

**Samuel W. Flake**  
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Postdoctoral Scientist  
Cary Institute of Ecosystem Studies  
Millbrook, NY

## Education

Ph.D., Plant Biology North Carolina State University, Raleigh, NC	August, 2021
MS, Natural Resources and Environmental Science University of Nevada – Reno, NV	August, 2016
BS, Biology Guilford College, Greensboro, NC	May, 2011

## Professional appointments

Postdoctoral scientist Cary Institute of Ecosystem Studies, Millbrook, NY	July, 2025 - present
Postdoctoral scholar Department of Forestry and Environmental Resources North Carolina State University, Raleigh, NC	July, 2021 – July, 2025

## Grants

2025. Co-Investigator. Simulating floodplain inundation dynamics using Landis-II. US Geological Survey. \$30,000.

2024-2025. Co-Investigator. Evaluating Optimal Placement and Timing of Fuel Treatments Across Dynamic Southern California Landscapes. Subaward from Joint Fire Science Program award to Conservation Biology Institute. \$20,000.

2022-2024. Co-written as named postdoc. Climate adaptive forest management for breeding bird habitat in the southern Appalachians. US Geological Survey Southeastern Climate Adaptation Science Center. \$124,765. *Note: due to university rules I could not serve as co-I on this grant.*

## Awards, Fellowships, and Scholarships

ORISE Fellowship (2023): \$7,000  
NCSU Plant Biology Lightning Talk 1<sup>st</sup> place prize (2020): \$200  
USGS SE-CASC Global Change Fellowship (2019-2020): \$24,000  
Andrews Doctoral Fellowship (NC State University) (2016-17): \$21,500

NC State University Graduate Fellowship (2016-2017): \$4,000  
UNR Graduate Student Association Travel Grant (Feb 2016): \$500  
UNR Graduate Student Access Grant (2015): \$3000  
Guilford College Honors Program Scholarship (2007-2011): \$12,000  
Guilford College Senate Travel Grant, Apr 2011: \$400

## Peer-reviewed Publications

*Italics* indicate student collaborator.

Hoffmann, W.A., **S. W. Flake**, G. Durigan. (2025). All or nothing? The importance of considering partial dieback for tree responses to fire. *Trees* 39, 92 (2025). <https://doi.org/10.1007/s00468-025-02669-z>

*Boardman, E. N.*, Z. Duan, M. S. Wigmosta, **S. W. Flake**, M. R. Sloggy, J. Tarricone, A. A. Harpold. (2025). Restoring Historic Forest Disturbance Frequency Would Partially Mitigate Droughts in the Central Sierra Nevada Mountains. *Water Resources Research*, 61(4), e2024WR039227. <https://doi.org/10.1029/2024WR039227>

**Flake, S. W.**, *P. J. Elliott.*, G. Durigan, D. R. Rossatto, W. A. Hoffmann. (2025). Linking leaf traits and litter flammability using a novel framework, tested with Brazilian Cerrado trees. *Functional Ecology*, 39, 1247–1261. <https://doi.org/10.1111/1365-2435.70032>

Hefty, K. L., N. A. Povak, P. N. Manley, S. W. Flake, K. A. Zeller. (2025). Spatiotemporal patterns of diversity and diversity-stability relationships as a function of compounding disturbances and forest management. *Landscape Ecology*, 40(5), 1–19. <https://doi.org/10.1007/s10980-025-02075-3>

Chen, H., M. R. Sloggy, **S. W. Flake**, S. Evans, & C. J. Maxwell. (2025). Impacts of climate-driven insect population change on sawtimber provisioning, carbon sequestration, and water retention: A case study of bark beetle outbreaks in the USA. *Frontiers in Forests and Global Change*, 7. <https://doi.org/10.3389/ffgc.2024.1513721>

*Eastburn, J. F.*, M. J. Campbell, P. E. Dennison, W. R. Anderegg, K. J. Barrett, P. A. Fekety, **S. W. Flake**, D. W. Huffman, S. A. Kannenberg, K. L. Kerr, A. J. Sánchez Meador, & J. C. Vogeler (2024). Ecological and climatic transferability of airborne lidar-driven aboveground biomass models in Piñon-Juniper woodlands. *GIScience & Remote Sensing*, 61(1), 2363577. <https://doi.org/10.1080/15481603.2024.2363577>

Hoffmann, W.A., **S. W. Flake**, R. C. R. Abreu, D. R. Rossatto, A. C. de Antonio, G. Durigan. (2024). Variation in wound closure among tree species in a Neotropical savanna. *Trees* 38:1, 197-204. <https://doi.org/10.1007/s00468-023-02477-3>

Zeller, K.A., N. A. Povak, P. N. Manley, **S. W. Flake**, K. L. Hefty. (2023). Managing for biodiversity: the effects of climate, management, and natural disturbance on wildlife species richness. *Diversity and Distributions* 29:12, 1623-1638. <https://doi.org/10.1111/ddi.13782>

**Flake, S. W.**, E. A. Honda, N. A. L. Pilon, W. A. Hoffmann, G. Durigan. (2022). Not all trees can make a forest: Tree species composition and competition control forest encroachment in a tropical savanna. *Journal of Ecology* 110, 301– 312. <https://doi.org/10.1111/1365-2745.13820>

**Flake, S. W.**, W. A. Hoffmann, R. C. R. Abreu, G. Durigan. (2021). Savannas are not old fields: functional patterns of succession in a fire-suppressed Brazilian savanna. *Functional Ecology* 35:8. <https://doi.org/10.1111/1365-2435.13818>

**Flake, S. W., & Weisberg, P. J.** (2021). Drought alters the understory of pinyon-juniper woodlands indirectly through tree dieback. *Rangeland Ecology & Management*, 76, 118–128.  
<https://doi.org/10.1016/j.rama.2021.02.007>

Garbarino, M., F. Malandra, T. Dilts, **S. W. Flake**, L. Montalto, S. Spinsante, P. J. Weisberg. (2020). Upper and lower treeline biogeographic patterns in semi-arid pinyon-juniper woodlands. *Journal of Biogeography* 47:12, 2634-2644, [doi.org/10.1111/jbi.13952](https://doi.org/10.1111/jbi.13952)

**Flake, S. W.,** P.J. Weisberg. (2019). Fine-scale stand structure mediates drought-induced tree mortality in pinyon-juniper woodlands. *Ecological Applications* 29:2. [doi.org/10.1002/eap.1831](https://doi.org/10.1002/eap.1831)

Urza, A. K., P. J. Weisberg, J. C. Chambers, D. Board, **S. W. Flake.** (2019). Seeding native species increases resistance to annual grass invasion following prescribed burning of semiarid woodlands. *Biological Invasions* 21, 1993–2007, [doi.org/10.1007/s10530-019-01951-9](https://doi.org/10.1007/s10530-019-01951-9)

Hoffmann, W. A., **S. W. Flake**, R. C. R. Abreu, N. A. L. Pilon, D. R. Rossatto, and G. Durigan. (2019). Rare frost events reinforce tropical savanna–forest boundaries. *Journal of Ecology* 107:1, 468-477, [doi.org/10.1111/1365-2745.13047](https://doi.org/10.1111/1365-2745.13047)

## Articles in Review or Preparation

McCauley, L. A., Shannon, A., **Flake, S. W.**, Scheller, R. M., Woolley, T., Henne, P. D., Robles, M. D. Submitted to *Forest Ecology and Management*. Forest restoration reduces tree mortality from drought and wildfire in ponderosa pine forests.

**Flake, S. W.**, McQuillan, K. A., Scheller, R. M., Martin, K. L. Submitted to *Ecohydrology*. Increasing ring porous species composition improves forest water yield and stabilizes productivity.

**Flake, S. W.**, R. M. Scheller, N. R. De Jager. *In preparation*. A trophic cascade mediates rates of carbon sequestration in a warming climate. (Target: Canadian Journal of Forest Research)

**Flake, S. W.**, R. M. Scheller. *In preparation*. The accuracy and interpretability of bird species distribution models are improved by spaceborne LiDAR. (Target: Landscape Ecology)

**Flake, S. W.**, R. C. R. Abreu, G. Durigan, W. A. Hoffmann. *In preparation*. Inter- and intraspecific differences in leaf area allometries affect rates of canopy closure at savanna-forest transitions. (target: New Phytologist)

Shannon, A., **S. W. Flake**, R. M. Scheller, P. D. Henne, L. A. McCauley. *In preparation*. Drought-mortality and repeated wildfires drive forest dieback by the end of century across future climates in northern Arizona. (target: Fire Ecology)

Teixeira, J., **S. W. Flake**, Y. Zhou, W. A. Hoffmann, A.C.G. Melo, G. Durigan, A. C. Staver. *In preparation*. Improved allometric equations for savanna tree biomass and carbon stock estimates. (target: Journal of Ecology)

## Other Publications

**Flake, S. W.**, P. J. Weisberg. (2020). Stand Structure and Drought Alter Tree Mortality Risk in Nevada's Pinyon-Juniper Woodlands. In Malcolm, Karl; Dykstra, Brian; Johnson, Kristine; Lightfoot, David; Muldavin, Esteban; Ramsey, Marikay. 2020. Symposium Proceedings on Piñon-Juniper Habitats: Status

and Management for Wildlife–2016. Proceedings RMRS-P-77. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 128 p.

**Flake, S.W.**, P.J. Weisberg. (2019). Widespread mortality and defoliation of pinyon pine in central Nevada mountains. Bulletin of the Ecological Society of America doi: 10.1002/bes2.1507

## Teaching

Instructor: Research Methods (FOR803; 1 credit) Fall 2022

Teaching assistant: General Ecology lab (PB 360/AEC 360)  
Fall 2017, Spring 2018, Fall 2020, Spring 2021

LANDIS-II (forest landscape simulation modeling software) training instructor:  
2022-2025: Net Ecosystem Carbon and Nitrogen extension  
2021 - 2023: Biomass Succession extension  
2021-2022: Base Fire extension  
2023: Harvest extension

Guest instructor:

Spring 2018: General Ecology (topic: Landscape ecology)  
Spring 2016: Landscape Ecology; Forest Ecology

Participant in Teaching and Communication Certificate, NC State University

## Conference Presentations

*Italics indicate student collaborator*

**Flake, S.W.**, M. M. Johnston, W. D. Hansen. (2026). Projecting impacts of climate change on subalpine forest resilience to fire in Gunnison, CO. IALE – North America Annual Meeting, Athens, GA. (poster)

**Flake S. W.**, N. R. De Jager, R. M. Scheller. (2025). Moose may mediate a climate-change-driven tradeoff between ecosystem C storage and boreal forest resilience at Isle Royale National Park. IALE – North America Annual Meeting, Raleigh, NC.

Teixeira, J., **S. W. Flake**, Y. Zhou. (2025). Effects of savanna degradation on carbon stocks in cerrado. Association for Tropical Biology and Conservation annual meeting, Oaxaca, Mexico.

*Shannon, A.*, R. M. Scheller, **S. W. Flake**, L. A. McCauley. (2024). Assessing Forest Ecosystem Response to Future Fire and Drought-driven Tree Mortality Across Ponderosa Pine Forests in the Southwestern United States. American Geophysical Union annual meeting, Washington, D.C. (poster).

Teixeira, J., Y. Zhou, G. Durigan, **S. W. Flake**, W. A. Hoffmann, A. C. Staver. (2024). How Can Drastic Ecosystem Changes Affect Carbon Sequestration Potential in Savannas? American Geophysical Union annual meeting, Washington, D.C. (poster)

**Flake, S.W.**, R.M. Scheller. (2024). Projecting changes in habitat for birds of conservation concern in the Southern Appalachians. IALE – North America Annual Meeting. Oklahoma City, OK.

- Flake, S.W.**, R. M. Scheller. (2023). Spatial variation in drivers of fire spread and severity in the Sierra Nevada, CA. Ecological Society of America Annual Meeting. Portland, OR.
- Flake, S.W.**, P. N. Manley, N. A. Povak, M. R. Sloggy, C. J. Maxwell, R. M. Scheller. (2023). Assessing the effectiveness of treatment placement on achieving landscape management objectives in the Lake Tahoe/Central Sierra region. IALE – North America Annual Meeting. Riverside, CA.
- Henne, P. D.; **S. W. Flake**, L. A. McCauley, R. Pelltier, R. M. Scheller. (2023). Combining tree-ring records with a forest landscape model to understand climate-driven landcover change in the Southern Rocky Mountains. IALE – North America Annual Meeting. Riverside, CA.
- Shannon, A.*, R. M. Scheller, **S. W. Flake**, L. A. McCauley, P. D. Henne.(2023). Projecting Future Drought-induced Tree Mortality Across Dry Forests in the Southwestern United States. IALE – North America Annual Meeting. Riverside, CA. (poster).
- Flake, S.W.**, N. R. De Jager, R. M. Scheller. (2022). Simulating indirect effects of moose browsing on ecosystem carbon stocks in Isle Royale, MI. Ecological Society of America. (poster)
- Flake, S.W.**, L. McCauley, P. Henne, R. M. Scheller. (2022). Simulating Long-term Effects of Drought on Forest Landscape Dynamics. IALE – North America Annual Meeting.
- Flake, S. W.**, C. J. Maxwell, R. M. Scheller, M. R. Sloggy, K. N. Wilson, P. N. Manley. (2021). Projecting ecosystem service benefits of fire management in the central Sierra Nevada, CA. 9th International Fire Ecology and Management Congress.
- Flake, S.W.**; E.A. Honda., N.A. Pilon, W.A. Hoffmann, R.C.R. Abreu, G. Durigan. (2020). Differences among species in growth rates and leaf area influence rates of succession from savanna to forest. Ecological Society of America Annual Meeting.
- Flake, S.W.**, W.A. Hoffmann., R.C.R. Abreu, G. Durigan. (2020). Growing a forest: tree traits and growth rates during savanna-forest succession. Plant Biology Graduate Student Symposium; NC State University. *1<sup>st</sup> place award.*
- Weisberg, P.J., T. Dilts, **S.W. Flake**. (2019). The future of pinyon-juniper woodlands in the Great Basin: expansion, decline, or structural transformation? Society for Range Management International Meeting. Minneapolis, MN.
- Weisberg, P.J., T. Dilts, **S.W. Flake**. (2018). Landscape dynamics of Great Basin pinyon-juniper woodlands: expansion, or regional decline? American Geophysical Union, Fall Meeting, Washington, DC.
- Urza A.K., Weisberg P.J., Chambers J.C., Board D., and **Flake S.W.** (2018). Long-term understory vegetation response to prescribed burning in pinyon-juniper woodlands. Fire Continuum Conference, Missoula, MT.
- Flake, S.W.**, Hoffmann, W.A., Abreu, R.C.R., Durigan, G. (2018). Ecological filters and plant traits at savanna-forest transitions. Plant Biology Graduate Student Symposium; NC State University.
- Flake, S.W.**, P.J. Weisberg (2017). Drivers of drought-induced mortality in semiarid woodlands. Climate Science Lightning Talk; NC State University.
- Flake, S.W.**, P.J. Weisberg (2016). Stand structure mediates effects of drought in Nevada semiarid woodlands. US-IALE Annual Meeting; Asheville, NC.

**Flake, S.W.**, L.J. Moseley (2011). The effects of white-tailed deer (*Odocoileus virginianus*) on invasive exotic woody plants in Piedmont North Carolina forest communities. Beta Beta Beta Southeast District Regional Conference. *Honorable mention award*.

**Flake, S.W.**, L.J. Moseley (2011). The effects of white-tailed deer (*Odocoileus virginianus*) on invasive exotic woody plants in Piedmont North Carolina forest communities. The 108<sup>th</sup> Annual Meeting of the North Carolina Academy of Sciences.

## Invited Presentations

**Flake, S.W.**, R.M. Scheller. (2024). Projecting habitat for imperiled bird species in the Southern Appalachians. USGS Southeast Climate Adaptation Science Center science seminar. April 19, 2024.

**Flake, S. W.** (2022). Fire across scales: from leaves to landscapes. Forestry and Environmental Resources Departmental Seminar. North Carolina State University, Raleigh, NC. April 11, 2022.

**Flake, S. W.**, W. A. Hoffmann, R. C. R. Abreu, G. Durigan. (2020). Tree traits, growth, and feedbacks at the savanna-forest boundary. Duke PopBio Seminar; Duke University, Durham, NC. February 13, 2020.

**Flake, S. W.**, P. J. Weisberg (2016). Density-dependence and environmental context of drought-mediated tree mortality in singleleaf pinyon – Utah juniper woodlands. USFWS Pinyon-Juniper Symposium; Albuquerque, NM. October 12, 2016.

**Flake, S.W.**, P.J. Weisberg (2016). Remote sensing and fine-scale stand structure during drought in pinyon-juniper woodlands. PlantTalk; University of Nevada, Reno.

**Flake, S.W.** (2015). Causes and consequences of tree mortality in central Nevada pinyon-juniper woodlands. PlantTalk; University of Nevada, Reno.

## Leadership and Service

Treasurer, LANDIS-II Foundation (Oct, 2025 – present)

Reviewer for Joint Fire Science Program Graduate Research Innovation (GRIN) program

Reviewer for Ecological Applications, Ecology Letters, Journal of Applied Ecology, Forest Ecology & Management, Journal of Vegetation Science, Flora, Theoretical and Experimental Plant Physiology, Biotropica, Journal of Biogeography, and Anais da Academia Brasileira de Ciências (see <https://publons.com/researcher/1528366/>)

## Outreach

Scheller, R. M, and **S.W. Flake** (2022). Hood River Forest Collaborative. Seminar: Climate, Wildfire, & Management Influences on Forest Carbon Carrying Capacity. August 8, 2022.

Weisberg, P.J., Dilts, T.E, and **S.W. Flake**. (2021). Great Basin pinyon-juniper responses to climate change: Woodland expansion, contraction, or transformation? PJ woodlands in a changing climate webinar series. Great Basin Fire Science Exchange.

Southeast Climate Adaptation Science Center Global Change Seminar (2020). Organized two public seminars on global change topics.

Urza, A.K., T.E. Dilts, M.D. Redmond, **S.W. Flake** and P.J. Weisberg (2015). The landscape guessing game: an interactive flip board of landscape change. Presented at Valley Road field day for the public. Reno, Nevada; September 26, 2015.

**Flake, S.W.**, D.T. Crowther (2015). STEM Education and Outreach with AVID Program for First-Generation College Students. Sparks High School, Sparks, NV and University of Nevada, Reno, NV. January – May, 2015.

**Flake, S. W.**, L. J. Moseley (2011). Effects of deer in the Guilford College Woods. Guilford College Board of Trustees Meeting; Feb 25, 2011; Guilford College, NC.