

Mark Cable Rains

Education	Ph.D. (2002), Hydrologic Sciences, UC Davis, Davis, California M.S. (1994), Forest Resources, University of Washington, Seattle, Washington B.A. (1990), Ecology, Behavior, and Evolution, UC San Diego, San Diego, California
Additional Short Course Education	River Morphology and Applications. 1996. Wildland Hydrology, Pagosa Springs, Colorado. 40 Hours. Applied Fluvial Geomorphology. 1995. Wildland Hydrology, Pagosa Springs, Colorado. 40 Hours.
Professional Experience	Associate Professor (2009-Current) & Assistant Professor (2003-2009), Department of Geology, University of South Florida Senior Scientist (2005-Current), Florida Coastal Everglades Long-Term Ecological Research Program President (2005-Current), Coshow Environmental, Inc., Temple Terrace, Florida Fellow (2008), Dr. Kiran C. Patel Center for Global Solutions, University of South Florida Postgraduate Researcher (2002-2003), Department of Land, Air, and Water Resources, University of California, Davis Research Assistant (1997-2002), Department of Geology, University of California, Davis Staff Scientist (1997-2003), David Magney Environmental Consulting, Ojai, California Research Associate (1995-1996), Smithsonian Environmental Research Center, Edgewater, Maryland Senior Associate (1996-1997), Associate (1994-1996), & Technical Assistant (1993-1994), L.C. Lee & Associates, Inc., Seattle, Washington Research Assistant (1991-1993), College of Forest Resources, University of Washington, Seattle, Washington
Awards and Certifications	Silver Telly Award in the Category of Best Use of Animation, Telly Awards, 2009 (Awarded to the Media Innovation Team, University of South Florida, for an animation which we collaboratively created as part of a teaching tool I use in my courses.) Patel Faculty Research Fellow, Dr. Kiran C. Patel Center for Global Solutions, 2008 Level I Scientific and Technological Achievement Award, U.S. Environmental Protection Agency, 2007 Professional Wetland Scientist (Certification #1299) Xi Sigma Pi National Honors Society of Foresters
Professional Organizations	Representative for the University of South Florida, Consortium of Universities for the

Advancement of Hydrologic Science, Inc., 2004-current
American Geophysical Union
American Water Resources Association
Geological Society of America
International Association of Hydrological Sciences
National Ground Water Association
Society of Wetland Scientists
Sigma Xi

**Teaching
Specialization**

I teach a variety of courses in the hydrologic sciences, including interdisciplinary courses which address the interactions between hydrology, geomorphology, ecology, and the human environment.

**Teaching
Accomplishments**

Undergraduate

Course Title: GLY4822C Fluid Earth 2: Hydrogeology

Course Description: Undergraduate lecture/laboratory course in hydrogeology.

Number of Credits: 4

Number of Times Taught: 6

Course Title: GLY4947L Hydrogeology Field Methods (co-taught with Dr. Mark Stewart)

Course Description: Undergraduate field/laboratory methods course that is part of the 6-credit USF Geology Summer Field School.

Number of Credits: 1

Number of Times Taught: 6

Course Title: GLY4948L Hydrogeology Laboratory Methods (co-taught with Dr. Mark Stewart)

Course Description: Undergraduate field/laboratory methods course that is part of the 6-credit USF Geology Summer Field School.

Number of Credits: 1

Number of Times Taught: 6

Course Title: GLY4780 Ecohydrology of Mexican Mangroves

Course Description: Undergraduate field course in which students design and conduct field studies on the structure and function of mangroves and the roles they may play in maintaining traditional fishing and developing ecotourism economies.

Number of Credits: 2

Number of Times Taught: 3

Course Title: GLY4780 Ecohydrology Field Studies

Course Description: Undergraduate field course in which students design and conduct ecohydrology field studies on selected topics.

Number of Credits: 2

Number of Times Taught: 2

Course Title: GLY4930 Water in Grand Canyon

Course Description: Undergraduate lecture/field course covering the effects of water resources development in the American West on the Colorado River in Grand Canyon.

The course had two parts: 2 months of lecture/discussion at USF and a 6-day field trip on the Colorado River in Grand Canyon.

Number of Credits: 3
Number of Times Taught: 1

Course Title: GLY4930 Fluvial Hydrology & Geomorphology
Course Description: Undergraduate lecture/laboratory course covering the mechanics of open-channel flows, primarily to understand the potential energy available to do work, and the geomorphic responses to work, including channel initiation, sediment transport, and channel adjustment.

Number of Credits: 4
Number of Times Taught: 1

Course Title: GLY4947L Evapotranspiration
Course Description: Undergraduate field/laboratory methods course.
Number of Credits: 1
Number of Times Taught: 1

Graduate

Course Title: GLY6824 Ecohydrology
Course Description: Graduate lecture course covering hydrological processes along the atmosphere-plant-soil continuum and the ways in which hydrological processes control ecological structure and function in all ecosystems.

Number of Credits: 3
Number of Times Taught: 3

Course Title: GLY6573 Fluvial Hydrology & Geomorphology
Course Description: Graduate lecture course covering the mechanics of open-channel flows, primarily to understand the potential energy available to do work, and the geomorphic responses to work, including channel initiation, sediment transport, and channel adjustment.

Number of Credits: 3
Number of Times Taught: 2

Course Title: GLY6739 Ecohydrology of Mexican Mangroves
Course Description: Graduate field course in which students design and conduct field studies on the structure and function of mangroves and the roles they may play in maintaining traditional fishing and developing ecotourism economies.

Number of Credits: 2
Number of Times Taught: 2

Course Title: GLY6739 Water in Grand Canyon
Course Description: Graduate lecture/field course covering the effects of water resources development in the American West on the Colorado River in Grand Canyon. The course had two parts: 2 months of lecture/discussion at USF and a 6-day field trip on the Colorado River in Grand Canyon.

Number of Credits: 3
Number of Times Taught: 1

Additional Short Courses Taught

Hydrogeomorphic Approach to Assessing Wetland Function. 2009. Jicarilla Apache Natural Resource Department, Durango, Colorado.

Hydrogeomorphic Approach to Assessing Wetland Function. 2005. Jicarilla Apache Natural Resource Department, Durango, Colorado.

Ecology and Management of Vernal Pool Grasslands. 2003. UC Davis Extension, Davis, California.

Understanding Riparian Processes. 2002. UC Davis Extension, Davis, California.

The Hydrogeomorphic Approach to Assessment of Functions of Waters of the U.S., Including Wetlands, in the Kenai River Watershed. 1997. National Wetland Science Training Cooperative, Soldatna, Alaska.

The Hydrogeomorphic Approach to Assessment of Functions of Waters of the U.S., Including Wetlands, on the Central California Coast. 1996. National Wetland Science Training Cooperative, San Francisco, California.

The Hydrogeomorphic Approach to Assessment of Functions of Waters of the U.S., Including Wetlands, in the Santa Margarita Watershed, California. 1994. National Wetland Science Training Cooperative, Temecula, California.

**Research
Specialization**

I conduct research on hydrological processes at the subsurface-surface-atmospheric interface, and on the roles that hydrological processes at the subsurface-surface-atmospheric interface play in governing ecosystem structure and function in wetland, river, estuary, and near-shore marine ecosystems.

**Peer-Reviewed
Publications [Boldface
indicates me or
graduate students
whom I have advised]**

Articles, Reports, and Book Chapters

Stringer, C.E., M.C. Rains, S. Kruse, and D. Whigham. In Review. Controls on water levels and salinity in a barrier island mangrove, Indian River Lagoon, Florida. *Wetlands*.

Kish, G.R., **Stringer, C.E.**, M.T. Stewart, and **M.C. Rains**. In Review. Geochemical mass-balance approach for baseflow separation, upper Hillsborough River watershed, west-central Florida, 2003-2005. U.S. Geological Survey Scientific-Investigations Report.

Kittridge, M.G., and **M.C. Rains**. Accepted Pending Revision. Accuracy and cost/effectiveness analysis of various reference evapotranspiration equations, peninsular Florida, USA. *Journal of Hydrologic Engineering*.

Hammersmark, C.T., S. Dobrowski, **M.C. Rains**, and J.F. Mount. 2009. Simulated effects of stream restoration on herbaceous vegetation distribution. *Restoration Ecology* DOI: 10.1111/j.1526-100X.2009.00519.x.

Hammersmark, C.T., **M.C. Rains**, A.C. Wickland, and J.F. Mount. 2009. Vegetation – water-table relationships in a hydrologically-restored riparian meadow. *Wetlands* 29:785–797.

Murphy, K.E., **M.C. Rains**, **M.G. Kittridge**, M. Stewart, and M.A. Ross. 2008. Hydrological connectivity between clay settling areas and surrounding hydrological landscapes in the phosphate mining district, peninsular Florida, USA. *Journal of the American Water Resources Association* 44:980-995.

Rains, M.C., R.A. Dahlgren, R.J. Williamson, G.E. Fogg, and T. Harter. 2008. Geological control of physical and chemical hydrology in vernal pools, Central Valley, California. *Wetlands* 28:347-362.

Hammersmark, C.T., **M.C. Rains**, and J.F. Mount. 2008. Quantifying the hydrologic effects of stream restoration in a montane meadow environment. *River Research and Applications* 24:735-753.

Leibowitz, S.G., P.J. Wigington, Jr., **M.C. Rains**, and D.M. Downing. 2008. Non-navigable streams and adjacent wetlands: Addressing science needs following the Supreme Court's Rapanos decision. *Frontiers in Ecology and Environment* 6:364-371.

Nadeau, T.-L., and **M.C. Rains**. 2007. Contribution of headwaters to downstream integrity: Introduction to the JAWRA special issue. *Journal of the American Water Resources Association* 43:1-4.

Nadeau, T.-L., and **M.C. Rains**. 2007. Hydrological connectivity of headwaters to downstream waters: State-of-the-science and future directions. *Journal of the American Water Resources Association* 43:118-133.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. Geological control of physical and chemical hydrology in vernal pool wetlands, Central Valley, California. In Kovar, K, Z. Hrkal, and J. Bruthans (Eds.), *Hydrology and Ecology: The Groundwater/Ecology Connection*, 25-28. Czech Association of Hydrogeologists, Prague, Czech Republic.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. The role of perched aquifers in hydrological connectivity and biogeochemical processes in vernal pool landscapes, Central Valley, California. *Hydrological Processes* 20:1157-1175.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. Local shallow groundwater drawdown and baseflow cessation due to regional groundwater pumping. In Lowrance, R. (Ed.), *Riparian Ecosystems and Buffers: Multi-Scale Structure, Function, and Management*. American Water Resources Association, Middleburg, Virginia, TPS-04-2, CD-ROM.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. Simulated changes in shallow groundwater and vegetation distributions under different reservoir operations scenarios. *Ecological Applications* 14:192-207.

Rains, M.C. 2003. Hydrogeologic principles useful in predicting the effects of stream flow alterations on shallow groundwater and associated riparian vegetation. *Stream Notes* July:3-6.

Rains, M.C. 2003. The role of groundwater in resource conservation efforts. *Conservation Biology* 17:933-934.

Rains, M.C., and J.F. Mount. 2002. Origin of shallow ground water in an alluvial aquifer as determined by isotopic and chemical procedures. *Ground Water* 40:552-563.

Rains, M.C. 2000. Avoiding an Ozymandian fate. *Conservation Biology* 14:587-588.

Whigham, D.F., L.C. Lee, M.M. Brinson, R.D. Rheinhardt, **M.C. Rains**, J.A. Mason, H. Kahn, M.B. Ruhlman, and W.B. Nutter. 1999. Hydrogeomorphic (HGM) assessment - a test of user consistency. *Wetlands* 19:560-569.

Edited Volumes

Nadeau, T.-L., and **M.C. Rains** (Eds.). 2007. Featured Collection: Headwaters Hydrology. *Journal of the American Water Resources Association* 43.

Theses and Dissertations

Rains, M.C. 2002. Surface and Ground-Water Origins and Interactions and Vegetation Distributions in Riverine and Reservoir-Fringe Systems: A Case Study in Support of Reservoir Management Efforts. Ph.D. Dissertation, University of California, Davis, California.

Rains, M.C. 1994. Plant Community Structure Along Environmental Gradients Defined by Hydrology, Redox Potential, and Shade in Pacific Northwest Palustrine Wetlands. M.S. Thesis, College of Forest Resources, University of Washington, Seattle, Washington.

Published Teaching Materials

Rains, M.C. In Review. Salmon use of geomorphically restored streams at Point Reyes National Seashore. Spreadsheets Across the Curriculum, Module SSACgnp.GB661.MCR1.3. Tampa: University of South Florida Libraries.

Rains, M.C. In Review. Comparing stream discharge in two watersheds in Glacier National Park. Spreadsheets Across the Curriculum, Module SSACgnp.GB661.MCR1.2. Tampa: University of South Florida Libraries.

Rains, M.C., D.C. Shelley, and L. Vacher. 2009. Flood days and good canoeing days at Congaree National Park. Spreadsheets Across the Curriculum, Module SSACgnp.GB.MCR1.1. Tampa: University of South Florida Libraries.

Non-Peer-Reviewed Technical Reports [Boldface indicates me or graduate students whom I have advised]

Kleindl, W.J., **M.C. Rains**, F.R. Hauer, J. Doskocil, and J. White. 2008. Jicarilla Rapid Assessment of Functions (JRAF): A Protocol for the Rapid Assessment of Functions on Riverine Floodplains in the San Juan River System. Prepared for the Jicarilla Apache Nation, Dulce, New Mexico.

Ross, M., M. Stewart, K. Trout, and **M. Rains**. 2008. Hydrology of a Clay Settling Area: Interim Report (FIPR Project No. 03-03-150S). Prepared for the Florida Institute of Phosphate Research, Bartow, Florida.

Rains, M.C. 2007. Preliminary Report on the Surface-Water and Groundwater Interactions in Small Pools on the Pebble Property, South-Central Alaska. Prepared for Three Parameters Plus, Inc. by Coshow Environmental, Inc., Temple Terrace, Florida.

Rains, M.C. 2007. Surface and Shallow Subsurface Hydrogeology of Four Sites at the Donlin Creek Gold Project, Interior Alaska. Prepared for Three Parameters Plus, Inc. by Coshow Environmental, Inc., Temple Terrace, Florida.

Larsen, E.W., and **M.C. Rains**. 2006. Meander Migration Model Assessment for the 50-And 100-Year Storms, Whitman Property, San Antonio Creek, Ventura County, California. Prepared for Mr. John Whitman by Coshow Environmental, Inc., Temple Terrace, Florida.

Larsen, E.W., and **M.C. Rains**. 2006. Meander Migration Model Assessment for the January 2005 Storm, Whitman Property, San Antonio Creek, Ventura County, California. Prepared for Mr. John Whitman by Coshow Environmental, Inc., Temple Terrace, Florida.

Williamson, R.J., G.E. Fogg, **M.C. Rains**, and T.H. Harter. 2005. Hydrology of Vernal Pools at Three Sites, Southern Sacramento Valley (FHWA/CA/IR-2004/08). Prepared for the California Department of Transportation. Sacramento, California.

Lee, L.C., P.L. Fiedler, S.R. Stewart, D.J. Partridge, J.A. Mason, E.M. Inlander, and **M.C. Rains**. 2004. Draft Operational Guidebook for Assessment of the Functions of Riverine Waters/Wetlands in the Santa Margarita Watershed, Riverside & San Diego Counties, California. San Diego Regional Water Quality Control Board, Technical Publication. San Diego, California.

David Magney Environmental Consulting. 2002. Bankfull Discharge, Slope, and Bed-Material Particle Size on a Sand-Bed Stream in a Semi-Arid Region: Conejo Creek at Winding Brook Farm, Camarillo, California. (PN 00-0161). Prepared for the California State Coastal Conservancy, Oakland, California.

David Magney Environmental Consulting with Parametrix. 2001. Surface and Ground Water Interactions Between the Jemez River, Jemez Canyon Reservoir, and the Shallow Alluvial Aquifer. (PN 01-0211). Prepared for the Pueblo of Santa Ana, Bernalillo, New

Mexico.

David Magney Environmental Consulting. 2001. General Geology, Hydrology, and Soils of the Ojai Meadows Preserve, Ojai, California. (PN 00-0031). Prepared for the Ojai Valley Land Conservancy, Ojai, California.

David Magney Environmental Consulting with Geolnsight International, Secor International, and Wildlands. 2000. Calleguas Creek Watershed Restoration and Preservation Plan. (PN 97-0141). Prepared for the California Coastal Conservancy, Oakland, California and U.S. Environmental Protection Agency (Region IX), San Francisco, California.

David Magney Environmental Consulting. 2000. Wetland Restoration Plan and Monitoring Program for the Reinke Property, Rolling Oaks Drive, Thousand Oaks, California. (PN 00-0132). Prepared for the U.S. Army Corps of Engineers, Ventura, California and the California Department of Fish and Game, Ventura, California.

David Magney Environmental Consulting. 1999. Revegetation and Monitoring Plan: Ventura River at State Route 150. (PN-98-0171). Prepared for the Ojai Valley Sanitary District, Ojai, California.

David Magney Environmental Consulting. 1999. Harrison Property Bank Stabilization Assessment on San Antonio Creek, Ojai Valley, California. (PN 99-0081). Prepared for the U.S. Army Corps of Engineers, Ventura, California.

Lee, L.C., **M.C. Rains**, J.L. Cassin, S.R. Stewart, R. Post, M. Brinson, M. Clark, J. Hall, G. Hollands, D. LaPlant, W. Nutter, J. Powell, T. Rockwell, and D. Whigham. 1999. Operational Draft Guidebook for Reference Based Functional Assessment of the Functions of Precipitation-Driven Wetlands on Discontinuous Permafrost in Interior Alaska. State of Alaska Department of Environmental Conservation/U.S. Army Corps of Engineers Waterways Experiment Station Technical Report Number WRP-DE-____. Juneau, AK.

Lee, L.C., M.L. Butterwick, J.L. Cassin, R.A. Leidy, J.A. Mason, **M.C. Rains**, L.E. Shaw, and E.G. White. 1997. A Report on Assessment of the Functions of Waters of the United States, Including Wetlands, on the Borden Ranch, Sacramento and San Joaquin Counties, California. Prepared for the U.S. Environmental Protection Agency (Region IX), San Francisco, California.

Lee, L.C., M.L. Butterwick, J.L. Cassin, R.A. Leidy, J.A. Mason, **M.C. Rains**, L.E. Shaw, and E.G. White. 1997. A Draft Guidebook for Assessment of the Functions of Waters of the U.S., Including Wetlands, on the Borden Ranch, Sacramento and San Joaquin Counties, California. Prepared for the U.S. Environmental Protection Agency (Region IX), San Francisco, California.

Lee, L.C., M.M. Brinson, D. DeWald, M. Gilbert, W.J. Kleindl, W.L. Nutter, **M.C. Rains**, D.F. Whigham, M. Whited. 1997. Operational Draft Guidebook to HGM Functional Assessments in Temporary and Seasonal Depressional Waters/Wetlands in the Northern Prairie Pothole Region. Prepared for the Natural Resources Conservation Service, Washington, D.C.

L.C. Lee & Associates, Inc. 1997. 1996 Monitoring Report: International Paper, Ticonderoga, New York. Prepared for International Paper, Ticonderoga, New York.

Lee, L.C., **M.C. Rains**, J.A. Mason, and W.J. Kleindl. 1996. Draft Guidebook to HGM Functional Assessments in 3rd and 4th Order Riverine Waters/Wetlands of the Central California Coast. Prepared for the U.S. Environmental Protection Agency (Region IX), San Francisco, California.

L.C. Lee & Associates, Inc. 1996. Final Mitigation and Monitoring Plan: University of Washington-Bothell/Cascadia Community College Collocated Campus. Prepared for the Washington State Higher Education Coordinating Board, Olympia, Washington.

L.C. Lee & Associates, Inc. 1996. 1995 Monitoring Report: International Paper, Ticonderoga, New York. Prepared for International Paper, Ticonderoga, New York.

L.C. Lee & Associates, Inc. 1995. An Analysis of the Distribution and Jurisdictional Status of Waters of the United States, Including Wetlands, at the Proposed University of Washington-Bothell/Cascadia Community College Collocated Campus Site. Prepared for the Washington State Higher Education Coordinating Board, Olympia, Washington.

L.C. Lee & Associates, Inc. 1995. 1994 Monitoring Report: International Paper, Ticonderoga, New York. Prepared for International Paper, Ticonderoga, New York.

Lee, L.C., M.M. Brinson, W.L. Nutter, **M.C. Rains**, E.A. Olsen, and N.A. MacLeod. 1994. A Preliminary Framework for Assessing the Waters of the U.S., Including Wetlands, in the Santa Margarita Watershed, Riverside and San Diego Counties, California. Prepared for the U.S. Environmental Protection Agency (Region IX), San Francisco, California.

Presentations and Posters [Boldface indicates me or graduate students whom I have advised]

National and International Meetings

Rains, M.C. 2009. Water sources and hydrodynamics of closed-basin depressions, south-central Alaska. Society of Wetland Scientists 2009 Annual Meeting, Madison, Wisconsin.

McCarten, N., M.C. Rains, and T. Harter. 2009. Ecohydrology of vernal pool wetland ecosystems. HydroEco2009, International Multidisciplinary Conference on Hydrology and Ecology: Ecosystems Interfacing with Groundwater and Surface Water, Vienna, Austria.

Stringer, C.E., M.C. Rains, S. Kruse, D. Whigham, J.T.A. Verhoeven, and R. Laanbroek. 2008. Linkages between surface and subsurface hydrology and ecological functioning of mangrove systems in Ft. Pierce, Florida. American Geophysical Union 2008 Fall Meeting, San Francisco, California.

McCarten, N., M.C. Rains, and T. Harter. 2008. Seasonal, variably saturated flows in a vernal pool wetland ecosystem. American Geophysical Union 2008 Fall Meeting, San Francisco, California.

Whigham, D.F., S.J. Baird, C. Field, C. Walker, R.S. King, J.A. Back, **M.C. Rains,** and **J. Bellino.** 2008. Headwater wetlands of the Kenai Lowlands, Alaska. Society of Wetland Scientists 29th Annual Meeting, Washington, DC.

Murphy, K.E., M.C. Rains, M.G. Kittridge, M.T. Stewart, and M.A. Ross. 2007. Hydrological connectivity between clay settling areas and surrounding hydrological landscapes, peninsular Florida, USA. American Water Resources Association 2007 Annual Conference, Albuquerque, New Mexico.

Kittridge, M.G., and **M.C. Rains.** 2007. Cost/effectiveness analysis of obtaining operational estimates of reference evapotranspiration, peninsular Florida, USA. American Water Resources Association 2007 Annual Conference, Albuquerque, New Mexico.

Whigham, D.F., I. Feller, **C. Stringer, M. Rains,** J.T.A. Verhoeven, P. van der Ven, and P. Baas. INVITED. 2007. Linkages between surface hydrology and ecological functioning of mangrove ecosystems in Ft. Pierce, Florida. International Association of

Landscape Ecologists 2007 World Congress, Wageningen, The Netherlands.

Rains, M.C., R.A. Dahlgren, G.E. Fogg, T. Harter, and R.J. Williamson. INVITED. 2007. Geological control of physical and chemical hydrology in vernal pool wetlands, Central Valley, California. Society of Wetland Scientists 28th Annual Meeting, Sacramento, California.

Leibowitz, S.G., P.J. Wigington, **M.C. Rains**, and D.M. Downing. 2007. A conceptual framework for addressing information needs following the US Supreme Court's Rapanos and Carabell decisions. Society of Wetland Scientists 28th Annual Meeting, Sacramento, California.

Hammersmark, C.T., M.C. Rains, and J.F. Mount. 2007. Hydrologic effects of a pond and plug stream restoration in a mountain meadow. Society of Wetland Scientists 28th Annual Meeting, Sacramento, California.

Stringer, C.E., M.C. Rains, D. Whigham, I. Feller, J.T.A. Verhoeven. 2007. Controls on the chemical hydrology and associated ecological structure and function in mangroves, Indian River Lagoon, Florida. Society of Wetland Scientists 28th Annual Meeting, Sacramento, California.

Stringer, C.E., M.C. Rains, D. Whigham, I. Feller, and J.T.A. Verhoeven. INVITED. 2006. Linkages between surface and subsurface hydrology and ecological functioning of mangrove ecosystems in Ft. Pierce, Florida. Geological Society of America Annual Meeting and Exposition, Philadelphia, Pennsylvania.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. INVITED. 2006. Perched aquifer control of hydrogeological and biogeochemical processes in vernal pool landscapes, Central Valley, California. Geological Society of America Annual Meeting and Exposition, Philadelphia, Pennsylvania.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2006. Geological control of physical and chemical hydrology in vernal pool wetlands, Central Valley, California. HydroEco2006, International Conference on Hydrology and Ecology: The Groundwater/Ecology Connection, Karlovy Vary, Czech Republic.

Rains, M.C. INVITED PANELIST. 2006. A review of the state of the science. Regional Science Workshop on Headwaters and Associated Wetlands in the Mid-Atlantic Highlands Region, U.S. Environmental Protection Agency Region 3, Philadelphia, Pennsylvania.

Rains, M.C. INVITED PANELIST. 2006. Too much, too little, just right: Optimum hydrologic regimes for the natural system. The Everglades Coalition 21st Annual Conference, Hutchinson Island, Florida.

Nadeau, T.-L., and **M.C. Rains**. INVITED. 2005. How science can inform Clean Water Act jurisdiction and policy after SWANCC: Hydrological and ecological connectivity. American Water Resources Association 2005 Annual Meeting, Seattle, Washington.

Rains, M.C., R.A. Dahlgren, G.E. Fogg, T. Harter, and R.J. Williamson. INVITED. 2005. Hydrologic-soil interactions in vernal pool wetlands with claypans versus duripans. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America International Annual Meeting, Salt Lake City, Utah.

Rains, M.C., R.J. Williamson, G.E. Fogg, T. Harter, and R.A. Dahlgren. 2005. Geological control of physical and chemical hydrology in vernal pools, Central Valley, California. Society of Wetland Scientists 26th Annual Meeting, Charleston, South Carolina.

Suwannee River Watershed Hydrologic Observatory Design Team. INVITED. 2004. The Suwannee River Hydrologic Observatory: A subtropical coastal plain watershed in transition. American Geophysical Union 2004 Fall Meeting, San Francisco, California.

Rains, M.C., R.J. Williamson, G.E. Fogg, T. Harter, and R.A. Dahlgren. 2004. Geological control of physical and chemical hydrology in vernal pools, Central Valley, California. American Geophysical Union 2004 Fall Meeting, San Francisco, California.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2004. Hydrological and biogeochemical connectivity between uplands, vernal pools, and streams, Great Central Valley, California. Society of Wetland Scientists 25th Annual Meeting, Seattle, Washington.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2003. Hydrological and biogeochemical connectivity between uplands, vernal pools, and streams, Great Central Valley, California. American Geophysical Union 2003 Fall Meeting, San Francisco, California.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2003. Simulated changes in shallow groundwater and vegetation distributions under different reservoir operations scenarios. Society of Wetland Scientists 24th Annual Meeting, New Orleans, Louisiana.

Rains, M.C., and J.F. Mount. 2001. Origin of shallow ground water supporting regionally-unique riparian plant and wildlife habitats as determined by isotopic and chemical procedures. American Geophysical Union 2001 Fall Meeting, San Francisco, California.

Rains, M.C. 2001. Regional ground water discharge as the dominant source of late season shallow ground water in riverine and reservoir fringe wetlands. Society of Wetland Scientists 22nd Annual Meeting, Chicago, Illinois.

Rains, M.C. 1999. Surface and ground water interactions between a stream, a reservoir, and a shallow alluvial aquifer: implications for restoration and management. Society of Wetland Scientists 20th Annual Meeting, Norfolk, Virginia.

Rains, M.C., L.C. Lee, M. Butterwick, E. Stein, J.A. Mason, and W.J. Kleindl. 1997. Development of a draft guidebook to HGM functional assessments in riverine waters/wetlands of the Santa Margarita watershed. Society of Wetland Scientists 18th Annual Meeting, Bozeman, Montana.

Rains, M.C., L.C. Lee, P.L. Fiedler, W.J. Kleindl, and J.A. Mason. 1997. Development of a draft guidebook to HGM functional assessments in riverine waters/wetlands of the central California coast. Society of Wetland Scientists 18th Annual Meeting, Bozeman, Montana.

Rains, M.C. INVITED. 1997. Examples and experiences in building reference: When the rubber hits the road. Association of State Wetland Managers National Workshop and Symposium on the Future of Wetland Assessment: Applying Science Through the Hydrogeomorphic Assessment Approach and Other Approaches, Annapolis, Maryland.

Rains, M.C., L.C. Lee, M. Butterwick, E. Stein, J.A. Mason, and W.J. Kleindl. 1997. Development of a draft guidebook to HGM functional assessments in riverine waters/wetlands of the Santa Margarita watershed. National Workshop and Symposium on the Future of Wetland Assessment: Applying Science Through the Hydrogeomorphic Assessment Approach and Other Approaches, Annapolis, Maryland.

Rains, M.C., M.M. Brinson, M. Clark, K.A. Coshow, J. Hall, G. Hollands, W.J. Kleindl, D. LaPlant, L.C. Lee, W.L. Nutter, R. Post, J. Powell, T. Rockwell, D. Whigham. 1997. Development of a draft guidebook to HGM functional assessments in precipitation-driven

wetlands on discontinuous permafrost in interior Alaska. Association of State Wetland Managers National Workshop and Symposium on the Future of Wetland Assessment: Applying Science Through the Hydrogeomorphic Assessment Approach and Other Approaches, Annapolis, Maryland.

Rains, M.C., L.C. Lee, and J.A. Mason. 1997. Development and use of a reference system in restoration of riverine and depressional waters/wetlands in the Puget Sound Lowlands. Association of State Wetland Managers National Workshop and Symposium on the Future of Wetland Assessment: Applying Science Through the Hydrogeomorphic Assessment Approach and Other Approaches, Annapolis, Maryland.

Rains, M.C., L.C. Lee, J.H. Braatne, and J.A. Mason. 1995. An evaluation of the hydrogeomorphic approach for assessing forested wetland functions in the Puget Sound Lowlands. Society for Ecological Restoration 1995 International Conference, Seattle, Washington.

Rains, M.C. 1995. Vegetation zonation along hydrologic gradients in beaver pond wetlands. Society of Wetland Scientists 16th Annual Meeting, Boston, Massachusetts.

Regional Meetings, Seminars, and Colloquia

Rains, M.C. 2009. Balancing water resources between human and natural users in coastal environments. Workshop ANID, Paso Pacifico, and International Institute of Tropical Forestry, Managua, Nicaragua.

Rains, M.C. 2009. Water sources and hydrodynamics of closed-basin depressions, southcentral Alaska. East Carolina University, Greenville, North Carolina.

Rains, M.C. 2009. Water sources and hydrodynamics of closed-basin depressions, southcentral Alaska. University of South Florida, Tampa, Florida.

Rains, M.C. 2008. Water sources and hydrodynamics of closed-basin depressions, southcentral Alaska. University of Florida, Gainesville, Florida.

Rains, M.C. 2008. Balancing limited water resources in coupled human-natural systems: A case study on the Costa Alegre, Mexico. United Nations Association of the USA Tampa Bay Chapter, Tampa, Florida.

Stringer, C.E., M.C. Rains, S. Kruse, D. Whigham, J.T.A. Verhoeven, and R. Laanbroek. 2008. Controls on the chemical hydrology and associated ecological structure and function of mangroves, Indian River Lagoon, Florida. 2008 Water Institute Symposium, Gainesville, Florida.

Rains, M.C. 2008. Conservation of coupled human-mangrove systems: Research, teaching, and capacity building on the Costa Alegre, Mexico. Meeting of the Friends of the Patel Center for Global Solutions, Tampa, Florida.

Rains, M.C. 2007. Ecohydrology of Mexican mangroves: Research, teaching, and community outreach on the Costa Alegre, Mexico. University of South Florida, Tampa, Florida.

Rains, M.C., R.J. Williamson, G.E. Fogg, T. Harter, and R.A. Dahlgren. 2006. Geological control of physical and chemical hydrology in vernal pools, Central Valley, California. University of Florida, Gainesville, Florida.

Rains, M.C., R.J. Williamson, G.E. Fogg, T. Harter, and R.A. Dahlgren. 2006. Geological control of physical and chemical hydrology in vernal pools, Central Valley, California. University of Nevada, Reno, Nevada.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2005. The effects of reservoir operations on

shallow groundwater and vegetation distributions in reservoir-fringe ecosystems. University of South Florida, Tampa, Florida.

Rains, M.C., C. Stringer, D. Whigham, I. Feller, P. Megonigal, and J. Verhoven. 2005. Hydrological controls on ecological functions in mangrove systems, Indian River Lagoon, Florida. SFWMD/USGS Cooperative Program - Coastal (Northern) Issues Meeting, West Palm, Florida.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. The effects of reservoir operations on shallow groundwater and vegetation distributions in reservoir-fringe ecosystems. Wetlands Hydrology Workshop, Tampa Bay Water, Clearwater, Florida.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2004. What is ecohydrology? A definition and case study. 2004 University of South Florida Geology Alumni Society & Geology Department Internship Symposium, Tampa, Florida.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2004. Geological control of hydrological, biogeochemical, and biological processes in vernal pool landscapes, Central Valley, California. University of South Florida, Tampa, Florida.

Rains, M.C., G.E. Fogg, T. Harter, R.A. Dahlgren, and R.J. Williamson. 2003. Geological control of ecological structure and function in vernal pool wetlands, Central Valley, California. University of South Florida, Tampa, Florida.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2003. The effects of reservoir operations on shallow groundwater and vegetation distributions in reservoir-fringe ecosystems. University of South Florida, Tampa, Florida.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2003. The effects of reservoir operations on shallow groundwater and vegetation distributions in reservoir-fringe ecosystems. New Mexico Tech, Socorro, New Mexico.

Rains, M.C., J.F. Mount, and E.W. Larsen. 2003. The effects of reservoir operations on shallow groundwater and vegetation distributions in reservoir-fringe ecosystems. UC Davis, Davis, California.

Rains, M.C., and K.E. Ewing. 1994. Plant community structure along environmental gradients defined by hydrology, redox potential, and shade in Pacific Northwest palustrine wetlands. University of Washington, Seattle, Washington.

Recent Academic Funding

Title: ULTRA-Ex: Urban Development, Power Relations, and Water Redistribution as Drivers of Wetland Change in the Tampa Bay Urban Ecosystem

Source of Funding: NSF

Investigators: PI – D.B. Lewis; co-PIs –F.A. Akiwumi, T.L. Crisman, M.C. Rains; R.K. Zarger

Total Amount of Funding Requested: \$289,000

Project Start and End Dates: January 2010-December 2011

Title: Development of a Coordinated Watershed Approach for Linking Compensatory Mitigation and Tampa Bay Habitat Restoration Goals

Source of Funding: Tampa Bay Estuary Program

Investigators: PI – Tom Crisman; co-PIs – Susan Bell, Shawn Landry, Mark Rains, and Mark Stewart

Total Amount of Funding: \$95,000

Project Start and End Dates: July 2009-December 2010

Title: Geology of National Parks: Spreadsheets, Quantitative Literacy, and Natural

Resources

Source of Funding: NSF

Investigators: PI – H.L. Vacher; co-PIs – M.C. Rains, J. Harden, and T. Juster

Total Amount of Funding Requested: \$197,000

Project Start and End Dates: January 2009-December 2010

Title: FCE LTER II – Supplement for International Collaboration with the Ecosistemas Arrecifales del Pacifico Program of the Mexican ILTER Network (Supplemental to FCE LTER II: Coastal Oligotrophic Ecosystems Research, \$1,744,000)

Source of Funding: NSF

Investigators: PI – M.C. Rains; Sr. Personnel – Francisco de Asís Silva Bátiz, Enrique Godínez Domínguez (Universidad de Guadalajara)

Total Amount of Funding: \$6,000

Project Start and End Dates: July 2008-November 2008

Title: Groundwater Discharge to Salmon-Bearing Headwater Streams, Kenai Peninsula, Alaska (Subcontract to Headwater Stream Wetland Settings and Shallow Ground Water Influence: Relationships to Juvenile Salmon Habitat on the Kenai Peninsula, Alaska, \$185,000)

Source of Funding: EPA

Investigators: PI – M.C. Rains

Total Amount of Funding: \$26,000

Project Start and End Dates: June 2007-May 2009

Title: Changes in Groundwater Discharge to the Oligotrophic Ecotone (Subcontract to FCE LTER II: Coastal Oligotrophic Ecosystems Research, \$1,744,000)

Source of Funding: NSF

Investigators: PI – M.C. Rains

Total Amount of Funding: \$30,000

Project Start and End Dates: November 2009-October 2010

Title: Investigating a Harm Standard Based Upon Chapter 40D-2.301 FAC

Source of Funding: Southwest Florida Water Management District

Investigators: PIs – D. Martin, S. Emery; co-PIs – M.C. Rains, M. Stewart

Total Amount of Funding: \$150,000

Project Start and End Dates: October 2006-April 2008

Title: Investigating Environmental Impacts and Climate Change of Creating a Lake in the Hyperarid Sahara Desert

Source of Funding: NSF

Investigators: PIs – A. Said, M.A. Ross; Sr. Personnel – M.C. Rains, M. Stewart, K. Trout, and H. Fuelberg (Florida State University)

Total Amount of Funding: \$30,000

Project Start and End Dates: September 2006-April 2007

Title: Linkages Between Surface and Subsurface Hydrology and Ecological Functioning of Mangrove Ecosystems

Source of Funding: Smithsonian Institution

Investigators: PI – D.F. Whigham (Smithsonian Environmental Research Center); co-PIs – M.C. Rains, I. Feller (Smithsonian Environmental Research Center), J. Verhoeven (Utrecht University), Riks Laanbroek (Utrecht University), Wilfred Rodriguez (University of Rhode Island)

Total Amount of Funding: \$60,000

Project Start and End Dates: October 2004-September 2009

Title: Hydrology of Clay Settling Areas

Source of Funding: Florida Institute for Phosphate Research
Investigators: PI – M.A. Ross; co-PIs – M.C. Rains, M. Stewart, and K. Trout
Total Amount of Funding: \$1,189,000
Project Start and End Dates: March 2005-June 2010

Title: USF GeoPark and Botanical Gardens – Linked Resources for Community Education in Hydrogeology

Source of Funding: Southwest Florida Water Management District
Investigators: PI – H.L. Vacher; co-PIs – M.C. Rains and M. Stewart
Total Amount of Funding: \$5,000
Project Start and End Dates: January 2004-June 2004 (no-cost extension to March 2005)

**Workshops Attended
by Invitation**

Florida Coastal Everglades Long-Term Ecological Research All Scientists Meeting. 2009. Coral Gables, Florida.

Florida Coastal Everglades Long-Term Ecological Research All Scientists Meeting. 2008. Coral Gables, Florida.

Florida Coastal Everglades Long-Term Ecological Research All Scientists Meeting. 2007. Coral Gables, Florida.

Regional Science Workshop on Headwaters and Associated Wetlands in the Mid-Atlantic Highlands Region. 2006. Philadelphia, Pennsylvania.

Florida Coastal Everglades Long-Term Ecological Research All Scientists Meeting. 2005. Coral Gables, Florida.

Designing Hydrologic Observatories as a Community Resource: A CUAHSI National Workshop. 2004. Logan, Utah.

Wetlands Hydrology Workshop. 2004. Clearwater, Florida.

Streamside Vegetation-Hydrologic Interactions Workshop. 2003. Tucson, Arizona.

Workshop on the Hydrogeomorphic Approach to Assessment of Functions of Waters of the U.S., Including Wetlands, in the Santa Margarita Watershed. 1997. Fallbrook, California.

Workshop on the Hydrogeomorphic Approach to Assessment of Functions of Precipitation-Driven Wetlands on Discontinuous Permafrost in Interior Alaska. 1997. Fairbanks, Alaska.

National Workshop and Symposium on the Future of Wetland Assessment: Applying Science Through the Hydrogeomorphic Assessment Approach and Other Approaches. 1997. Annapolis, Maryland.

Workshop on the Hydrogeomorphic Approach to Assessment of Functions of Waters of the U.S., Including Wetlands, in the Northern Prairie Region. 1995. Jamestown, North Dakota.

Legal Support

Technical support and expert witness for numerous public and private sector entities, including technical support for the U.S. Environmental Protection Agency and the U.S. Department of Justice in a successful judgment ultimately upheld by the U.S. Supreme Court on December 16, 2002 (*Borden Ranch Partnership and Angelo K. Tsakopoulos, Petitioners v. United States Army Corps of Engineers and Environmental Protection Agency*).

