

EXHIBIT 63

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RESEARCH INTERESTS

Integrated computer-based deterministic and stochastic modeling of watershed scale processes to understand the impacts of historic and future climate on water resources in arid and semi-arid environments using paleoclimate information (e.g., streamflow estimates reconstructed from tree ring records and other historic climate indicators), global climate model estimates (e.g., historic and future precipitation and temperature estimates from both statistical and dynamically downscaled studies), and instrumental ground-based information (e.g., NWS Co-op data, NRCS SNOTEL data, and PRISM data sets). Additional research interests include streamflow forecasting, water leasing and banking, water markets, GIS, remote sensing, parameter estimation and uncertainty analysis, and automated multi-criteria optimization.

EDUCATION

University of Arizona - Hydrology with minor in Systems Engineering, Ph.D., 2001
University of Nevada, Reno - Hydrology and Hydrogeology, M.S., 1996
University of Southern California - Aerospace Engineering, B.S., 1989

EMPLOYMENT

Academic and Research

2010 – present Associate Professor, Department of Geography, University of Nevada, Reno
2007 - 2010 Associate Research Professor, Desert Research Institute, Reno, Nevada.
2001 - 2007 Assistant Research Professor, Desert Research Institute, Reno, Nevada.
2000 - 2001 Research Associate, Desert Research Institute, Reno, Nevada.
1996 - 2000 Graduate Research Associate, University of Arizona.
1994 - 1995 Graduate Research Scientist, University of Nevada, Reno.

2012 – present Nevada State Climatologist & Director of the Nevada State Climate Office, Department of Geography, University of Nevada, Reno
2008 - 2010 Director, Nevada Water Resources Research Institute, Desert Research Institute, Reno, Nevada.
2008 - 2010 Acting Deputy Executive Director, Division of Hydrologic Sciences, Desert Research Institute, Reno, Nevada.
2007 - 2008 Assistant Director, Nevada Water Resources Research Institute, Desert Research Institute, Reno, Nevada.

Teaching – International

Friedrich-Schiller-Universität, Department of Geoinformatik, Jena, Germany
Guest Lecture, "Dynamical System Modeling" in Modellierung von Systemen (May 2006)
Instructor, GEO 404 Sensitivity Analyses and Model Uncertainties (Winter Semester 2007, 2008)

Teaching – USA

University of Nevada, Department of Geography
Instructor, GEOG 314 Field Methods (Spring 2012 and 2013)

Instructor, GEOG 701R Special Problems in Water Resources and Climate Modeling (Spring 2011)

University of Nevada, Graduate Program of Hydrologic Sciences

Instructor, GEOL 781 Advanced Surface Water Hydrology (Spring 2005, 2006, 2007, 2010)

Instructor, Snow Hydrology (Spring 2009)

Instructor, Hydrometeorology (Spring 2008)

Instructor, Hydrologic Parameter Estimation and Uncertainty Analysis (Fall 2005, 2006, 2007)

Instructor, Advanced Surface Water Modeling (Spring 2002),

Instructor, Hydrologic Field Methods (Spring 2001 and 2002),

Instructor, Small Watershed Hydrology (Fall 2001)

Teaching Assistant, Hydrologic Fluid Dynamics (Fall 1994)

University of Arizona, Department of Hydrology and Water Resources, Tucson, AZ

Teaching Assistant, Fundamentals of Hydrology (Spring 1998)

Professional Engineering

1993 – 1994 Hydrologist, Nimbus Engineering, Reno, Nevada.

1989 – 1993 Assistant in Civil Engineering I/II, El Dorado County, Department of Transportation, Placerville, California.

SYNERGISTIC ACTIVITIES

Service on Review Panels

- NSF-EPSCoR Academic Year Undergraduate Research Awards, Office of Undergraduate Research, University of Nevada, Reno, October 2010.
- Tahoe Science Consortium Peer Review Committee, August 2007 to 2010.
- European Commission (EC) Panel Review Committee, Jena Germany, January 2008
- USGS National Climate Change and Wildlife Science Center (NCCWSC), October 2009.
- NSF-EPSCoR Academic Year Undergraduate Research Awards, Office of Undergraduate Research, University of Nevada, Reno, October 2007.
- NASA Review Panel - NASA Applied Sciences Program, Decision Support through Earth Science Results, NASA Decisions CAN Solicitation, March 2005.
- CSIRO-CRC for Catchment Hydrology, Melbourne, Australia, August 2003.

Service on Professional Committees

- Walker Lake Integrated Science Committee, 2009 to present.
- Upper Rio Grande Water Operations Model Technical Review Committee, 2002 to 2010.
- AGU Surface Water Committee, 1998 to 2010.

Service at the Desert Research Institute

- Acting Deputy Executive Director, DHS, 2008 to 2010.
- DHS Research Affairs Council, 2008 to 2010 (Chair).
- DHS Maxey Fellowship Committee, 2007 to 2009.
- DRI Sabbatical Committee, 2005 to 2008 (Committee Chair 2006 and 2007).
- DRI Emeritus Committee, 2005 to 2008 (Committee Chair 2007).
- DRI Faculty Senate, 2003 to 2006.
- DRI Career Day for at risk youth - 2003
- DRI faculty search committees, 2001 to present (approximately two/year).

Service at the University of Nevada, Reno

- Member of University of Nevada, Reno Network of Faculty for Undergraduate Research (NFUR), 2007 to present.
- Chair of Faculty Surface Water Curriculum Committee, Graduate Program of Hydrologic Sciences, University of Nevada, Reno, 2007 to 2012.
- Prepared and conducted a workshop for the UNR Network of Faculty for Undergraduate Research (NFUR), on “How to Prepare and Present a Research Poster,” August 2007.
- Invited panel speaker for the UNR Woman’s ASCE student group, “Opportunities for Women in the Hydrologic Sciences” in May 2007.
- Hydrologic Sciences Faculty, Graduate Program of Hydrologic Sciences, University of Nevada, Reno, 2001 to present.

Service on UNR Graduate Student Committees

- Terri Gorham (M.S., GPHS, 2003)
- Daniel Lahde (M.S., GPHS, 2003)
- Dong Chen (Ph.D., GPHS, 2005)
- Seshadri Rajagopal (M.S. GPHS, 2006) - Chair
- Joy Giffin (M.S., GPHS, 2006)
- Stephen Noble (M.S., GPATMS, 2009)
- Jerrold McAlpine (M.S., GPATMS, 2009)
- Cornelia Barth (Ph.D., GPHS, current) - Chair
- Patrick Fritchel (Ph.D., GPHS, current) - Chair
- Jerrold McAlpine (Ph.D. GPATMS, current)
- Jasmine Vittori (M.S. Envir. Science, current)

Peer Review of National and International Journals Manuscripts

- Reviewer of over thirty manuscripts for professional journals including the following: Water Resources Research, Journal of Hydrology, iEMSs Environmental Modeling and Software, IAHS Hydrological Sciences Journal.

Membership in Professional Societies

- American Geophysical Union (AGU)
- American Meteorological Society (AMS)
- American Water Resources Association (AWRA)
- International Environmental Modelling and Software Society (iEMSs)

Conference Organizational Service

- Session Chair at 2009 SAHRA Annual Meeting, September 2009
- Co-convener at AGU, Fall 2004
- Co-convener at AGU, Fall 2002

International Collaboration

- Negotiated a cooperative agreement between DRI and Friedrich-Schiller University in Jena, Germany to perform collaborative research and teach undergraduate/graduate course on uncertainty analysis and model sensitivity, 2005 to 2008.

PUBLICATIONS

Refereed Journals and Book Chapters – published or in press

Boyle, D.P., C. Barth, S. Bassett, "Towards Improved Hydrologic Model Predictions in Ungauged Snow-Dominated Watersheds Utilizing a Multi-Criteria Approach and SNODAS Estimates of SWE," to be

published in Putting PUB into Practice, edited by J. Pomeroy, C. Spence, and P. Whitfield, Red Book monograph published by the *International Association of Hydrological Sciences* and the *Canadian Water Resources Association*, 2013, In Press.

- Moore, D., R. Woods, **D.P. Boyle**, "Putting PUB into Practice in Mountainous Regions," *Streamline Watershed Management Bulletin*, 2013, In Press, Vol. 15 No. 2.
- Schumer, R., A. Knust, and **D.P. Boyle**, "Characteristics of ephemeral hydrographs in the Southwestern United States", *Journal of Hydrologic Engineering*, ASCE, 2013, In Press, doi: 10.1061/(ASCE)HE.1943-5584.0000643.
- Caldwell, T., T. Wöhling, M. Young, **D.P. Boyle**, E. McDonald, "Characterizing Disturbed Desert Soils Using Multiobjective Parameter Optimization", *Vadose Zone Journal*, 2013, In Press, doi:10.2136/vzj2012.0083.
- Gupta, H. V., D.S. Brookshire, V.C Tidwell, **D.P. Boyle**, "Modeling: a basis for linking policy to adaptive water management," in *Water Policy in New Mexico, Addressing the challenge of an uncertain future*, edited by H.V. Gupta, D.S. Brookshire, V.C. Tidwell, V., Resources for the Future Press Water Policy Series, 2012.
- Fain, X., D. Obrist, A. Pierce, C. Barth, M. Gustin, **D.P. Boyle**, "Whole-watershed mercury balance at Sagehen Creek, Sierra Nevada CA," *Geochimica et Cosmochimica Acta*, Elsevier, 2011: 2379–2392.
- McAlpine, J.D., D. Koracin, **D.P. Boyle**, J.A. Gillies, and E. McDonald, "Development of a rotorcraft dust-emission parameterization using a CFD model," *Environmental Fluid Mechanics*, 2010, 10: 691–710.
- Carroll, R.W.H., G. Pohl, D. McGraw, C. Garner, A. Knust, **D.P. Boyle**, T. Minor, S. Bassett, and K. Pohlmann, "Mason Valley Groundwater Model: Linking Surface Water and Groundwater in the Walker River Basin, Nevada," *Journal of the American Water Resources Association*, 2010, 46 3: 554-572.
- McAlpine, J.D., D. Koracin, K. Veropoulos, **D.P. Boyle**, E. McDonald, and G. Lamorey, "Determining atmospheric dust concentrations during strong flow perturbations using a digital-optical technique," *Lecture Notes in Computer Science: Advances in Visual Computing*, 4841, 393-402, 2007.
- Boyle, D.P.**, G. Lamorey, A. Huggins, "Application of a hydrologic model to assess the effects of cloud seeding in the Walker River basin, Nevada," *Journal of Weather Modification*, 2006.
- Krause, P., **D.P. Boyle**, D. F. Base, "Comparison of different efficiency criteria for hydrological model assessment," *Advances in Geosciences*, 2005.
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, "Multicriteria calibration of hydrologic models," Chapter 8 of *Advances in Calibration of Watershed Models*, Edited by Q. Duan, S. Sorooshian, H.V. Gupta, A.N. Rousseau, R. Turcotte, Monograph Series on Water Resources, American Geophysical Union, 2003.
- Gupta, H.V., S. Sorooshian, T. Hogue, and **D.P. Boyle**, "Advances in Automatic Calibration of Watershed Models", Chapter 1 of *Advances in Calibration of Watershed Models*, Edited by Q. Duan, S. Sorooshian, H.V. Gupta, A.N. Rousseau, R. Turcotte, Monograph Series on Water Resources, American Geophysical Union, 2003.
- Boyle, D.P.**, H.V. Gupta, S. Sorooshian, V. Koren, Z. Zhang, and M. Smith, "Towards improved streamflow forecasts: The value of semi-distributed modeling," *Water Resources Research*, AGU, 37(11), 2749-2759, 2001.
- Wagener, T., **D.P. Boyle**, M.J. Lees, H.S. Wheater, H.V. Gupta, and S. Sorooshian, "A framework for development and application of hydrological models," *Hydrology and Earth System Science*, European Geophysical Society, 5(1), 13-26, 2001.
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, "Toward improved calibration of hydrologic models: Combining the strengths of manual and automatic methods," *Water Resources Research*, AGU, 36(12), 3663-3674, 2000.

Refereed Journals and Books – in preparation and near submission

- Bassett, S., D.P. Boyle, C. Garner, J. Huntington, M. Dolloff, L. Ingvaldstad, D. Norpchen, H. Rawlings, D. Stapleton, M. van den Berg, C. Wooldridge, "Agricultural and residential scenarios for the Walker River Basin, Nevada", *Environment and Planning B*.

Conference Papers

- Boyle, D.P.**, G. Lamorey, S. Bassett, G. Pohll, P. Krause, and S. Kralisch, Investigating the value of hydrologic model complexity and spatial information using multicriteria methods”, Proceedings of the 7th International Conference in Hydroinformatics, 4-8 September 2006, Nice, France.
- Kralisch, S., P. Krause, **D.P. Boyle**, “JAMS – A framework for natural resource model development and application” Proceedings of the 7th International Conference in Hydroinformatics, 4-8 September 2006, Nice, France.
- Boyle, D.P.**, R. Naranjo, G. Lamorey, S. Bassett, H. Gupta, and D. Brookshire, “Development of an integrated hydrologic model to explore the feasibility of water banking and markets in the southwestern U.S.,” International Congress on Modelling and Simulation Advances and Applications for Management and Decision Making. Melbourne, Australia, December, 2005
- Barth, C., P. Krause, **D.P. Boyle**, and S. Markstrom, “Hydrologic modeling of a groundwater dominated watershed using a loosely coupled modeling approach.”, International Congress on Modelling and Simulation Advances and Applications for Management and Decision Making. Melbourne, Australia, December 2005.
- Boyle, D.P.**, P. E. Fritchel, G. Lamorey, and S. Markstrom, Evaluation of a Hydrologic Model of the Rio Grande (USA) Using Observed and Modelled Land Surface Fluxes and States. In Pahl-Wostl, C., Schmidt, S., Rizzoli, A.E. and Jakeman, A.J. (eds), Complexity and Integrated Resources Management, Transactions of the 2nd Biennial Meeting of the International Environmental Modelling and Software Society, iEMSs: Manno, Switzerland, 2004. ISBN 88-900787-1-5
- Sorooshian, S., H.V. Gupta, and **D.P. Boyle**, “Improving calibration of flood forecast models: A multi-criteria approach”, Presented at the International Symposium on Flood Defense, Kassel, Germany, September 20-23, 2000.

Conference Presentations

- Barth, C., **D.P. Boyle**, and S. Bassett, "Toward the use of modern hydrologic modeling tools in paleoclimate studies," UNR College of Science Graduate Student Poster Competition, UNR College of Science, November 2012.
- Boyle, D.P.**, C. Barth, and S. Bassett, "Modeling of Pluvial Lake Systems in the Great Basin," Abrupt Climate Change Annual Meeting, Comer Science and Education Foundation, September 18, 2012.
- Hochrein, M., S. Bassett, E. A. Leger, and **D.P. Boyle**, "The importance of vegetative microclimate and elevation in the successful germination and establishment of *Abies magnifica* seedlings," 2012 Nevada NSF EPSCoR Climate Change Meeting, Nevada NSF EPSCoR Office, February 2012.
- Boyle, D.P.**, "Does climate change save terminal lakes? - A new approach for estimating, comparing, and evaluating paleoclimate conditions in pluvial lake systems," NSF EPSCoR Climate Change Seminar, Nevada NSF EPSCoR Office, February 2, 2012.
- Barth, C., **D.P. Boyle**, and S. Bassett, "An approach for estimating and comparing paleoclimate conditions in pluvial lake systems using a simple hydrologic model," American Geophysical Union Fall 2011 Meeting, American Geophysical Union, December 2011.
- Boyle, D.P.**, M. Hausner, and C. Barth, "Improving the USGS Thornthwaite water balance model in semi-arid settings by including baseflow," American Geophysical Union Fall 2011 Meeting, American Geophysical Union, December 2011.
- Heslop, J. and **D.P. Boyle**, "Meadow Groundwater Storage Following Two Precipitation Events at Sagehen Creek, CA," American Geophysical Union Fall 2011 Meeting, American Geophysical Union, December 2011.
- Barth, C. and **D.P. Boyle**, "A hydrologic modeling approach to estimating paleoclimate conditions in pluvial Jakes Lake, NV," UNR College of Science Graduate Student Poster Competition, UNR College of Science, November 2011.
- Heslop, J. and **D.P. Boyle**, "Modeling the Impacts of Climate Change on Hydrology at Galena Creek, Nevada," UNR College of Science Graduate Student Poster Competition, UNR College of Science, November 2011.

- Boyle, D.P.**, C. Barth, and S. Bassett, "An approach for estimating, comparing, and evaluating paleoclimate conditions in pluvial lakes," 2011 Comer Science and Education Abrupt Climate Change Conference, Comer Science and Education Foundation, September 2011.
- Bassett, S., D. Mouat, A. Shearer, **D.P. Boyle**, A. Knust, Q. Korbulic, P. Marin, S. Thomas, and E.J. Trammell, "Alternative futures at the range complex level: SW United States," Sustainable Ranges Working Integrated Product Team, U.S. Department of Defense, September 2011.
- Robbe, E., M. Hochrein, **D.P. Boyle**, and S. Bassett, "Toward a Better Understanding of the Impacts of Climate Change on Red Fir (*Abies Magnifica*)," Undergraduate Research Summer Poster Conference, UNR Office of Undergraduate and Interdisciplinary Research, August 2011.
- Boyle, D.P.**, C. Barth, and S. Bassett, "Towards Improved Hydrologic Model Predictions in Ungauged Snow-Dominated Watersheds Utilizing a Multi-Criteria Approach and SNODAS Estimates of SWE," International Association of Hydrological Sciences Workshop on Putting PUB into Practice, International Association of Hydrological Sciences, May 2011.
- Boyle, D.P.**, S. Bassett, and C. Garner, "Toward understanding the use of hydrologic models at weather and climate scales," Joint Meeting of the Canadian Water Resources Association and the Canadian Geophysical Union, Canadian Water Resources Association and the Canadian Geophysical Union, May 2011.
- Barth, C., **D.P. Boyle**, and S. Bassett, "Improving Hydrologic Model Calibration of Snow-Dominated Mountainous Watersheds by Utilizing a Multi-Criteria Approach," 2011 Annual Meeting of the Western Snow Conference, Western Snow Conference, April 2011.
- Boyle, D.P.**, S. Bassett, and E.J. Trammell, "Development of a hydrologic modeling laboratory for paleoclimate analysis in the Great Basin," Annual State EPSCoR Climate Change Meeting, Nevada EPSCoR, February 2011.
- Voepell, H.E., R. Schumer, **D.P. Boyle**, A. Knust, J. Ashby, H. Klieforth "Changes in Eastern Sierra Nevada precipitation related to climate change," American Geophysical Union Fall 2010 Meeting, American Geophysical Union, San Francisco, CA., December 2010.
- Barth, C., **D.P. Boyle**, "Improving Hydrologic Model Calibration of Snow-Dominated Mountainous Watersheds by Utilizing a Multi-Criteria Approach," UNR College of Science Graduate Student Poster Competition, UNR College of Science, University of Nevada, Reno, October 2010.
- Boyle, D.P.** and S. Bassett, "Walker River Basin Paleohydrologic Modeling Investigations," 2010 Comer Science and Education Abrupt Climate Change Conference, Comer Science & Education Foundation, Soldiers Grove, WI, September 2010.
- Dolloff, M.R., S. Bassett, **D.P. Boyle**, "Downscaling the IPCC SRES local land use scenarios," NSF EPSCoR Tristate Conference, Nevada NSF EPSCoR, Las Vegas, NV, April 2010.
- Bassett, S., M.R. Dolloff, **D.P. Boyle**, "Local land use scenario formulation using the IPCC SRES climate change scenarios within Nevada", (Oral Presentation), , NSF EPSCoR Tristate Conference, Nevada NSF EPSCoR, Las Vegas, NV. (April 2010).
- Boyle, D.P.**, T. Minor, G. Pohl, A. Knust, C. Garner, R. Carroll, D. McGraw, S. Bassett, C. Barth, D. Norpchen, and A. Stroud, "Development and Testing of a Decision Support Tool in Support of Water Right Acquisitions in the Walker River Basin," International Symposium on Terminus Lakes, Reno, NV, October 2009.
- Boyle, D.P.**, "Modeling Local Third Party Effects in a Water Leasing Market," SAHRA Annual Meeting, Tucson, AZ, 22-25, September 2009.
- Boyle, D.P.**, R. Schumer, J. Ashby, H. Klieforth, A. Knust, and C. Barth, "An analysis of long-term precipitation and snow-water equivalent records in the Lake Tahoe and Truckee River watersheds," Western Snow Conference, Canmore, Alberta, Canada, 20-24 April, 2009.
- Boyle, D.P.**, "How do you Measure Water Supply: Uncertainties associated with predicting sustainable water supply in light of climate change," Invited Panel Speaker, NWRA 2009 Annual Conference, Reno, NV, 4 February 2009 - *Invited*
- Schumer, R., **D.P. Boyle**, and A. Knust, "Short duration volume-frequency relationships in arid/semi-arid watersheds," Floodplain Management Association Spring Meeting, 2008
- Carroll, R., G. Pohl, K. Pohlmann, **D.P. Boyle**, C. Garner, and A. Knust, "Preliminary Model of a Coupled Groundwater-Surface Water System, Mason Valley, Nevada," 2008 MODFLOW and More: Ground

Water and Public Policy. International Ground Water Modeling Center. Colorado School of Mines, Golden, CO USA.

- Boyle, D.P.**, and C. Garner, "Water management and irrigation modeling applications, USGS Climate Workshop," EROS Data Center, Sioux Falls, SD, 27 August 2008.
- Boyle, D.P.**, C. Garner, and S. Bassett, "Water Leasing Model in the Middle Rio Grande Basin: Stage IV - Third Party Effects," 8th Annual Meeting, SAHRA, 15-17 October 2008, Tucson, AZ.
- Garner, C., **D.P. Boyle**, G. Lamorey, S. Bassett, S. Markstrom, D. Brookshire, C. Broadbent, D. Coursey, V. Tidwell, H. Gupta, "Development of a MODSIM Model to Assess the Feasibility of Water Leasing in the Middle Rio Grande Basin," 8th Annual Meeting, SAHRA, 15-17 October 2008, Tucson, AZ.
- Boyle, D.P.**, "Watershed Modeling focused on the headwater areas of Walker Lake Basin," Walker River Basin Panel, NWRA 2008 Annual Conference, Mesquite, NV, 4-6 March 2008 - *Invited*
- Schumer, R., **D.P. Boyle**, and A. Knust, "Short duration volume-frequency relationships in arid/semi-arid watersheds," Floodplain Management Association Fall Meeting, 2008.
- Schumer, R., A. Knust, **D.P. Boyle**, and S. Bassett, "Comparison of Statistical and Physically Based Modeling of Flash Floods in the Southwestern U.S.," 2008 Fall AGU Meeting, 2008.
- Barth, C., **D.P. Boyle**, L. Bastidas, and R. Schumer, "Toward Improved Calibration of Hydrologic Models: Multi-objective Analysis of Streamflow and SWE Modeling Errors in Mountainous Regions," 2008 Fall AGU Meeting, 2008.
- Schumer, R., C. Li, A. Knust, **D.P. Boyle**, "Impact of flow-duration curves on sediment load estimates," 2008 Annual Conference, Floodplain Management Association, San Diego, CA., 2008.
- Makowski, A., R. Schumer, and **D.P. Boyle**, "Volume and frequency characteristics of ephemeral streams in the semi-arid U.S.," 2007 Fall Meeting, American Geophysical Union, San Francisco, CA., 2007.
- Garner, C.B., **D.P. Boyle**, G.W. Lamorey, and S. Bassett, "Development of a Hydrologic Model to Assess the Feasibility of Water Leasing in the Middle Rio Grande Basin," AGU Fall 2007 meeting, American Geophysical Union, San Francisco, CA., 2007.
- McAlpine, J.D., D. Koracin, K. Veropoulos, **D.P. Boyle**, E. McDonald, and G. Lamorey, "Determining atmospheric dust concentrations during strong flow perturbations using a digital-optical technique," 3rd International Symposium on Visual Computing, Lake Tahoe, NV, 26-28 November, 2007.
- Garner, C.B., **D.P. Boyle**, G.W. Lamorey, and S. Bassett, "Development of a Hydrologic Model to Assess the Feasibility of Water Leasing in the Middle Rio Grande Basin," SAHRA Annual Meeting, Sustainability of Semi-arid Hydrology and Riparian Areas. , Tucson, AZ, 2007.
- Boyle D.P.**, C.B. Garner, G.W. Lamorey, and S. Bassett, "Water Leasing Stage 4, 5, 6: Third Party Effects Modeling Issues," SAHRA Annual Meeting, Sustainability of Semi-arid Hydrology and Riparian Areas, Tucson, AZ, 2007.
- Schumer, R., D. Benson, M.M. Meerschaert, and **D.P. Boyle**, "Recurrence of Extreme Events with Heavy Tailed Interarrivals," Spring American Geophysical Union Meeting, May, 2007.
- Huntington, J., **D.P. Boyle**, G. Lamorey, S. Bassett, D. Toll, "Toward Improving Streamflow Simulation in the Truckee River Basin Using MODIS Fractional Snow Cover Information" presented at the NWRA 2006 Conference in Mesquite Nevada, 21-23 February 2006.
- Boyle, D.P.**, R. Naranjo, G. Lamorey, and S. Bassett, S. Markstrom, H. Gupta, D. Brookshire, G. Leavesley, "Development of an integrated hydrologic model to explore the feasibility of water banking and markets in the southwestern U.S." presented at the Joint Eighth Federal Interagency Sedimentation Conference and Third Hydrologic Modeling Conference, 2-6 April 2006, Reno, Nevada.
- Naranjo, R., **D.P. Boyle**, G. Lamorey, and S. Bassett, S. Markstrom, G. Leavesley, "Development of an integrated physical and engineering hydrologic model of the Rio Grande" presented at the Joint Eighth Federal Interagency Sedimentation Conference and Third Hydrologic Modeling Conference, 2-6 April 2006, Reno, Nevada.
- Huntington, J., **Boyle, D.P.**, G. Lamorey, and S. Bassett, "Improving US Bureau of Reclamation Water Supply, Demand Monitoring and Forecasting Using NASA Earth Science Data" presented at the Joint Eighth Federal Interagency Sedimentation Conference and Third Hydrologic Modeling Conference, 2-6 April 2006, Reno, Nevada.

- Rajagopal, S., **D.P. Boyle**, G. Lamorey, and S. Bassett, "Optimizing the Carson River to Minimize Water Quantity and Quality Impacts on the Truckee River" presented at the Joint Eighth Federal Interagency Sedimentation Conference and Third Hydrologic Modeling Conference, 2-6 April 2006, Reno, Nevada.
- Boyle, D.P.**, G. Lamorey, S. Bassett, G. Pohll, P. Krause, and S. Kralisch, Investigating the value of hydrologic model complexity and spatial information using multicriteria methods", Proceedings of the 7th International Conference in Hydroinformatics, 4-8 September 2006, Nice, France.
- Kralisch, S., P. Krause, **D.P. Boyle**, "JAMS – A framework for natural resource model development and application" Proceedings of the 7th International Conference in Hydroinformatics, 4-8 September 2006, Nice, France.
- Naranjo, R., **D.P. Boyle**, S. Markstrom, H. Gupta, D. Brookshire, and G. Leavesley, "The Development of a Physically Based Hydrologic Model to Assess Water Markets/ Banking on the Middle Rio Grande, NM" presented at the NSF-SAHRA Sixth Annual Meeting, 11-14 October 2006, Phoenix Arizona.
- Boyle, D.P.**, R. Naranjo, S. Markstrom, "Medium resolution physical model of the middle Rio Grande basin for water leasing and market studies" presented at the NSF-SAHRA Sixth Annual Meeting, 11-14 October 2006, Phoenix, Arizona.
- Krause, P., **D.P. Boyle**, "Comparative analysis of different snow process algorithms and concepts found in various conceptual hydrological models" presented at the alpine snow workshop, 5-6 October 2006, Munich, Germany.
- Boyle, D.P.**, P. Krause, G. Lamorey, and S. Bassett, "An investigation of the impacts of different snow process algorithms in terms of catchment streamflow simulation" presented at the alpine snow workshop, 5-6 October 2006, Munich, Germany.
- Bassett, S., D. Mouat, and **D.P. Boyle**. "Alternative futures analysis: a scenario-based strategic planning assessment technique to aid environmental management." Presented at the 2006 Desert Knowledge Symposium and Business Showcase: Global Desert opportunities, November 2006, Alice Springs, Australia.
- Bassett, S., D. Mouat, and **D.P. Boyle**. "Alternative futures analysis: a scenario-based strategic planning assessment technique to aid environmental management." Invited presentation given at the Institute for Rural Futures seminar, November 2006, Armidale, Australia.
- Huntington, J., **D.P. Boyle**, G. Lamorey, D. Toll, "Evaluation of a hydrologic model applied to the Walker River Basin, Nevada, using a long term gridded evapotranspiration data set" Bureau of Reclamation ET Workshop: State-of-the-Art Review of Evapotranspiration (ET) Remote Sensing Science and Technology, 8-10 February 2005, Fort Collins, Colorado.
- Boyle, D.P.**, G. Lamorey, and A. Huggins, "Application of a hydrologic model to assess the effects of cloud seeding in the Walker River basin, Nevada," presented at the 2005 AMS Annual Meeting, Long Beach, CA., January, 2005.
- Naranjo, R., **D.P. Boyle**, G. Lamorey, H. Gupta, and D. Brookshire, "Development of an integrated hydrologic model to explore the feasibility of water banking and markets in the Southwestern U.S.", presented at the 2005 Fall Annual Meeting of the AGU, San Francisco, CA, December 2005.
- Rajagopal, S., **D.P. Boyle**, G. Lamorey, S. Coors, M. Mann, "Toward improving water supply forecasts on the Carson River with a physically based hydrologic model", International Congress on Modelling and Simulation Advances and Applications for Management and Decision Making. Melbourne, Australia, December, 2005
- Boyle, D.P.**, R. Naranjo, G. Lamorey, S. Bassett, H. Gupta, and D. Brookshire, "Development of an integrated hydrologic model to explore the feasibility of water banking and markets in the southwestern U.S.", International Congress on Modelling and Simulation Advances and Applications for Management and Decision Making. Melbourne, Australia, December, 2005
- Barth, C., P. Krause, **D. P. Boyle**, and S. Markstrom, "Hydrologic modeling of a groundwater dominated watershed using a loosely coupled modeling approach.", International Congress on Modelling and Simulation Advances and Applications for Management and Decision Making. Melbourne, Australia, December, 2005.
- Huntington, J., P. Shivakumar, **D.P. Boyle**, "Estimation of Fractional Snow Cover Using Landsat – MODIS Normalized Snow Index Regression Equations for Improved Streamflow Forecasting: An

Example from Del Norte, Colorado” Science & Technology Center for Sustainability of Semi-Arid Hydrology and Riparian Areas (SAHRA) Annual Meeting, 13-15 October 2004, Albuquerque, New Mexico.

- Boyle, D.P.**, P. E. Fritchel, G. Lamorey, and S. Markstrom, “Evaluation of a Hydrologic Model of the Rio Grande (USA) Using Observed and Modelled Land Surface Fluxes and States.” In Pahl-Wostl, C., Schmidt, S., Rizzoli, A.E. and Jakeman, A.J. (eds), Complexity and Integrated Resources Management, Transactions of the 2nd Biennial Meeting of the International Environmental Modelling and Software Society, iEMSs: Manno, Switzerland, 2004. ISBN 88-900787-1-5.
- Bassett, S. and **D.P. Boyle**. “An overview of spatial analysis and model integration for environmental understanding: Military implications.” Presentation given at the Desert Surficial Process and Landscape Dynamics on Military Lands Scientific Advances, New Challenges, and Technology Transfer Conference. Zzyzx, CA, September 2004.
- Fritchel, P.E., **D.P. Boyle**, J. R. McConnell, “Evaluation of a Hydrologic Model of the Rio Grande using a Long-Term dataset of Land Surface Fluxes and States.” Presented at 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, December, 2003.
- Boyle, D.P.**, “Evaluation of real-time streamflow forecasts from a distributed, physically based, hydrologic model applied in the Gunnison River Basin, CO.” Presented at American Water Resources Association's Annual Conference, San Diego, CA, November, 2003.
- Markstrom, S., L. Hay, G. Leavesley, M. Clark, and **D.P. Boyle**, “A Multi-objective Calibration Approach Applied to Hydrologic Modeling of the Upper Gunnison River Basin.” Presented at American Water Resources Association's Annual Conference, San Diego, CA, November, 2003.
- Koracin, D., A. Huggins, **D.P. Boyle**, and G. Lamorey “Use of atmospheric, dispersion, and hydrological modeling to assess the impact of wintertime cloud seeding in the Tahoe and Truckee River basins.” Presented at NOAA 28th Annual Climate Diagnostics and Prediction Workshop, Reno, NV, October, 2003.
- White, K.D., D.E. Lawson, and **D.P. Boyle**, “Characterizing and monitoring abandoned and active mine lands.” Presented at Workshop on Mining Impacted Native American Lands, Reno, NV, September, 2003.
- Boyle, D.P.**, J.R. McConnell, A. Hobson, and T.A. Gorham, “Water Balance Above the Mountain Front: Integrating Hydrologic Modeling and Field Studies.” Presented at the 2003 EGS-AGU-EUG Joint Assembly, Nice, France, April, 2003.
- Markstrom, S.L., **D.P. Boyle**, G.M. Pohl, R.J. Viger, W.A. Fluegel, G.H. Leavesley, and J.R. McConnell, “A Modular Approach to Coupling Surface Water and Ground Water Models.” Presented at the 2003 EGS-AGU-EUG Joint Assembly, Nice, France, April, 2003.
- Hobson, A.N., J.R. McConnell, **D.P. Boyle**, S.W. Tyler, and T.A. Gorham, “Towards Understanding Hydrologic Outflows from a Snow-Dominated Watershed in the Eastern Sierra Nevada”, Presented at the 2002 Fall Meeting of the American Geophysical Union, San Francisco, CA, December, 2002.
- Gorham, T.A., **D. P. Boyle**, J. R. McConnell, S. Markstrom, R. Viger, and G. Leavesley, “An Evaluation of Real-Time Streamflow Forecasts From a Distributed, Physically Based, Hydrologic Model Applied in the Upper Rio Grande Basin.” Presented at the 2002 Fall Meeting of the American Geophysical Union, San Francisco, CA, December, 2002
- Markstrom, S., **D.P. Boyle**, G.M. Pohl, R.J. Viger, W.A. Fluegel, G.H. Leavesley, and J.R. McConnell, “A modular approach to coupling surface water and ground water models.” Presented at the 2002 Fall Meeting of the American Geophysical Union, San Francisco, CA, December, 2002
- Gorham, T.A., **D. P. Boyle**, J. R. McConnell, G. W. Lamorey, S. Markstrom, R. Viger, and G. Leavesley, “An evaluation of real-time streamflow forecasts from a distributed, physically based, hydrologic model applied in the Upper Rio Grande Basin”, Presented at the Second Federal Interagency Hydrologic Modeling Conference, Las Vegas, NV, July 28 through August 1, 2002.
- Boyle, D.P.**, A.E. Jeton, J.R. McConnell, Gregg W. Lamorey, S. Markstrom, R. Viger, and G. Leavesley, “Application of a Distributed, Physically Based, Hydrologic Model to Improve Streamflow Forecasts in the Upper Part of the Truckee River Basin, California and Nevada”, Presented at the Second Federal Interagency Hydrologic Modeling Conference, Las Vegas, NV, July 28 through August 1, 2002.

- Boyle D.P.**, G.M. Pohll, T. A. Gorham, J.R. McConnell, and R. Carroll, “Modifications to a distributed, physically based, hydrologic model to improve simulation of subsurface flow in Sagehen Creek, CA.”, Presented at American Water Resources Association's Summer Specialty Conference on Ground Water/Surface Water Interactions, Keystone, CO, July 1-3, 2002.
- Boyle, D.P.**, A.E. Jeton, S. Markstrom, and J.R. McConnell, “Application of a Distributed, Physically Based, Hydrologic Model to Improve Streamflow Forecasts in the Upper Part of the Truckee River Basin, California and Nevada.” Presented at the Truckee River Watershed Council, Northstar Resort, CA, June 12, 2002.
- Boyle, D.P.**, A.E. Jeton, and S. Markstrom “Overview of WaRSMP MMS-PRMS modeling activities in the Upper Part of the Truckee River Basin, California and Nevada.” Presented at Interagency Water Supply and Demand Forecasting Meeting, Sacramento, CA, June 5, 2002.
- Gorham, T.A., **D.P. Boyle**, J. R. McConnell, S. Markstrom, R. Viger, and G. Leavesley, “Application of a distributed, physically based, hydrologic model to improve streamflow forecasts in the Upper Rio Grande Basin.” Presented at the 2001 Fall Meeting of the American Geophysical Union, San Francisco, CA, 10-14 December, 2001.
- Boyle, D.P.**, A.E. Jeton, and J.R. McConnell, “Application of a Distributed, Physically Based, Hydrologic Model to Improve Streamflow Forecasts in the Upper Part of the Truckee River Basin, California and Nevada.” Presented at the NWRA Symposium of the Truckee & Carson Rivers, Reno, NV, November 14, 2001.
- Tracy, J. and **D.P. Boyle**, “Assessing the Success of Watershed Restoration Activities: A Statistical Approach.” Presented at the ASCE Wetlands Engineering & River Restoration Conference, Reno, NV August 27-31, 2001
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, “Multicriteria calibration of hydrologic models.” Accepted for presentation at the International Workshop on Catchment scale Hydrological Modeling and Data Assimilation, Wageningen, The Netherlands, 3-5 September, 2001.
- Boyle, D.P.**, R. Viger, S. Markstrom, L.E. Hay, J.R. McConnell, G. Leavesley, and T. Bardsley “Application of a Distributed, Physically Based, Hydrologic Model to Improve Streamflow Forecasts in the Headwaters of the Rio Grande”, Presented at 2001 Spring Meeting of the American Geophysical Union, Boston, MA, 29 May - 2 June, 2001.
- Boyle, D.P.**, J.C. Tracy, and R. Naranjo, “Influences of climate, land use, and watershed behavioral response on sediment loading from Lake Tahoe tributaries”, Presented to the Lake Tahoe Water Quality Working Group, South Lake Tahoe, CA, 8 May 2001.
- Boyle, D.P.**, R. Naranjo, and J.C. Tracy, “Climate influences on TMDL measures of suspended sediment loading in a tributary of Lake Tahoe”, Presented at the Eighteenth Annual PACLIM Workshop, Asilomar State Conference Grounds, Pacific Grove, CA, 18-21 March 2001.
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, “Incorporating Spatial Hydrologic Information to Improve Streamflow Forecasts.” Presented at the 2000 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 15-19, 2000. (Best Student Paper Award)
- Sorooshian, S., H.V. Gupta, and **D.P. Boyle**, “Improving calibration of flood forecast models: A multi-criteria approach”, Presented at the International Symposium on Flood Defense, Kassel, Germany, September 20-23, 2000.
- Boyle, D.P.**, T.S. Hogue, H.V. Gupta, and S. Sorooshian, “The Proper Role of Automatic Methods in Parameter Estimation.” Presented at 80th American Meteorological Society Annual Meeting, Long Beach, CA, January 9-14, 2000.
- Holz, A.B., Connelly, D.T. Braatz, T.S. Hogue, and **D.P. Boyle**, “Comparing Various Methods for the Regionalization of Model Parameters in the Sacramento Soil Moisture Accounting Model and the Snow Accumulation and Ablation Model.” Presented at 80th American Meteorological Society Annual Meeting, Long Beach, CA, January 9-14, 2000.
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, “Calibration of Hydrologic Models using Multi-criteria Methods.” Presented at American Geophysical Union 19th Annual Hydrology Days, Fort Collins, CO, August 16-20, 1999.

- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, “Calibration of Hydrologic Models using Multi-criteria Methods.” Hydrologic Research Lab, U.S. National Weather Service, Silver Spring, MD, April 18-22, 1999.
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, “A Simple Approach to Semi Distributed Modeling: Less is More.” Presented at 1997 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 8-12, 1997.
- Boyle, D.P.**, H.V. Gupta, and S. Sorooshian, “Comparison of the SAC-SMA and HyMod Conceptual Flood Forecasting Models.” Hydrologic Research Lab, U.S. National Weather Service, Silver Spring, MD, November 17-19, 1997.
- Boyle, D.P.** and J.J. Warwick, “Partial area rainfall-runoff modeling: A case study in a small undeveloped catchment near Lake Tahoe, NV.” Presented at AWRA/UCOWR Symposium on Water Resources Education, Training, and Practice: Opportunities for the Next Century, Keystone, CO, June 29 to July 3, 1997.
- Sullivan, M., J.J. Warwick, and **D.P. Boyle**, “Summary of event-based water quantity and quality observations in the upper Incline Creek watershed, Nevada.” Presented at the 5th National Watershed Conference, Reno, NV, May 18-21, 1997.
- Boyle, D. P.**, and J.J. Warwick, “Application of a distributed parameter model to simulate runoff quantity and quality process.” Presented at Watersheds 1994: The Fifth Biennial Watershed Management Conference, Ashland, OR, Nov. 16-18, 1994.
- Boyle, D. P.**, and R.S. Slater, “Design flow estimates for catchments in El Dorado County, CA.” Presented at ASCE 1993 National Conference on Hydraulic Engineering and International Symposium on Engineering Hydrology, San Francisco, CA, July 25-30, 1993.

FUNDED RESEARCH

- *Using the Walker River Basin Decision Support Tool to Perform Impact Assessments of Water Right Acquisitions, System Efficiency Scenarios, and River Health – Phase III, D. Boyle, P.I., Bassett, Scott, Co-P.I., Garner, Chris, Co-P.I., (10/12-12/17), \$1,999,911, National Fish and Wildlife Foundation and U.S. Department of Interior, Desert Terminal Lakes*
- *Evaluation of the Effectiveness of Potential Water Right Acquisitions in the Walker River Basin using a Decision Support Tool – Phase II, D. Boyle, P.I., (6/12-12/13) \$540,000, National Fish and Wildlife Foundation and U.S. Department of Interior, Desert Terminal Lakes*
- *Evaluation of the Effectiveness of Potential Water Right Acquisitions in the Walker River Basin using a Decision Support Tool, D. Boyle, P.I., (8/10-12/13) \$392,455, National Fish and Wildlife Foundation and U.S. Department of Interior, Desert Terminal Lakes*
- *Nevada Water Resources Data, Modeling, and Visualization (DMV) Center – Phase II: D. Boyle, P.I., G. Pohll, Co-I., and T. Minor, Co-I., (10/10-9/12), \$750,000, Department of Energy*
- *Nevada Water Resources Data, Modeling, and Visualization (DMV) Center – Phase I: D. Boyle, P.I., G. Pohll, Co-I., and T. Minor, Co-I., (10/09-9/11), \$1,066,841, Department of Energy*
- *Identifying and understanding the impacts of climate change on water resources in the Truckee and Carson River systems: D. Boyle, P.I., (10/09-9/11), \$400,000, Department of Interior, Water for America*
- *Alternative Futures at the Range Complex Level: Southwest United States, D. Mouat, P.I., S. Bassett, Co-P.I., D. Boyle, Co-P.I., and A. Gertler, Co-P.I., (10/08-9/10), \$950,000, Department of Defense*
- *Estimation of short-duration volume-frequency relationships in arid/semi-arid watersheds - Phase II. D. Boyle, P.I., Rina Schumer, Co-P.I., Anna Knust, Co-I, and Li Chen, Co-I, (9/1/08-8/30/09), \$77,706, USACE, Urban Flooding Demonstration Program*
- *Development of a Decision Support Tool in Support of Water Right Acquisitions in the Walker River Basin: D. Boyle, P.I., G. Pohll, Co-P.I., S. Bassett, Co-P.I., G. Lamorey, Co-I., Rina Schumer, Co-I., and R. Carroll, Co-I., (3/07-9/08), \$947,533, Department of Interior, Desert Terminal Lakes*

- *Development of tools and solutions to optimize the operations of the Truckee River based on the requirements of the Truckee River Operating Agreement - Development, testing, and implementation of tools to optimize the operations of the Truckee River using high resolution estimates of hydrologic variables from NWS and NASA data products: D. Boyle, P.I., G. Lamorey, Co-P.I., G. Pohll, Co-P.I., and S. Bassett, Co-P.I., (10/06-2/09), \$233,554, Department of Interior, Water 2025*
- *Development of tools and solutions to optimize the operations of the Truckee River based on the requirements of the Truckee River Operating Agreement - Perform streamflow forecast study to provide operational guidance to Reclamation streamflow forecasters aimed at optimizing the operations of the Truckee River: D. Boyle, P.I., G. Lamorey, Co-P.I., G. Pohll, Co-P.I., and S. Bassett, Co-P.I., (10/06-2/09), \$146,446, Department of Interior, Water 2025*
- *Development of tools and solutions to optimize the operations of the Truckee River based on the requirements of the Truckee River Operating Agreement - Perform studies to understand and improve the quality of real time hydrologic data acquisition, storage, and usage to improve Reclamation DSS on the Truckee-Carson River system: D. Boyle, P.I., G. Lamorey, Co-P.I., G. Pohll, Co-P.I., and S. Bassett, Co-P.I., (10/06-2/09), \$199,539, Department of Interior, Water 2025*
- *Estimation of short-duration volume-frequency relationships in arid/semi-arid watersheds – Phase II: D. Boyle, P.I., R. Schumer, Co-P.I., G. Lamorey, Co-P.I., (10/06-5/07), \$91,600, USACE, Urban Flooding Demonstration Program*
- *Visualization of Desert Terrain Conditions in Support of Military Operations: Phase II: E. McDonald, P.I., D. Boyle, Co-P.I., S. Bassett, Co-PI, and D. Koracin, Co-PI, (6/06-6/07), \$69,000, Internal DRI CAVCaM Center, DOD Army STTC*
- *The Virtual Proving Ground: Dynamic Visualization of Military Vehicle Test Course in Desert Terrains: E. McDonald, P.I., D. Boyle, Co-P.I., S. Bassett, Co-P.I., T. Caldwell Co-P.I., and S. Bacon, Co-P.I., (6/06-6/07), \$73,000, Internal DRI CAVCaM Center, DOD Army STTC*
- *Installation of a Meteorological Station at Tahoe Meadows: D. Boyle, Co-P.I., G. Lamorey, Co-P.I., (1/06-1/08), \$50,000, Internal DRI-DHS, Desert Research Institute*
- *Estimation of short-duration volume-frequency relationships in arid/semi-arid watersheds – Phase I: D. Boyle, P.I., G. Lamorey, Co-P.I., S. Bassett, Co-P.I., (10/05-9/06), \$110,000, USACE, Urban Flooding Demonstration Program*
- *River management scenario modeling and the implications on restoration efforts on the Lower Truckee River: D. Boyle, P.I., S. Bassett, Co-P.I., G. Lamorey, Co-P.I., (10/05-9/06), \$77,017, USACE, Urban Flooding Demonstration Program*
- *Development of tools and solutions to optimize the operations of the Truckee River based on the requirements of the Truckee River Operating Agreement - Identify and quantify return flows to the Truckee River and improve existing Reclamation DSS: D. Boyle, P.I., G. Lamorey, Co-P.I., G. Pohll, Co-P.I., and S. Bassett, Co-P.I., (5/05-9/07), \$202,341, Department of Interior, Water 2025*
- *Sustainability of Water Resources in Semi-Arid Regions (SAHRA) – NSF Science and Technology Center at the University of Arizona, DRI component: J. McConnell, Co-P.I. and D. Boyle, Co-P.I., (1/05-12/09), \$547,000, National Science Foundation*
- *Improving water supply forecasts in the Western U.S. using NASA Earth Science products: D. Boyle, P.I., (11/04 – 9/07), \$80,094, NASA*
- *The development of an interactive groundwater management tool for the Shoal site: D. Boyle, P.I., G. Lamorey, Co-P.I., S. Bassett, Co-P.I., and G. Pohll, Co-P.I., (10/05-9/06), \$220,000, Department of Energy*
- *The development of an interactive groundwater management tool for the Rio Blanco site: J. Chapman, P.I., C. Cooper, Co-P.I., D. Boyle, Co-P.I., G. Lamorey, Co-P.I., (10/05-9/06), \$220,000, Department of Energy*
- *Truckee Canal Optimization: J. Miller Co-P.I. and D. Boyle, Co-P.I., (10/04-9/07), \$138,000, Department of Interior, Water 2025*
- *Demonstrating innovative river restoration assessment technologies, Truckee River, Nevada: S. Benner, P.I., S. Bassett, Co-P.I., D. Boyle, Co-P.I., J. Brock, Co-P.I., C. Fritsen, Co-P.I., and D.*

- Sada, Co-P.I., (10/04-9/05), **\$148,000**, USACE, Urban Flooding Demonstration Program
- *The development of an interactive groundwater management tool for the CNTA: D. Boyle, P.I., S. Bassett, Co-P.I., and G. Pohll, Co-P.I., (10/04-9/05), \$240,000, Department of Energy*
 - *Integrated Desert Terrain Forecasting for Military Operations - Phase 2: McDonald, E., P.I., S. Bassett, Co-I., D. Boyle, Co-I., T. Minor, Co-I., T. Bullard, Co-I., K. McGuire, Co-I., and J. Gillies, Co-I., (10/04-9/07), \$2,760,000, DoD, Army Research Office*
 - *Optimizing the Carson River to minimize water quantity and quality impacts on the Truckee River: D. Boyle, P.I., G. Pohll, Co-P.I., and S. Bassett, Co-P.I., (10/04-9/07), \$138,000, Department of Interior, Water 2025*
 - *MMS Installation, Training, and Support on the Truckee River Basin, Nevada and California: D. Boyle, P.I., (1/04-6/05), \$8,000, U.S. District Court Water Master*
 - *Evaluating the Impacts of Wintertime Cloud Seeding on the Snowpack and Streamflow in a Watershed – Year 2: A. Huggins, P.I., D. Koracin, Co-I., D. Boyle, Co-I., (9/03-6/05), \$199,871, U.S. Bureau of Reclamation*
 - *Las Vegas Wash Quantitative Precipitation Forecast: D. Boyle, P.I., S. Bassett, Co-P.I., (9/03-3/04), \$71,000, USACE, Urban Flooding Demonstration Program*
 - *Data Fusion for the Urban Flooding Demonstration Program: S. Bassett, P.I., D. Boyle, Co-P.I., (9/03-3/04), \$64,000, USACE, Urban Flooding Demonstration Program*
 - *Evaluating the Impacts of Wintertime Cloud Seeding on the Snowpack and Streamflow in a Watershed – Year 1: A. Huggins, P.I., D. Koracin, Co-I., D. Boyle, Co-I., G. Lamorey, Co-I., (2/03-6/04), \$318,105, U.S. Bureau of Reclamation*
 - *Development, Application, and Evaluation of Hydrologic Models in Watershed and River System Management Program (WaRSMP) Basins: D. Boyle, P.I. and J. McConnell, Co-P.I., (10/02-9/03), \$82,262, USGS*
 - *USGS Truckee River Watershed and River System Management Program (WaRSMP): D. Boyle, P.I., (10/01-8/02), \$35,472, USGS*
 - *Improving Streamflow Forecasts on the Upper Rio Grande: D. Boyle P.I. and J. McConnell, Co-P.I., (10/01-8/02), \$45,143, USGS*
 - *USGS Truckee River Watershed and River System Management Program (WaRSMP): D. P. Boyle, P.I., (10/01-8/02), \$50,144, USGS*

ACADEMIC AWARDS

- “Excellence in Teaching Award” (Honorable Mention) 2000-2001 Academic Year – AWRA Student Chapter of the Graduate Program of Hydrologic Sciences, University of Nevada, Reno.
- “Outstanding Student Paper Award” 2000 Fall Meeting of the American Geophysical Union – Hydrology Section, AGU.