Henrique Haas

Assistant Professor

New Mexico State University, Department of Animal and Range Sciences, Las Cruces, NM 88001

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Education

Ph.D in Earth System Science **2024**

Auburn University | Auburn, AL, USA

Dissertation: "*The role of intra-watershed processes in improving the understanding of physical processes, hydrologic trends, and restoration measures across the Mobile Bay watershed-AL*"

M.S. in Natural Resources **2020**

Auburn University | Auburn, AL, USA

Thesis: "*Capturing Forest Dynamics in Hydrological Modeling*"

B.S. in Environmental and Sanitary Engineering **2018**

Federal University of Santa Maria | Santa Maria, Brazil

Apppointments

08/2026 – Present **Assistant Professor of Watershed Management**
New Mexico State University, Department of Animal and Range Sciences

05/2024 – 08/2026 **Postdoctoral Research Scientist**
Columbia University, Center for Climate Systems Research and NASA GISS
Supervisor: Jonas Jägermeyr, Alex C. Ruane, Cynthia E. Rosenzweig

08/2020 – 04/2024 **Graduate Research Assistant**
Auburn University, College of Forestry, Wildlife and Environment
Advisor: Latif Kalin

08/2018 – 08/2020 **Graduate Research Assistant**
Auburn University, College of Forestry, Wildlife and Environment
Advisors: Latif Kalin and Puneet Srivastava

01/2018-08/2018 **Undergraduate Research Assistant**
Federal University of Santa Maria (Brazil)
Advisor: Delmira Beatriz Wolf

Research Interests

- Watershed hydrology and water quality
- Integration of modeling approaches, GIS, and satellite Earth observations to better manage water systems

- Impacts of land use, extreme events, and watershed management on water security, water quality, hydrological extremes
- Compound and cascading weather events and their consequences for water resources.
- Watershed Digital Twins
- Hybrid machine learning-hydrologic modeling frameworks to improve hazard prediction and water quality forecasting
- Nature-Based solutions and agricultural best management strategies
- Low-Tech-Process-Based Restoration

Publications

Published Journal Articles:

1. **Haas, H.**, Esit, M., Kalin, L., Lehrter, J., 2026. "Ecohydrological trend detection in the Mobile Bay Watershed-AL using a rolling window Mann-Kendall test". Journal of Hydrology 678, 136056. https://doi.org/10.1016/j.jhydrol.2026.136056

2. Alves, W.F., **Haas, H.**, Kalin, L., Roig, H.L., 2026. "Improved Surface Runoff and Groundwater Recharge Representation Enhance Hydrological Modelling Predictions in a Monsoon Watershed in Central Brazil". Hydrol. Process. 40, e70446. https://doi.org/10.1002/hyp.70446

3. **Haas, H.**, Kalin, L., Tian, D., Lehrter, J., 2025. "Dynamic land-use/cover improves simulations of long-term watershed-scale streamflow and water quality trends". Journal of Hydrology 661, 133744. https://doi.org/10.1016/j.jhydrol.2025.133744

4. **Haas, H.**, Kalin, L., Sun, G., Kumar, S., 2024. "Understanding the effects of afforestation on water quantity and quality at watershed scale by considering the influences of tree species and local moisture recycling". Journal of Hydrology 640, 131739. https://doi.org/10.1016/j.jhydrol.2024.131739

5. **Haas, H.**, Kalin, L., Yen, H., 2024. "Improved forest canopy evaporation leads to better predictions of ecohydrological processes". Ecological Modelling 489, 110620. https://doi.org/10.1016/j.ecolmodel.2024.110620

6. **Haas, H.**, Kalin, L., Baltaci, E., 2024. "How wide is the problem? Leveraging alternative data sources to enhance channel width representation in watershed modeling". Environmental Modelling & Software 172, 105935. https://doi.org/10.1016/j.envsoft.2023.105935
7. Isik, S., **Haas, H.**, Kalin, L., Hantush, M.M., Nietch, C., 2023. "Nutrient Removal Potential of Headwater Wetlands in Coastal Plains of Alabama, USA". Water 15, 2687. https://doi.org/10.3390/w15152687
8. **Haas, H.**, Kalin, L., Srivastava, P., 2022. "Improved forest dynamics leads to better hydrological predictions in watershed modeling". Science of The Total Environment 821, 153180. https://doi.org/10.1016/j.scitotenv.2022.153180

9. **Haas, H.**, Reaver, N.G.F., Karki, R., Kalin, L., Srivastava, P., Kaplan, D.A., Gonzalez-Benecke, C., 2022. "Improving the representation of forests in hydrological models". Science of The Total Environment 151425. https://doi.org/10.1016/j.scitotenv.2021.151425

10. **Haas, H.**, Dosdogru, F., Kalin, L., Yen, H., 2021. "Soft Data in Hydrologic Modeling: Prediction of Ecologically Relevant Flows with Alternate Land Use/Land Cover Data". Water 13, 2947. https://doi.org/10.3390/w13212947

Journal Articles Under Review:

1. **Haas, H.**, Karl, K., Madajewicz, M., Jägermeyr, J., Weatherwax, C., Mukundan, R., Srinivasan, R., Ruane, A.C., Rosenzweig, C. E., 2026. "Water Quality Declines Despite Effective Agricultural Best Management Practices Under Future Climate Conditions". *Journal of Environmental Management*.
2. Amatya, D., **Haas, H.**, Liu, N., Hamidi, M.D., Senay, G.B., Sun, G., Kalin, L., Trettin, C., Oishi, C., 2026. "Evapotranspiration Partitioning in Forested Watersheds: A Multi-Model Comparison of SWAT, MIKE SHE, and dWaSSI". Water Resources Research.
3. Wafa, M., **Haas, H.**, Therond, O., Boote, K., Ruane, A. C., Wassenaar, T., 2026. "Towards a Hybrid Modelling Framework for Regional Sustainability". *Nature Sustainability*.

Journal Articles in Preparation:

4. **Haas, H.**, Karl, K., Jägermeyr, J., Ruane, A.C., 2026. "Water Quality Responses to Compound Rain-on-Snow Events in the New York City Watershed". Target Journal: *Journal of Hydrology*.
5. **Haas, H.**, Khan, A., Karl, K., Ruane, A.C., 2026. "A Hybrid Hydrological Modelling and Machine Learning-based Framework for Improved Water Quality Predictions". Target Journal: *Environmental Modelling & Software*.
6. **Haas, H.**, Singh, J., Jägermeyr, J., 2026. "Understanding the Impacts of Solar Radiation Modification for Watershed-Scale Water Quantity and Quality". Target Journal: *Environmental Research Letters.*
7. Madajewicz, M., **Haas, H.**, Karl, K., Jägermeyr, J., Ruane, A.C., Guarin, JR., Boone, RB., Valdivia, RO., Rosenzweig, E. C., 2026. "Towards Enhanced Water Quality and Agricultural Sustainability in the NYC Watershed: A Stakeholder-Driven Approach". Target Journal: *Nature Sustainability*.
8. Karl, K., Madsen, E., Nemec, V., Xiong, J., **Haas, H.**, 2026. "A Public Data Framework for Managing Surface Transported Nutrients in a New York City Source Watershed". Target Journal: *Journal of Hydrology*.

Book chapters:

1. Amatya, D.M., Hwang, T., Sun, G., Dobre, M., **Haas, H.**, Zhang, Y., Hamidi, M.D., Liu, N., Tian, S., Oishi, A., Kalin, L., 2025. "Chapter Two - Simulating forest evapotranspiration in hydrologic models: challenges and opportunities", in: Irmak, S. (Ed.), "Evapotranspiration in Agro-Ecosystems and Forestry". Academic Press, pp. 33–76. https://doi.org/10.1016/B978-0-443-21649-7.00003-1

Oral Presentations: (¥ = presenter):

1. **Haas, H.**, Karl, k., Nipp, T. ¥, 2025. "A SWAT-Based Framework for Understanding Sediment and Nutrient Dynamics Under Best Management Practices in the NYC Watershed". US SWAT Conference, Colorado State University in Fort Collins, Colorado-USA, Oct. 20-24, 2025.
2. **Haas, H.**, Kalin, L. ¥, 2025. "Unleashing the Power of Emerging Datasets for More Reliable Hydrologic Models". XIIth Scientific Assembly of the International Association of Hydrologic Sciences (IAHS 2025), Indian Institute of Technology Roorkee, India, Oct. 5-10, 2025.
3. **Haas, H.** ¥, Boone, R. B., Short, M., Karl, K., Jägermeyr, J., Ruane, A.C., 2024. "Integrating Ecosystem Dynamics and Hydrologic Modeling to Assess Climate Change Impacts on Water Quality in the Cannonsville Watershed". 2025 AgMIP10, CIMMYT, El Batan, Mexico, Mar 31-Apr 4, 2025.
4. **Haas, H.** ¥, Boone, R. B., Short, M., Karl, K., Castellano, A., Jägermeyr, J., Ruane, A.C., 2024. "Combining Dynamic Land Use Change and Biogeochemical Modeling to Improve Watershed Modeling Under Climate Change". 2024 AGU Fall Meeting, Washington, D.C., USA, Dec. 9-13, 2024.

5. Rippel, E.[¥], Piccilli, D.G.A., Kalin, L., **Haas, H.** (2023). "SWAT vs SWAT+ comparison in the Pampa Region of South America". 2023 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 4-6, 2022.
6. **Haas, H.**, Amatya, D[¥]., Ning, L., Sun, G., Kalin, L., Hamidi, D. (2023). "Modeling the hydrology of a loblolly pine dominated watershed in South Carolina: A multiple model comparison study". 2023 Interagency Conference on Research in the Watersheds, Corvallis - OR, USA, May 5-8, 2023.
7. **Haas[¥], H.,** L. Kalin (2023). "Channel geometry in regional watershed modeling: how much does it matter?". 2023 World Environmental & Water Resources Congress, Henderson - NV, USA, May 21-24, 2023.
8. **Haas, H.**, Amatya, D[¥]., Kalin, L. (2023). "Effects of potential ET on ET estimates using the SWAT model in a loblolly pine dominated watershed". 2023 Center for Forest Watershed Research, virtual meeting, April 27, 2023.
9. **Haas[¥], H.,** L. Kalin (2023). "Simulated longleaf pine (*Pinus palustris*) restoration leads to increased streamflow in the Mobile River Basin-AL". 2023 Auburn Research Student Symposium, Auburn-AL, March 28, 2023.
10. **Haas[¥], H.,** L. Kalin (2022). "Investigating the impacts of longleaf pine (Pinus palustris) restoration on water quantity and quality in the Mobile River Basin-AL". 2022 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 7-9, 2022.
11. **Haas[¥], H.**, Kalin, L., 2022. "Hydroclimatic trends and hydrologic modeling in the Mobile Bay watershed – AL". 2022 Auburn Research Student Symposium, Auburn-AL, March 28, 2022.
12. Isik, S[¥], Kalin, L., **Haas, H.**, Du, X., 2022. "Modeling Organic Loading with the Soil and Water Assessment Tool: Application to the Big Creek Watershed". 2022 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 7-9, 2022.
13. Carpenter, J[¥], Kalin, L., **Haas, H.**, 2022. "Temperature Tolerances of Threatened Organisms in the Cahaba River and How Future Climate Conditions May Impact Them". 2022 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 7-9, 2022.
14. **Haas[¥], H.**, Kalin, L., Lehrter, J., Tian, D., Lowe, L., 2021. "A watershed modeling framework to assess the impacts of environmental changes in the Mobile Bay, Alabama". 2021 AGU Fall Meeting, New Orleans, LA USA, Dec. 13-17.
15. Reaver[¥], N.G.F., **Haas, H.**, Kalin, L., Kaplan, D.A., Graham, W.D., 2021. "Representing silvicultural management practices in SWAT and quantifying their impact on water yield". 2021 AGU Fall Meeting, New Orleans, LA USA, Dec. 13-17.
16. Reaver[¥], N.G.F., Lee, D., Rath, S., Koirala, U., He, F., **Haas, H.**, Rooij, R.D., Adams, D., Borisova, T., Kalin, L., Smith, A., Kaplan, D.A., Graham, W.D., 2021b. "Quantifying tradeoffs among nitrate flux, water yield, and economic returns for agricultural and silvicultural practices in the Floridan Aquifer region". 2021 AGU Fall Meeting, New Orleans, LA USA, Dec. 13-17.
17. **Haas[¥], H.,** L. Kalin (2021). "How Important is Considering Point-Sources in Large-Scale Watershed Modeling?".2021 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 8-10, 2021.
18. Isik[¥], S., Kalin, L., **Haas, H.**, 2021. "Quantifying Nutrient Reductions at Wetlands in the Upper Fish River Watershed". 2021 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 8-10, 2021.

19. Koirala[¥], U., Reaver, N.G.F., **Haas, H.**, Susaeta, A., Adams, D.C., Kaplan, D.A., Kalin, L., Graham, W.D., 2021. "Economics of Managing Southern Pine to Meet Timber, Non-Timber Forest Products, and Ecosystem Services Demands". 2021 Society of American Foresters (SAF) National Convention, Virtual Meeting, Nov. 4th.
20. **Haas[¥], H.**, S. Isik, L. Kalin, M. M. Hantush (2020). "Understanding the importance of wetland ecosystems for water quality and quantity in a coastal watershed". 2020 Bays and Bayous Symposium, Virtual Event, Dec 1-3, 2020.
21. **Haas[¥], H.**, L. Kalin, P. Srivastava, N.G.F. Reaver, D.A. Kaplan (2020), "Scrutinizing Significance of Trees in Watershed Modeling". 7th Interagency Conference on Research in the Watersheds (ICRW7), Tifton - GA, USA, Mar. 30-Apr 2, 2020.
22. **Haas[¥]**, H., L., Kalin, P., Srivastava (2019), "Can Soft Data Help Improving Intra-watershed Processes in Hydrologic Modeling?". 2019 AGU Fall Meeting, San Francisco - CA, USA, Dec. 9-13, 2019.
23. **Haas[¥], H.,** L. Kalin, P. Srivastava (2019), "Predicting Pine Tree Growth and Evapotranspiration in Southeastern United States". 2019 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 4-6, 2019.
24. Isik, S., **H. Haas[¥],** L. Kalin, M. M. Hantush (2019). "Studying Impacts of Wetlands in Fish River Watershed Nutrient Export through coupling of SWAT and WetQual". 2019 World Environmental & Water Resource Congress (EWRI), Pittsburgh - PA, May 9-13, 2019.
25. **Haas, H.**, L. Kalin[¥] (2018), "Modelling the impacts of conservation practices on water quality at a reservoir catchment in southern Brazil". 2018 International Soil and Water Assessment Tool Conference, Brussels, Belgium, September 17-21, 2018.

Poster Presentations: (¥ = presenter):

1. **Haas, H.**, Karl, K., Jägermeyr, Madajewicz, 2025. "Integrating Stakeholder Knowledge and Hydrologic Modeling to Protect Water Quality and Support Climate-Resilient Agriculture Under Future Socio-Economic Scenarios". 2025 AGU Fall Meeting, New Orleans, LA, USA, Dec. 15-19 2025.
2. **Haas, H.**, Karl, K., Khan, A., 2025. "A Hybrid Hydrological Modeling and Machine Learning-Based Framework for Improved Water Quality Predictions". 2025 AGU Fall Meeting, New Orleans, LA, USA, Dec. 15-19 2025.
3. **Haas[¥], H.,** Kalin, L., 2022. "Stream temperature prediction using a machine learning approach in the Mobile River Basin – AL". Presented at the 2022 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 7-9, 2022.
4. **Haas[¥], H.,** Kalin, L., Tian, D., 2021. "Hydroclimatic trends in the Mobile Bay Basin from 1979 to 2018". Presented at the 2021 Alabama Water Resources Conference & Symposium, Orange Beach - AL, USA, Sept. 8-10, 2021.
5. **Haas**, **H.**, L. Kalin, P. Srivastava, N.G.F. Reaver[¥], D.A. Kaplan (2020), "Implementing Pine Plantation Silvicultural Production and Management Practices into the Soil and Water Assessment Tool (SWAT)". 7th UF Water Institute Symposium, Gainesville - FL, USA, Feb. 25-26, 2020.
6. **Haas[¥], H.,** L. Kalin, P. Srivastava (2019), "Predicting *Pinus Taeda* Growth and Evapotranspiration in Southeastern United States with SWAT". 2019 School of Forestry and Wildlife Sciences Graduate Student Research Symposium, Auburn-AL, USA, Nov. 20, 2019.
7. **Haas[¥], H.,** L. Kalin, P. Srivastava (2019), "Studying the nexus between upland and riverine processes in a forest ecosystem". 2019 Auburn Research: Student Symposium, Auburn-AL, USA, April 9th, 2019.

Research Grants

1. **2026 -** "Compounding Climate Risks to Agricultural Sustainability in the Rio Grande Watershed: Adaptation Pathways for Water Resilience". **Role:** PI. **Source:** FY27 Research Seed Fund Program, Columbia Climate School. **Status:** Not funded.
2. **2025 -** "Agricultural Sustainability in the Rio Grande Watershed: Risk Characterization and Adaptation Pathways?". **PI:** Rebecca Gustine (LDEO, Columbia University). **Role:** Co-I. **Source:** USDA-NIFA (Water Quantity and Quality). **Status:** Not funded.
3. **2025 -** "A high-resolution dataset to investigate the impacts of Stratospheric Aerosol Injection-like conditions on streamflow, *water quality, and agricultural productivity at the watershed scale*". **PI:** Jonas Jägermeyr (Center for Climate Systems Research, Columbia University). **Role:** Co-I. **Source:** Environmental Defense Fund. **Status:** Not funded.
4. **2025 -** "*A participatory modeling process to improve best management practices and mitigate climate challenges to agriculture and water quality in the New York City watershed*". **Role:** PI. **Source:** Seed Funding Program. Columbia Climate School. **Status:** Not funded.
5. **2025 -** "*Exploring the Potential of Opportunity Crops to Combat Climate-Induced Food Insecurity in Africa*". **PI:** Meijian Yang (Center for Climate Systems Research, Columbia University). **Role:** Postdoctoral Research Scientist collaborator. **Source:** Seed Funding Program. Columbia Climate School **Status:** Not funded.
6. **2024 -** "*Climate-Smart Watershed Management*". **PI:** Michael Puma (Center for Climate Systems Research, Columbia University). **Role:** Postdoctoral Research Scientist collaborator. **Source:** Science for Nature and People Partnership (SNAPP). **Status:** Not funded.
7. **2024 -** "*Management and conservation of southeastern forests for agricultural and ecological sustainability and resilience to climate change*". **PI:** Ritesh Karki (University of Maryland). **Role:** Postdoctoral Research Scientist collaborator. **Source:** USDA-NIFA. **Status:** Not funded.
8. **2024 -** "Watershed threats assessment for at-risk and listed freshwater mussels in the Escambia-Yellow-Choctawhatchee (EYC) river basins". **PI:** Shannon Brewer (Auburn University, USGS). **Role:** Graduate Research Assistant collaborator. **Source:** USGS. **Status:** Not funded.
9. **2022 -** "DSFAS-CIN: *A Climate-Water Research Network for Long-term Sustainability of US Agriculture*". **PI:** Sanjiv Kumar (Auburn University). **Role:** Graduate Research Assistant collaborator. **Source:** USDA. **Status:** Not funded.

Teaching

Course Name	Year	Role	Major Professor	University
NATR 7550 – Watershed Hydrology	2023	Teaching Assistant	Dr. Latif Kalin	Auburn University
NATR 7560 – Modeling Environmental Change at Multiple Scales	2022	Teaching Assistant	Dr. Latif Kalin	Auburn University
NATR 7550 – Watershed Hydrology	2021	Teaching Assistant	Dr. Latif Kalin	Auburn University
NATR 4240 – Watershed Management	2020	Teaching Assistant	Dr. Latif Kalin	Auburn University
NATR 7550 – Watershed Hydrology	2019	Teaching Assistant	Dr. Latif Kalin	Auburn University
HDS 1027 - Wastewater Treatment. Conventional Processes	2018	Teaching Assistant	Dr. Delmira Beatriz Wolff	Federal University of Santa Maria (Brazil)

Awards

- **2025 ASCE Outstanding Reviewer (2026):** In recognition of outstanding service as a reviewer for the ASCE Journal of Hydrologic Engineering. https://ascelibrary.org/jhyeff/outstanding_reviewers
- **Drummond Company Endowed Fellowship in the College of Forestry, Wildlife and Environment (2024):** The Drummond Company Graduate Fellowship winner is the College of Forestry, Wildlife, and Environment nominee to the university-wide Outstanding Doctoral Student Award at Auburn University.
- **James Henderson Dukes Memorial Fellowship (2022)**: granted by the College of Forestry, Wildlife, and Environment at Auburn University in recognition of studies in biological sciences related to natural resources.
- **Outstanding International Student Award (2020)**: granted by the International Student Organization (ISO) at Auburn University in recognition of successes of international students who represented the highest academic achievement, leadership, and involvement.
- **National Water Center Innovators Program Summer Institute (2020)**: Eight-weeks summer training scholarship at the National Water Center to collaborate with national leaders in hydrology, modeling, and decision support, and with top graduate students in the field.
- **The Brazilian Scientific Mobility Program (2014-2015)**: Sixteen months scholarship to study Civil and Environmental engineering at the University of Illinois at Chicago (UIC). Funded by the Brazilian Government.

Professional Affiliations

- American Society of Civil Engineers (ASCE)
- ASCE's Wetlands Hydrology Technical Committee
- American Geophysical Union (AGU) Hydrology section

Technical Skills

- **Models:** Soil and Water Assessment Tool (SWAT), SWAT+, Community Land Model (CLM), QUAL2K, WetQual, 3-PG, L-RANGE, Decision Support System for Agrotechnology (DSSAT).
- **Software and tools:** Indicators of Hydrological Alterations (IHA), US-EPA BASINS, Long-Term Hydrologic Impact Assessment (L-THIA), Weighted Regression on Time, Discharge, and Season (WRTDS), LOADESTimator (LOADEST), USGS StreamStats.
- **Programming languages:** Fortran, R, Google Earth Engine, Python.
- **Spatial Analysis and GIS tools:** QGIS, ArcMap, ArcPro, GeoDa, SatScan, Weka, MapWindow, ERDAS, eCOGNITION.

Peer Review Service

- **2026 –** Reviews for Water Resources Research, Journal of Hydrology, Ecological Indicators, Journal of Hydrologic Engineering
- **2025 –** Reviews for *Water Resources Research, Journal of Hydrology, Nature-Based Solutions, Environmental Modelling & Software*, *Computers and Geosciences*, *Forest Ecosystems*, *Journal of Hydrologic Engineering*, *Ecological Indicators*, *CATENA*.
- **2024 –** Reviews for *Journal of Hydrologic Engineering* and *Journal of Environmental Management*.
- **2023 –** Reviews for *Journal of Hydrologic Engineering*.
- **2022 -** Reviews for *Journal of American Water Resources Association* and *Journal of Hydrologic Engineering*.
- **2021 -** Reviews for *Journal of Hydrologic Engineering* and *Environmental Modelling & Software*.