

Bruce L. Jacobs Ph.D., PE

Senior Environmental Engineer

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Dr. Jacobs has broad environmental engineering experience in the analysis of groundwater flow and transport, receiving water quality, subsurface site characterization and remediation, drainage design, water resources, storm surge impacts, and the application of numerical models in support of these efforts. Typical projects include the review of stormwater management plans, assessment of water table mounding, siting of water supply wells, environmental data management, remediation design, determination of contaminant source histories, and modeling of groundwater contaminant transport. He has served as the chair of the Boston Society of Civil Engineers Section (BSCES) Environmental Water Resources Institute and other BSCES committees and is currently the BSCES President. He also serves on the executive board of the Boston Professional Chapter of Engineers Without Borders.

Representative Projects

Water Quality Modeling: Explored the feasibility of studying potential effects of climate change on nitrogen impairments in the salt water embayments of Cape Cod, Massachusetts. Resulting product was a report describing the existing state of knowledge and means for better understanding the climate change impacts.

Groundwater Contamination Fate and Transport: Prepared and calibrated a transient groundwater model of contaminant transport at the Massachusetts Military Reservation. Modeling tasks included regional transient flow field simulations, particle tracking simulations under transient conditions, calibration of local flow subject-to-surface water boundary impacts, and contaminant transport simulations of a known source.

Combined Sewer Overflow Planning: Analyzed overflows from a combined sewer system and assisted in the conceptual design to reduce overflows through system expansion, separation of storm and sanitary sewers, and additional system storage.

Storm Surge Analysis: Evaluated cost-benefit ratios for a storm surge barrier on the Hackensack River in New Jersey. Refined the watershed model grid and surface topography within the study area and executed simulations for 24 synthetic storm events.

Total Maximum Daily Load Evaluation: Supported the development of a phosphorus total maximum daily load (TMDL) for the Androscoggin River. Reviewed the results of numerical models used in development of the TMDL and modified and executed additional scenarios to assist in generation of the final TMDL.

Water Distribution System Mediated Exposure History: Evaluated historical changes in spatial distribution of N-nitrosodimethylamine (NDMA) within the water distribution system in Wilmington, Massachusetts, to determine the exposure history of individual community members and evaluate the correlation between exposure and incidences of cancer.

Remediation Cost Allocation: Estimated remediation costs and time to clean up for multiple facilities that were under investigation and owned by the client. Selected remedial strategies based on available information, including site-specific records of decision and feasibility studies, and documented performance characteristics of alternative remediation methods.

Areas of Expertise

- Contaminant Fate and Transport
- Surface and Groundwater Hydrology/Hydraulics
- Contaminated Site Assessment and Management
- Distribution System Water Quality
- Stormwater Management

Education

Ph.D., Environmental Engineering, Massachusetts Institute of Technology

M.S., Civil Engineering, Massachusetts Institute of Technology

B.S., Civil Engineering, Wayne State University

Registered Professional Civil Engineer in Massachusetts

Selected Publications

Jacobs, B. 2014. "Fundamental concepts of groundwater flow." *International Manual on the Hydraulics of Wells*. (Eds.: Ahmed, N; Taylor, SW; Sheng, Z), American Society of Civil Engineers, p1-36.

Durant, JL; **Jacobs, B**; Shanahan, P. 2008. "Historical Inputs of N-Nitrosodimethylamine to the Public Drinking Water Supply in Wilmington, Massachusetts." In *Proceedings of the World Environmental & Water Resources Congress*, Honolulu, Hawai'i, May 12-16.

Jacobs, BL; Gelhar, LW. 2005. "Effective properties of two-phase flow in heterogeneous aquifers." *Water Resour. Res.* 41(1). doi: 10.1029/2004WR003232.

Jacobs, B; Fitzgerald, R; Wilhelm-Miralles, F. 2004. "Modelling of natural attenuation." In *Natural Attenuation of Hazardous Wastes*. (Eds.: Surampalli, R; Ong, SK; Seagren, E; Nuno, J; Banerji, S), American Society of Civil Engineers, p73-92.



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