

BRIAN S. CARUSO, Ph.D., P.E.



PERSONAL INFORMATION:

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PROFESSIONAL SUMMARY/HIGHLIGHTS:

- Over 20 years of experience in water resources and environmental engineering, science, planning and management including consulting, government, and academia. I have been responsible for managing over 30 multidisciplinary professional staff and \$10 million annually in projects.
- Currently Associate Professor in Dept. of Civil and Natural Resources Engineering at the University of Canterbury in Christchurch, New Zealand.
- Chief of the Wetlands and Watersheds Unit/Supervisory Environmental Scientist, and Technical Liaison/ Environmental Scientist with the US Environmental Protection Agency Region 8 and Office of Research and Development in Denver, Colorado from 2004-2009.
- Director of Technical Services, a member of the Executive Management Team, for natural resources science, engineering, and management with the Otago Regional Council in Dunedin, New Zealand from 1996-2000.
- Ph.D. in Hydrology and Water Resources/Environmental Engineering from Colorado State University.
- 15 years of consulting engineering and management experience throughout the western US and internationally.
- Associate Editor for Riparian Ecology and Management for the Journal of the American Water Resources Association, with 35 peer-reviewed publications in international journals and over 50 technical consulting reports.
- Secured over \$5 million in consulting contracts and research grants.
- Expertise in surface and groundwater hydrology/water quality; hydrologic, hydraulic and contaminant fate and transport modelling; environmental assessment/impact analysis; wetlands and riparian ecology and management; floodplain management; risk analysis; nonpoint source pollution and stormwater management/best management practices; contaminated sites and mine site investigation and remediation; hydropower/energy development and impact mitigation; and ecosystem restoration.

CURRENT POSITION:

2009-present: Associate Professor - University of Canterbury, Dept. of Civil and Natural Resources Engineering, Christchurch, New Zealand. Teach and coordinate courses in Water Resources Engineering, Ecological Engineering, and Integrated Catchment Analysis. Perform research and supervise students as part of the Hydrological and Ecological Engineering Research Group on surface and groundwater hydrology/water quality; hydrologic, hydraulic and contaminant fate and transport modelling; wetlands and riparian ecology and management; floodplain management; nonpoint source pollution and stormwater management; contaminated sites and mine site investigation and remediation; hydropower/energy development and impact mitigation; and ecosystem restoration. Director of 3rd Professional Year Studies (senior students) 2010-2012. Chair of the Department Water Cluster 2012. Member of the Joint Working Group for the Waterways Centre for Freshwater Management.

2009-present: Director - Hydroecologic Research, Christchurch, New Zealand (part-time). Consultant to industry and government on water resources and environmental projects.

PAST POSITIONS:

2006-2009: Chief, Wetlands and Watersheds Unit/Supervisory Environmental Scientist – US Environmental Protection Agency (US EPA) Region 8 Ecosystems Protection and Remediation Program, Denver, Colorado. Managed Clean Water Act wetlands and watersheds protection and restoration programs throughout the Rocky Mountains and Plains region in six western states (Colorado, Montana, North and South Dakota, Utah, and Wyoming). Managed 10 professional staff, as well as consultants and grantees, working on regional and site-specific research and monitoring, regulatory protection, and restoration of aquatic resources and watersheds impacted by agriculture, urban development, and industry. This included monitoring, assessment, and analysis of impacts to wetlands, riparian areas, streams, rivers and lakes; development of policy and strategic plans; protection and mitigation/restoration program development; management of the Section 404 permitting program; administering contracts and grants with other organizations to help build capacity; and community outreach and education. Responsible for strategic and annual planning, budgeting, operations, reporting, and a \$5 million annual budget. Collaborated with a wide range of US EPA, federal, state and local government, and stakeholder organizations, and interacted with other scientists, policy analysts, and government and elected officials.

2004-2006: Technical Liaison/Environmental Scientist – US EPA Office of Research and Development and Region 8, Denver, Colorado. Technical liaison between the US EPA Office of Research and Development and Region 8 responsible for improving integration between research, science, engineering, and technology with policy and management in the region (six western states), nationally, and internationally. Provided high-level Superfund and other contaminated site technical support, and worked on investigation and remediation of numerous major mining sites and other hazardous waste sites across the region. A primary component of this work included improving metals fate and transport modeling and passive wetland treatment system design, operation, and monitoring at mine sites. Led the development of workshops and conferences; collaborated with a wide range of US EPA, federal, state and local government, and stakeholder organizations; and interacted with other scientists, policy analysts, and government officials. Served on numerous national US EPA and other federal agency committees and advisory boards. Also secured a \$325,000 grant from the U.S. State Department and led a multidisciplinary international research team on “Regional Evaluation of Mining-Related Metals Contamination, Risks, and Innovative Remediation Technologies in Ukraine and Georgia” as part of their Former Soviet Union Biochemical Weapons Redirect Program.

2000-2004: Senior Project Manager – CDM, Inc., Denver, Colorado. Senior Project Manager for a wide range of environmental and water resources projects in the western US, including senior advisor to US EPA on ecosystem investigation and restoration projects. Work included hydrologic and water quality studies and modeling; watershed, river, and wetlands restoration; environmental impact assessment; Superfund/contaminated sites investigation and remediation; abandoned mine lands reclamation; and permitting for hydroelectric power re-licensing. Also responsible for technical review of work products for US EPA, US Forest Service, US Army Corps of Engineers, Bureau of Reclamation, local government agencies, and private industrial clients.

1997-2000: Director of Technical Services - Otago Regional Council, Dunedin, New Zealand. Managed the environmental/resource science, water resources management/river engineering, and land resources management programs for the council, including over 30 multidisciplinary professional staff and a \$10 million annual budget. This included research and monitoring of surface and groundwater hydrology and quality, aquatic ecology, wetlands, soils, point source discharges, and contaminated sites throughout the region. Also responsible for river and wetland restoration, flood and floodplain management, watershed and nonpoint source pollution management, invasive species management, and stakeholder collaboration as part of these programs. Included leading and mentoring staff, budget planning and tracking, program effectiveness evaluation and reporting, and working with other scientists, policy analysts, and government and elected officials.

1996–1998: Assistant Professor – School of Earth Sciences, Victoria University of Wellington, New Zealand. Taught undergraduate and graduate courses in environmental science, physical environmental processes, environmental impact assessment, and hydrology and water resources. Supervised graduate students and conducted research on environmental impacts of mining and agriculture, particularly contaminant transport and water quality impacts. Research projects included evaluation of nutrient sources and transport in steep, agricultural hill country and assessment of environmental and socioeconomic costs and benefits of gold mining in New Zealand.

1989-1996: Manager of Environmental Engineering - SM Stoller Corp, Boulder, Colorado. Managed a group of 10 environmental scientists, engineers, and technicians, and served as Project Manager for wide range of environmental studies/engineering projects in the western US. Projects included site-wide surface water and sediment monitoring and ecological risk assessment at high-profile contaminated sites, including the Rocky Flats Environmental Technology Site and numerous mine sites, and many other environmental and water resources projects in the Rocky Mountains involving hydrologic and water quality studies and ecosystem restoration. Responsible for senior technical review of all work products, mentoring of staff, and business development.

1993-1995: Research Associate/Co-principal Investigator - Colorado State University, Ft Collins, CO/US EPA Region 8, Denver, Colorado. Conducted applied research on the development of a watershed-based methodology for assessment of nonpoint source pollution from abandoned metal mines as part of PhD dissertation for US EPA. The study site was the Animas River Basin in the San Juan Mountains, Colorado.

1986-1989: Senior Hydrologist – Morrison Knudsen Corp., Denver, Colorado. Performed surface and groundwater investigations, hydrologic and water quality monitoring and modeling, risk assessment, RI/FS, and restoration planning and design for the Rocky Mountain Arsenal Superfund site and other contaminated sites in the western US.

1984-1986: Research Assistant - University of Colorado, Institute of Arctic and Alpine Research, Boulder, Colorado. Conducted hydrologic and water quality studies and modeling of the City of Boulder municipal alpine watershed, Colorado, as part of MS research.

EDUCATION:

PhD Hydrology and Water Resources/Environmental Engineering, Colorado State University
MS Water Resources and Environmental Engineering, University of Colorado
BS Environmental and Forest Biology, State University of New York College of Environmental Science & Forestry

AWARDS:

US EPA Office of Research and Development Superior Accomplishment Award 2004, 2005, 2006
National Academy of Engineering one of 100 Outstanding Young Engineers 2001
IBM/Colorado State University Environmental Engineering Graduate Fellowship
University of Colorado Research Assistantship
State University of New York Regents Scholarship

PROFESSIONAL ACTIVITIES:

Member

American Geophysical Union, 2004 to present
American Water Resources Association, 1995 to present
International Association of Hydrological Sciences, 1996 to present
New Zealand Hydrological Society, 1996 to present
Organizing Committee, 2007 Annual Conference
Associate Editor for Riparian Ecology and Management, *Journal of the American Water Resources Association*
Journal Reviewer: *Journal of Environmental Engineering*, *Environmental Management*, *Journal of Environmental Management*, *Environmental Monitoring and Assessment*, *Hydrological Sciences Journal*, *Journal of Hydrology*, *Journal of Hydrology (New Zealand)*, *Wetlands*, *Ecohydrology*

Book reviews: *Journal of the American Water Resources Association*

Proposal Reviews

US EPA Regional Applied Research Effort (RARE) grants 2004, 2006, 2007
US EPA Science to Achieve Results (STAR) Small Business Innovative Research (SBIR) grants 2006
US State Department US-Egypt Joint Science and Technology Program grants 2005
US EPA Region 8 Environmental Education grants 2005
US EPA Region 8 Regional Priority grants 2005
US EPA Mine Waste Technology Program grants 2004, 2005
US EPA Community Action for a Renewed Environment (CARE) grants 2004

Organizer

US EPA, National Center for Disease Control and Public Health, Science and Technology Center of Ukraine, Environmental Characterization (Ground Water and Surface Water) and Risk Assessment at Hard Rock Mine Sites Workshop, Tbilisi, Georgia, 2009
New Zealand Hydrological Society Annual Meeting, Taupo, New Zealand, 2007
US EPA Office of Research and Development Metals Fate and Transport Modeling Workshop, Denver, CO, 2007
US EPA Abandoned Mine Lands Innovative Treatment Technologies Workshop, Coeur d'Alene, ID, 2007
US EPA Council on Regulatory Environmental Modeling, Integrated Modeling for Integrated Environmental Decision-Making Workshop, Research Triangle Park, NC, 2007
US EPA Office of Research and Development Hard Rock 2006 Conference, Tucson, AZ, 2006
US EPA Abandoned Mine Lands Innovative Treatment Technologies Workshop, Denver, CO, 2005
US EPA Council on Regulatory Environmental Modeling, Region 8 Metals Fate and Transport Modeling for Contaminated Sites and Mercury TMDLs Seminar, Denver, CO, 2005

Moderator

US EPA Office of Research and Development Metals Fate and Transport Modeling Workshop, Denver, CO, 2007
US EPA Office of Research and Development Hard Rock 2006 Conference, Tucson, AZ, 2006
US EPA Abandoned Mine Lands Innovative Treatment Technologies Workshop, Denver, CO, 2005

SELECTED REFEREED ARTICLES AND CONFERENCE PRESENTATIONS:

Caruso, B.S. In Press. GIS-based classification of streams in a mountain watershed for jurisdictional evaluation. *Journal of the American Water Resources Association*.

- Caruso, B.S., O'Sullivan, A.D., Faulkner, S., Sherratt, M., and Clucas, R. 2013. Agricultural diffuse nutrient pollution transport in a high country wetland complex. *Water, Air, and Soil Pollution* 224:1695. DOI: 10.1007/s11270-013-1695-x.
- Caruso, B.S., Edmondson, L., and Pithie, C. 2013. Braided river flow and invasive vegetation dynamics in the New Zealand Southern Alps. *Environmental Management* 52:1-18. DOI: 10.1007/s00267-013-0070-4.
- Caruso, B.S., Ross, A., Shuker, C., and Davies, T. 2013. Flood hydraulics and impacts on invasive vegetation in a braided river floodplain, New Zealand. *Environment and Natural Resources Research* 3(1):92-110. DOI: 10.5539/enrr.v3n1p92.
- Caruso, B.S., Rademaker M., Balme, A., and Cochrane T.A. 2013. Flood modelling in a high country mountain catchment, New Zealand: comparing statistical and deterministic model estimates for ecological flows. *Hydrological Sciences Journal* 58(2):1-14. DOI:10.1080/02626667.2012.752577.
- Caruso, B.S. 2013. Hydrologic modification from hydroelectric power operations in a mountain basin. *River Research and Applications* 29(4):420-440. DOI: 10.1002/RRA.1609.
- Arias, M.E., Cochrane, T.A., Piman, T., Kumm, M., Caruso, B.S., and Killeen, T.J. 2012. Landscape assessment of flooding and habitats of the Tonle Sap Lake Floodplain, Cambodia: historical interaction and future scenarios. *Journal of Environmental Management* 112:53-66. DOI: 10.1016/j.jenvman.2012.07.003.
- Caruso, B.S., Mirtskhulava, M., Wireman, M., Schroeder, W., Kornilovich, B., and Griffin, S. 2012. Effects of manganese mining on water quality in the Caucasus Mountains, Republic of Georgia. *Mine Water and the Environment* 31:16-28. DOI: 10.1007/s10230-011-0163-3.
- Butler, B.A., Caruso, B.S., and J.F. Ranville. 2009. Reactive transport modeling of remedial scenarios to predict cadmium, copper, and zinc in North Fork Clear Creek, Colorado. *Remediation Journal* 19(4):101-119. DOI 10.1002/rem.20221.
- Caruso, B.S. and M. Bishop. 2009. Seasonal and spatial variation of metal loads from natural flows in the Upper Tenmile Creek Watershed, Montana. *Mine Water and the Environment* 28:166-181. DOI 10.1007/s10230-009-0073-9.
- Caruso, B.S. and H.E. Dawson. 2009. Impacts of groundwater metal loads from bedrock fractures on water quality of a mountain stream. *Environmental Monitoring and Assessment* 153:405-425. DOI 10.1007/s10661-008-0367-6.
- Caruso, B.S., Cox, T.J., Runkel, R.L., Velleux, M.L., Bencala, K.E., Nordstrom, D.K., Julien, P.Y., Butler, B.A., Alpers, C.N., Marion, A., and K.S. Smith. 2008. Metals fate and transport modeling in streams and watersheds: state-of-the-science and USEPA workshop review. *Hydrological Processes* 22:4011-4021.
- Caruso, B.S. and T.J. Cox. 2008. Modeling effects of natural flow restoration on metals fate and transport in a mountain stream impacted by mine waste. *Journal of the American Water Resources Association* 44(3):535-551.
- Caruso, B.S. and P.W. Downs. 2007. Rehabilitation and flood management planning in a steep, boulder-bedded stream. *Environmental Management* 40:256-271.
- Caruso, B.S. 2006. Effectiveness of braided, gravel-bed river restoration in the Upper Waitaki Basin, New Zealand. *River Research and Applications* 22:905-922.
- Caruso, B.S. 2006. Project River Recovery: Restoration of braided gravel-bed river habitat in New Zealand's high country. *Environmental Management* 37(6):840-861.
- Caruso, B.S. 2005. Simulation of metals total maximum daily loads and remediation in a mining-impacted stream. *Journal of Environmental Engineering* 131(5):777-789.
- Caruso, B.S. 2004. Modeling metals transport and sediment/water interactions in a mining-impacted mountain stream. *Journal of the American Water Resources Association* 40(6):1603-1615.
- Caruso, B.S. 2003. Water quality simulation for planning restoration of a mined watershed. *Water, Air and Soil Pollution* 150(1-4):221-234.
- Caruso, B.S. and K. Wangerud. 2002. Deterministic and stochastic water balance modeling of the Gilt Edge Mine Superfund Site, South Dakota. *Society for Mining, Metallurgy, and Exploration Transactions* 2002, 312:104-112.

REFEREED REPORTS AND REPORT CHAPTERS:

Over 50 scientific and technical refereed reports and report chapters, including consultant and government reports.

REFERENCES: Available upon request.

A full list of projects, publications, courses taught, and students is also available on request as an Attachment to this resume.