

NWRI Expert Panel for the California Department of Public Health

CV for Proposed Expert Panel Member:

- Michael A. Anderson, Ph.D.

MICHAEL A. ANDERSON, Ph.D.

ADDRESS

Department of Environmental Sciences
University of California, Riverside, CA 92521
(951) 827-3757
e-mail: michael.anderson@ucr.edu

EMPLOYMENT HISTORY

- *Chair*, Environmental Sciences, University of California, Riverside. 2010 – present.
- *Professor*, Environmental Sciences, University of California, Riverside. 2009 – present.
- *Associate Professor*, Environmental Sciences, University of California, Riverside. 1996 – 2009.
- *Assistant Professor*, Environmental Sciences, University of California, Riverside. 1990 - 1996.
- *Environmental Chemist*, University of Georgia. 1984 - 1987.
- *Hydrologist*, US Dept. of Interior, Bureau of Land Management, Coeur d'Alene, ID. 1984.

EDUCATIONAL BACKGROUND

- Ph.D., *Environmental Chemistry*. Virginia Tech, June, 1990.
- M.S., *Environmental Studies*. Bemidji State University, July, 1984.
- B.S., *Biology*. Illinois Benedictine College, May, 1982.

RESEARCH INTERESTS AND AREAS OF SPECIALIZATION

- Applied limnology and lake/reservoir management
- Surface water quality and modeling
- Fate of contaminants in waters, soils and sediments

RECENT RESEARCH PROJECTS

- *Environmental, Biological and Technical Support for Development of Species Conservation Habitat at the Salton Sea*. Funding Agency: California Dept. of Water Resources. 2010-2012.
- *Bathymetric, Sedimentological and Retrospective Water Quality Analysis of Lake Elsinore*. Funding Agency: Lake Elsinore-San Jacinto Watersheds Authority. 2010.
- *Managing Quagga Mussels in the Reservoirs of the Colorado River Aqueduct*. Funding Agency: Metropolitan Water District of Southern California. 2008-2010.

RECENT PROFESSIONAL ACTIVITIES

- Vice-Chair, IWA Lake and Reservoir Management Specialist Group (2013-2014)
- Guest Professor, Huazhong Agricultural University, Wuhan, China (2011-14)
- Associate Editor, *Lake and Reservoir Management* (2007 – present)
- Member, Integrated Watershed Management, Environmental Protection Admin., Taiwan (2009)
- Member, San Diego Indirect Potable Reuse/Reservoir Augmentation Panel, NWRI (2009-12)
- Member, Water Science Management Board, California Bay Delta Authority CALFED (2005)
- Member, USEPA Drinking Water (2000, 2002) & USDA Water Resources (2002, 2003) Panels
- Member, UC Water Resources Center Technical Advisory Committee (2001-05)

PEER-REVIEWED TECHNICAL ARTICLES

- Anderson, M.A., A. Komor and K. Ikehata. 2014. Flow routing with bottom withdrawal to improve water quality in Walnut Canyon Reservoir, CA. *Lake Reserv. Manage.* (in press).
- Anderson, M.A., J.L. Conkle, P. Pacheco and J. Gan. 2013. Use of hydroacoustic measurements to characterize bottom sediments and guide sampling and remediation of organic contaminants in lake sediments. *Sci. Tot. Environ.* 458-460:117-124.
- Martinez, D. and M.A. Anderson. 2013. Methane production and ebullition in a shallow, artificially aerated eutrophic temperate lake (Lake Elsinore, CA). *Sci. Tot. Environ.* 454-455:457-465.
- Wang, W., L. Delgado-Moreno, J. Conkle, M.A. Anderson, C. Amrhein, Q.F. Ye and J. Gan. 2012. Characterization of sediment contamination patterns by hydrophobic pesticides to preserve ecosystem functions of drainage lakes. *J. Soils Sediments* 12:1407-1418.
- Conkle, J.L., J. Gan and M.A. Anderson. 2012. Degradation and sorption of commonly detected PPCPs in wetland sediments under aerobic and anaerobic conditions. *J. Soils Sediments* 12:1164-1173.
- Reid, N.J., O. Holovachov and M.A. Anderson. 2012. Nematodes associated with the invasive quagga mussel (*Dreissena rostriformis bugensis*) in the Colorado River Aqueduct reservoirs, southern California, USA. *Nematology* 14:827-837.
- Anderson, M.A. and W.D. Taylor. 2011. Quantifying quagga mussel veliger abundance and distribution in Copper Basin Reservoir (California) using acoustic backscatter. *Water Res.* 45:5419-5427.
- Anderson, M.A. and P. Pacheco. 2011. Characterization of bottom sediments in lakes using hydroacoustic methods and comparison with laboratory measurements. *Water Res.* 45:4399-4408.
- Anderson, M.A. and J. Berkowitz. 2010. Aluminum polymers formed following alum treatment of lake water. *Chemosphere* 81:832-836.
- Reid, N.J., M.A. Anderson and W.D. Taylor. 2010. Distribution of quagga mussel veligers, *Dreissena bugensis*, in the reservoirs of the Colorado River Aqueduct. *Lake Reserv. Manage.* 26:328-335
- Kirby, M., S.P. Lund, W.P. Patterson, M.A. Anderson, B.W. Bird, L. Ivanovici, P. Monarrez and S. Nielsen. 2010. A Holocene Record of Pacific Decadal Oscillation (PDO)-Related Hydrologic Variability in Southern California (Lake Elsinore, CA). *J. Paleolimnol.* 44:819-839.
- Anderson, M.A. 2010. Influence of pumped-storage hydroelectric plant operation on a shallow polymictic lake: Predictions from 3-D hydrodynamic modeling. *Lake Reserv. Manage.* 26:1-13.
- Whiteford, J.K. and M.A. Anderson. 2009. Quantitation of diaminomaleonitrile using high performance liquid chromatography with UV and electrospray ionization mass spectrometric detection. *Anal. Lett.* 42:2567-2577.

- Reese, B.K. and M.A. Anderson. 2009. Dimethyl sulfide production in a saline eutrophic lake, Salton Sea, California. *Limnol. Oceanogr.* 54:250-261.
- Reese, B.K., M.A. Anderson and C. Amrhein. 2008. Hydrogen sulfide production and volatilization in a polymictic eutrophic saline lake, Salton Sea, California. *Sci. Tot. Environ.* 406:205-218.
- de Koff, J.P., M.A. Anderson and C. Amrhein. 2008. Geochemistry of iron in the Salton Sea, California. *Hydrobiol.* 604:111-121.
- Anderson, M.A., L. Whiteaker, E. Wakefield and C. Amrhein. 2008. Properties and distribution of sediment in the Salton Sea, California: An assessment of predictive models. *Hydrobiol.* 604:97-100.
- Rodriguez, I.R., C. Amrhein and M.A. Anderson. 2008. Laboratory studies on the coprecipitation of phosphate with calcium carbonate in the Salton Sea, California. *Hydrobiol.* 604:45-55.
- Rodriguez, I.R., C. Amrhein and M.A. Anderson. 2008. Reducing dissolved phosphorus loading to the Salton Sea with aluminum sulfate. *Hydrobiol.* 604:37-44.
- Lawson, R. and M.A. Anderson. 2007. Stratification and mixing in Lake Elsinore, California: an assessment of axial flow pumps for improving water quality in a shallow eutrophic lake. *Water Res.* 41:4457-4467.
- Kirby, M.E., S.P. Lund, M.A. Anderson and B.W. Bird. 2007. Insolation forcing of Holocene climate change in Southern California: a sediment study from Lake Elsinore. *J. Paleolimnol.* 38:395-417.
- Berkowitz, J., M.A. Anderson and C. Amrhein. 2006. Influence of aging on phosphorus sorption to alum floc in lake water. *Water Res.* 40:911-916.
- Breiner, J.M., M.A. Anderson, H.W.K. Tom and R.C. Graham. 2006. Properties of surface modified colloidal particles. *Clays Clay Miner.* 54:12-24.
- Berkowitz, J., M.A. Anderson and R.C. Graham. 2005. Laboratory investigation of aluminum solubility and solid-phase properties following alum treatment of lake waters. *Water Res.* 39:3918-3928.
- Mason, L.B., C. Amrhein, C.C. Goodson, M.R. Matsumoto and M.A. Anderson. 2005. Reducing sediment and phosphorus in tributary waters with alum and polyacrylamide. *J. Environ. Qual.* 34:1998-2004.
- Davis, K., M.A. Anderson and M.V. Yates. 2005. The distribution of indicator bacteria in Canyon Lake, California. *Water Res.* 39:1277-1288.
- Anderson, M.A. 2004. Impacts of metal salt addition on the chemistry of Lake Elsinore, California: 2. Calcium salts. *Lake Reserv. Manage.* 20:270-279.
- Anderson, M.A. 2004. Impacts of metal salt addition on the chemistry of Lake Elsinore, California: 1. Alum. *Lake Reserv. Manage.* 20:249-258.

- Lee, S.J., J. Gan, W.P. Liu and M.A. Anderson. 2003. Evaluation of K_d underestimation using solid phase microextraction. *Environ. Sci. Technol.* 37:5597-5602.
- Frazier, C.S., R.C. Graham, P.J. Shouse, M.V. Yates and M.A. Anderson. 2002. A field study of water flow and virus transport in weathered granitic bedrock. *Vadose Zone J.* 1:113-124.
- Stewart, M.H., M.V. Yates, M.A. Anderson, C.P. Gerba, J.B. Rose, R. DeLeon and R.L. Wolfe. 2002. Predicted public health consequences of body-contact recreation on a potable water reservoir. *J. Am. Water Works Assoc.* 94:84-97.
- Anderson, M.A., M.S. Giusti and W.D. Taylor. 2001. Hepatic copper concentrations and condition factors of largemouth bass (*Micropterus salmoides*) and common carp (*Cyprinus carpio*) from copper sulfate-treated and untreated reservoirs. *Lake Reserv. Manage.* 17:97-104.
- Quideau, S.A., O.A. Chadwick, A. Benesi, R.C. Graham, and M.A. Anderson. 2001. A direct link between vegetation type and soil organic matter composition. *Geoderma* 104:41-60.
- Hubbert, K., R.C. Graham and M.A. Anderson. 2001. Soil and weathered bedrock: components of a Jeffrey pine plantation substrate. *Soil Sci. Soc. Am. J.* 65:1255-1262.
- Gao, F., Y. Jin, S.R. Yates, S. Papiernik, M. Anderson and M.V. Yates. 2000. Theory and laboratory study of tall passive chamber for measuring gas fluxes at soil surface. *J. Air Waste Manage. Assoc.* 51:49-59.
- Quideau, S.A., O.A. Chadwick, S.E. Trumbore, J.L. Johnson-Maynard, R.C. Graham and M.A. Anderson. 2000. Vegetation control on soil organic matter dynamics. *Org. Geochem.* 32:247-252.
- Anderson, M.A. 2000. Removal of MTBE and other organic contaminants from water by sorption to high silica zeolites. *Environ. Sci. Technol.* 34:725-727.
- Haughey, M.A., M.A. Anderson, R.D. Whitney, W.D. Taylor and R.F. Losee. 2000. Forms and fate of Cu in a source drinking water reservoir following CuSO_4 treatment. *Wat. Res.* 34:3440-3452.
- Quideau, S.A., M.A. Anderson, R.C. Graham, O.A. Chadwick, and S.E. Trumbore. 2000. Soil organic matter processes: characterization by ^{13}C NMR and ^{14}C measurements. *Forest Ecol. Manage.* 138:19-27.
- Williams, C.F., J. Letey, W.J. Farmer, S.D. Nelson, M. Anderson and M. Ben-Hur. 1999. Efficiency of hexane extraction of napropamide from Aldrich humic acid and soil solutions. *J. Environ. Qual.* 28:1751-1757.
- Anderson, M.A., F.R. Trouw and C.N. Tam. 1999. Properties of water in calcium- and hexadecyltrimethylammonium-exchanged bentonite. *Clays Clay Minerals* 47:28-35.
- Anderson, M.A., M. Stewart, M.V. Yates, and C.P. Gerba. 1998. Modeling the impact of body-contact recreation on pathogen concentrations in a source drinking water reservoir. *Water Res.* 32:3293-3306.
- Fortin, J., W.A. Jury, and M.A. Anderson. 1998. Dissolution of trapped non-aqueous phase liquids in sand columns. *J. Environ. Qual.* 27:38-45.

- Hinedi, Z.R., A.C. Chang, M.A. Anderson, and D.B. Borchardt. 1997. Quantification of microporosity by NMR relaxation of water imbibed in porous media. *Water Resour. Res.* 33:2697-2704.
- Graham, R.C., P.J. Schoeneberger, M.A. Anderson, P.D. Sternberg, and K.R. Tice. 1997. Morphology, porosity, and hydraulic conductivity of weathered granitic bedrock and overlying soils. *Soil Sci. Soc. Am. J.* 61:516-522.
- Fortin, J., W.A. Jury, and M.A. Anderson. 1997. Enhanced removal of trapped non-aqueous phase liquids from saturated soil using surfactant solutions. *J. Contaminant Hydrol.* 24:247-267.
- Sternberg, P.D., M.A. Anderson, R.C. Graham, J.L. Beyers, and K.R. Tice. 1996. Root distribution and seasonal water status in weathered granitic bedrock under chaparral. *Geoderma* 72:89-98.
- Thibault, S.L., M.A. Anderson, and W.T. Frankenberger, Jr. 1996. Influence of surfactants on pyrene desorption and degradation in soils. *Appl. Environ. Microbiol.* 62:283-287.
- Guvenc, Z.B. and M.A. Anderson. 1996. A molecular dynamics study of small water clusters comparing two flexible models for water. *Z. Phys. D* 36:171-183.
- Weitkamp, W., R.C. Graham, M.A. Anderson, and C.A. Amrhein. 1996. Pedogenesis of a vernal pool Entisol-Alfisol-Vertisol catena in Southern California. *Soil Sci. Soc. Am. J.* 60:316-323.
- Anderson, M.A., R.C. Graham, G.J. Alyanakian, and D.Z. Martynn. 1995. Late summer water status of soils and weathered bedrock in a giant sequoia grove. *Soil Sci.* 160:415-422.
- Guvenc, Z.B, M.A. Anderson, and B.H. Choi. 1995. Structural and dynamical properties of water dimer and tetramer: molecular dynamics study. *Z. Phys. D* 35:51-55.
- Levy, D.B., C.A. Amrhein and M.A. Anderson. 1995. Coprecipitation of sodium, magnesium, and silicon with calcium carbonate. *Soil Sci. Soc. Am. J.* 59:1258-1267.
- Anderson, M.A., A.Y.C. Hung, D. Mills and M.S. Scott. 1995. Factors affecting the surface tension of soil solutions and solutions of humic acids. *Soil Sci.* 160:1-6.
- Gan, J., M.A. Anderson, M.V. Yates, W.F. Spencer, and S.R. Yates. 1995. Sampling and stability of methyl bromide on activated charcoal. *J. Agric. Food Chem.* 43:1361-1367.
- Gan, J., S.R. Yates, M.A. Anderson, W.F. Spencer, and F.F. Ernst. 1994. Effect of soil properties on degradation and sorption of methyl bromide in soil. *Chemosphere* 29:2685-2700.
- Johnson-Maynard, J.L., M.A. Anderson, S. Green, and R.C. Graham. 1994. Physical and hydraulic properties of weathered granitic rock in southern California. *Soil Sci.* 158:375-380.
- Levy, D.B., C. Amrhein, and M.A. Anderson. 1994. Mineral precipitation and trace oxyanion behavior during evaporation of saline waters. *J. Environ. Qual.* 23:944-954.
- Anderson, M.A. 1993. Interfacial tension-induced transport of nonaqueous phase liquids in model aquifer systems. *Water, Air, Soil Pollut.* 74:1-10.

Anderson, M.A. and P.M. Bertsch. 1993. Electrophoretic mobility and apparent particle size of kaolinite and bentonite in pure and mixed suspensions. *Soil Sci. Soc. Am. J.* 57:1641-1643.

Anderson, M.A. 1992. Influence of surfactants on vapor-liquid partitioning. *Environ. Sci. Technol.* 26:2186-2191.

Anderson, M.A., P.M. Bertsch, S.B. Feldman, and L.W. Zelazny. 1991. Interactions of acidic metal-rich coal pile runoff with a subsoil. *Environ. Sci. Technol.* 25:2038-2046.

Anderson, M.A., P.M. Bertsch, and L.W. Zelazny. 1991. Fluoro-aluminum complexes on model and soil exchangers. *Soil Sci. Soc. Am. J.* 55:71-75.

Anderson, M.A. and J.C. Parker. 1990. Sensitivity of organic contaminant transport and persistence models to Henry's Law constants: Case of polychlorinated biphenyls. *Water, Air, Soil Pollut.* 50:1-18.

Anderson, M.A., P.M. Bertsch, and W.P. Miller. 1989. Beryllium in selected southeastern soils. *J. Environ. Qual.* 19:347-348.

Anderson, M.A., P.M. Bertsch, and W.P. Miller. 1989. Exchange and apparent fixation of Li in selected soils and clay minerals. *Soil Sci.* 148:46-52.

Bertsch, P.M., M.A. Anderson, and W.J. Layton. 1989. Aluminum-27 nuclear magnetic resonance studies of ferron-hydroxo-polynuclear Al interactions. *Mag. Resonance Chem.* 27:283-287.

Bertsch, P.M. and M.A. Anderson. 1989. Speciation of aluminum in aqueous solutions using ion chromatography. *Anal. Chem.* 61:535-539.

Bertsch, P.M., W.P. Miller, M.A. Anderson, and L.W. Zelazny. 1989. Precipitation and coprecipitation of Al^{3+} , Fe^{3+} and Fe^{2+} during neutralization of dilute iron and aluminum solutions. *Clays and Clay Miner.* 37:12-18.

Anderson, M.A. and P.M. Bertsch. 1988. Dynamics of aluminum complexation in multiple ligand systems. *Soil Sci. Soc. Am. J.* 52:1597-1602.

Anderson, M.A., P.M. Bertsch, and W.P. Miller. 1988. The distribution of lithium in selected soils and surface waters of southeastern USA. *Appl. Geochem.* 3:205-212.

Bertsch, P.M. and M.A. Anderson. 1988. Determination of aluminum extracted from soils by ion chromatography. *Soil Sci. Soc. Am. J.* 52:540-542.

PEER-REVIEWED BOOK CHAPTERS

Anderson, M.A. 2003. Isotopes. In B.A. Stewart and T.A. Howell (eds.) *Encyclopedia of Water Science*. Marcel Dekker, Inc. New York, NY. pp. 565-568.

Anderson, M.A., P.M. Bertsch, and L.W. Zelazny. 1993. Multicomponent transport through soil subjected to coal pile runoff under steady saturated flow. p. 137-164. In R. Keefer (ed.) *Trace Elements in Coal and Coal Combustion Residues*, Lewis Publ., Chelsea, MI.

SELECTED TECHNICAL REPORTS (OUT OF 36 TOTAL)

Anderson, M.A., M. Tobin, and J. Tobin. 2011. *Biological Monitoring of Lake Elsinore*. Final Report. Lake Elsinore and San Jacinto River Watersheds Authority. 55 p..

Anderson, M.A., J. Sickman, N. Reid and J. McCullough. 2010. *Managing Quagga Mussels in the Reservoirs of the Colorado River Aqueduct*. Draft Final Report. Metropolitan Water District of Southern California. 43 pp.

Barry, B. and M.A. Anderson. 2010. *Hydrologic, Temperature and Water Quality Modeling in Support of Development of Species Conservation Habitat*. Draft Report to DWR. 19 pp+Appendices.

Anderson, M.A. 2009. *Mass-Balance and 1-D Water Quality Modeling of San Dieguito Reservoir: Development of Management Strategies*. Final Report to Santa Fe Irrigation District. 26 pp.

Anderson, M.A. 2008. *Predicted Water Quality and Public Health Impacts Resulting from Pathogen Inputs Near Water Intakes on Lake Tahoe*. In (Black & Veatch) *Lake Tahoe Source Water Protection Risk Assessment*. 118 pp. + Appendices.

Anderson, M.A., C. Paez, and S. Men. 2007. *Sediment Nutrient Flux and Oxygen Demand Study for Canyon Lake with Assessment of In-Lake Alternatives*. Final Report. San Jacinto River Watershed Council. 25 pp.

Anderson, M.A. 2007. *Predicted Effects of In-Lake Treatment on Water Quality in Canyon Lake*. Final Report. San Jacinto River Watershed Council. 31 pp.+Appendix.

Berkowitz, J. and M.A. Anderson. 2005. *Full-Scale Alum Application to Big Bear Lake, California: Water Quality and Geochemical Responses* Final Report. Big Bear Municipal Water District. 71 pp.

Anderson, M.A., J. Wakefield-Schmuck, J. Erguiza, J. San Jose and J. Berkowitz. 2004. *Impacts of Macrophyte Control Methods on Water Quality and Internal Recycling in Big Bear Lake*. Final Report. Big Bear Municipal Water District. 14 pp. + Appendices.

Anderson, M.A. and C. Amrhein. 2002. *Nutrient Cycling in the Salton Sea. Final Report*. Salton Sea Authority. 86 pp.

Anderson, M.A., K. Davis and M.V. Yates. 2001. *The Occurrence and Distribution of Indicator Bacteria in Canyon Lake*. Final Report. Santa Ana Regional Water Quality Control Board. 58 pp.

UNIVERSITY TEACHING

ENSC 101: Water Resources (2012 - present)

ENSC 140: Limnology (1994 - 2012)

ENSC 176: Acquisition and Analysis of Environmental Data (1998 - 2006)

ENSC 204: Environmental Organic Chemistry (1997 - 2006)

ENSC 207: Surface Water Quality Modeling (2009 - present)

SWSC 203: Surface Chemistry of Soils (1992 - present)