

STATEMENT OF QUALIFICATIONS

Armin Munévar

EDUCATION

M.S. Civil and Environmental Engineering, University of California, Davis, 1997
B.S. Civil Engineering, University of California, Los Angeles, 1991

PROFESSIONAL REGISTRATIONS

Professional Engineer: California C59862

CURRENT EXPERIENCE

Senior Global Technology Leader, CH2M HILL, 2009 - present. Lead development and implementation of frameworks for evaluating climate change impacts on water resource systems, assessing system vulnerabilities, and developing adaptation strategies. Focuses on quantitative methods for incorporating climate change, and broader hydroclimate variability, in water resources planning and management. Collaborate with leading climate researchers to develop innovative methods for climate change assessments.

PREVIOUS EXPERIENCE

- Senior Technologist, CH2M HILL, 2001 - 2008
- Associate Engineer, California Department of Water Resources, 1997 - 2001

SELECTED RELATED EXPERIENCE

- *Central Valley Flood Protection Plan, CA Department of Water Resources, 2014-present* - Utilized downscaled climate change projections for the Central Valley and conducted hydrologic evaluations to estimate changes in flood flows and flood frequencies using multiple CMIP3 and CMIP5 data sets and downscaling methods
- *Bay-Delta Conservation Plan (BDCP), California Department of Water Resources, California, 2007-present* – Integration Lead for a cascade of physical modeling analyses through development of innovative ensemble-informed climate scenarios from an initial set of over 100 downscaled climate projections, and the incorporation of statistical changes in climate and sea level in evaluations of ecosystem restoration, water supply, and water quality programs in the Sacramento – San Joaquin Bay-Delta and the application of physically-based numerical and water management models to support evaluation of a range of infrastructure and operations alternatives as part of this long-range water and tidal habitat restoration.
- *Sacramento-San Joaquin Basins Study, U.S. Bureau of Reclamation, California, 2012-present* - Project manager and Technical Integrator for study of the long-term risk to water-dependent resources in the Central Valley through 2021 using unique, transient climate scenarios and combined climate-socioeconomic scenarios which included future urban and agricultural footprints, technological trends and human adoption of water use efficiency measures, and urban density. The analysis addressed climate vulnerability to the system resources: water supply, energy, ecosystem, flood control, water quality, and recreational resource areas
- *Central Valley Project Integrated Resource Plan, U.S. Bureau of Reclamation, California, 2009-2013* – Developed transient climate change scenarios from over 100 individual climate projections; and developed and applied systems screening tools to

identify adaptation measures and portfolios involving system-wide actions such as storage, delta conveyance, groundwater management, as well as local/regional actions such as water conservation, wastewater reuse and desalination

- *Central Valley Water Management Screening Model, California Department of Water Resources, 2007-2008* - Project Manager and Technical Lead on this model, CalLite, that is a rapid, interactive screening model for Central Valley water management that simulates the hydrology of the Central Valley, reservoir operations, project operations and delivery allocation decisions, Delta salinity responses to river flow and export changes, and habitat-ecosystem indices using stochastic hydrologic methods and allocation forecasting methods.

SELECTED PUBLICATIONS

- Freas, K, Bailey, Munevar, and Butler. 2008. Incorporating Climate Change in Water Planning, *Climate Change and Water: International Perspectives on Mitigation and Adaptation*. AWWA/IWA 2010.
- CH2M HILL, 2009. *Confronting Climate Change: An Early Analysis of Water and Wastewater Adaptation Costs*, National Association of Clean Water Agencies/Association of Metropolitan Water Agencies, Oct.
- CH2M HILL, 2008. *Climate Change Study: Report on Evaluation Methods and Climate Scenarios*, Lower Colorado River Authority, Nov.
- Freas, K, Bailey, Munevar, and Butler. 2008. Incorporating Climate Change in Water Planning, *Journal of AWWA*.
- Van Lienden, B., Munévar, A., Field, R., and Yaworsky, R. 2006. *A Daily Time-Step Planning and Operations Model of the American River Watershed*. Proceedings of the American Society of Civil Engineers Operation Management 2006 Conference. August 14-16, 2006. Sacramento, CA.
- Draper, A.J., Munévar, A., Arora, S.K., Reyes, E., Parker, N.L., Chung, F.I., and Peterson, L.E. 2004. *CALSIM: Generalized Model for Reservoir System Analysis*. American Society of Civil Engineers, *Journal of Water Resources Planning and Management*, Vol. 130, No. 6.
- Munévar, A. and Chung, F.I. 1999. *Modeling California's Water Resource Systems with CALSIM*. American Society of Civil Engineers Water Resources Planning and Management Conference Proceedings.
- Munévar, A. and Mariño, M.A. 1999. *Modeling Analysis of Groundwater Recharge Potential on Alluvial Fans Using Limited Data*. *Ground Water*. Vol. 37, No. 5.
- Munévar, A. 1997. *Modeling Analysis of Groundwater Recharge Potential on Alluvial Fans Using Limited Data*. American Institute of Hydrology, *International Conference on Advances in Ground-Water Hydrology, A Decade of Progress*. Nov. 16-20, 1997. Tampa, FL.

HONORS AND AWARDS

California Water and Environmental Modeling Forum Hugo B. Fisher Award Recipient, 2001