

## ELIZABETH PAYTON

Water Resources Specialist  
Western Water Assessment  
Cooperative Institute for  
Research in Environmental  
Science (CIRES)  
University of Colorado, Boulder  
[elizabeth.payton@colorado.edu](mailto:elizabeth.payton@colorado.edu)

## EDUCATION

University of Colorado  
MS Civil Engineering, 1985  
Indiana University  
BS Biology, 1979

## EMPLOYMENT HISTORY

Water Resources Specialist,  
Western Water Assessment,  
CIRES, CU Boulder, 2018 to  
present  
Water resources specialist  
conducting research and  
providing climate services to  
communities in the  
Intermountain West.

Technical Writer, Lynker  
Technologies, 2017-2018  
Technical editor and writer on  
water resources topics.

Water Resources Engineer,  
Hydrosphere Resource  
Consultants, 1985-2001  
Project manager and engineer  
specializing in water resources  
planning and management.

Teacher, US Peace Corps,  
1979-1981  
Secondary level math &  
science teacher in western  
Nepal.

## RESEARCH INTERESTS

Climate and hydrology assessment, western US water supply, transferring climate and hydrology information to stakeholders, statistical hydrology.

## PROJECTS

**Non-stationary Drought Index.** Project manager on an effort to develop a prototype non-stationary drought index tool for the western US.

**Fifth National Climate Assessment (NCA5).** Water chapter lead responsible for building an author team, chapter development, and ensuring that the chapter tells a clear and compelling narrative.

**Collaborative Research: Anthropogenic water management, Climate Change, and Environmental Sustainability in the Southwestern US (ACCESS).** Co-PI on an NSF-funded project in collaboration with Michigan State University to assess future water supplies in the Colorado River basin under a changing climate.

**Snowtopography: Snowpack & Soil Moisture Monitoring Handbook.** Lead author and WWA project manager with USDA-ARS and The Nature Conservancy on a handbook to support resource managers, researchers, and practitioners to establish snowtopography and soil moisture monitoring stations.

**Snowpack Monitoring in the Rocky Mountain West: A User Guide.** Contributing author on a guide to understanding and retrieving snowpack and related data for water managers, decision makers, forecasters, researchers, and others who use, collect, and produce snow information.

**Colorado River Basin Climate and Hydrology, State of the Science.** Co-lead author and editor of *Colorado River Basin Climate and Hydrology, State of the Science* report, a synthesis of current research in basin hydrology and climate and a technical overview of the forecasting and planning tools that apply that research.

**Colorado River Model.** Project engineer on the development of a model of the Colorado River basin. The model tracks salinity, hydropower revenues, shortages, and storage for the entire basin while capturing the intra- and interstate institutions that govern allocation and reservoir operations.

**Colorado River Allocation Under a Changed Climate.** Project engineer on a study of the impacts of climate change on hydrology and water allocation in the Colorado River Basin under current and modified operational settings.

**Nebraska v. Wyoming, Supreme Court of the United States.** Expert testimony, *Nebraska v. Wyoming*, Supreme Court of the United States, No. 108, Original, October Term, 1997. Statistical hydrology expert and project engineer in support of interstate compact litigation in the North Platte River Basin.

## PROJECTS, CONTINUED

**Grand Canyon Trust—U.S. Senate Testimony.** Project engineer on the assessment of impacts to water availability, salinity, and streamflow for varying levels of water development in the Colorado River Basin in support of testimony before the U.S. Senate Subcommittee on Water and Power, Committee on Energy and Natural Resources.

**U.S. Bureau of Reclamation Guidebook for Preparing Conservation Plans.** Technical editor and contributing writer on a text to help agricultural water districts prepare water management and conservation plans.

**U.S. Bureau of Reclamation Handbook for Determining Rate Schedules by Agricultural Water Districts.** Technical editor and contributing writer on a text to provide water districts with tools to use in setting water rates that encourage efficient use of water.

**Lower Poudre River Recovery and Resilience Master Plan.** Technical editor on a master plan to improve river health, floodplain function, community safety and ecosystem resilience.

**Tenth Mountain Division Hut Environmental Assessment.** Project manager on the environmental assessment of two additional huts in a backcountry ski hut system. Also responsible for vegetation aspects of the environmental assessment.

**Oregon Pollutant Trading Resource Guide.** Technical editor and contributing writer on a step-by-step guide to pollutant trading for the State of Oregon.

**City of Boulder Open Space Water Resources Database.** Project manager on the design, development and population of a water resources database that integrates Colorado State Engineer's diversion data, consumptive use estimates, cropping and acreage data, historical documents and decrees, engineering studies, water rights transactions and field assessments.

**City of Boulder Open Space Water Supply Studies.** Project manager and engineer on evaluations of irrigation requirements, ditch company operations, water rights yields and water rights assessments.

**City of Northglenn Raw Water Optimization Model.** Project engineer on the design and development of a model of the complex arrangement of storage, exchange and deliveries in a multi-party municipal and agricultural water supply system.

**City of Boulder Raw Water Master Plan.** Project engineer on development of a model of Boulder's water supply system, including water rights, trans-basin diversions, reservoir operations, treatment plants and hydropower generation.

## PUBLICATIONS

Payton, E.A., A.O. Pinson, T. Asefa, L.E. Condon, L.-A.L. Dupigny-Giroux, B.L. Harding, J. Kiang, D.H. Lee, S.A. McAfee, J.M. Pflug, I. Rangwala, H.J. Tanana, and D.B. Wright, 2023: Ch. 4. Water. In: *Fifth National Climate Assessment*. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. <https://doi.org/10.7930/NCA5.2023.CH4>

Pokhrel, Yadu, Ahmed Elkouk, Lifeng Luo, Elizabeth Payton, Ben Livneh, and Yifan Cheng. 2023. "Impact of Model Parameters on Runoff Sensitivities in the Community Land Model: A Study on the Upper Colorado River Basin," May. <https://doi.org/10.5194/egusphere-egu23-10644>.

Elkouk, Ahmed, Yadu Pokhrel, Lifeng Luo, Elizabeth Payton, Ben Livneh, and Yifan Cheng. 2022. "Mechanistic Drivers of Runoff Sensitivity to Temperature in the Community Land Model: A Study on the Upper Colorado River Basin" 2022 (December): H22Q-1067. <https://ui.adsabs.harvard.edu/abs/2022AGUFM.H22Q1067E>.

- Frisvold, George B., Linda M. Fernandez, Flavio Lehner, Stephanie A. McAfee, Sharon Megdal, Elizabeth Payton, Jack Schmidt, Julie Vano, and Connie Woodhouse. 2022a. "Featured Collection Introduction: Severe Sustained Drought Revisited: Managing the Colorado River System in Times of Water Shortage 25 Years Later — Part I." *JAWRA Journal of the American Water Resources Association* 58 (5): 597–603. <https://doi.org/10.1111/1752-1688.13062>.
- . 2022b. "Featured Collection Introduction: Severe Sustained Drought Revisited Managing the Colorado River System in Times of Water Shortage 25 Years Later—Part II." *JAWRA Journal of the American Water Resources Association* 58 (6): 1049–52. <https://doi.org/10.1111/1752-1688.13085>.
- Pokhrel, Yadu, Ahmed Elkouk, Ben Livneh, Elizabeth Payton, Lifeng Luo, and Katherine Clifford. 2022. "A Systems Modeling Approach to Examine Water and Environmental Sustainability Pathways in the Southwestern US." In *AGU Chapman Conference 2022*.
- Payton, Elizabeth, Joel Biederman, and Marcos Robles. 2021. "Snowtography: Snowpack & Soil Moisture Monitoring Handbook." <https://doi.org/10.25810/R9S7-4T28>.
- Payton, Elizabeth A., and Jeff Lukas. 2021. "Colorado River Basin Climate and Hydrology State of the Science: A Synthesis Report to Support Water Planning and Management." *Colorado Water*, June 2021.
- Woelders, Lineke, Jeff Lukas, E Payton, and Benét Duncan. 2020. "Snowpack Monitoring in the Rocky Mountain West: A User Guide." *University of Colorado: Boulder, CO, USA*, 2021–10.
- Lukas, Jeff, and Elizabeth Payton. 2020. "Science Synthesis to Support Water Planning and Management in the Colorado River Basin." In . AGU. <https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/759681>.
- Lukas, Jeff, and Elizabeth Payton. 2020. "Colorado River Basin Climate and Hydrology: State of the Science." Western Water Assessment, University of Colorado Boulder. <https://doi.org/10.25810/3hcv-w477>.
- Payton, Elizabeth A., Charles M. Bredecke, Benjamin L. Harding, Edward Armbuster, T. McGuckin, and C. Huntley. 1997. "Agricultural Water Conservation Planning & Pricing Tools and Technologies." In *Proceedings of the Irrigation Association's 18th International Conference*. Nashville, TN.
- Bredecke, Charles M., Benjamin L. Harding, and Elizabeth A. Payton. 1996. "PC-Based Decision Support Tools: Lessons from a Dozen Applications." In *Proceedings of the Fifth Water Resources Operations Management Workshop*. Arlington, VA: ASCE.
- Harding, Benjamin L., Taiye B. Sangoyomi, and Elizabeth A. Payton. 1995. "Impacts of a Severe Sustained Drought on Colorado River Water Resources." *Journal of the American Water Resources Association* 31 (5): 815–24. <https://doi.org/10.1111/j.1752-1688.1995.tb03403.x>.
- Harding, Benjamin L., Elizabeth A. Payton, and Thomas C. Brown. 1990. "Modeling the Allocation of Water for the Colorado River under a Warmer Climate." In *Proceedings of 1990 AGU Annual Meeting, Front Range Branch*. Boulder, CO.
- Brown, Thomas C., Benjamin L. Harding, and Elizabeth A. Payton. 1990. "Marginal Economic Value of Streamflow: A Case Study for the Colorado River Basin." *Water Resources Research* 26 (12): 2845–59. <https://doi.org/10.1029/WR026i012p02845>.
- Bredecke Charles M., DeOreo William B., Payton Elizabeth A., and Rozaklis Lee T. 1989. "Network Models of Water Rights and System Operations." *Journal of Water Resources Planning and Management* 115 (5): 684–96. [https://doi.org/10.1061/\(ASCE\)0733-9496\(1989\)115:5\(684\)](https://doi.org/10.1061/(ASCE)0733-9496(1989)115:5(684)).
- Rozaklis, Lee, Elizabeth A. Payton, Charles M. Bredecke, and Benjamin L. Harding. 1988. "Modeling Water Allocation Problems Under Complex Hydrologic and Institutional Settings." In *24th Annual AWRA Conference and Symposia*. Milwaukee, WI.
- Harding, Benjamin L., Elizabeth A. Payton, William B. Lord, Thomas C. Brown, and Lee T. Rozaklis. 1988. "Market-Based Operation to Improve the Efficiency of Water Supplies from the Colorado River Basin." <http://hdl.handle.net/10150/310665>.
- Bredecke, Charles M., Elizabeth A. Payton, and Robert Wheeler. 1987. "Network Optimization Models for Water Rights Analysis and System Operating Studies for the City of Boulder." In *Colorado Water Engineering and Management Conference Proceedings*, 275–84. Ft. Collins, CO.
- DeOreo, William, Elizabeth A. Payton, and Robert Wheeler. 1987. "Use of Network Optimization Techniques to Simulate Operation of Municipal Water Systems." In *AWWA Annual Conference*. Cheyenne, WY.

Payton, Elizabeth A., and Charles M. Brendecke. 1985. "Rainfall and Snowmelt Frequency in an Alpine Watershed." In *Proceedings of the 53rd Annual Western Snow Conference*, 25–36. Boulder, CO.

#### TECHNICAL REPORTS

Lynker Technologies, 2017. "Lower Poudre River Recovery and Resilience Master Plan." 139 pp.

Hydrosphere, Inc., 2000. "North Platte River Streamflow Analysis." Submitted to the Special Master, Nebraska v. Wyoming, Supreme Court of the United States, No. 108, Original, October Term, 1997. 55 pp.

Hinckley Cons., Hydrosphere, Water Rights Services, HRS Water Engineers, 2000. "Water Rights, Streamflow, and Hydrogeology of the Horse Creek Basin, Wyoming." Submitted to the Special Master, Nebraska v. Wyoming, Supreme Court of the United States, No. 108, Original, October Term, 1997. 55 pp.

Hydrosphere, Inc., 2000. "Analysis of Historical North Platte River Water Accounting Records for Conformance with Terms of the North Platte Decree of 1945 and Warren Act Contracts." Submitted to the Special Master, Nebraska v. Wyoming, Supreme Court of the United States, No. 108, Original, October Term, 1997. 50 pp.

USBR 1997. "Achieving Efficient Water Management—A Guidebook for Preparing Agricultural Water Conservation Plans." 150 pp.

USBR 1997. "Incentive Pricing Handbook for Agricultural Water Districts." 100 pp.

Hydrosphere, Inc. 1996. "Open Space Water Resources Database and User's Guide." 75 pp.

Hydrosphere, Inc. 1995. "Boulder Valley Ranch Water Supply Study." 20 pp.

Hydrosphere, Inc. 1995. "Axelson/Johnson Management Area Water Supply Study." 16 pp.

Hydrosphere, Inc. 1995. "Environmental Assessment--Two Additional Huts in the 10th Mountain Division Hut Association System." 60 pp plus appendices.

Hydrosphere, Inc., 1994. "Colorado River Model User's Guide." 130 pp.

Hydrosphere, Inc., 1994. "Colorado River Model Technical Overview." 30 pp.

Hydrosphere, Inc., 1993. "Bhutan Power System Master Plan--Environmental Assessment." 60 pp.

WBLA, Inc., 1989. "Central Arizona Project Water Availability Study," Boulder, Colorado, 43 pp.

WBLA, Inc., 1988. "Northglenn System Model User Documentation," Boulder, Colorado, 50 pp.

WBLA, Inc., 1988. "Colorado River Network Model User Documentation," Boulder, Colorado, 65 pp.

#### ADVISORY BOARDS AND WORKING GROUP

City of Boulder Comprehensive Flood and Stormwater Master Plan Community Working Group (2021-2022)

City of Boulder Planning Board, Member (2014-2019), Chair (2018-2019)

City of Boulder Landmarks Board Member (2009-2014)