

Jeff Langman

Hydrologist

hydrogeochem.ui@gmail.com

www.hydrogeochemica.com

mobile: (208) 892-4590

Google Scholar: <https://scholar.google.com/citations?user=4zYyHn4AAAAJ&hl=en>

Summary

Motivated and talented environmental scientist driven to pursue personal, research, and environmental ambitions. Diverse and exceptional record of hydrologic research success with a focus on mining and mining-impacted environments.

Work Experience

- Principal Hydrologist* 2016–present
Hydrogeochemica, LLC, Moscow, Idaho, United States
Primary duties: evaluate potential impacts from mine drainage and metal mobility
- Assistant Professor of Hydrogeochemistry* 2015–present
Department of Geological Sciences, University of Idaho, United States
Primary duties: teaching and research of mineral weathering and mobility of metals in the environment
- Research Fellow* 2012–2014
Groundwater Geochemistry and Remediation Group, Department of Earth and Environmental Sciences, University of Waterloo, Canada
Primary duties: research of sulfide mineral oxidation and acid rock drainage, weathering experiments
- Visiting Assistant Professor/Teaching Fellow* 2010–2012
Chemistry and Petroleum and Energy Engineering departments, American University in Cairo, Egypt
Primary duties: science education, Nile Basin resource investigations, salinity and climate change
- Hydrologist* 2000–2012
New Mexico Water Science Center, United States Geological Survey
Primary duties: hydrologic resource investigations through inter-agency projects, aquifer and basin scale
- Research Assistant/Lecturer* 2005–2009
Environmental Geochemistry Research Group, Geological Sciences, University of Texas at El Paso, U.S.
Primary duties: non-traditional isotope and source-water tracking research, hydrogeology lecturer
- Lecturer* 2008–2009
Department of Geological Sciences, El Paso Community College, United States
Primary duties: geology education and outreach
- Associate Hydrologist* 1998–2000
Water and Environmental Hydrology Market Groups, Environmental Science Associates, United States
Primary duties: environmental review of potential water resource impacts from human influences
- Research Assistant/Water Quality Specialist* 1995–1997
Department of Natural Resources Management & Environmental Sciences
California Polytechnic State University, San Luis Obispo
California Central Coast Regional Water Quality Control Board, United States
Primary duties: estuary and river monitoring, paired-watershed study for sediment and nutrient control for protection of watershed resources

Education

Ph.D. 2008 (Geology—Hydrogeochemistry), University of Texas at El Paso

Thesis: *A multi-tracer study of saltwater origin, cross-formational flow, and the geochemical evolution of groundwater in the Southern High Plains Aquifer along the Western Caprock Escarpment*

M.S. 1997 (Natural Resources—Hydrology), California Polytechnic State University, San Luis Obispo

B.S. 1992 (Communications and Business), California Polytechnic State University, San Luis Obispo

Teaching Experience

University of Idaho: Groundwater Hydrology, Chemical Hydrology, Env. Hydrology, Geochemistry

University of Waterloo (guest lectures): Introductory Hydrology, Geochemistry, Environmental Geology

American University in Cairo: Scientific Thinking, Man and the Environment, Chemistry Science Lab

University of Texas at El Paso: Principles of Earth Science, Hydrogeology

El Paso Community College: Principles of Geology, Physical Geology, Historical Geology

Peer-Reviewed Publications

Langman, J.B., Torso, K., Moberly, J.G., 2018, Seasonal and basinal influences on the formation and transport of dissolved trace metal forms in a mining-impacted riverine environment, *Hydrology* 5(3), doi: 10.3390/hydrology5030035.

Wilson, D., Amos, R.T., Blowes, D.W., Langman, J.B., Smith, L., Segó, D.C., 2018, Diavik Waste Rock project: Scale-up of a reactive transport model for temperature and sulfide-content dependent geochemical evolution of waste rock, *Applied Geochemistry*, doi: 10.1016/j.apgeochem.2018.07.001.

Langman, J.B., Moberly, J.G., 2018, Weathering of a mined quartz-carbonate, galena-sphalerite ore and release and transport of nanophase zinc carbonate in circumneutral drainage, *Journal of Geochemical Exploration* 188, 185–193, doi: 10.1016/j.gexplo.2018.01.024.

Wilson, D., Amos, R.T., Blowes, D.W., Langman, J.B., Ptacek, C.J., Smith, L., Segó, D.C., 2018, Diavik Waste Rock Project: A conceptual model for temperature and sulfide-content dependent geochemical evolution of waste rock—Laboratory scale, *Applied Geochemistry* 89, 160–172. doi: 10.1016/j.apgeochem.2017.12.007.

Langman, J.B., Veeramani, H., Blowes, D.W., Bailey, B., Wilson, D., Smith, L., Segó, D.C., Amos, R.T., Holland, S.P., 2017, Waste rock biogeochemistry in a permafrost environment: Examination of a cover design for a low sulfide, granitic waste rock, *Geomicrobiology Journal*, 34(8), 1–14, doi: 10.1080/01490451.2016.1238978.

Langman, J.B., Blowes, D.W., Amos, R.T., Atherton, C., Wilson, D., Smith, L., Segó, D.C., Sinclair, S.A., 2017, Influence of a tundra freeze-thaw cycle on sulfide oxidation and metal leaching in a low sulfur, granitic waste rock, *Applied Geochemistry* 76, 9–21, doi: 10.1016/j.apgeochem.2016.11.010.

Langman, J.B., Blowes, D.W., Sinclair, S.A., Krentz, A., Amos, R.T., Smith, L.J.D., Pham, H.N., Segó, D., Smith, L., 2015, Early evolution of weathering and sulfide depletion of a low-sulfur, granitic, waste rock in an Arctic climate: a laboratory and field site comparison, *Journal of Geochemical Exploration* 156, 61–71, doi: 10.1016/j.gexplo.2015.05.004.

- Langman, J.B., Blowes, D.W., Veeramani, H., Wilson, D., Smith, L., Segó, D., Paktunc, D., 2015, The evolution of sulfur species and nickel coordination with weathering of pyrrhotite in a low-sulfide, granitic, waste rock, *Chemical Geology* 401, 169–179, doi: 10.1016/j.chemgeo.2015.02.024.
- Langman, J.B., 2015, Spatial evolution of $\delta^2\text{H}$ and $\delta^{18}\text{O}$ in the hydrologic cycle of the Nile Basin, *Journal of Arid Land* 7(2), 133–145. doi: 10.1007/s40333-014-0078-5.
- Langman, J.B., Moore, M.L., Ptacek, C.J., Smith, L., Segó, D., Blowes, D.W., 2014, Diavik Waste Rock Project: Evolution of mineral weathering, element release, and acid generation and neutralization during a five-year humidity cell experiment, *Minerals* 4, 257–278. doi: 10.3390/min4020257.
- Langman, J.B., Engdahl, N.B., 2014, Evaluation of a pressure pulse in a fractured-rock aquifer to reduce uncertainty of hydraulic conductivity measurements, Rio Grande Rift, New Mexico, United States, *Water and Environment Journal* 28(3), 340–349. doi: 10.1111/wej.12040.
- Langman, J.B., Ellis, A.S., 2013, Geochemical indicators of interbasin groundwater flow within the southern Rio Grande Rift, New Mexico, *Environmental Earth Sciences* 66(5), 1285–1303. doi: 10.1007/s12665-012-1827-4.
- Robertson, A.J., Henry, D.W., Langman, J.B., 2013, Geochemical evidence of groundwater flowpaths and the fate and transport of constituents of concern in the alluvial aquifer at Fort Wingate Depot Activity, New Mexico, U.S. Geological Survey Scientific Investigations 2013–5098, 89 p.
- Callegary, J., Langman, J., Leenhouts, J., Martin, P., 2013, Assuring water availability and quality in the 21st Century, Chapter 4, *in* Updike, R.G., Ellis, E.G., Page, W.R., Parker, M.J., Hestbeck, J.B., Horak, W.F. (eds.) *United States–Mexican Borderlands—Facing Tomorrow’s Challenges Through USGS Science*, U.S. Geological Survey Circular 1380, 318 p.
- Langman, J.B., 2012, Geologic framework, regional aquifer properties, and spring, creek, and seep properties of the upper San Mateo Creek Basin near Mount Taylor, New Mexico, U.S. Geological Survey Scientific Investigations 2012–5019, 96 p.
- Langman, J.B., Ellis, A.S., 2010, Geologic influences on source-water mixing along a paleochannel in the Southern High Plains Aquifer, New Mexico, *Carbonates and Evaporites* 25(3), 247–265. doi: 10.1007/s13146-010-0029-y.
- Langman, J.B., Ellis, A.S., 2010, A multi-isotope approach (δD , $\delta^{18}\text{O}$, $^{87}\text{Sr}/^{86}\text{Sr}$, and $\delta^{11}\text{B}$) for identifying saltwater intrusion and resolving groundwater evolution along the western Caprock Escarpment of the Southern High Plains, New Mexico, *Applied Geochemistry* 25(1), 159–174. doi: 10.1016/j.apgeochem.2009.11.004.
- Ellis, A., Carney, M., Langman, J., 2010, Geochemical analysis of saline injection of concentrates and saline aquifers in El Paso, Texas, Southwest Consortium for Environmental Research and Policy in cooperation with the U.S. Environmental Protection Agency W-06-05, 28 p.
- Langman, J.B., 2009, Travel time of the Rio Grande in the Middle Rio Grande Basin, 2003–05, U.S. Geological Survey Scientific Investigations 2007-5292, 32 p.
- Langman, J.B., Robertson, A.J., Bynum, J., Gebhardt, F.E., 2008, Geochemical trends and natural attenuation of RDX, nitrate, and perchlorate in the Hazardous Test Area fractured-granite aquifer, New Mexico, 1996–2006, U.S. Geological Survey Scientific Investigations 2008-5157, 45 p.
- Langman, J.B., Falk, S.E., Gebhardt, F.E., Blanchard, P.J., 2006, Groundwater hydrology and water quality of the Southern High Plains Aquifer, Cannon Air Force Base, Curry County, New Mexico, U.S. Geological Survey Scientific Investigations 2006-5280, 61 p.

- Langman, J.B., Nolan, E.O., 2005, Streamflow and water-quality trends of the Rio Chama and Rio Grande, northern and central New Mexico, water years 1985 to 2002, U.S. Geological Survey Scientific Investigations 2005-5118, 36 p.
- Langman, J.B., Anderholm, S.K., 2005, Effects of reservoir installation, San Juan-Chama Project water, and reservoir operations on streamflow and water quality in the Rio Chama and Rio Grande, northern and central New Mexico, 1938–2000, U.S. Geological Survey Scientific Investigations 2004-5188, 47 p.
- Langman, J.B., Gebhardt, F.E., Falk, S.E., 2004, Ground-water characterization of the High Plains Aquifer, Melrose Bombing Range, Cannon Air Force Base, Roosevelt County, New Mexico, 2002–03, U.S. Geological Survey Scientific Investigations 2004-5158, 42 p.
- Myers, N.C., Langman, J.B., 2004, Assessment of the potential for downward migration of landfill asbestos to the uppermost aquifer, Cannon Air Force Base, New Mexico, U.S. Geological Survey Report, 25 p.
- Wilcox, R.W., Langman, J.B., 2003, Hydrogeology and water quality of the Open Burn/Open Detonation Site at the Hazardous Test Area, U.S. Army White Sands Missile Range, New Mexico, 1996–2000, U.S. Geological Survey Report, 64 p.
- Langman, J.B., 2002, Potential indicators of wastewater contamination in the bolson-fill aquifer, White Sands Missile Range, New Mexico, 2000, U.S. Geological Survey Report, 27 p.

Conference Papers

- Wilson, D., Amos, R.T., Blowes, D.W., Langman, J.B., Segó, D.C., Smith, L., 2018, Diavik Waste Rock Project: A mechanistic approach to the prediction of the geochemical evolution of sulfidic waste rock *in* Proceedings of the 11th International Conference on Acid Rock Drainage, International Mine Water Association Conference, Pretoria, South Africa, ISBN not yet assigned.
- Wilson, D., Amos, R.T., Blowes, D.W., Langman, J.B., Segó, D.C., Smith, L., 2015. Diavik Waste Rock Project: reactive transport simulation of sulfide weathering *in* Proceedings of the 10th International Conference on Acid Rock Drainage, International Mine Water Association Annual Conference, Santiago, Chile (GECAMIN), ISBN 978-956-9393-27-3.
- Blowes, D.W., Holland, S.P., Sinclair, S.A., Langman, J.B., Bailey, B.L., Amos, R.T., Krentz, A., Smith, L., Ptacek, C.J., Pham, H.N., Segó, D.S., Macdonald, G., 2015. Diavik Waste Rock Project: An integrated study of waste rock evolution *in* Proceedings of the Symposium 2015 on Mines and the Environment, Rouyn-Noranda, QC, Canada.
- Carney, M., Ellis, A., Bullen, T., Langman, J., 2009. Geochemistry of Yukon and Copper River tributaries, Alaska. Proceedings of the World Environmental and Water Resources Congress, 5857–5863.

Non-Peer Reviewed Reports (Multiple Authors, Nonpublic)

- 1999 North Slough Tidal Restoration Plan, Environmental Science Associates
- 1998 San Leandro Marshland Enhancement Monitoring Report, Environmental Science Associates
- 1996 & 1997 Annual Report for the Nonpoint Source Pollution and Treatment Measure Evaluation for the Morro Bay Estuary and Watershed, Central Coast Regional Water Quality Control Board

Conference Abstracts

- Langman, Moberly, Child, 2018, Formation and Stability of Nanophase Metal Particles in Mining-Impacted Lacustrine Sediments, Resources for Future Generations, Vancouver, Canada

- Duckett, Langman, 2018, Isotopic tracers for discriminating recharge and subsystems in a Columbia River Basalt Group Aquifer, GSA Cordilleran, Flagstaff, AZ
- Child, Moberly, Langman, 2018, Evaluation of metal mobility in Lake Coeur d'Alene sediments with alteration of oxidation-reduction conditions from a simulated algal bloom, Society for Freshwater Science (SFS) Annual Meeting, Detroit, Michigan.
- Wilson, Amos, Blowes, Langman, Ptacek, Smith, Segó, 2017, Diavik Waste Rock Project: Scale-up of a reactive transport conceptual model for temperature and sulfide dependent geochemical evolution, Goldschmidt
- Langman and Moberly, 2017, Natural metal nanoparticles and disassociation buffering in circumneutral mine drainage, Goldschmidt
- Peach, Child, Langman, Moberly, 2017, What is the fate of heavy metals at the bottom of Lake Coeur d'Alene under anoxic conditions?, Idaho Conference on Undergraduate Research
- Larsen, Hudson, Peach, Child, Langman, Moberly, 2017, Exploring the fate of heavy metals in anaerobic Coeur d'Alene Lake sediment, Idaho Network of Biomedical Research Excellence Research Conference
- Torso, Moberly, and Langman, 2016, Seasonal controls on the formation and transport of metal nanoparticles in a mining-impacted riverine environment, Rocky Mountain Section, GSA, 68th Annual Meeting
- Langman, Veeramani, Blowes, Wilson, Smith, Segó, Amos, and Holland, 2016, Waste rock biogeochemistry in a permafrost environment: Examination of a cover design for a low sulfide, granitic waste rock, NGWA Summit
- Wilson, Amos, Blowes, Langman, Segó, and Smith, 2015, Diavik Waste Rock Project: Reactive transport simulation of sulfide weathering, International Mine Water Association, 10th International Conference on Acid Rock Drainage
- Sinclair, Langman, Krentz, Amos, Segó, Smith, and Blowes, 2014, Temporal and spatial contributions to element release from a low sulfide waste rock pile in the Canadian Arctic, GSA Annual Meeting
- Langman, Holland, Sinclair, Wilson, Smith, Segó, and Blowes, 2014, Weathering evolution of nickel and sulfur in pyrrhotite within a low-sulfide, granitic, mine-waste rock in the Canadian Arctic, Goldschmidt
- Sinclair, Langman, Blowes, Segó, and Smith, 2014, Influence of freeze-thaw dynamics on weathering and element release from a low-sulfide, waste-rock pile in the Canadian Arctic, Geological Association of Canada and Mineralogical Association of Canada Joint Annual Meeting
- Langman, Holland, Sinclair, and Blowes, 2013, Controls on weathering of pyrrhotite in a low-sulfide, granitic mine-waste rock in the Arctic, Canada, AGU Fall Meeting
- Langman, 2012, Uncertainty in the downscaling of climate models for regional climate change predictions and the possibility of water-quality proxies to reduce base data unreliability, Nile Basin example, 50th Estuarine and Coastal Shelf Science
- Langman, 2011, Globalizing local hydrologic data for validation of regional climate change predictions and the understanding of resource dynamics in areas of increasingly stressed hydrologic resources, Arab-American Frontiers Symposium
- Langman and Ellis, 2009, Saltwater intrusion and cross-formational flow in the Southern High Plains Aquifer along the western Caprock Escarpment, New Mexico, NGWA Ground Water Summit
- Langman, 2009, A multi-isotope approach to resolve geochemical evolution of groundwater affected by multiple source waters, cross-formational flow, saltwater intrusion, and agricultural recharge, Smithsonian Tropical Research Institute Symposium on Tropical Hydrology

Ellis, Langman, Carney, 2009, Weathering in central Alaskan Rivers: sulfur sources and cycling using S and O Isotopes, AGU Fall Meeting

Carney, Ellis, Bullen, and Langman, 2009, Isotope geochemistry of the Yukon and Copper Rivers, Alaska: continental weathering in a changing environment, 23rd Annual University of Texas at El Paso Geological Sciences Colloquium

McCarney, Ellis, and Langman, 2008, Geochemistry of the Yukon and Copper River tributaries in Alaska: continental weathering in a changing environment, AGU Fall Meeting

Langman and Ellis, 2007, A multi-isotope (O, H, Sr, B) and age-dating (^3H - ^3He , ^{14}C) study of saline-water intrusion and cross-formational flow in the Southern High Plains Aquifer, AGU Fall Meeting

Funding Sources

University of Idaho: National Science Foundation, National Institutes of Health, U.S. Geological Survey, Idaho Department of Environmental Quality, U.S. Office of Surface Mining and Remediation, University of Idaho, Palouse Basin Aquifer Committee, Canadian Light Source

University of Waterloo: Natural Sciences and Engineering Research Council of Canada, Argonne National Laboratories, Canadian Light Source

American University in Cairo: Research Institute for a Sustainable Environment

U.S. Geological Survey: U.S. Forest Service, U.S. Army Corps of Engineers, U.S. Air Force, U.S. Army, Albuquerque-Bernalillo County Water Authority, State of New Mexico

University of Texas at El Paso: Southwest Consortium for Environmental Research and Policy

Environmental Science Associates: City of San Francisco, National Park Service, City of San Leandro, East Bay Municipal District

California Polytechnic State University: U.S. Environmental Protection Agency

Training and Certification

Occupational Safety and Health Administration: Hazardous Waste Operations (HAZWOPER), 2001–2018

U.S. Environmental Protection Agency: Field-Based Site Characterization Technologies Training, 2000;

U.S. Geological Survey: Water Quality, 2003; Aquatic Chemistry, 2004; Groundwater Geochemistry, 2005

U.S. Forest Service: Wildland Fire Behavior/Basic Firefighter and Incident Command System, 2002

U.S. Army/U.S. Air Force: Unexploded Ordinance Hazards, 2000 and 2003; Range Hazards, 2001 and 2003

Red Cross: First Aid, CPR, and AED, certified 2001, 2004, 2013, 2014

Professional Societies

American Geophysical Union, Geochemical Society, National Ground Water Association, Geological Society of America, International Mine Water Association

Equipment and Software Familiarity

Mineral/rock analysis equipment: optical microscopy, XRD, μ -XRD, XRF, laser ablation, SEM, synchrotron radiation and x-ray absorption spectroscopy, carbon/sulfur analyzer, humidity cell experiments,

anaerobic chambers, sieves and shakers, lyophilizers, autoclaves, shakers/tilt tables/rotators, sonic baths, vortex mixers, DNA extraction kits, general wet chemistry applications

Solute analysis equipment: gas chromatograph, ion chromatograph, spectrometer, multi-parameter probes, field and laboratory probes

Field hydrologic equipment: transducers, various dataloggers and transmission platforms, weather stations, current meters, Bennett pumps, Grunfos pumps, bladder pumps, peristaltic pumps, auto samplers, survey equipment, churns, universal and gravity corers

Hydrogeology equipment installation and usage: direct-push drilling/coring (Geoprobe), overseeing of drilling operations including mud rotary and air hammer for well installation, well development through over-pumping and air surging, well protection installation according USEPA guidelines

Analytical software: SPLUS, ProStat, PSI-Plot, Veusz, Geochemist's Workbench, PHREEQC, NETPATH, PHAST, AquaChem, AQTESOLV, WELLCAD, Rockworks, Athena, SMAK, Orange, R Studio

Surface-water measurement: installed surface-water gages and water-chemistry probes, conducted stream reach surveying, developed discharge-height relations, maintained and modified continuous data collection platforms such as that include GOES data-transmission protocols

Groundwater measurement: extensive steel tape and e-tape use; performed multi-level sample collection through packer systems utilization; evaluated well logging outputs of caliper, acoustic, resistivity, neutron, and gamma data

Leadership and Community Participation

Faculty mentor to Geological Sciences, Environmental Sciences, Water Resources, and Chemical and Materials Engineering undergraduate and graduate students at the University of Idaho

Laboratory supervisor and safety officer in the Groundwater Geochemistry and Remediation Group in the Department of Earth and Environmental Sciences at the University of Waterloo, 2012–2014

Invited participant to the U.S. National Academies' Arab-American Science, Engineering, and Medicine Symposium sponsored by the Kuwait Institute for Scientific Research, 2011

Project chief of multi-year investigations concerning hydrologic resources in New Mexico for the U.S. Geological Survey, New Mexico Water Science Center, 2002–2011

Committee Chair for the Young Scientists Awards, International Atomic Energy Agency's International Symposium on Isotopes in Hydrology and Marine Ecosystems, Monaco, March 2011

Associate editor of *Mine Water and the Environment*; Ad hoc reviewer for *Journal of Arid Land*, *Journal of Environmental Monitoring and Assessment*, *Journal of Environmental Earth Sciences*, *Journal of Marine and Petroleum Geology*, *Atmospheric Research*, *Chemical Geology*, *Applied Geochemistry*

United States Naval Reserve, 2000 to 2007: Aerographer's Mate, 1st Class, Naval Operations Support Centers—USS Boxer and USS Tarawa amphibious support groups, US Fleet Activities Yokosuka support group