
Resume of Thomas Aley

PERSONAL DATA

Born September 8, 1938 in Steubenville, Ohio. U.S. Citizen. Married, two adult children.

EDUCATION

University of California, Berkeley. B.S. in Forestry (1960).

University of California, Berkeley. M.S. in Forestry with emphasis in forest influences and wildland hydrology. (1962).

University of California, Berkeley. Department of Geography (1962-1963); emphasis in hydrology and geology.

University of Arizona, Tucson. Department of Watershed Management (1963-1964); emphasis in wildland hydrology.

Southern Illinois University, Carbondale. Department of Geography (1972-1973). Emphasis in hydrology and geology.

PROFESSIONAL CERTIFICATION & REGISTRATION

Professional Hydrogeologist, Certificate Number 179, American Institute of Hydrology, Board of Registration. Granted 1983.

Certified Forester, Society of American Foresters. Granted 1996.

Professional Geologist, State of Arkansas Registration Number 1646. Issued 1991.

Professional Geologist, State of Kentucky Registration Number 1541. Issued 1994.

Registered Geologist, State of Missouri Registration Number 0989. Issued 1998.

Professional Geologist, State of Alabama Registration Number 1089. Issued 2003.

PROFESSIONAL SOCIETY MEMBERSHIPS

American Institute of Hydrology
Association of Ground Water Scientists and Engineers
Society of American Foresters
Missouri Consulting Foresters Association
National Speleological Society

HONORS AND AWARDS

1960. Pack Prize in Forestry. University of California.

1961. Membership in Xi Sigma Pi, honorary forestry society.

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- 1972.** Award for outstanding performance, United States Forest Service.
- 1972.** U.S. Forest Service nominee for the American Motors Conservation Award.
- 1973.** Lester B. Dill Award for significant contributions to speleology. Mississippi Valley-Ozark Region of the National Speleological Society.
- 1977.** Chairman's Conservation Award. Mississippi Valley-Ozark Region of the National Speleological Society.
- 1979.** J Harlan Bretz Award for outstanding contributions to the study of speleology in the state of Missouri. Missouri Speleological Survey.
- 1981.** Outstanding Service to Education Award. Phi Delta Kappa honorary educational fraternity for southwest Missouri.
- 1981.** Fellow. National Speleological Society.
- 1988.** In The Name of Science Award. Springfield, Missouri Public Schools. In recognition of outstanding service and dedication to science.
- 2012.** Berry Commoner Science in Environmental Service Award. Missouri Coalition for the Environment.

EMPLOYMENT HISTORY

1973 to Present. Director and President, Ozark Underground Laboratory, Protem, Missouri. Conducts or directs consulting and contract studies in hydrogeology, cave and karst related issues, and natural resource management of karst regions.

1966 to 1973. Hydrologist, United States Forest Service. Winona, Missouri and Springfield, Missouri. Directed the Hurricane Creek Barometer Watershed study, which assessed the interactions of land use and ground water hydrology in a forested karst area. Directed Grey Hollow study. Conducted "trouble shooting work" in Missouri, Arkansas, Wisconsin, Utah, Illinois, and Indiana. Left government service as GS-12.

1964 to 1965. Chief Hydrologist, Toups Engineering, Inc., Santa Ana, California. Duties included basic data collection and analysis for plaintiffs in Santa Ana Basin adjudication and similar work for defendants in San Gabriel Basin adjudication; these were both ground water basin adjudication suits. Directed technical work on ground water basin management and artificial recharge.

1963 to 1964. Teaching Assistant, Department of Watershed Management, University of Arizona, Tucson. Aerial photogrammetry and photo interpretation.

1963. Researcher, grant from Office of Naval Research, U.S. Navy, through Department of Geography, University of California, Berkeley. Conducted field studies on the origin and hydrology of caves in Jamaica, Haiti, and the Dominican Republic. Responsible for all field work. Work resulted in 3 publications.

1960 to 1963. Teaching Assistant and Research Assistant, School of Forestry, University of California, Berkeley. Teaching in aerial photogrammetry, photo interpretation, and forest influences. Research assistant in the same fields.

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SUMMARY OF EXPERIENCE

50 years of professional experience in ground water and surface water hydrology, pollution control investigations, and land management issues with particular emphasis on soluble rock landscapes. The following projects are representative examples.

1. Hydrologic studies for land management and spring protection with particular emphasis on soluble rock regions. Numerous studies of this type have been conducted for local, state, and federal agencies in Missouri, Arkansas, Alabama, Florida, Kentucky, Illinois, Tennessee, Alaska, and Wyoming.
2. Expert witness testimony on pollution potential of underground injection of hazardous wastes into deep-lying soluble rocks in Oklahoma.
3. Expert witness testimony in ground water and surface water hydrology in Missouri, Arkansas, Oklahoma, Kansas, California, Alabama, Maryland, Washington, and Indiana.
4. Expert witness testimony on riverbank stability problems in Missouri before U.S. Senate Committees at request of Senator John Danforth of Missouri.
5. Member of 6-member review panel on the adequacy of testing to determine radionuclide migration from a radioactive waste disposal site at the Idaho National Engineering Laboratory, Idaho. Served as the only hydrogeologist on the panel.
6. Member of 6-member expert hydrogeology panel on hydrological issues associated with the St. Louis Airport Radioactive Waste Site.
7. Chairman of a 4-member "blue ribbon" panel established by the U.S. Forest Service to assess the significance of cave and karst resources in southeastern Alaska. The panel also assessed the extent to which land management activities were adversely impacting the resources.
8. Hydrologic consultant to St. Charles County, Missouri on clean-up of radioactive wastes at Weldon Spring Site, a former Atomic Energy Commission processing facility. Advised on actions to protect county well field from radioactive contaminants dumped in an abandoned quarry.
9. Ground water tracing in soluble rock landscapes, and delineation of recharge areas for spring systems. Work conducted in Missouri, Arkansas, Oklahoma, Indiana, Illinois, Kentucky, Tennessee, Alabama, Florida, Georgia, Texas, Maryland, Pennsylvania, New York, West Virginia, Arizona, Oregon, California, Nevada, Wyoming, and Alaska. Foreign work in Canada, Barbados, Australia, Indonesia, and Peru. Ground water tracing in fractured rock landscapes in New Hampshire, Alabama, New Mexico, Minnesota, Idaho, Utah, and Washington. Ground water tracing in unconsolidated geologic units in New York, Massachusetts, Florida, North Carolina, South Dakota, Missouri, Arkansas, California, Oregon, Washington, Alaska, and British Columbia (Canada).
10. Hydrogeologic investigations of groundwater impacts from pipeline corridors. Missouri, Oklahoma, and Texas.

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11. Ground water tracing investigations at mines in Virginia, West Virginia, Pennsylvania, New York, Missouri, Utah, Colorado, Montana, Alabama, Maryland, Canada, Indonesia, Australia, and Peru.
12. Hydrologic investigations to determine sources of pollutants which caused fish kills at commercial fish farms in Missouri and Arkansas.
13. Hydrogeologic site investigations (and sometimes testimony) on municipal landfills with emphasis on site suitability and probability of ground water contamination. 21 sites in Arkansas, Missouri, Wisconsin, and Alabama.
14. Hazardous waste remediation investigations with emphasis on hydrogeology. Sites in Missouri, Arkansas, Kentucky, Pennsylvania, Maryland, New York, Alabama, Tennessee, and California. Second opinion review of projects in Missouri, Kansas, and New York.
15. Impacts of food processing wastes on surface and ground water quality. Various projects in Arkansas and Missouri.
16. Hydrologic investigations of petroleum pollution of wells. Multiple sites in Missouri, Arkansas, New York, and North Carolina.
17. Assessment of the hydrologic impacts of proposed geothermal energy development on the Santa Clara Indian Reservation, New Mexico.
18. Investigations on the extent and sources of sewage contamination in about 100 springs at Eureka Springs, Arkansas. Work involved the delineation of recharge areas for most of these springs and the identification of sewer line segments which had the greatest leakage problems.
19. Hydrogeologic hazard area mapping for proposed sewer line corridors in a sinkhole plain area south of Mammoth Cave, Kentucky. Work included hydrologic recommendations for minimizing exfiltration and monitoring strategies.
20. Hydrogeologic mapping of Greene County, Missouri to identify areas where sinkhole flooding and serious ground water contamination could result from land development.
21. Assessment of impacts of proposed highways on springs, caves, and endangered cave-dwelling species, Arkansas, Missouri, Indiana, Virginia, West Virginia, and Alaska. Similar work for airports in Missouri and Arkansas, and for coal-fired power plants in Missouri and Arkansas.
22. Identification and delineation of rare, threatened, and endangered animal species' habitats in caves and ground water systems. Studies in Arkansas, Missouri, Oklahoma, Tennessee, Alabama, and Illinois.
23. Health and safety assessment of Harrison's Crystal Cave, Barbados.
24. Health and safety assessment of natural radiation as encountered in caves open to the public in the United States. Development of industry standards under OSHA Alliance Agreement.

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25. Various microclimate, hydrologic, biologic, interpretive, and management investigations of caves in Missouri, Arkansas, Tennessee, Kentucky, New Mexico, Arizona, California, Wyoming, Oregon, Alaska, British Columbia, New Zealand, and Australia.
26. Evaluation of 19 sites for designation as National Natural Landmarks; sites are in Indiana, Missouri, Arkansas, Iowa, Ohio, and New Mexico.
27. Assessment of hydrologic impacts of rock quarries. Multiple sites in Missouri, Arkansas, Maryland, Illinois, Alabama, and Alaska.
28. Assessment of the impacts of deep mining on regional hydrology. Missouri.
29. Preparation of sole-source aquifer designation petition. Missouri.
30. Delineation of wellhead protection zones for public ground water supplies in Arkansas, Missouri, Alaska, Alabama, South Dakota, New Hampshire, Maryland, and Florida.
31. Groundwater tracing at four nuclear power plants, USA.
32. Feasibility study for creation of a national-scale American Cave and Karst Museum.
33. Instructor in numerous professional short-courses. These have included:
 - 1) over 20 four-day courses in karst hydrogeology and groundwater monitoring sponsored by the Association of Ground Water Scientists and Engineers and by Environmental Education Enterprises;
 - 2) two courses on groundwater site investigation techniques for health department professionals in Washington State; and
 - 3) courses on land management in karst terrains for resource managers in West Virginia, Indiana, Kentucky, Tennessee, Missouri, Arkansas, Utah, Idaho, Oregon, Washington, Alaska, and New Mexico.

PUBLICATIONS

1. _____. 1962. Analytical review of Gurnee, Russell; Richard Anderson; Albert C. Mueller; and Jose Limeras. 1961. Barton Hill Project; a study of the hydrology of limestone terrain. National Speleological Society Bulletin. Vol. 23, Part I. 30p. Review in Cave Notes, Vol. 4:4, pp. 32-33.
2. _____. 1963. Water balances for limestone terrain. *Cave Notes*, Vol. 5:3, pp. 17-22.
3. _____. 1963. Basic hydrographs for subsurface flow in limestone terrain: theory and application. *Cave Notes*, Vol. 5:4, pp. 26-30.
4. _____. 1964. Sea caves in the coastal karst of western Jamaica. *Cave Notes*, Vol. 6:1, pp. 1-3.
5. _____. 1964. Echinoliths--an important solution feature in the stream caves of Jamaica. *Cave Notes*, Vol. 6:1, pp. 3-5.

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6. _____. 1964. Origin and hydrology of caves in the White Limestone of north central Jamaica. Dept. of Geography, Univ. of Calif., Berkeley. 29p.
7. _____. 1965. Corrasional cave passage enlargement. *Cave Notes*, Vol. 7:1, pp. 2-4.
8. _____. 1965. Analytical review of Brown, R.F. and T.W. Lambert. 1963. Reconnaissance of ground-water resources in the Mississippian Plateau region of Kentucky. U.S. Geol. Surv. Water Supply Paper 1603. 58p. Review in *Cave Notes*, Vol. 7:2, pp. 9-13.
9. Crooke, Howard W., John M. Toups, and _____. 1965. Ground water recharge means "progress insurance" in Orange County, California. *Water and Sewage Works*, Vol. 112:7, pp. 257-261.
10. _____. 1967. Analytical review of Sweeting, M. M.; G. E. Groom; V. H. Williams; C. D. Pigott; D. Ingle Smith; and G. T. Warwick. 1965. Denudation in limestone regions; a symposium. *Geographical Journal*, Vol. 131, Part 1, pp. 34-57. Review in *Caves and Karst*, Vol. 9:1, pp. 5-6.
11. _____. 1967. Water balance study of Greer Springs, Missouri. *Caves and Karst*, Vol. 9:2, pp. 12-15.
12. _____. 1967. Analytical review of White, William B. and Victor A. Schmidt. 1966. Hydrology of a karst area in east-central West Virginia. *Water Resources Research*, Vol. 2:3, pp. 549-560. Review in *Caves and Karst*, Vol. 9:5, pp. 44-46.
13. _____. 1968. Hydrology of a karst watershed in the Missouri Ozarks. *Caves and Karst*, Vol. 10:6, pp. 49-55.
14. _____. 1969. Out of sight, out of mind. *Missouri Mineral Industry News*, Vol. 9:12, pp. 163-166.
15. _____. 1970. Temperature fluctuations at a small Ozark spring. *Caves and Karst*, Vol. 12:4, pp. 25-30.
16. _____. 1972. The sinkhole dump and the spring. *Missouri Conservationist*, Vol. 33:2, pp. 16-17.
17. _____. 1972. Groundwater contamination from sinkhole dumps. *Caves and Karst*, Vol. 14:3, pp. 17-23.
18. _____. 1972. Control of unwanted plant growth in electrically lighted caves. *Caves and Karst*, Vol. 14:5, pp. 33-35.
19. _____, James H. Williams, and James W. Massello. 1972. Groundwater contamination and sinkhole collapse induced by leaky impoundments in soluble rock terrain. *Engineering Geology Monographs*, Series 5. Missouri Geol. Survey and Water Resources. 32p.
20. _____. 1974. Groundwater problems in southwest Missouri and northwest Arkansas. *Missouri Speleology*, Vol. 14:2, pp. 1-13.
21. _____. 1975. Hydrology. IN: Gott, J. D. Soil survey of Mark Twain National Forest Area, Missouri. U.S. Dept. of Agric. Soil Survey Report, pp. 47-50.

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22. _____. 1976. Caves, cows, and carrying capacity. *Proc. First National Cave Management Symposium*, pp. 70-71.
23. _____. 1976. Hydrology and surface management. *Proc. First National Cave Management Symposium*, pp. 44-45.
24. _____ and Mickey W. Fletcher. 1976. The water tracer's cookbook. *Missouri Speleology*, Vol. 16:6, pp. 1-32.
25. _____ and Doug Rhodes; Editors. 1977. *Proc. Second National Cave Management Symposium*, 106p.
26. _____. 1977. Comments on cave radiation. *Proc. Second National Cave Management Symposium*, pp. 75-76.
27. _____. 1977. Introductory comments on commercial and high value caves. *Proc. Second National Cave Management Symposium*, pp. 52-53.
28. _____. 1977. The Ozark Underground Laboratory. *Proc. Second National Cave Management Symposium*, pp. 94-98.
29. _____. 1977. A model for relating land use and groundwater quality in southern Missouri. IN Dilamarter, R. R. and S. C. Csallany, Editors. Hydrologic problems in karst regions. Western Kentucky Univ. Press, pp. 323-332.
30. _____. 1977. The Ozark Underground Laboratory. IN Sloane, Bruce; Editor. Cavers, caves, and caving. Rutgers Univ. Press, pp. 140-158.
31. _____. 1977. Springs and sewage. IN Sloane, Bruce; Editor. Cavers, caves, and caving. Rutgers Univ. Press, pp. 318-329.
32. _____. 1978. A predictive hydrologic model for evaluating the effects of land use and management on the quantity and quality of water from Ozark springs. *Missouri Speleology*, Vol. 18, 185p.
33. Harmon, R.S.; H.P. Schwarcz, and _____. 1978. Isotopic studies of speleothems from a cave in southern Missouri, U.S.A. IN: Zartman, Robert E. (Editor). Short Papers of the Fourth Intern'l. Conf. on Geochronology, Cosmochronology, and Isotope Geology. U.S. Geol. Surv. Open File Rept. 78-701.
34. _____ and Catherine Aley. 1979. Prevention of adverse impacts on endangered, threatened, and rare animal species in Benton and Washington Counties, Arkansas. Northwest Arkansas Regional Planning Commission, Springdale, 35p.
35. _____ and David I. Foster. 1979. Deep secrets and dark problems; studies of karst springs in the Ozark National Scenic Riverways. *Proc. Second Conference on Scientific Research in the National Parks*, Vol. 5, pp. 499-505. U.S. National Park Service.
36. _____. 1979. Do threatened and endangered species threaten or endanger commercial interests at show caves? *Down Under*, Vol. 14:2, pp. 24-26.
37. _____ and Kenneth C. Thomson. 1981. Hydrogeologic mapping of unincorporated Greene County, Missouri, to identify areas where sinkhole flooding and serious

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groundwater contamination could result from land development. Mo. Dept. of Natural Resources, map folio and project summary.

38. _____ and Danny Halterman. 1982. A conceptual characterization of the subsurface movement of toxic chemicals in soluble rock lands. *Proc. Fifth National Cave Management Symposium*, pp. 77-80.

39. _____. 1982. Hydrologic impacts of urbanization in the soluble rock lands of Greene County, Missouri. *Proc. Fifth National Cave Management Symposium*, pp. 61-69.

40. _____ and Cathy Aley. 1982. Interpretive training for show cave personnel. *Proc. Fifth National Cave Management Symposium*, pp. 91-92.

41. _____. 1984. Groundwater tracing in water pollution studies. *National Speleological Society Bulletin*, Vol. 46:2, pp. 17-20.

42. _____. 1985. Optical brightener sampling; a reconnaissance tool for detecting sewage in karst groundwater. *Hydrological Science and Technology Short Papers*, Vol. 1:1, pp. 45-48.

43. _____, Cathy Aley, and Russell Rhodes. 1986. Control of exotic plant growth in Carlsbad Caverns, New Mexico. *Proc. Sixth National Cave Management Symposium*, pp. 159-171.

44. _____ and Cathy Aley. 1986. Effects of land management on cave and water resources, Dry Medicine Lodge Creek Basin, Bighorn Mountains, Wyoming. *Proc. Sixth National Cave Management Symposium*, pp. 79-92.

45. Quinlan, J.F. and _____. 1987. Discussion of "A new approach to the disposal of solid waste on land" by R.C. Heath and J.H. Lehr. *Ground Water* Vol. 25:5, pp. 615-616.

46. _____. 1988. Complex radial flow of ground water in flat-lying residuum-mantled limestone in the Arkansas Ozarks. *Proc. Second Environmental Problems in Karst Terranes and Their Solutions Conference*, pp. 159-170. National Water Well Association.

47. _____. 1989. Assessing the areal extent of groundwater impacts in karst. *Third Annual Watershed Conf. Proc., Watershed Comm. of the Ozarks*, Springfield, MO, pp. 187-191.

48. _____. 1990. The karst environment and rural poverty. *Ozarks Watch* (Southwest Mo. State Univ.) Vol. 4:1, pp. 19-21. (Reprinted in "An anthology of Ozarks Watch", *Ozarks Watch*, Vol. 5:3, pp. 60-62).

49. _____ and Cathy Aley. 1991. Delineation and hazard area mapping of areas contributing water to significant caves. *Proc. Eighth National Cave Management Symposium*, pp. 116-122.

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51. _____. 1992. The water below. *Ozark Watch* (Southwest Mo. State Univ.) Vol. 6:1 & 2, pp. 42-44.

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52. _____, Catherine Aley, William R. Elliott, Peter W. Huntoon. 1993. Karst and cave resource significance assessment of the Ketchikan Area, Tongass National Forest, Alaska. Report by the Karst Resources Panel to the U.S. Forest Service. 79p. + appendixes.
53. _____. Some thoughts on environmental management as related to cave use. *Australian Cave and Karst Management Association Jour.* Vol. 17, pp. 4-10.
54. Field, Malcolm S.; Ronald G. Wilhelm; James F. Quinlan; and _____. 1995. An assessment of the potential adverse properties of fluorescent tracer dyes used for ground-water tracing. *Environmental Monitoring and Assessment*, Vol. 38:1, pp. 75-96.
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56. _____. 1996. Procedures for tracing water with fluorescent dyes. Robert W. Seabloom, Editor. *Proceedings of 9th Northwest On-Site Wastewater Treatment Short Course and Equipment Exhibition.* Univ. Washington, Seattle, pp. 329-341.
57. Chilman, Kenneth; David Foster; and _____. 1996. River management at Ozark National Scenic Riverways. IN: Halvorson, William L. and Gary E. Davis, Editors. *Science and Ecosystem Management in the National Parks.* Univ. Ariz. Press, Tucson, pp. 295-317.
58. _____. 1997. Caves in crisis. *Encyclopaedia Britannica Yearbook of Science and the Future, 1997*, pp. 116-133.
59. _____ and Wilgus B. Creath. 1997. Chapter 5, Mining and hydrology. IN: Mineral Policy Center. *Golden dreams, poisoned streams*, pp. 125-142.
60. _____. 1997. Groundwater tracing in the epikarst. *The Engineering Geology and Hydrogeology of Karst Terranes; Proc. 6th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst.* A.A. Balkema, Rotterdam, pp. 207-211.
61. _____. 1997. Keynote Address: Dyes don't lie; practical karst hydrology. *Proc. Karst-water Environment Symposium.* Virginia Tech. Water Resources Research Center, pp. 1-8.
62. _____. 1997. Beyond the passage ends. IN: Taylor, Robert L. and Jonathan Beard (Editors). *Guidebook for the National Speleological Society Annual Convention; Exploring Missouri caves*, pp. 38-45.
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64. Stokes, T.R.; _____; and P. Griffiths. 1998. Dye tracing in forested karst terrain: a case study on Vancouver Island, British Columbia. *Post-Conference Proc. of the 8th. Intern'l. Assoc. of Geological Engineers*, Vancouver, B.C.

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67. George, Scott; _____.; and Arthur Lange. 1999. Karst system characterization utilizing surface geophysical, downhole geophysical and dye tracing techniques. *Proc. 7th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst*. A.A. Balkema, Rotterdam, pp. 225-242.
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78. _____. 2001. Discussion of "A conceptual model for DNAPL transport in karst ground water basins" by Caroline M. Loop and William B. White. *Ground Water*, Vol. 39:4, pp. 483-484.

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