plant and animal communities. He has conducted research on a broad range of ecosystem types including montane conifer forests in Idaho and Arizona, ecological transition zones in northern California, coupled human-natural systems in Central America, and riparian systems in the Midwest, Southeast and Southwest. He has published more than 60 papers, chapters, and reports in a diverse range of outlets including top journals in geography, biogeography, geomorphology, and ecology. His research often has direct applications to ecosystem management, and he works regularly with scientists at Congaree National Park where he has aided their understanding of the interactions among flooding, sedimentation, and floodplain forests. Dr. Kupfer earned his B.A. in geography/biology from Valparaiso University and his M.A. and Ph.D. in geography from The University of Iowa.

Ning Lu

Member

Ning Lu is a geotechnical engineer and hydrologist with 25 years of experience in industry consulting, government research, and academia. He is presently a professor at the Colorado School of Mines where his research focuses on the coupling between hydrological and mechanical processes in both natural and engineered environments such as hillslopes, embankments, and levees. These coupled processes play vital roles in the occurrence of natural and manmade geologic hazards such as rainfall-induced landslides and instability of earth dams and sediments. He is the senior author of two widely used textbooks: *Unsaturated Soil Mechanics* and *Hillslope Hydrology and Stability*. Dr. Lu earned his B.S. degree in geotechnical engineering from the Wuhan University of Technology and his M.S. and Ph.D. degrees in civil engineering from The Johns Hopkins University.

Basil Stumborg

Member

Basil Stumborg is BC Hydro's decision analysis expert in energy planning and economic development (finance). He joined BC Hydro in 2000 and has worked on a number of projects across the company—assisting BC Hydro in structuring its decision processes where decisions are complex and outcomes are uncertain. In particular, Mr. Stumborg helped structure and implement the water use planning program that rebalanced competing interests at Hydro's dams, processes for long-term provincial energy planning, BC Hydro's Business Case Requirements, litigation strategies and, most recently, is supporting British Columbia's efforts in reviewing the Columbia River Treaty. Mr. Stumborg created and hosts BC Hydro's internal training on structured decision-making to assist staff in implementing the business case requirements for complex projects and process changes. Before joining BC Hydro, Mr. Stumborg did graduate work in economics at the University of Wisconsin, Madison and McGill University and psychology at Cornell University, taught at the University of Victoria, and consulted in the private and public sectors. The core focus of all of his activities has been decision-making under uncertainty and multiple-objective decision analysis—a discipline now known as behavioral economics. He received his B.A. in political science and M.A. in economics from McGill University.

Kathleen J. Tierney

Member

Kathleen Tierney is a Professor of Sociology and Director of the Natural Hazards Research and Applications Information Center at the University of Colorado at Boulder. The Hazards Center is housed in the Institute of Behavioral Science where Professor Tierney holds a joint appointment. Dr. Tierney's research focuses on the social dimensions of hazards and disasters including natural, technological, and human-induced extreme events. With collaborators Michael Lindell and Ronald Perry, she published *Facing the Unexpected: Disaster Preparedness and Response in the United States*. This influential compilation presents a wealth of information derived from theory and research on disasters over 25 years. Among Dr. Tierney's current and recent research projects are studies on the organizational response to the September 11, 2001 World Trade Center disaster, risk perception and risk communication, the use of new technologies in disaster management, and the impacts of disasters on businesses. She received her B.A. in sociology from Youngstown State University and her M.S. and Ph.D. in sociology from The Ohio State University.

Desiree D. Tullos

Member

Desiree Tullos is an Associate Professor of Water Resources Engineering at Oregon State University. Her research team investigates the interactions between river engineering and the physical and biological processes of rivers. Projects focus on questions that range from the particle to basin scale with the emphasis on the sustainable management of water resources. Example projects include: a) Physical and biological responses to river engineering, including dam removal and reintroducing large wood; b) Impacts of climate change and reservoir operations on flood risk reduction, water supply, hydropower generation, and environmental flows, c) Analysis of uncertainty in water resources, d) Effects of hydropower development in China and flood management in the Himalaya; e) Turbulence and habitat of flow around vegetation and wood in rivers, and f) Sustainable flood risk management and infrastructure. In addition, she currently serves on the Independent Scientific Review Panel for Bonneville Power Administration's Northwest Power and Conservation Council and the board of directors for the Natural Heritage Institute. Her teaching emphasizes design-based learning in her primary classes: River Engineering, Hydraulic Engineering, and Ecological Engineering. She earned her B.S. in civil engineering from the University of Tennessee, Knoxville, her M.S. in civil engineering from the North Carolina State University, Raleigh, and her Ph.D. in biological engineering from the North Carolina State University, Raleigh.

Greg A. Valentine

Member

Greg A. Valentine was a member of the technical staff at Los Alamos National Laboratory from 1987-2007. During this time, he conducted research on explosive volcanic processes, subsurface radionuclide transport, and basaltic volcanism. Dr. Valentine was group leader for the last ten years of his tenure at Los Alamos—coordinating the research of 60-75 permanent technical staff members on a variety of topics related to environmental, energy, and defense-related problems. He was technical lead and Manager for Disruptive Events (volcanism and earthquakes) on the Yucca Mountain Project, which focused on performance assessment of a permanent geological repository for high-level radioactive waste. Dr. Valentine joined the Department of Geology at the University at Buffalo in 2008 where he teaches and conducts research in volcanology and natural hazards and directs the Center for Geohazards Studies. Dr. Valentine has published more than 80 peer reviewed papers and book chapters ranging from numerical modeling of eruption processes to experiments on explosive volcanism and fundamental processes of volcanic fields. He initiated vhub.org, a major online cyberplatform for collaborative volcanology and currently leads a major NSF-funded, multi-institutional project that integrates geology, geophysics, social science, and statistics in order to improve resilience to persistent volcanic unrest. He earned his B.S. in geological engineering and geology at the New Mexico Institute of Mining and Technology and his Ph.D. in geological sciences at the University of California, Santa Barbara.