

CV Ryan Bailey

Curriculum Vitae – February 2023

Ryan T. Bailey

Associate Professor

Civil & Environmental Engineering Department

Colorado State University

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Summary of Experience and Qualifications

Dr. Ryan Bailey’s research focuses on the sustainability of watershed management practices regarding water quantity and water quality. Recent projects have focused on the development of process-based, dynamic numerical modeling codes to identify sustainable management practices within environmental systems and have provided a foundation for ongoing and future research. Projects include:

- Assessment of selenium, nitrogen, phosphorus, uranium, and salinity reactive transport in agricultural groundwater systems through field, laboratory, and numerical modeling approaches
- Linking watershed and groundwater flow and transport models to assess the movement of water and nutrients in watersheds, and investigating best-management practices for pollutant remediation
- Investigating best-management practices for sustaining groundwater resources in the Ogallala Aquifer
- Assessing current and future groundwater resources of atoll island nations
- Investigating impacts of groundwater pumping on water rights

Dr. Bailey teaches graduate courses (CIVE 531 Groundwater Hydrology, CIVE 542 Water Quality Modeling, CIVE 580 Methods for Sustainable Water Supply) and undergraduate courses (CIVE 423 Groundwater Engineering, CIVE 260 Statics-Honors).

Education

PhD	Colorado State University, Fort Collins, CO, July 2012 Civil & Environmental Engineering – Groundwater Hydrology & Water Quality <u>Dissertation</u> : <i>Selenium and Nitrogen Cycling in Irrigated Agricultural Groundwater Systems: Conceptualization, Modeling, and Mitigation</i>
MS	University of Guam, Mangilao, GU, 2008 Water & Environmental Research Institute of the Western Pacific – Environmental Science <u>Thesis</u> : <i>Groundwater Resources of Atoll Islands: Observation, Modeling, and Management</i>
BS	Brigham Young University, Provo, UT 2006 Civil & Environmental Engineering

Positions Held

Associate Professor, Colorado State University, Civil & Environmental Engineering Department
July 2019 – Present

Assistant Professor, Colorado State University, Civil & Environmental Engineering Department
July 2013 – July 2019

Funded Research Projects

Active Projects as Principal Investigator

Total: \$2.65M

Conjunctive Freshwater-Saltwater Management for Climate-Resilient Agroecosystems [\\$262,813](#)

Sponsor: USDA-NIFA-AFRI (2021-2025)

Note: CSU is a subaward for this project, via Oklahoma State University; Dr. Bailey is the PI at CSU

Integration of a New Groundwater Flow and Salinity Model in SWAT+ [\\$59,630](#)

Sponsor: USDA-ARS (2022-2023)

Quantifying the Impact of Management Practices on Selenium and Nitrogen in the Lower Arkansas River Basin downstream of John Martin Reservoir [\\$28,000](#)

Sponsor: Colorado Department of Public Health and Environment (2022)

CAREER: What Governs Salt Mobilization and Transport in Upland Semi-Arid Catchments? [\\$496,062](#)

Sponsor: National Science Foundation (2019-2023)

INFEWS/T2: Improving crop yield and soil salinity by cost-effective integration of microbial community, hydrology, desalination, and renewable power [\\$399,140](#)

Sponsor: National Science Foundation (2019-2023)

Note: CSU is a subaward for this project, via University of North Texas; Dr. Bailey is the PI at CSU

Integration of SWAT+/MODFLOW and Inclusion in the Geospatial Modeling Interface [\\$110,000](#)

Sponsor: USDA-ARS in Temple, Texas (2018-2023)

Improved Modeling Framework for Assessing Phosphorus and Nitrogen Transport in Tile-Drained Watersheds [\\$497,500](#)

Sponsor: USDA-NIFA-AFRI (2017-2022)

Selenium Characterization and Modeling for the Lower Arkansas River Basin [\\$405,002](#)

Sponsor: Colorado Department of Public Health and Environment (2018-2021)

Amendment to Selenium Characterization and Modeling for the Lower Arkansas River Basin [\\$22,000](#)

Sponsor: Colorado Department of Public Health and Environment (2021)

BLM-NOC, Enhancement of APEX Model for simulating soil erosion and salt transport in the Colorado River Basin [\\$300,988](#)

Sponsor: Bureau of Land Management (via Texas A&M University) (2017-2022)

Quantifying Salinity Controls and Crop Water Footprint in Irrigated Stream-Aquifer Systems [\\$60,000](#)

Sponsor: CSU Agricultural Experiment Station (2020-2022)

Past Projects as Senior Collaborator

Sustaining Agriculture through Adaptive Management Resilient to a Declining Ogallala Aquifer and Changing Climate [Total Award: \\$7,384,939](#)

Sponsor: USDA – National Institute of Food and Agriculture (2016-2021)

Principal Investigator: Dr. Meagan Schipanski (Soil & Crop Sciences, CSU)

Past Projects as Principal Investigator

Total: \$795K

Investigating the Impact of Recharge Ponds, Pumping, and Drought on Groundwater Levels and Return Flows in the LaSalle/Gilcrest Area during 2013-2018 [\\$50,000](#)

Sponsor: Colorado Water Conservation Board (2019-2020)

Modeling and management of salinity in irrigated regions affected by tile drain networks [\\$60,000](#)

Sponsor: CSU Agricultural Experiment Station (2018-2020)

Investigating major influences on groundwater levels in the LaSalle/Gilcrest area [\\$47,610](#)

Sponsor: Colorado Water Conservation Board (2018-2019)

Selenium Characterization and Modeling for the Lower Arkansas River Basin [\\$134,987](#)

Sponsor: Colorado Department of Public Health and Environment (2017-2018)

Assessment and Management of Saline Irrigation-Return Flows in Areas Affected by Tile Drain Networks [\\$90,000](#)

Sponsor: CSU Agricultural Experiment Station (2015-2018)

Constructing and Testing a Refined Groundwater Model for the LaSalle/Gilcrest Area [\\$48,515](#)

Sponsor: Colorado Water Conservation Board (2017-2018)

Measuring Pumping-Induced Streamflow Depletion [\\$49,572](#)

Sponsor: Water & Environmental Systems Technology, Inc. (2016-2018)

Developing a refined groundwater flow model for the LaSalle/Gilcrest area [\\$49,234](#)

Sponsor – Colorado Water Conservation Board (2016-2017)

Quantifying pumping-induced streamflow depletion in the South Platte River corridor [\\$45,310](#)

Sponsor – Colorado Water Conservation Board (2016-2017)

Groundwater Pumping Pilot Study for Gilcrest [\\$8,050](#)

Sponsor – West Greeley Conservation District (2016-2017)

Integration of SWAT and MODFLOW and Inclusion in the Geospatial Modeling Interface [\\$60,000](#)

Sponsor – USDA-ARS (Temple, TX) (2015-2016)

Instrumentation for Gilcrest Pilot Study [\\$15,000](#)

Sponsor – Colorado Water Conservation Board (2016)

Modeling the Influence of Conjunctive Water Use on Flow Regimes in the South Platte River Basin using the South Platte Decision Support System [\\$49,234](#)

Sponsor – Colorado Water Conservation Board (2015-2016)

Increasing Coastal Water Security for Climate Change in Selected FSM State Outlying Islands [\\$22,400](#)

Sponsor – Research Corporation of the University of Guam (2015-2016)

Year 3-Modeling the Influence of Conjunctive Water Use on Flow Regimes in the South Platte River Basin Using the South Platte Decision Support System [\\$50,000](#)

Sponsor – Colorado Water Conservation Board (2014-2015)

Developing a Framework for Simulating the Fate and Transport of Salinity Species in the Lower Arkansas River Valley, Colorado [\\$10,000](#)

Sponsor: CSU Water Center, Water Faculty Fellow (2014-2015)

Sampling for Selenium Drainage Assessment [\\$7,420](#)

Sponsor – AVID LLC (2014)

Past Projects as Co-Principal Investigator

Total: \$1.8M

Water Quality and Productivity Enhancement in an Irrigated River Basin through Participatory Conservation Planning and Analysis [Total Award: \\$659,954](#)

Sponsor: USDA – National Institute of Food and Agriculture, NIWQP (2014-2019)

Principal Investigator: Dr. Timothy K. Gates (Civil and Environmental Engineering, CSU)

Improved Assessment of Nitrogen and Phosphorus Fate and Transport for Irrigated Agricultural Watersheds in Semi-Arid Regions [Total Award: \\$488,500](#)

Sponsor: USDA – National Institute of Food and Agriculture - AFRI (2013-2018)

Principal Investigator: Dr. Mazdak Arabi (Civil and Environmental Engineering, CSU)

Lower Arkansas Natural Uranium Project: Findings Ways to Mitigate Irrigation-Induced Uranium Contamination in Colorado's Lower Arkansas River Valley [Total Award: \\$112,500](#)

Sponsor: Colorado Department of Public Health and Environment (2016-2019)

Principal Investigator: Dr. Timothy K. Gates (Civil and Environmental Engineering, CSU)

Identifying Arkansas River Selenium and Nitrogen Best Management practices [Total Award: \\$256,620](#)

Sponsor: Colorado Department of Public Health and Environment (2012-2016)

Principal Investigator: Dr. Timothy K. Gates

Enhancement of Identifying Arkansas River Selenium and Nitrogen Best Management practices *Sponsor:* Water Quality Improvement Fund, Colorado Department of Public Health and Environment [Total Award: \\$59,462](#)

Sponsor: Colorado Department of Public Health and Environment (2013-2014)

Principal Investigator: Dr. Timothy K. Gates

Building and Assessing an Accounting Tool for Water from Lease-Fallowing in Colorado's Lower Arkansas River Valley [Total Award: \\$227,551](#)

Sponsor: Upper Arkansas Valley Water Conservancy District (2012-2014)

Principal Investigator: Dr. Timothy K. Gates

Other Research Contracts

Groundwater Resources Analysis of Itu Aba [\\$2,100](#)

Sponsor: Foley Hoag LLP, Washington, D.C. (2015-2016)

Sustainable Conjunctive use of Groundwater and Rain Catchment Water under Variable Climatic Scenarios for Atoll Island Communities [\\$10,000](#)

Sponsor: United States of Geologic Survey (by way of University of Guam) (2015-2016)

Sustainable Conjunctive use of Groundwater and Rain Catchment Water under Variable Climatic Scenarios for Atoll Island Communities [\\$10,000](#)

Sponsor: United States of Geologic Survey (by way of University of Guam) (2014-2015)

Combined Use of Surface Water and Groundwater for Sustainability of Atoll Island Water Supply [\\$7,000](#)

Sponsor: United States of Geologic Survey (by way of University of Guam) (2012-2013)

Groundwater Resources Analysis for the Maldives (Maldives Water Scarcity) [\\$5,700](#)

Sponsor: World Bank (2012-2013)

Teaching and Instruction

Undergraduate Courses

CIVE 260 Engineering Mechanics: Statics ([8 semesters](#)) Average Student Evaluation (186): [4.99/5.00](#)

CIVE 261 Engineering Mechanics: Dynamics ([1 semester](#)) Average Student Evaluation (14): [4.93/5.00](#)

CIVE 423 Groundwater Engineering ([5 semesters](#)) Average Student Evaluation (102): [4.92/5.00](#)

Graduate Courses

CIVE 580-A9 Methods of Sustainable Water Supply ([1 semester](#)) Average Student Evaluation (12): [4.83/5.00](#)

CIVE 531 Groundwater Hydrology ([4 semesters](#)) Average Student Evaluation (99): [4.94/5.00](#)

CIVE 542 Water Quality Modeling ([2 semesters](#))

Training Courses / Public Outreach

- “Assessment of future water supply for Micronesian atoll island communities” (Pohnpei State, Federated States of Micronesia; October 2014)
- “Conjunctive use of rain catchment water and groundwater for atoll island communities” (Yap State, Federated States of Micronesia; October 2012)
- “Sustainability of Water Supply on Atoll Islands: Water Resources, Education, and Future Needs” (Chuuk State, Federated States of Micronesia; October 2011)
- “Groundwater Resources of Atoll Islands: Threats, Prediction, and Management” (Pohnpei State, Federated States of Micronesia, October 2010)
- “Groundwater Management for Atoll Islands” (Yap and Pohnpei States, Federated States of Micronesia; August 2009)

Workshops Conducted

- SWAT-MODFLOW workshop. October 2015 at Purdue University, in association with the international SWAT conference. Number of attendees: **18**
- SWAT-MODFLOW workshop. January 2017 at Aarhus University, Denmark. Number of attendees: **7**
- SWAT-MODFLOW workshop. August 2017 at Colorado State University. Number of attendees: **7**
- QSWATMOD workshop. June 2018 at *9th International Congress on Environmental Modelling and Software*, Fort Collins, CO, June 24-28 2018.
- SWAT-MODFLOW workshop. September 2018 at *SWAT International Conference*, September 2018, Brussels, Belgium. Number of attendees: **20**
- SWAT-MODFLOW workshop. July 2019 at *SWAT International Conference*, July 2019, Vienna, Austria. Number of attendees: **15**

Mentoring

Number of MS students graduated (2015-2022): **15**

Number of PhD students graduated (2018-2020): **9**

Number of post-doctoral fellows supervised: **4**

Number of current MS students: **3**

Number of current PhD students: **8**

Journal Article Citations

From Google Scholar profile (<https://scholar.google.com/citations?user=n6gnTd0AAAAJ&hl=en>)

- Total citations 2,328
- Citations since 2018 1,768
- H-index 28
- I10-index 63

Publications and Presentations

Refereed Journal Articles

(published)

underlined authors indicate advised graduate student

double-underlined authors indicate advised undergraduate student

1. **Bailey, R.T.**, Jenson, J.W., and Olsen, A.E. (2009), Numerical modeling of atoll island hydrogeology. *Ground Water* 47(2), 184-196.
2. Gates, T.K., Cody, B.M., Donnelly, J.P., Herting, A.W., **Bailey, R.T.**, and Mueller-Price, J. (2009), Assessing selenium contamination in the irrigated stream-aquifer system of the Arkansas River, Colorado. *Journal of Environmental Quality* 38, 1-13.
3. **Bailey, R.T.**, Jenson, J.W., and Olsen, A.E. (2010), Estimating the ground water resources of atoll islands. *Water* 2(1), 1-27.
4. **Bailey, R.T.** and Baù, D. (2010), Ensemble smoother assimilation of hydraulic head and return flow data to estimate hydraulic conductivity distribution, *Water Resources Research*, 46, W12543, doi:10.1029/2010WR009147.
5. **Bailey, R.T.** and Baù, D. (2011), Estimating spatially-variable first-order rate constants in groundwater reactive transport systems, *Journal of Contaminant Hydrology*, 122, 104-121.
6. **Bailey, R.T.**, and Baù, D. (2012), Estimating geostatistical parameters and spatially-variable hydraulic conductivity within a catchment system using an ensemble smoother. *Hydrology and Earth System Sciences*, 16, 287-304.

7. **Bailey, R.T.**, Hunter, W.J., and Gates, T.K. (2012), The influence of nitrate on selenium in irrigated agricultural groundwater systems. *Journal of Environmental Quality*, 41, 783-792.
8. **Bailey, R.T.**, Baù, D., and Gates, T.K. (2012), Estimating spatially-variable rate constants of denitrification in an irrigated agricultural groundwater system using an Ensemble Smoother. *Journal of Hydrology*, 468-469, 188-202.
9. Morway, E.D., Niswonger, R., Langevin, C., **Bailey, R.T.**, and Healy, R. (2013), Modeling variably saturated subsurface solute transport with MODFLOW-UZF and MT3DMS. *Groundwater*, 51(2), 237-251.
10. **Bailey, R.T.**, Jenson, J.W., and Taborosi, D. (2013), Estimating the freshwater lens thickness of atoll islands in the Federated States of Micronesia. *Hydrogeology Journal*, 21(2), 441-457.
11. **Bailey, R.T.**, Gates, T.K., and Halvorson, A.D. (2013) Simulating variably-saturated reactive transport of selenium and nitrogen in agricultural groundwater systems. *Journal of Contaminant Hydrology*, 149, 27-45.
12. **Bailey, R.T.**, Morway, E.D., Niswonger, R., and Gates, T.K. (2013), Modeling variably saturated multispecies reactive groundwater solute transport with MODFLOW-UZF and RT3D. *Groundwater*, 51(5), 752-761.
13. **Bailey, R.T.** and Jenson, J.W. (2013), Effects of marine overwash for atoll island aquifers: environmental and human factors. *Groundwater*, 52(5), 694-704.
14. **Bailey, R.T.** and M. Ahmadi (2014), Spatial and Temporal Variability of In-Stream Water Quality Parameter Influence on Dissolved Oxygen and Nitrate within a Regional Stream Network. *Ecological Modelling* 277, 87-96.
15. **Bailey, R.T.**, Gates, T.K., and M. Ahmadi (2014), Simulating reactive transport of selenium coupled with nitrogen in a regional-scale irrigated groundwater system. *Journal of Hydrology* 515, 29-46.
16. **Bailey, R.T.**, Khalil, A., and V. Chatikavanij (2014), Estimating Transient Freshwater Lens Dynamics for Atoll Islands of the Maldives. *Journal of Hydrology* 515, 247-256.
17. Yen, H., **Bailey, R.T.**, Arabi, M., Ahmadi, M., White, M., and Arnold, J. (2014), The role of interior watershed processes in improving parameter estimating and performance of watershed models. *Journal of Environmental Quality*, doi:10.2134/jeq2013.03.0110.
18. **Bailey, R.T.**, Khalil, A., and V. Chatikavanij (2014), Estimating Current and Future Groundwater Resources of the Maldives. *Journal of the American Water Resources Association*, doi: 10.1111/jawr.12236.
19. Wallace, C.D. and **R.T. Bailey** (2014), Sustainable rainwater catchment systems for Micronesian atoll communities. *Journal of the American Water Resources Association*, doi: 10.1111/jawr.12244.
20. **Bailey, R.T.**, Romero, E.C., and T.K. Gates (2015), Assessing best management practices for remediation of selenium loading in groundwater to streams in an irrigated region. *Journal of Hydrology*. 521:341-359.
21. Foy, C., Arabi, M., Yen, H., Gironás, J., and **R.T. Bailey** (2015), Multisite assessment of hydrologic processes in snow-dominated mountainous river basins in Colorado using a watershed model. *Journal of Hydrologic Engineering*. doi: 10.1061/(ASCE)HE.1943-5584.0001130.
22. **Bailey, R.T.** (2015), Quantifying transient post-overwash aquifer recovery for atoll islands in the Western Pacific. *Hydrological Processes*. doi: 10.1002/hyp.10512.

23. **Bailey, R.T.**, Gates, T.K., and E.C. Romero (2015), Assessing the effectiveness of land and water management practices on nonpoint source nitrate levels in an alluvial stream-aquifer system. *Journal of Contaminant Hydrology*. 179, 102-115.
24. Wallace, C.D., **Bailey, R.T.**, and M. Arabi (2015), Rainwater catchment system design using simulated future climate data. *Journal of Hydrology*, 529, 1798-1809.
25. **Bailey, R.T.**, Ahmadi, M., Gates, T.K. and M. Arabi (2015), Spatially distributed influence of agro-environmental factors governing nitrate fate and transport in an irrigated stream-aquifer system. *Hydrology and Earth System Sciences*, 19, 4859-4876. doi: 10.5194/hess-19-4859-2015.
26. **Bailey, R.T.**, Barnes, K., and C.D. Wallace (2016), Predicting Future Groundwater Resources of Coral Atoll Islands. *Hydrological Processes* 30, 2092-2105.
27. **Bailey, R.T.**, Wible, T.C., Arabi, M., Records, R.M., and J. Ditty (2016), Assessing regional-scale spatio-temporal patterns of groundwater-surface water interactions using a coupled SWAT-MODFLOW model. *Hydrological Processes* 30(23), 4420-4433.
28. Sharp, M.D., Hoag, D.L.K., **Bailey, R.T.**, Romero, E.C., and T.K. Gates(2016), Institutional Constraints on Cost-Effective Water Management: Selenium Contamination in Colorado's Lower Arkansas River Valley. *Journal of the American Water Resources Association* 52(6), 1420-1432.
29. **Bailey, R.T.** (2016), Review: selenium contamination, fate, and reactive transport in groundwater in relation to human health. *Hydrogeology Journal*. doi 10.1007/s10040-016-1506-8.
30. Wallace, C.D., and **R.T. Bailey** (2017), Geo-hydrologic factors governing atoll island groundwater resources. *Journal of Hydrologic Engineering*, 22(6), 05017004.
31. **Bailey, R.T.**, Rathjens, H., Bieger, K., Chaubey, I., and J. Arnold (2017), SWATMOD-Prep: Graphical user interface for preparing coupled SWAT-MODFLOW simulations. *J. American Water Resources Association*. 53(2), 400-410.
32. Barkey, B.L., and **R.T. Bailey** (2017), Estimating the impact of drought on groundwater resources of the Marshall Islands. *Water*, 9, 41, doi:10.3390/w9010041.
33. Alzraiee, A.H., **Bailey, R.**, and D. Bau (2017), Assimilation of historical head data to estimate spatial distributions of stream bed and aquifer hydraulic conductivity fields. *Hydrological Processes* 31:1527-1538.
34. Kivi, S.T. and **R.T. Bailey** (2017), Modeling sulfur cycling and sulfate reactive transport in an agricultural groundwater system. *Agricultural Water Management* 185, 78-92.
35. Huizenga, A., **R.T. Bailey**, and T.K. Gates (2017), Stream-aquifer and in-stream processes affecting nitrogen along a major river and contributing tributary. *J. Contaminant Hydrology* 199, 24-35.
36. Deng, C. and **R.T. Bailey** (2017), Assessing groundwater availability of the Maldives under future climate conditions. *Hydrological Processes* 31, 3334-3349.
37. **Bailey, R.T.** and S.T. Kivi (2017), Method for estimating available groundwater volume of small coral islands. *Hydrological Sciences Journal* 62(14), 2381-2392. (Tison award)

38. Hrozencik, R.A., Manning, D.T., Suter, J.F., Goemans, C., and **R.T. Bailey** (2017), The Heterogeneous impacts of groundwater management policies in the Republican River Basin of Colorado. *Water Resources Research*, 10.1002/2017WR020927.
39. Uddameri, V., Singaraju, S., Karim, A., Gowda, P., **Bailey, R.**, and M. Schipanski (2017), Understanding climate-hydrologic-human interactions to guide groundwater model development for Southern High Plains. *Journal of Contemporary Water Research & Education* 162, 79-99.
40. **Bailey, R.T.**, Beikmann, A., Kottermair, M., Taborosi, D., and J.W. Jenson (2018), Sustainability of rainwater catchment systems for small island communities. *Journal of Hydrology* 557, 137-146.
41. Alsumaiei, A.A. and **R.T. Bailey** (2018), Quantifying threats to groundwater resources in the Republic of Maldives Part I: Future rainfall patterns and sea-level rise. *Hydrological Processes* 32:1137-1153.
42. Alsumaiei, A. and **R.T. Bailey** (2018), Quantifying threats to groundwater resources in the Republic of Maldives Part II: Recovery from tsunami marine overwash events. *Hydrological Processes* 32:1154-1165.
43. Shultz, C.D., **Bailey, R.T.**, Gates, T.K., Heesemann, B.E. and E.D. Morway (2018), Simulating selenium and nitrogen fate and transport in coupled stream-aquifer systems of irrigated regions. *Journal of Hydrology* 560: 512-529.
44. Wei, X., **Bailey, R.T.**, Records, R.M., Wible, T.C. and M. Arabi (2018), Comprehensive simulation of nitrate transport in coupled surface-subsurface hydrologic systems using the linked SWAT-MODFLOW-RT3D model. *Environmental Modelling & Software*. <https://doi.org/10.1016/j.envsoft.2018.06.012>.
45. Wei, X., **Bailey, R.T.** and A. Tasdighi (2018), Using the SWAT model in intensively managed irrigated watersheds: model modification and application. *Journal of Hydrologic Engineering*, 23(10), 04018044. (Editor's Choice)
46. Shultz, C.D., Gates, T.G., and **R.T. Bailey** (2018), Evaluating best management practices to lower selenium and nitrate in groundwater and streams in an irrigated river valley using a calibrated fate and reactive transport model. *Journal of Hydrology* 566, 299-312.
47. Flores, L. and **R.T. Bailey** (2019), Theis Origins: revisiting the Theis solution derivation to enhance understanding and application. *Hydrogeology Journal*, 27(1), 55-60.
48. Park, S., Nielsen, A., **Bailey, R.T.**, Trolle, D., and K. Bieger (2019), A QGIS-based graphical user interface for application and evaluation of SWAT-MODFLOW models. *Environmental Modelling & Software* 111, 493-497. <https://doi.org/10.1016/j.envsoft.2018.10.017>.
49. Gowda, P., **Bailey, R.**, Kisekka, I., Lin, X., and V. Uddameri (2019), Featured series introduction: Optimizing Ogallala aquifer water use to sustain food systems. *J. American Water Resources Association*. 53(2), 400-410. <https://doi.org/10.1111/1752-1688.12719>.
50. Molina-Navarro, E., Trolle, D., Andersen, H.E., Thodsen, H., Nielsen, A., **Bailey, R.T.**, Park, S., Jensen, J.B., Jensen, J.S. (2019), Comparison of performance and abstraction scenarios simulated by a semi- and a fully-distributed hydrological model. *Hydrological Sciences Journal*, 64(4), 434-454.
51. Tavakoli-Kivi, S., **Bailey, R.T.**, and T.G. Gates (2019), A salinity reactive transport and equilibrium chemistry model for regional-scale agricultural groundwater systems. *Journal of Hydrology* 572, 274-293.

52. Aliyari, F., **Bailey, R.**, Tasdighi, A., Dozier, A., Arabi, M., and K. Zeiler (2019), Coupled SWAT-MODFLOW model for large-scale mixed agro-urban river basins. *Environmental Modelling & Software* 115, 200-210.
53. **Bailey, R.T.**, Tavakoli-Kivi, S., and X. Wei (2019), A salinity module for SWAT to simulate salt ion fate and transport at the watershed scale. *Hydrol. Earth Syst. Sci.* 23, 3155-3174.
54. Wei, X. and **R.T. Bailey** (2019), Assessment of System Responses in Intensively Irrigated Stream–Aquifer Systems using SWAT-MODFLOW. *Water* 11, 1576; doi:10.3390/w11081576.
55. Mosase, E., Ahiablame, L, Park, S., and **R.T. Bailey** (2019), Modelling potential groundwater recharge in the Limpopo River Basin with SWAT-MODFLOW. *Groundwater for Sustainable Development* 9, doi.org/10.1016/j.gsd.2019.100260.
56. Deng, C., and **R.T. Bailey** (2019), A Modeling Approach for Assessing Groundwater Resources of a Large Coral Island under Future Climate and Population Conditions: Gan Island, Maldives. *Water* 11, 1963; doi:10.3390/w11101963.
57. Flores, L., and **R.T. Bailey**, and Kraeger-Rovery, C (2020), Analyzing the effects of groundwater pumping on an urban stream-aquifer system. *Journal of the American Water Resources Association*, 56(2), 310-322.
58. Guevara Ochoa, C., Medina Sierra, A., Vives, L., Zimmermann, E. and **Bailey, R** (2020), Spatio-temporal patterns of the interaction between groundwater and surface water in plains. *Hydrological Processes*, 34(6), pp.1371-1392.
59. Alrashidi, M.S. and **Bailey, R.T.** (2020), Estimating groundwater recharge for a freshwater lens in an arid region: Formative and stability assessment. *Hydrological Processes*, 34(4), pp.1063-1080.
60. Liu, W., **Bailey, R.T.**, Andersen, H.E., Jeppesen, E., Park, S., Thodsen, H., Nielsen, A., Molina-Navarro, E. and Trolle, D. (2020), Assessing the impacts of groundwater abstractions on flow regime and stream biota: Combining SWAT-MODFLOW with flow-biota empirical models. *Science of the Total Environment*, 706, p.135702.
61. Xiang, Z., **Bailey, R.T.**, Nozari, S., Husain, Z., Kisekka, I., Sharda, V. and Gowda, P. (2020), DSSAT-MODFLOW: A new modeling framework for exploring groundwater conservation strategies in irrigated areas. *Agricultural Water Management*, 232, p.106033.
62. **Bailey, R.T.**, Park, S., Bieger, K., Arnold, J.G. and Allen, P.M. (2020), Enhancing SWAT+ simulation of groundwater flow and groundwater-surface water interactions using MODFLOW routines. *Environmental Modelling & Software*, 126, p.104660.
63. Manning, D.T., Rad, M.R., Suter, J., Goemans, C., Xiang, Z. and **Bailey, R.** (2020), Non-market valuation in integrated assessment modeling: The benefits of water right retirement. *Journal of Environmental Economics and Management*, p.102341.
64. Deng, C. and **Bailey, R.T.** (2020), Assessing causes and identifying solutions for high groundwater levels in a highly managed irrigated region. *Agricultural Water Management*, 240, p.106329.
65. Neupane, P., **Bailey, R.T.** and Tavakoli-Kivi, S. (2020), Assessing controls on selenium fate and transport in watersheds using the SWAT model. *Science of The Total Environment*, 738, p.140318.
66. Liu, W., **Bailey, R.T.**, Andersen, H.E., Jeppesen, E., Nielsen, A., Peng, K., Molina-Navarro, E., Park, S., Thodsen, H. and Trolle, D. (2020), Quantifying the effects of climate change on hydrological regime and

stream biota in a groundwater-dominated catchment: A modelling approach combining SWAT-MODFLOW with flow-biota empirical models. *Science of The Total Environment*, 745, p.140933.

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Conference Proceedings

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79. Ahn, S., Sheng, Z., Park, S., and **R. Bailey** (2018), Surface water-groundwater modeling for semi-arid agricultural areas using SWAT-MODFLOW. 2018 AGU Meeting, December 2018, Washington D.C., USA.
80. Ahn, S., Jung, C., Sheng, Z., Park, S., and **R. Bailey** (2019), Development of SWAT-MODFLOW linkage framework for surface and groundwater management of semi-arid agricultural areas. 2019 World Environmental & Water Resources Congress, Pittsburg, PA, USA.
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84. **Bailey, R.T.**, Park, S., Bieger, K., and J.G. Arnold (2019), Enhancing SWAT+ groundwater flow simulation using MODFLOW routines. 2019 SWAT International Conference, July 15-19, Vienna, Austria.
85. **Bailey, R.T.**, Molina-Novarro, E., Liu, W., Wei, X., and D. Trolle (2019), SWAT-MODFLOW: Recent Applications and an Introduction to Version 3. 2019 SWAT International Conference, July 15-19, Vienna, Austria.
86. Park, S., **Bailey, R.T.**, Schurz, C., Bieger, K., and J. Arnold (2019), Framework for quantifying uncertainty, sensitivity, and estimating parameters for SWAT+ with MODFLOW routines. 2019 SWAT International Conference, July 15-19, Vienna, Austria.
87. Samimi, Ma., Mirchi, Al, **Bailey, R.**, and L. Ma (2020), SWAT-Salt simulation of salinity in Elephant Butte Irrigation District, ASABE Annual Internal Meeting (virtual), July 13-15, 2020.
88. **Bailey, R.T.**, and K. Bieger (2020), Using SWAT+ and MODFLOW to explore river-aquifer connectivity in large river basins. AWRA Virtual Geospatial Water Technology Conference, August 4-13, 2020.
89. Henson, E. and **R.T. Bailey** (2021), Development of a SWAT hydrologic model to predict salt transport in an upland desert catchment of the Lower Arkansas River Basin, Colorado. Annual meeting of the American Geophysical Union, December 13-17, 2021, New Orleans, LA, USA.
90. ****Bailey, R.T** (2021), Simulating watershed hydro-chemical processes with SWAT+. ASA-CSSA-SSSA 2021 International Annual Meeting. November 7-10, 2021, Salt Lake City, UT.
91. Barnes, K., **Bailey, R.T.**, Acevedo, M., and Smithers, B. (2021), The impacts of farm-scale desalination technology on crop relative yield. AGU Hydrology Days, Colorado State University, March 30-31, 2021, Fort Collins, CO.
92. Aliyari, F., **Bailey, R.T.**, and M. Arabi (2021), A versatile river basin-scale approach in assessing groundwater vulnerability to climate change. AGU Hydrology Days, Colorado State University, March 30-31, 2021, Fort Collins, CO.
93. Addab, H., and **Bailey, R.T.** (2021), Simulating the effect of subsurface tile drainage on watershed salinity using SWAT. AGU Hydrology Days, Colorado State University, March 30-31, 2021, Fort Collins, CO.
94. Zimmer, C., and **Bailey, R.T.** (2021), Salt mobilization and transport in upland catchments of the Lower Arkansas River Basin. AGU Hydrology Days, Colorado State University, March 30-31, 2021, Fort Collins, CO.
95. Yimer, E., **Bailey, R.T.**, and A. van Griensven (2021), Improved representation of groundwater-surface water interaction in SWAT+ for wetland and drought simulations. IAH Congress, Inspiring Groundwater, September 6-10, 2021, Brussels, Belgium.
96. Nozari, S., Rouhi Rad, M., **Bailey, R.T.**, Suter, J., and D. Sahoo (2022), Managing Soil and Water Salinity in an Irrigated Agricultural Region using a Coupled Hydro-Chemical Modeling Approach. AGU Fall Meeting, Chicago, Illinois, December 2022.
97. Nozari, S., **Bailey, R.T.**, Rouhi Rad, M., Smith, G., Andales, A., Schipanski, M., Zambreski, Z., and X. Lin (2022), Long-term economic and environmental impacts of groundwater management: Modelling real-world agents under actual future climate scenarios, AGU Fall Meeting, Chicago, Illinois, December 2022.
98. ****Bailey, R.T.**, Abbas, S., Raffae, M., Arnold, J., White, M., Cerkasova, N., and J. Gao. (2022), Coupled surface/subsurface hydrologic modeling with SWAT+: current approach and regional applications. ASA, CSSA & SSSA International Annual Meeting. Baltimore, Maryland, November 2022.
99. Yimer, E., Villani, L, Alitane, A., **Bailey, R.T.**, Nossent, J., van Griensven, A., Schaeybroeck, B.V., and H. Van De Vyver (2022), Assessing the impact of climate change on coastal catchment (Bruna –Italy) using SWAT+gwflow. 18th Biennial Conference of the Euromediterranean Network of Experimental and Representative Basins (ERB 2022), Portoferraio, Elba Island (Italy), 07-10 June 2022.
100. Alderfer, C., and **R.T. Bailey** (2022), Analyzing Groundwater Storage Trends in the United States from 1951-2020. CSU Hydrology Days, Fort Collins, CO. April 2022.

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101. Shrestha, S., **Bailey, R.T.**, Acevedo, M., and B. Smithers (2022), Modeling the effects of groundwater salinity increases on crop yield in the LARV. CSU Hydrology Days, Fort Collins, CO. April 2022.
102. Xiang, Z., and **Bailey, R.T.** (2022), Quantifying the Impact of Climate and Management Strategies on Groundwater Conservation in the High Plains Aquifer. CSU Hydrology Days, Fort Collins, CO. April 2022.
103. Henson, E., and **Bailey, R.T.** (2022), Development of a SWAT hydrologic model to predict salt transport in an upland desert catchment of the Lower Arkansas River Basin. CSU Hydrology Days, Fort Collins, CO. April 2022.
104. **Bailey, R.T.**, Arnold, J., White, M., and N. Cerkasova (2022), Simulating Surface/Subsurface Hydrologic Fluxes with SWAT+ for Integrated Water Management. MODFLOW & More, Princeton University, June 2022.

Technical Reports

1. **Bailey, R.T.**, Jenson, J.W., Rubinstein, D., and A.E. Olsen (2008), “Groundwater resources of atoll islands: Observations, Modeling, and Management”. Water and Environmental Research Institute of the Western Pacific, University of Guam. Technical Report No. 119.
2. **Bailey, R.T.**, Jenson, J.W., Rubinstein, D., and A.E. Olsen (2008), “An atoll freshwater lens algebraic model for groundwater management in the Caroline Islands”. Water and Environmental Research Institute of the Western Pacific, University of Guam. Technical Report No. 120.
3. **Bailey, R.T.**, and J.W. Jenson (2011), “Groundwater resources analysis of atoll islands in the Federated States of Micronesia using an Algebraic Model”. Water and Environmental Research Institute of the Western Pacific, University of Guam. Technical Report No. 134.
4. **Bailey, R.T.** (2012), “Groundwater Resources Analysis for the Maldives: Addressing current climate conditions, drought conditions, and the effects of sea-level rise”, Final Draft submitted to The World Bank, Washington, D.C.

Invited Talks and Lectures

1. R.T. Bailey (2015), Water Quality in the Lower Arkansas River Valley: Salinity, Nitrate, & Selenium Governors Forum on Colo Agriculture, February 26, 2015, Denver, CO.
2. R.T. Bailey (2017), Water quality modeling for groundwater, surface water, and watersheds: basic theory and applications. Presented at the University of Nebraska-Lincoln on February 15, 2017.
3. R.T. Bailey (2017), SWAT-MODFLOW: current applications and developments. Presented at the University of Florida on May 3, 2017.
4. R.T. Bailey (2017), Simulating water flow and solute transport in coupled groundwater-surface water systems using SWAT-MODFLOW. Presented at the University of Texas-El Paso on May 12, 2017.
5. R.T. Bailey (2018), An Integrated Modeling Framework for Investigating Water Management Practices in the Ogallala Aquifer Region, 2018 NIWR Water Symposium, October 24-26, Lincoln, Nebraska.
6. R.T. Bailey (2019), SWAT Model Enhancements: Groundwater Flow and Salinity Transport. Presented at Baylor University, Geosciences Department, January 18, 2019.
7. R.T. Bailey (2019), High Groundwater Levels in the LaSalle/Gilcrest Area: Problems, data, and future directions. Presented at the Colorado Farm Show, January 29, 2019.

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8. R.T. Bailey (2019), Ongoing Groundwater Projects in Colorado. Presented at the Colorado Department of Agriculture, February 20, 2019.
9. R.T. Bailey (2019), SWAT Model Enhancements: Groundwater Flow and Salinity Transport. Presented at UC-Davis, June 19, 2019.
10. R.T. Bailey (2020), Modeling tools for investigating flow and chemical transport in watershed systems. CSU Water Seminar, March 6, 2020.
11. R.T. Bailey (2020), Modeling tools for investigating groundwater-related issues in Colorado. Colorado American Water Resources Association meeting, September 1, 2020.
12. R.T. Bailey, Nozari, S., and Z. Xiang (2020), Integrated hydro-agronomic modeling for the Ogallala Aquifer Region: focus on eastern Colorado and southwest Kansas. Colorado Water Congress, September 15, 2020.
13. R.T. Bailey (2021), The Ogallala Water Coordinated Agricultural Project (OWCAP), Fort Collins Rotary Club, Lincoln Center, December 8, 2021.

Awards

- (2015) Faculty Award for Excellence in Teaching, Department of Civil and Environmental Engineering, Colorado State University. Awarded May 2015.
- (2015) Dr. Vujica Yevjevich Faculty Scholarship, Dept. of Civil and Environmental Engineering, Colorado State University. Awarded December 2015.
- (2017) Scientist of the Year Award, for scientific contribution to the SWAT model at the 2017 International SWAT Conference, June 28-30, 2017, Warsaw, Poland.
- (2018) Tison Award for outstanding paper in Hydrologic Sciences Journal, International Association of Hydrological Sciences, World Meteorological Organization, Geneva, Switzerland. Awarded May 2018.
- (2018) Faculty Award for Outstanding Faculty Performance, Department of Civil and Environmental Engineering, Colorado State University. Awarded May 2018.
- (2018) George T. Abell Outstanding Early-Career Faculty Award, Walter Scott College of Engineering, Colorado State University. Awarded May 2018.
- (2021) Faculty Award for Excellence in Research, Department of Civil and Environmental Engineering, Colorado State University. Awarded May 2021.
- (2021) Interdisciplinary Scholarship Team Award, as part of the Ogallala Water Coordinated Agriculture Project Team faculty. Colorado State University. Awarded May 2021.

Peer-Review Activity

Journals

- *Advances in Water Resources* (2012 – present)
- *Agricultural Water Management* (2015 – present)
- *Applied Geochemistry* (2014 – present)
- *Chemical Geology* (2021 – present)
- *Chemosphere* (2013 – present)
- *Ecological Modelling* (2017-present)
- *Environmental and Sustainability Indicators* (2021 – present)
- *Environmental Earth Sciences* (2018 – present)
- *Environmental Modelling & Software* (2017-present)
- *Environmental Pollution* (2015 – present)
- *Frontiers in Water* (2020 – present)
- *Geophysical Research Letters* (2016 – present)
- *Groundwater* (National Ground Water Association) (2009 – present)
- *Groundwater Monitoring & Remediation* (2021 – present)
- *Hydrogeology Journal* (2014 – present)
- *Hydrological Processes* (2013 – present)
- *Hydrology and Earth System Sciences* (2014 – present)
- *Hydrological Sciences Journal* (2018 – present)
- *Journal of the American Water Resources Association* (2015 – present)
- *Journal of Contaminant Hydrology* (2013 – present)
- *Journal of Environmental Quality* (2012 – present)
- *Journal of Environmental Management* (2022 – present)
- *Journal of Hydrology* (2013 – present)
- *Journal of Hydrology – Regional Studies* (2018 – present)
- *Journal of Hydrometeorology* (2015 – present)
- *Marine Pollution Bulletin* (2014 – present)
- *Science of the Total Environment* (2012 – present)
- *Scientific Reports* (2022 – present)
- *Transactions of the American Society of Agricultural and Biological Engineers* (2017-present)
- *Water* (2014 – present)
- *Water Research* (2017-present)
- *Water Resources Research* (2017-present)

Research Agencies

- National Science Foundation

Review Panels

- Department of Energy, Subsurface Biogeochemical Research (SBR) – May 20 2019

Journal Editorial Service

- Associate Editor, *Journal of the American Water Resources Association* (March 2017 – present)
- Editorial Board, *Journal of Contaminant Hydrology* (December 2017 – present)
- Review Editor, *Frontiers in Water – Water and Critical Zone* (February 2019 – present)
- Guest Editor, *Agricultural Water Management* (July 2019 – 2020)
- Editorial Board, *Water* (December 2020 – present)
- Editorial Board, *Hydrology* (July 2021 – present)
- Manuscript Editor, *Environmental Modelling & Software* (September 2021 – present)

Model Development

- SWAT-Salt to simulate salt ion fate and transport in watershed systems
 - SWAT- MODFLOW- RT3D to simulate flow and transport in watershed systems
<http://swat.tamu.edu/software/swat-modflow/>)
 - UZF-RT3D: linkage between MODFLOW-UZF and RT3D for reactive transport of solute in variably saturated soil and aquifer systems
 - UZF-RT3DAG: groundwater solute transport model that accounts for the fate and transport of selenium and nitrogen species in agricultural-influenced groundwater systems
 - OTIS-MULTI: modified version of OTIS, to simulate reactive transport of multiple interacting species in stream networks
 - RT3D-OTIS: reactive solute transport in coupled groundwater-surface water system
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