RUSSELL L. SCOTT

Curriculum Vitae

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Research Interests

I am interested in the fluxes of, and interactions between, hydrology and ecology at the soil, vegetation, and atmospheric interface. My current focus is on energy, water and carbon exchange in semiarid lands. This includes: 1) improving estimates of riparian vegetation water use, 2) understanding the consequences of woody plant encroachment on water and carbon fluxes, 3) determining the role that vegetation plays on vadose zone soil water redistribution, and 4) partitioning evapotranspiration into component fluxes. I use measurement techniques like eddy covariance, sap flow, soil respiration chambers, TDR, and ground penetrating radar to quantify these ecohydrological fluxes at a number of long-term research sites that I maintain and operate.

Education

University of Arizona	Hydrology and Water Resources	Ph.D. 1999
Massachusetts Institute of Technology	Civil and Environmental Eng./Hydrology	M.S. 1994
Colorado State University	Mathematics/Philosophy	B.S. 1990

Professional Experience

Research Hydrologist	USDA-ARS, Tucson	2002-present
Adjunct Assistant Professor	Dept. of Hydrology, U. of Arizona	2004-present
Postdoctoral Associate	USDA-ARS, Tucson	2000-2002
Instructor	University of Arizona	2000-2001
Research Associate	University of Arizona	1996-1999
Program Coordinator/ Research Specialist	USDA-ARS, Tucson	1995-1996
Research Associate	Massachusetts Institute of Technology	1992-1994

Awards and Honors

2008 DOI Cooperative Conservation Award as a member of the Upper San Pedro Partnership
2000 USDA Secretary's Group Honor Award for Excellence
1996-1999 EPA STAR Graduate Fellowship
1993-1995 NASA's Graduate Student Researcher Program Fellowship
Phi Beta Kappa National Honor Society

Publications

Scott, R.L., Jenerette, G.D., Potts, D.L., and Huxman, T.E. The effect of drought on the water and carbon dioxide exchange of a woody-plant-encroached semiarid grassland. *Global Change Biology*, in review.

Moran, M.S., Scott, R.L., Keefer, T.O., Emmerich, W.E., Hernandez, M., Nearing, G.S., Paige, G., Cosh, M.H., and O'Neill, P.E. 2008. Partitioning evapotranspiration in semiarid grassland and shrubland ecosystems using time series of soil surface temperature. *Agricultural and Forest Meteorology,* in press.

Williams, D.G., and Scott, R.L. Vegetation-hydrology interactions: Dynamics of riparian plant water use along the San Pedro River, in Ecology and Conservation of the San Pedro River, edited by J. Stromberg and B. Tellmann, in press.

Stromberg, J., Dixon, M.D., Scott, R.L., Maddock III, T., Baird, K., and Tellman, B. Prognosis for Upper San Pedro River (USA): Can the Riparian Ecosystem be Sustained? in Ecology and Conservation of the San Pedro River, edited by J. Stromberg and B. Tellmann, in press.

Jenerette, G.D., Scott, R.L., and Huxman, T.E. 2008 Whole ecosystem metabolic pulses following precipitation events. *Functional Ecology*, 22, 924-930. doi: 10.1111/j.1365-2435.2008.01450.x

Potts, D.L., Scott, R.L., Cable, J.E., Huxman, T.E., and Williams, D.G. 2008. Sensitivity of mesquite shrubland CO_2 exchange to precipitation in contrasting landscape settings. *Ecology,* 89, 2900–2910.

Xiao J., Zhuang Q., Baldocchi D.D., Law B.E., Richardson A.D., Chen J., Oren R., Starr G., Noormets A., Ma S., Verma S.B., Wharton S., Wofsy S.C., Bolstad P.V., Burns S.P., Cook D.R., Curtis P.S., Drake B.G., Falk M., Fischer M.L., Foster D.R., Gu L., Hadley J.L., Hollinger D.Y., Katul G.G., Litvak M., Martin T.A., Matamala R., McNulty S., Meyers T.P., Monson R.K., Munger J.W., Oechel W.C., Paw U K.T., Schmid H.P., Scott R.L., Sun G., Suyker A.E., Torn M.S. 2008. Estimation of net ecosystem carbon exchange for the conterminous United States by combining MODIS and AmeriFlux data. *Agricultural and Forest Meteorology*, 148, 1827-1847.

Goodrich, D.C., Unkrich, C.L., Keefer, T.O., Nichols, M.H., Stone, J.J., Levick, L.R. and Scott, R.L. 2008. Event to multidecadal persistence in rainfall and runoff in southeast Arizona, *Water Resources Research*, 44, W05S14, doi:10.1029/2007WR006222

Scott, R.L., Cable, W.L., Nagler, P.L., Huxman, T.E., Hernandez, M., and Goodrich, D.C. 2008. Multiyear riparian evapotranspiration and groundwater use for a semiarid watershed. *Journal of Arid Environments*, 72, 1232-1246. doi:10.1016/j.jaridenv.2008.01.001

Holifield-Collins, C.D., Emmerich, W.E., Moran, M.S., Hernandez, M., Scott, R.L., Bryant, R.B., King, D.M., and Verdugo, C.L. 2008. A remote sensing approach for estimating distributed daily net carbon dioxide flux in semiarid grasslands, *Water Resources Research*, 44, W05S17.

Scott, R.L., Cable, W.L., and Hultine, K.R. 2008. The ecohydrologic significance of hydraulic redistribution in a semiarid savanna. *Water Resources Research*, 44, W02440, doi:10.1029/2007WR006149

Li, F., Kustas, W.P., Anderson, M.A., Prueger, J.H., and Scott, R.L. 2008. Effect of remote sensing spatial resolution on interpreting tower-based flux observations. *Remote Sensing and the Environment*, 112, 337-349.

Yepez, E., Scott, R.L., Cable, W.L., and Williams, D.G. 2007. Intraseasonal variation in water and carbon dioxide flux components in a semiarid riparian woodland. *Ecosystems*, 10, 1100-1115.

Watts, C.J., Scott, R.L., Garatuza-Payan, J., Rodriguez, J.C., Prueger, J., Kustas, W., and Douglas, M. 2007. Changes in vegetation condition and surface fluxes during NAME 2004. *Journal of Climate*, 20, 1810-1820, doi: 10.1175/JCLI4088.1

Nagler, P.L., Glenn, E.P., Kim, H., Emmerich, W., Scott, R.L., Huxman, T.E., and Huete, A.R. 2007. Relationship between evapotranspiration and precipitation pulses in a semiarid rangeland estimated by moisture flux towers and MODIS vegetation indices. *Journal of Arid Environments*, 70, 443-462. doi:10.1016/j.jaridenv.2006.12.026

Williams, D.G., Scott, R.L., Huxman, T.E., Goodrich, D.C., and Lin, G. 2006. Sensitivity of riparian ecosystems to moisture pulses in semiarid environments. *Hydrological Processes*. Special Issue on Emerging Issues in Rangeland Ecohydrology, eds. Wilcox , B. and Thurlow, T., 20, 3191-3205. doi: 10.1002/hyp.6327

Scott, R.L., Huxman, T.E., Cable, W.L., and Emmerich, W.E. 2006. Partitioning of evapotranspiration and its relation to carbon dioxide exchange in a Chihuahuan Desert shrubland. *Hydrological Processes*. Special Issue on Emerging Issues in Rangeland Ecohydrology, eds. Wilcox , B. and Thurlow, T., 20, 3227-3243. doi: 10.1002/hyp.6329

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Scott, R.L., Huxman, T.E., Williams, D.G., and Goodrich, D.C. 2006. Ecohydrological impacts of woody plant encroachment: seasonal patterns of water and carbon dioxide exchange within a semiarid riparian environment. *Global Change Biology*, 12, 311–324, doi: 10.1111/j.1365-2486.2005.01093.

Scott, R.L., Goodrich, D., Levick, L., McGuire, R., Cable, W., Williams, D., Gazal, R., Yepez, E., Ellsworth, P., and Huxman, T. 2006. Determining the riparian groundwater use within the San Pedro Riparian National Conservation Area and the Sierra Vista Subwatershed, Arizona, chap D of Leenhouts, J.M. Stromberg, J.C., and Scott, R.L., eds., *Hydrologic Requirements of and Consumptive Ground-Water Use by Riparian Vegetation along the San Pedro River, Arizona*. U.S. Geological Survey, Scientific Investigations Report 2005-5163. 107-152.

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Leenhouts, J.M. Stromberg, J.C., and Scott, R.L., 2006, *Hydrologic Requirements of and Consumptive Ground-Water Use by Riparian Vegetation along the San Pedro River, Arizona*. U.S. Geological Survey Fact Sheet 2006-3027.

Nagler, P.L., Scott, R.L., Westenburg, C., Cleverly, J.R., Glenn, E.P., and Huete, A.R. 2005. Evapotranspiration on western U.S. rivers estimated using the Enhanced Vegetation Index from MODIS and data from eddy covariance and Bowen ratio flux towers. *Remote Sensing and the Environment*, 97, 337-351.

Huxman, T.E., Wilcox, B.P., Breshears, D.D., Scott, R.L., Snyder, K.A., Small, E.E., Hultine, K.R., Pockman, W.T., Jackson, R.B. 2005. Ecohydrological implication of woody plant encroachment. *Ecology*, 86, 308-319.

Harlow, R.C., Burke, E.J., Scott, R.L., Shuttleworth, W.J., Brown, C.M., and Petti, J.R. 2004. Derivation of temperature lapse rates in semi-arid southeastern Arizona. *Hydrology and Earth System Sciences*, 8, 1179-1185.

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Hultine, K.R., Scott, R.L., Cable, W.L., Goodrich, D.C., and Williams, D.G. 2004. Hydraulic redistribution by a dominant, warm desert phreatophyte: seasonal patterns and response to precipitation pulses. *Functional Ecology*, 18, 530-538.

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Scott, R.L., Watts, C., Garatuza, J., Edwards, E., Goodrich, D., Williams, D., and Shuttleworth, W.J. 2003. The understory and overstory partitioning of energy and water fluxes in an open canopy, semiarid woodland. *Journal of Agriculture and Forest Meteorology*, 114, 127-139.

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Goodrich, D.C., Scott, R., Qi, J., Goff, B., Unkrich, C. L., Moran, M.S., Williams, D., Schaeffer, S., Snyder, K., MacNish, R., Maddock, T., Pool, D., Chehbouni, A., Cooper, D. I., Eichinger, W.E., Shuttleworth, W.J., Kerr, Y., Marsett, R., and Ni, W. 2000. Seasonal estimates of riparian evapotranspiration using remote and in-situ measurements. *Journal of Agriculture and Forest Meteorology,* 105, 281-309.

Scott, R.L., Shuttleworth, W.J., Keefer, T.O., and Warrick, A.W. 2000. Modeling multiyear observations of soil moisture recharge in the semiarid American southwest. *Water Resources Research*, 36, 2233-2247.

Chehbouni, A., Kerr, Y., Watts, C., Hartogensis, O., Goodrich, D., Scott, R., Schieldge, J., Lee, K., Shuttleworth, W., and Dedieu, G. 1999. Estimation of area-average sensible heat flux using a large aperture scintillometer during the Semi-Arid-Land-Surface-Atmosphere (SALSA) Experiment. *Water Resources Research*, 35, 2505-2511.

Scott, R., Entekhabi, D., Koster, R., and Saurez, M., 1996. Time scales of surface evapotranspiration response. *Journal of Climate*, 4, 559-566.

Scott, R., Koster, R., Entekhabi, D., and Saurez, M. 1995. Effect of canopy interception reservoir on hydrological persistence in a general circulation model. *Journal of Climate*, 7, 1917-1922.

Non-peer reviewed publications

Scott, R.L., Williams, D.G., Huxman, T.E., Hultine, K.R., and Goodrich, D.C. 2008. Quantifying riparian evapotranspiration. *Southwest Hydrology*, 7(1), 26-27.

Huxman, T.E., and Scott R.L. 2007. Climate change, vegetation dynamics, and the landscape water balance. *Southwest Hydrology*, 6, 28-30.

Supervised Theses

Green, K.N., 2006. Partitioning of Evapotranspiration in a Chihuahuan Desert Grassland. M.S. Thesis, Department of Hydrology and Water Resources, University of Arizona. 84 p.

McGuire, R., 2005. Quantifying the Consumptive Water Use by the Dominant Understory Shrub Seep Willow (Baccharis salicifolia) in the San Pedro Riparian National Conversation Area. M.S. Thesis, Department of Natural Resources, University of Arizona. 86 p.

Edwards, E.A, 2002. Water, Energy and Carbon Dioxide Exchange of a Riparian Mesquite Woodland. M.S. Thesis, Department of Hydrology and Water Resources, University of Arizona. 104 p.