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**Cenozoic Geology of the New Mexico Region**

**SHORT PROFESSIONAL RESUME, SPRING 2006**  
**Complete Vita Available on Request (26 p., with index)**

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Hanover College, Indiana, B.A., *cum laude*, Geology, 1954

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After more than 35 years of public-sector professional activity (see following summary), John Hawley formed HAWLEY GEOMATTERS in December 1997. This consulting service deals primarily with environmental and groundwater geology of the New Mexico region, with emphasis on assessing and mitigating impacts of water- and mineral-resource development, and waste disposal in fragile arid and semiarid environments. A particularly important activity involves development of GIS digital-hydrogeologic models that support state-of-the-art water-resource management practices. Before the environmental impacts of exploitation of both groundwater and surface-water resources can be assessed, the hydrogeologic framework of the valley and basin fills that form the region's major aquifers must be understood. Most important are the alluvial aquifer systems and the few perennial streams (primarily the Rio Grande, Gila, San Juan, Pecos, and Canadian rivers) that are the major sources of both groundwater recharge and contamination. Challenges posed by transboundary water issues (binational/interstate), and desalination of brackish groundwater resources must also be addressed.

HAWLEY GEOMATTERS' consulting practice includes expert testimony\* (federal, state and local levels) on a variety of environmental concerns, including surface mining, Superfund and landfill sites, hydrogeology, and geologic hazards. Present and former clients include the All Indian Pueblo Council-Office of Environmental Protection, AMEC-Earth & Environmental\*, Attorney General of New Mexico \*, Balleau Ground Water, City of Deming\*, D.B. Stephens & Assoc., El Paso Water Utilities, Geoscience Technologies (Chaves County), Glorieta Geoscience (City of Rio Rancho), Hydroscience Assoc., John Shomaker & Assoc., Public Service Co. of NM\*, Metric Corp.\*, Resource Solutions Group (Estancia Basin), Rhino Environmental Services\*, Sheehan, Sheehan & Stelzner-P.A. (Twin Mountain Construction)\*, Tetra Tech EMI (NMOSE-ISC), U.S. Bureau of Land Management, and U.S. Bureau of Reclamation.

Ongoing and recent *pro bono* public service activities include:

1. Collaboration with the water-resource and environmental programs of the U.S. Indian Health Service and several Indian Pueblos (e.g. San Felipe and Santo Domingo).
2. Advisory committees, including: New Mexico First Research Committee and several Implementation Teams; Middle Rio Grande Water Assembly Action Committee—Specialists Group; and State Brackish Groundwater Workshop.
3. Point of Contact for a Sandia National Laboratories Small Business Assistance initiative involving geophysical investigations in the Estancia groundwater basin.
4. Universidad Autónoma de Ciudad Juárez, Centro de Información Geográfica—Adjunct Faculty Specialist on the hydrogeologic framework of northern Chihuahua.

Career Highlights:

1954-1977: Entry-level professional activity, interrupted by overseas military service with U.S. Army-Corps of Engineers (1955-1956), included employment with the U.S. Geological Survey, Illinois Geological Survey, Nevada Department of Conservation & Natural Resources, and Desert Research Institute. Ph.D. research (1959-1962) on Quaternary and groundwater geology of the Humboldt River basin in Nevada. Project Leader (1962-1977) of USDA-Soil Conservation Service-Soil Survey projects at New Mexico State University (NMSU), Texas Tech University, and Regional Technical Service Centers in Fort Worth, TX and Portland, OR. Emphasis was on geologic, soil-geomorphologic, and hydrogeologic interrelationships in arid and semiarid regions, including collaboration with state and other federal agencies in the USA and Mexico.

1977-1997: NM Bureau of Mines [Geology] & Mineral Resources (NMBGMR), a division of the NM Institute of Mining & Technology (NM Tech). Primary responsibilities involved development and management of the Bureau's research and public service program in environmental geology. Initiated cooperative programs in environmental geology with Los Alamos National Laboratory (1985-1993) and the All Indian Pueblo Council—Pueblo Office of Environmental Protection (1993-1997). Organized and managed the NMBGMR Albuquerque Office (1991-1997), which specializes in the hydrogeology of basin-fill aquifer systems, environmental geology (including geologic-hazard and waste-management assessments), and geologic mapping.

1997-present: Emeritus Senior Environmental Geologist with the NMBGMR involved in digital mapping of the State's landforms and surficial geology. Graduate Faculty Adjunct in the NM Tech—Earth & Environmental Science Department. Adjunct Curator in the NM Museum of Natural History & Science—Science Division. Part-time Senior Hydrogeologist at the Water Resources Research Institute (NMWRI) and Adjunct Professor of Geological Sciences at NMSU. Specific NMWRI projects include: 1) Research on Trans-boundary Aquifers of the New Mexico–Chihuahua region (Co-PI: 1998-2000 USEPA Interagency Contract) that developed basin-scale hydrogeologic-framework models of groundwater-flow systems; 2) studies of basin- and valley-fill aquifer systems of the southern Rio Grande rift region (Co-PI: 2002-2005), with partial support from the NM Interstate Stream Commission, USEPA, and NSF-SAHRA-CEACREST glue-grant program; 3) US BOR-funded study (Co-PI: 2004-2005) of irrigation-canal seepage losses in the Arch-Hurley Conservancy District (Conchas-Canadian river basin); and 4) development of new digital hydrogeologic models of aquifer systems in the El Paso del Norte area with the El Paso Water Utilities staff.

John Hawley has authored or co-authored more than 100 publications on the environmental geology, hydrogeology, and geomorphology of arid and semi-arid lands in western North America, including: the Great Basin, Chihuahuan Desert and Rio Grande rift areas of the Basin and Range province, and the Southern High Plains-Pecos Valley region\*\*. Honors for published research and scientific-community service include awards from the Geological Society of America (Kirk Bryan Award for desert soil-geomorphic research-1983\*\*\* and the 2005 Engineering Geology Division Distinguished Practice Award), American Association for the Advancement of Science (Certificate of Merit for Arid Zone Research), State Commission on Higher Education (1989 New Mexico Eminent Scholar), and the US Geological Survey: “for contributions to the understanding of the hydrogeology of New Mexico and the Albuquerque Basin” (1998).

Other professional activities and honors include: Past president and Honorary Member of the NM Geological Society, and co-dedicattee of the Society’s 50th Annual Field Conference Guidebook on "Albuquerque Geology" (1999). Hanover College Alumni Achievement Award for “outstanding career contributions to the science of geology” (2001). President of the NM Section–American Institute of Professional Geologists (2002) and a recipient of the AIPG Presidential Award of Merit (2003). Co-recipient of the NM Earth Science Achievement Award (2005) for” outstanding contributions in areas of applied science and education.” Dedicattee of the NM Museum of Natural History Bulletin No. 28: *New Mexico’s Ice Ages* (\*\*Love 2005, Connell et al. 2005, Hawley 2005). University of Illinois–2006 Geology Alumni Achievement Award.

#### **\*\*Selected Publications**

- Connell, S.D., Hawley, J.W., and Love, D.W., 2005, Late Cenozoic drainage development in the southeastern Basin and Range of New Mexico, southeasternmost Arizona and western Texas, *in* Lucas, S. G., Morgan, G., and Zeigler, K.E., eds., 2005, *New Mexico’s Ice Ages: New Mexico Museum of Natural History & Science Bulletin No. 28*, p. 125-150.
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- Gile, L. H., Hawley, J. W., Grossman, R. B., Monger, H. C., Montoya, C. E., and Mack, G. H., 1995, Supplement to the Desert Project Guidebook, with emphasis on soil micromorphology: N. M. Bureau of Mines & Mineral Resources Bulletin 142, 96 p.
- Hawley, J.W., 1969, Notes on the geomorphology and late Cenozoic geology of northwestern Chihuahua: N. M. Geological Society Guidebook 20, p. 131-142.
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- Hawley, J.W., 1986, Physiographic provinces [and] landforms of New Mexico, *in* Williams, J.L., ed., *New Mexico in Maps* (2<sup>nd</sup> edition): The University of New Mexico Press, p. 23-31.
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- Hawley, J.W. and Longmire, P.A., 1992, Site characterization and selection (Chapter 3), *in* Reith, C.C., and Thomson, B.M., eds., *Deserts as dumps? The disposal of hazardous materials in desert ecosystems*: Albuquerque, University of New Mexico Press, p. 57-99.
- Hawley, J.W. and Love, D.W., 1981, Overview of geology as related to environmental concerns in New Mexico, *in* Wells, S.G., and Lambert, W., eds., *Environmental Geology and Hydrology in New Mexico*: N.M. Geological Society, Special Publication 10, p. 1-10.
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