Eleanor R. Griffin
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RESEARCH INTERESTS:

Determining vegetation controls on landscape dynamics at both local and regional scales, particularly within semi-arid regions such as the southwestern United States. Developing methods to quantify effects of vegetation on erosion and deposition processes using geomorphic data from various sources combined with physically based models of flow and sediment transport. Assessing potential effects of future climate change on fluvial geomorphic systems and water availability.

EDUCATION:

M.S.	University of Colorado, Boulder, CO	1997	Geology
B.S.	United States Military Academy, West Point, NY	1980	(No major)

CURRENT POSITION:

Research Hydrologist – The goal of my research in the fields of hydrology, geomorphology, and sediment transport is to advance our understanding of the complex geomorphic processes that lead to observed fluvial landscapes. My research is focused on the study of feedbacks between streamflow, woody vegetation, and fine sediment transport at multiple spatial and temporal scales. I am particularly interested in geomorphic processes in semi-arid environments, where there can be large temporal and spatial variability in hydrologic conditions. I combine analyses of geomorphic data collected by various methods with the application of physically based models of streamflow and suspended sediment transport to assess causes of geomorphic change. In my research focused on quantifying effects of drag on woody vegetation on flood flow and sediment transport in the Rio Puerco, New Mexico, I have integrated and analyzed data from high-resolution elevation (LiDAR) surveys, high-precision (RTK) GPS surveys, and geomorphic mapping from imagery. Results of my work have important implications for the assessment of potential effects of future climate change as well as determination of the fate of contaminants transported with fine sediment.

A second, related research project involves the assessment of historical weather and runoff in the Little Missouri River basin, northern Great Plains, to determine historical precipitation / runoff relations, identify variability and change in these relations, and identify potential causes for observed changes. Results of this work have important implications for assessment of potential effects of future climate change and water availability in this basin.

PROFESSIONAL POSITIONS:

September 2009 – present. Research Hydrologist, U.S. Geological Survey, National Research Program

June 1993 – September 2009. Hydrologist, U.S. Geological Survey, National Research Program
- Performed analyses to assess relations between woody vegetation, streamflow, and bank erosion.
- Developed topographic input parameters from various data sets and applied physically based models to compute flow in channels with woody bank and floodplain vegetation.

January 1986 – December 1992. Communications Engineer, GTE Corp.
- Performed assessments of existing and planned communication systems supporting the exchange of intelligence information within major military commands and identified shortfalls in planned systems.
- Determined operational requirements for planned video and data transmissions using commercial satellites and assisted in negotiating international operating agreements.

May 1980 – January 1986. Communications-Electronics Officer, U.S. Army
• Responsible for deployment of communications systems, establishment and maintenance of communications links, and operational planning as well as personnel and property management.

BIBLIOGRAPHY

Book chapters:

Wiele, S.M., Andrews, E.D., and **Griffin, E.R.**, 1999, The effect of sand concentration on depositional rate, magnitude, and location in the Colorado River below the Little Colorado River, in *The Controlled Flood in Grand Canyon*, Webb et. al., ed., Geophysical Monograph 110, AGU, Washington, DC, pp. 131-145.

Griffin, E.R. and Smith, J. Dungan, 2004, Floodplain stabilization by woody riparian vegetation during an extreme flood, in Bennett, S.J., and Simon, A., eds., *Riparian Vegetation and Fluvial Geomorphology*, Water Science and Application 8, American Geophysical Union, pp. 221-236.

Refereed journal articles:

Friedman, J.M., Auble, G.T., Shafroth, P.B., Scott, M.L., Merigliano, M.F, Freehling, M.D., and **Griffin, E.R.**, 2005, Dominance of non-native riparian trees in western USA, *Biological Invasions*, Vol. 7, No. 4, pp. 747-751.

Griffin, E.R., Kean, J.W., Vincent, K.R., Smith, J.D., and Friedman, J.M., 2005, Modeling effects of bank friction and woody bank vegetation on channel flow and boundary shear stress in the Rio Puerco, New Mexico, *Journal of Geophysical Research*, 110, F04023, doi:10.1029/2005JF000322.

Friedman, J.M., Auble, G.T., Andrews, E.D., Kittel, G., Madole, R.F., **Griffin, E.R.**, and Allred, T.M., 2006, Transverse and longitudinal variation in woody riparian vegetation along a montane river, *Western North American Naturalist*, Vol. 66, No. 1, pp.78-91.

Vincent, K.R., Friedman, J.M., and **Griffin, E.R.**, 2009, Erosional consequence of saltcedar control, *Environmental Management*, Vol. 44, pp. 218-227. doi: 10.1007/s00267-009-9314-8

Perignon, M.C., Tucker, G.E**., Griffin, E.R.**, and Friedman, J.M., 2013, Effects of riparian vegetation on topographic change during a large flood event, Rio Puerco, New Mexico, USA, *Journal of Geophysical Research: Earth Surface*, 118, 1193-1209. doi: 10.1002/jgrf.20073

Griffin, E.R., Perignon, M.C., Friedman, J.M., and Tucker, G.E., 2014, Effects of woody vegetation on overbank sand transport during a large flood, Rio Puerco, New Mexico, *Geomorphology*, 207, 30-50. doi: 10.1016/j.geomorph.2013.10.025

Benson, L.V., **Griffin, E.R.**, Stein, J.R., Friedman, R.A., and Andrae, S.W., 2014, Mummy Lake: an unroofed ceremonial structure within a large-scale ritual landscape, *Journal of Archaeological Science*, 44, 164-179. doi: 10.1016/j.jas.2014.01.021

Friedman, J.M., Vincent, K.R., **Griffin, E.R.**, Scott, M.L., Shafroth, P.B., and Auble, G.T., 2015, Processes of arroyo filling in northern New Mexico, USA, *GSA Bulletin*, 127, 621-640. doi: 10.1130/B31046.1

Meko, D.M., Friedman, J.M., Touchan, R., Edmondson, J.R., **Griffin, E.R.**, and Scott, J.A., 2015, Alternative standardization approaches to improving streamflow reconstructions with ring-width indices of riparian trees, *The Holocene*, 25(7), 1093-1101. doi:10.1177/0959683615580181

U.S. Geological Survey reports and conference proceedings:

Griffin, E.R. and Wiele, S.M., 1996, Calculated hydrographs for unsteady research flows at selected sites along the Colorado River downstream from Glen Canyon Dam, Arizona, 1990 and 1991: *U.S. Geological Survey Water-Resources Investigations Report* 95-4266, 30 p.

Wiele, S.M. and **Griffin, E.R.**, 1997, Modifications to a one-dimensional model of unsteady flow in the Colorado River through the Grand Canyon, Arizona: *U.S. Geological Survey Water- Resources Investigations Report* 97-4046, 17 p.

Griffin, E.R. and Smith, J. Dungan, 2001a, Analysis of vegetation controls on bank erosion rates, Clark Fork of the Columbia River, Deer Lodge Valley, Montana: *U.S. Geological Survey Water- Resources Investigations Report* 01-4115, 8 p.

Griffin, E.R. and Smith, J. Dungan, 2001b, Computation of bankfull and flood-generated hydraulic geometries in East Plum Creek, Colorado, in *Proceedings of the Seventh Federal Interagency Sedimentation Conference*, Reno, Nevada, vol. 1, section II, p. 50-56.

Griffin, E.R. and Smith, J. Dungan, 2002, State of flood plain vegetation with the meander belt of the Clark Fork of the Columbia River, Deer Lodge Valley, Montana: *U.S. Geological Survey Water-Resources Investigations Report* 02-4109, 17 p.

Smith, J. Dungan and **Griffin, E.R.**, 2002, Relation between geomorphic stability and the density of large shrubs on the flood plain of the Clark Fork of the Columbia River in the Deer Lodge Valley, Montana: *U.S. Geological Survey Water-Resources Investigations Report* 02-4070, 25 p.

Price, F.D., Light, H.M., Darst, M.R., **Griffin, E.R.**, Vincent, K.R., and Ziewitz, J.W., 2006, Change in channel width from 1941 to 2004, and change in mean bed elevation from 1960 to 2001, in the nontidal Apalachicola River, Florida: *U.S. Geological Survey Data Series* 191, 5 p.

Griffin, E.R., Friedman, J.M., and Vincent, K.R., 2010, Progression of streambank erosion during a large flood, Rio Puerco Arroyo, New Mexico, in *Proceedings of the 2nd Joint Federal Interagency Conference*, Las Vegas, Nevada, June 27 – July 1, 2010, 12 p.

Griffin, E.R., and Friedman, J.M., 2015, Processes limiting depth of arroyo incision: Examples from the Rio Puerco, New Mexico, in *Proceedings of the 3rd Joint Federal Interagency Conference (10th Federal Interagency Sedimentation Conference and 5th Federal Interagency Hydrologic Modeling Conference)*, Reno, Nevada, April 19 – 23, 2015, 797-808.

Unpublished Master's thesis:

Griffin, E.R., 1997, Use of a geographic information system to extract topography for modeling flow in the Colorado River through Marble and Grand Canyons, Unpublished Masters Thesis, Univ. of Colorado, Boulder, 113 p.

TECHNICAL PRESENTATIONS

Griffin, E.R. and Smith, J. Dungan, 2001, Computation of bankfull and flood-generated hydraulic geometries in East Plum Creek, Colorado: Seventh Federal Interagency Sedimentation Conference, March 27, 2001, at Reno, NV. (PRESENTED)

Griffin, E.R., Kean, J.W., Vincent, K.R., Smith, J. Dungan, and Friedman, J.M., 2004, Channel flow modeling incorporating effects of bank friction and woody bank vegetation in an 81-km reach of the Rio Puerco, New Mexico: American Geophysical Union Fall Meeting, San Francisco, CA, December 2004. (PRESENTED)

Griffin, E.R., and Smith, J. Dungan, 2006, Modeling sediment transport during overbank flow in the Rio Puerco, New Mexico: 8th Federal Interagency Sedimentation Conference, April 2 - 6, 2006, Reno, NV. (PRESENTED)

Griffin, E.R., Freidman, J.M., Vincent, K.R., and Elliott, J.G., 2007, Erosional consequences of saltcedar control, Rio Puerco, New Mexico: 62nd Annual Meeting of the Rocky Mountain Hydrologic Research Center in Allenspark, Colorado, 28 September 2007. (PRESENTED)

Griffin, E.R., Smith, J. Dungan, Friedman, J.M., and Vincent, K.R., 2008, Determining effects of woody vegetation on flood flow and sediment transport: American Geophysical Union Fall Meeting, San Francisco, CA, December 2008. (PRESENTED)

Griffin, E.R., Smith, J. Dungan, Friedman, J.M., and Vincent, K.R., 2010, Progression of streambank erosion during a large flood, Rio Puerco Arroyo, New Mexico: 2nd Joint Federal Interagency Conference, Las Vegas, NV, June 27 – July 1, 2010. (PRESENTED)

Griffin, E.R., Friedman, J.M., and Vincent, K.R., 2010, Influences of arroyo-scale geomorphology on flood flow and sediment transport, Rio Puerco Arroyo, New Mexico: Annual Meeting of the Geological Society of America, Denver, Colorado, October 31 – November 3, 2010. (PRESENTED)

Griffin, E.R., Friedman, J.M., and Vincent, K.R., 2010, Effects of varying shrub density on erosion and deposition during a large flood, Rio Puerco, New Mexico: American Geophysical Union Fall Meeting, San Francisco, CA, December 2010. (**INVITED**)

Griffin, E.R., Benson, L.V., Stein, J. and Friedman, R., 2011, When is an archeological depression not a reservoir?: Annual Meeting of the Geological Society of America, Minneapolis, MN, October 9 – 12, 2011. (**INVITED**)

Griffin, E.R., Benson, L.V., Stein, J. and Friedman, R., 2011, When is an archeological depression not a reservoir?: Annual Meeting of the Rocky Mountain Hydrologic Research Center, Denver, Colorado, November 4, 2011. (PRESENTED)

Perignon, M.C., Tucker, G.E., **Griffin, E.R.**, Friedman, J.M., and Vincent, K.R., 2011, Predicting the effects of floodplain vegetation on patterns of sediment deposition using a morphodynamic landscape evolution model: Annual Meeting of the Geological Society of America, Minneapolis, MN, October 2011.

Griffin, E.R. and Champion, C.A., 2012, Runoff and sediment transport following the High Park Fire: Observations from the northern boundary, Hewlett Gulch area: 67th Annual Meeting of the Rocky Mountain Hydrologic Research Center, Fort Collins, Colorado, October 5, 2012. (PRESENTED)

Perignon, M.C., Tucker, G.E., **Griffin, E.R.**, and Friedman, J.M., 2012, Effects of riparian vegetation on topographic change during a large flood event, Rio Puerco, New Mexico: American Geophysical Union Fall Meeting, San Francisco, California, December 3-7, 2012.

Griffin, E.R., Friedman, J.M., Edmonson, J., Meko, D., Touchan, R., Scott, J., Merigliano, M., and Scott, M., 2014, Relating weather to runoff in the Little Missouri River Basin: 2014 Missouri River Natural Resources Conference & BiOp Forum, Nebraska City, NE, March 11-13, 2014. (PRESENTED)

Perignon, M.P., **Griffin, E.R.**, Tucker, G.E., Friedman, J.M., and Overeem, I., 2014, Interactions of flow, sediment transport, and vegetation in the long-term evolution of arroyos: American Geophysical Union Fall Meeting, San Francisco, CA, December 15-19, 2014.

Griffin, E.R. and Friedman, J.M., 2015, Processes limiting depth of arroyo incision: Examples from the Rio Puerco, New Mexico: 3rd Joint Federal Interagency Conference (10th Federal Interagency Sedimentation Conference and 5th Federal Interagency Hydrologic Modeling Conference), Reno, Nevada, April 19-23, 2015. (PRESENTED)

Griffin, E.R., 2015, Destabilization of a sand/silt-bed channel by vegetation control, Rio Puerco arroyo, New Mexico: Annual Meeting of the Geological Society of America, Baltimore, Maryland, November 1-4, 2015, Paper No. 240-9. (PRESENTED)

Griffin, E.R., and Friedman, J.M., 2015, Observations of decreased runoff response to precipitation, Little Missouri River basin, northern Great Plains, USA: American Water Resources Association 2015 Annual Water Resources Conference, November 16-19, 2015, Denver, CO. (PRESENTED)

SERVICE ACTIVITIES

Lectures and Seminars:

February 1997: Glen Canyon Environmental Studies Transition Work Group Meeting, Phoenix, Arizona. Title: Revision of the one-dimensional unsteady flow model with high flow channel geometry and roughness.

April 2000: USGS Central Region Branch of Regional Research, Lakewood, Colorado. Title: Hydraulic geometry of East Plum Creek, Colorado.

October 2007: USGS Central Region Branch of Regional Research, Lakewood, Colorado. Title: Erosional consequences of saltcedar control, Rio Puerco, New Mexico.

August 2008: USGS Eastern Region Branch of Regional Research, Reston, Virginia. Title: Determining effects of woody vegetation on flow and sediment transport during floods.

April 2012: USGS National Research Program, Central Branch, Boulder, Colorado: Title: Effects of varying shrub density on erosion and deposition during a large flood, Rio Puerco, New Mexico.

April 2015: North Dakota Water Science Center, Bismarck, North Dakota (by webinar). Title: River flow and cottonwood growth along the Little Missouri River, North Dakota.

Outreach and Information Transfer:

I participated in a study of the relation between woody vegetation and channel and floodplain stability along the Clark Fork of the Columbia River through the Deer Lodge Valley, MT, in cooperation with John Lambing and David Nimick of the Montana Water Science Center from Jan. 1999 to Sept. 2002. In March 2003, following the 2002 publication of reports, I provided data, advice and assistance to Douglas Martin, Montana Department of Justice, Natural Resources Damage Program, in support of his efforts in developing the State's restoration plan. Results of my work were cited extensively in Appendix B, "Clark Fork River OU Streambank Stabilization Design Consideration and Examples", in U.S. Environmental Protection Agency, Region 8, 2004, Clark Fork River Operable Unit of the Milltown Reservoir / Clark Fork River Superfund Site, Record of Decision.

Working with Jonathan Friedman and Greg Auble, USGS BRD, Fort Collins, CO, from June 2001 to June 2004, I developed and applied tools to query climate grids to obtain various climate parameters for 474 streamflow-gaging station locations throughout the western United States. This work was part of a multi-disciplinary study of the dominance of non-native woody species in riparian areas in the western US.

I provided extensive advice and assistance on interpretation of channel change using aerial photographic analysis to a multi-disciplinary team led by Helen Light, USGS Florida Integrated Science Center, Tallahassee, FL, studying the effects of water-level decline on floodplain habitats along the Apalachicola River, FL, from Aug. 2004 to June 2005.

I served as a member of Mariela Perignon's PhD advisory committee from 2010 to her graduation in December 2014 (University of Colorado, Boulder, Department of Geological Sciences). In November 2009, I provided technical support to her in preparation for her proposal to the National Center for Airborne Laser Mapping entitled "Repeated LiDAR surveys for the study of overbank flood dynamics". Ms. Perignon was awarded a grant for an aerial LiDAR survey of the Rio Puerco in March 2010. In addition, I provided to Ms. Perignon the complete set of geospatial data obtained and developed in support of U.S. Geological Survey Rio Puerco research.

Technical reviewer for:

Ecohydrology
Geomorphology
Journal of Geophysical Research: Earth Surface
Journal of Hydrology
Natural Hazards
Sedimentary Geology
Water Resources Research
American Antiquity
U.S. Geological Survey publications, 2001 – present.
NSF's Division of Earth Sciences Post-Doctoral Fellowship Program, 2013
Proposal submitted to the National Fund for Scientific and Technological Devlopement, Chilean National Commission for Scientific and Technological Research, 2015

Member, USGS RGE Peer Review panel, 2015

AWARDS AND HONORS

Star Award for outstanding job performance, USGS (2007, 2006, 2002)
Unit Award for "Excellence of Service", USGS, Grand Canyon Experimental Flood Team, 1999

Teamwork Award, GTE Spacenet, 1990
Superior Performance Award, GTE Government Systems, 1987
Meritorious Service Medal, U.S. Army, 1985
Army Commendation Medal, U.S. Army, 1984

PROFESSIONAL MEMBERSHIP

American Water Resources Association
American Geophysical Union
Geological Society of America
Rocky Mountain Hydrologic Research Center