

Diana L. Engle, Ph.D.

Statement of Qualifications for Written Testimony - SRCSD Exhibit 1

Senior Scientist
Larry Walker Associates
(530) 753-6401

Education:

Ph.D. 1993, Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA
B.S. 1983, Biology, University of Michigan, Ann Arbor, MI

Areas of Expertise:

- Cycling of elements in lakes, streams, rivers, floodplains, wetlands
- Effects of nutrient inputs on aquatic plants, invertebrates, and algae
- Assessment of freshwater and marine water quality, sources of water quality impairment
- Effects of wildfire on stream chemistry, runoff, and nutrient export

Relevant Professional Experience:

I am an aquatic ecologist with over 20 years of experience in the fields of aquatic ecology and biogeochemistry. My background includes work in lakes, small streams, large rivers and floodplains, estuaries, and wetlands. In my current position at Larry Walker Associates, I serve clients in such areas as water quality assessment and monitoring, pollutant source assessment, watershed export of nutrients and other constituents, stream and wetland chemistry, algal dynamics, and other aspects of aquatic ecology and aquatic resource management. Prior to joining Larry Walker Associates in 2008, I held appointments in several arms of the University of California, Santa Barbara, including the Marine Science Institute, the Donald Bren School of Environmental Science & Management, and the Institute for Computational and Earth System Science. In addition, I have worked as an independent consultant for the U.S. National Park Service, the U.S. Geological Survey, and several private companies. I have authored extensive assessments of water quality in coastal environments of Southern California and the Sierra Nevada, and have published peer-reviewed articles on topics including floodplain nutrient dynamics and carbon cycling, methane emissions, watershed mass balances, stream export in coniferous forest, aquatic macrophyte ecology, benthic algae, and zooplankton.

I am actively involved in forums addressing the POD and ammonia-related issues in the Delta. I have been a member of the IEP POD Contaminants Work Team since early 2008, and was an invited panel member at both the March 2009 CalFed *Ammonia Workshop* and the Central Valley Regional Board's August 2009 *Ammonia Summit*. I was an invited speaker at the October 2009 IEP Workshop: *Bay-Delta Monitoring Questions & Tools for the 21st Century*, and presented a comprehensive analysis of ambient ammonia data from the San Francisco Estuary at the 9th Biennial State of the San Francisco Estuary Conference in September 2009.

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Positions:

- 2008-PRESENT- **Senior Scientist**, Larry Walker Associates, 2151 Alessandro Drive, Suite 100, Ventura, CA.
- 2007 **Consultant** for Santa Barbara Channelkeeper, Santa Barbara, CA
Evaluation of existing, and potential, onshore and offshore sources of water quality impairment affecting the Channel Islands National Marine Sanctuary (CINMS) and the Santa Barbara Channel
- 2005-2007 **Research Specialist II**, University of California, Santa Barbara, CA (UCSB)
Affiliations:
Marine Science Institute
Institute for Computational & Earth System Science
Donald Bren School of Environmental Science & Management
Selected Projects
 - Assessment of the ecological condition and potential impairments of aquatic resources at Channel Islands National Park, CA and Cabrillo National Monument, CA. Funded by the U.S. National Park Service.
 - Analysis and modeling of carbon dynamics in Amazon wetlands. Funded by NASA (part of the Large Scale Biosphere-Atmosphere Experiment in Amazonia, or *LBA-ECO*).
 - Environmentally-based Executive Education at the Bren School, UC Santa Barbara. Funded by the Dean Witter Foundation.
- 2005 **Analyst V**, Donald Bren School of Environmental Science & Management, UCSB
Analysis of policy and technology-based solutions to environmental problems, and development of new research initiatives. Included financial risk assessment and stakeholder meetings with industry and agency leaders. Funded by the Paul G. Allen Family Foundation.
Agenda: Financial Instruments for Fisheries Reform
Molecular Probes for Pathogen Detection in Coastal Water
Markets for Ecosystem Services on the Agricultural Landscape
- 2005-2006 **Consultant** for Glencoe/McGraw-Hill Companies, Columbus OH
Writing, content review, editing, and fact checking for the Glencoe-Science's 2007 high school and middle school biology textbooks.
- 2002-2004 **Consultant** for U.S. National Park Service and U.S. Geological Survey, Sequoia & Kings Canyon National Parks, CA
Analysis and publication of a 16-year data set on nutrient fluxes in mixed conifer forest and the consequences of prescribed fire on stream hydrology, stream chemistry, and watershed mass balances in Sequoia National Park.
- 1996-2004 **Lecturer**, Department of Ecology, Evolution and Marine Biology, UCSB
Courses taught: Tropical Ecology, upper division (8 years: 1996-2004); Aquatic Community Ecology, upper division (3 years, 1999-2001); Undergraduate Ecology Seminar, upper division (4 years, 1996-2000)

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- 1998-2002 **Consultant** for Planet Earth Science, Santa Barbara, CA
Production of interactive CD-ROMs (virtual science expeditions) and on-line courseware for junior high, high school and college students, with strong emphasis on interpretation of satellite data. Position funded by the NASA ESIP program (Earth Science Information Partnership).
Foci of Digital Products:
River Ecology, Global Warming, Hurricanes, Atmospheric Aerosols
- 1994-1997 **Post-Doctoral Researcher**, Marine Science Institute, UCSB
Assessment of potential impacts of acid deposition on high altitude aquatic ecosystems in California; Integrating ten years of investigation. Funded by the California Air Resources Board.
- 1994 **Post-Doctoral Researcher**, in connection with the Universite du Quebec, Institut National de la Recherche Scientifique, Sainte-Foy, Quebec, Canada.
Characterization of exchangeable phosphorus on riverine particulates in the Parana River system, Argentina.
- 1986-1993 **Doctoral Dissertation Researcher**, Department of Biological Sciences, UCSB
Role of riverine flooding in the ecology of floodplain lakes of the Amazon River. Extended field and laboratory work in Amazonas, Brazil.
- 1992-1993 **Graduate Research Assistant**, Department of Biological Sciences, UCSB
Monitoring and evaluation of zooplankton as bio-indicators of acidification in alpine lakes of the Sierra Nevada, CA. Funded by the California Air Resources Board.
- 1985-1993 **Teaching Assistant**, Department of Ecology, Evolution & Marine Biology, UCSB
Courses: Aquatic Ecology, Concepts of Biology, Chemical and Physical Methods for Aquatic Environments, Tropical Ecology
- 1987 **Research Assistant**, NASA Global Tropospheric Experiment, ABLE 2B: Amazon Ground Emissions.
Field measurement of methane flux from an Amazon floodplain lake, and analysis of its relationship to episodic mixing.
- 1983-1985 **Research Assistant**, Division of Environmental Research, Academy of Natural Sciences, Philadelphia, PA.
Estuarine nutrient cycling, sediment chemistry, and denitrification in the Chesapeake and Delaware Bays.
- 1983 **Research Assistant**, Division of Biological Sciences, University of Michigan, Ann Arbor.
Lagrangian studies of zooplankton dynamics in Lake Michigan.
- 1983 **Honors Research**, University of Michigan, Ann Arbor.
Population differences in hemoglobin production by *Daphnia pulex*.
- 1982-1983 **Biological Aid**, U.S. Fish & Wildlife Service, Great Lakes Fishery Laboratory, Ann Arbor, MI.
Effects of acidification on life history characteristics of zooplankton.

Publications and Presentations:

- Melack J.M., and D.L. Engle (2010) An organic carbon budget for an Amazon floodplain lake. *Verh. Internat. Verein. Limnol.*, in press.
- McCord, S., J. Walker, and D. Engle (2009) A pilot study using continuous ammonium sensors in the Sacramento River. Interagency Ecological Program (IEP) Workshop #5: Bay-Delta Monitoring Questions & Tools for the 21st Century, Sacramento, CA., October 9, 2009.
- Engle, D.L., and G. Lau (2009) Total and Un-ionized Ammonia Concentrations in the Upper San Francisco Estuary: A Comparison of Ambient Data and Toxicity Thresholds. 9th Biennial State of the San Francisco Estuary Conference, Oakland, CA, September 29-October 1, 2009.
- Engle, D. (2009) Total Ammonia and Un-Ionized Ammonia Concentrations in the Delta. An Examination of Ambient Concentrations and Toxicity Thresholds. Central Valley Regional Water Quality Control Board Ammonia Summit, Sacramento, California, August 18-19, 2009.
- Altstatt, J., D.L. Engle, and K. Redmond (2009) Water quality characterization of the Channel Islands National Marine Sanctuary and Surrounding Waters. Submitted to National Oceanic and Atmospheric Administration, Channel Islands National Marine Sanctuary, May 2009. 229 pp.
- Larry Walker Associates (2009) Source Assessment Report: Nitrogen and Phosphorus in the Ventura River Watershed. Prepared for Ojai Valley Sanitary District, July 9, 2009. 55 pp. (author)
- Larry Walker Associates (2008) Calleguas Creek Nitrogen Compounds and Related Effects TMDL. Results of Special Study on Type and Extent of Algae Impairments. Prepared for the Calleguas Creek Watershed Management Plan, July 16, 2009. 93 pp (author).
- Engle D.L., J.M. Melack, R.D. Doyle and T.R. Fisher (2008). High rates of net primary production and turnover of floating grasses on the Amazon floodplain: Implications for aquatic respiration and regional CO₂ flux. *Global Change Biology*, 14 (2): 369-381. doi: 10.1111/j.1365-2486.2007.01481.x.
- Engle D.L., J. Sickman, C. Moore, A. Esperanza, J. Melack and J. Keeley (2008). The biogeochemical legacy of prescribed fire in a giant sequoia-mixed conifer forest of Sequoia National Park: A 16-year record of watershed balances. *Journal of Geophysical Research-Biogeosciences*, 113, G01014. doi:10.1029/2006JG000391
- Melack J.M. & Engle D.L. (2007) Carbon dynamics in Amazon floodplain lakes, 30th Congress of the International Association of Theoretical and Applied Limnology, August 2007, Montreal, Quebec.
- Engle D.L. (2006) Assessment of Coastal Water Resources and Watershed Conditions at Channel Islands National Park, California. Tech. Report NPS/NRWRD/NRTR-2006/354. 337 pp. http://www.nature.nps.gov/water/watershed_reports/WSCondRpts.cfm
- Engle D.L. and J.L. Largier (2006) Assessment of Coastal Water Resources and Watershed Conditions at Cabrillo National Monument, California. Tech. Report NPS/NRWRD/NRTR-2006/355. 235 pp. http://www.nature.nps.gov/water/watershed_reports/WSCondRpts.cfm
- Engle D.L. (2005) Pathogen Free Water - Molecular Probes for Safe Coastal Water, A Project Plan for the Global Solutions Institute, 65 pp.
- Engle D.L. (2002) Comparative analysis of high resolution remote sensing satellite systems: Landsat7, SPOT, IKONOS, ASTER, and RADARSAT. Prepared for the Japan External Trade Organization.

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- Engle D.L. and J.M. Melack (2001) Ecological consequences of infrequent events in high-elevation lakes and streams of the Sierra Nevada, California. *Verh. Internat. Verein. Limnol.* 27: 3761-3765.
- Caron B., Gautier C., Landsfeld M. & Engle D. (2001) Earth Data Multimedia Instrument – EDM: A NASA-funded showcase that brings research technology to secondary education. American Geophysical Union, December 2001, San Francisco, CA.
- Engle D. and J.M. Melack (2000) Methane emissions from an Amazon floodplain lake: Enhanced release during episodic mixing and during falling water. *Biogeochemistry* 51: 71-90.
- Engle D.L. and J.M. Melack (1997) Assessing the potential impact of acid deposition on high altitude aquatic ecosystems in California: Integrating ten years of investigation. Final Report. Prepared for the California Air Resources Board. Contract A093-312.
www.arb.ca.gov/research/abstracts/93-312.htm.
- Engle D.L. and J.M. Melack (1995) Zooplankton of high elevation lakes of the Sierra Nevada, California- Potential effects of chronic and episodic acidification. *Arch. Hydrobiol.* 133: 1-21.
- Engle D.L. (1993) Effects of suspended sediments on nutrient availability, algal growth and aquatic invertebrates of the Amazon floodplain. American Society of Limnology & Oceanography, Aquatic Sciences Meeting, June 1993, Edmonton, Alberta.
- Engle D.L. and J.M. Melack (1993) Consequences of riverine flooding for the seston and periphyton of floating meadows in an Amazon floodplain lake. *Limnology & Oceanography* 38: 1500-1520.
- Melack J.M., J.O. Sickman, F.V. Setaro and D. Engle (1993) Long-term studies of lakes and watersheds in the Sierra Nevada, patterns and processes of surface-water acidification. Final Report. Prepared for the California Air Resources Board. Contract A932-060.
- Engle D.L. (1992) Inundation of an Amazon floodplain lake during an unusually high flood year: consequences for seston and the periphyton of floating meadows. American Society of Limnology & Oceanography, Aquatic Sciences Meeting, February 1992, Santa Fe, NM.
- Melack J.M. & Engle D.L. (1991) Methane emissions from the Amazon floodplain: enhanced release during episodic mixing of lakes and a habitat-based regional assessment. 10th International Symposium on Environmental Biogeochemistry, August 1991, San Francisco, CA.
- Engle D.L. and O. Sarnelle (1990) Algal use of sedimentary phosphorus from an Amazon floodplain lake: Implications for total phosphorus analysis in turbid waters. *Limnology & Oceanography* 35: 483-490.
- Engle D.L. and J.M. Melack (1990) Floating meadow epiphyton: Biological and chemical features of epiphytic material in an Amazon floodplain lake. *Freshwater Biology* 23: 479-494.
- Fisher T.R., Doyle R.D., Moline M.A. & Engle D.L. (1989) Ecology of periphyton on the Amazon Floodplain. Symp. Floodplain Rivers, Baton Rouge, LO.
- Engle D.L. & Melack J.M. (1988) Epiphyton of floating meadows. 2nd Brazilian Conference of Limnology, July 1988, Cuiba, Mato Grosso, Brazil.
- Engle D.L. (1985) Haemoglobin production by *Daphnia pulex*; Intraspecific variation and its relation to habitat. *Freshwater Biology* 15: 631-638.

Awards and Honors:

- Ellen Schamberg Burley Scholarship, University of California: 1993
University of California Regents Special Fellowship: 1985-1990
Dissertation Year Fellowship, University of California Regents: 1990-1991

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National Science Foundation Pre-Doctoral Fellowship: 1985-1988

James B. Angell Scholar, University of Michigan: 1983

Class Honors, University of Michigan: 1981-1983

Michigan Alumni Club Scholarship: 1979-1983

W.J. Branstrom Prize for Academic Excellence: 1980

University of Michigan Academic Recognition Scholarship: 1979

Class Valedictorian, Damascus High School, Damascus, MD: 1979