

GEORGE C. BROOKS

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Department of Fish and Wildlife Conservation
College of Natural Resources and the Environment
Virginia Tech, Blacksburg, Virginia 24061

EDUCATION

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| Ph.D. Virginia Tech, Fisheries and Wildlife Conservation (with a minor in Preparing the Future Professoriate) | 2020 |
| M.S. University of Sheffield, Zoology | 2014 |
| B.S. University of Sheffield, Zoology | 2013 |

PROFESSIONAL EXPERIENCE

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| Postdoctoral Researcher , Virginia Tech | |
| Modeling fisheries as socioecological systems | 2022-present |
| Filial cannibalism in eastern hellbenders | 2021-2022 |
| Macroevolutionary models of life history evolution in vertebrates | 2020-2021 |

PUBLICATIONS

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- Articles in Peer Reviewed Journals** (* indicates co-author is a student or technician)
- Brooks, G. C.**, R. M. Moore, B. K. Rincon, T. A. Gorman, and C.A. Haas. Phenological differences help to maintain reproductive isolation and facilitate the coexistence of two sympatric frogs. *in review*
- Chandler, H. C., **G. C. Brooks**, N. M. Caruso, and C. A. Haas. Wetland hydrology, not altered phenology, challenges Reticulated Flatwoods Salamander (*Ambystoma bishopi*) management under future climate change. *in review*
- Feaga, J. B., J. Barron, **G. C. Brooks**, E. A. Frimpong, C. A. Haas, M. Holden, and E. Hultin. A hydrologic and land cover-based habitat model for use in bog turtle (*Glyptemys muhlenbergii*) conservation. *in review*
- Brooks, G. C.**, H. C. Chandler, C. A. Haas, and H. K. Kindsvater. Ten principles from evolutionary ecology for the effective conservation of reptiles and amphibians. *in review*
- Brooks, G. C.**, J. C. Uyeda, N. Bone, H. Conrad, C. Mull, and H. K. Kindsvater. Fundamental constraints on the evolution of vertebrate life histories. *in review*
- Brooks, G. C.**, W. A. Hopkins, and H. K. Kindsvater. 2024. Concurrent threats and extinction risk in a long-lived, highly fecund vertebrate with parental care. *Ecological Applications*.
- Brooks, G. C.**, T. A. Gorman, and C. A. Haas. 2024. Variation in flatwoods salamander survival is unrelated to temperature and rainfall. *Ichthyology and Herpetology*.
- Chandler, H. C. and **G. C. Brooks**. 2023. The relationship between female body size and clutch size in flatwoods salamanders. *Southeastern Naturalist*, 22:588-594.
- Brooks, G. C.**, H. C. Chandler, D. Z. Childs, Y. Jiao, and C. A. Haas. 2023. Predicting the population viability of an endangered amphibian under environmental and demographic uncertainty. *Population Ecology*, 1-12.
- Brooks, G. C.** 2023. Why are vertebrates so big? *Functional Ecology*, 37:2764-2766.
- Brooks, G. C.**, N. M. Caruso, H. C. Chandler, and C. A. Haas. 2023. Niche partitioning and the storage effect facilitate coexistence in an amphibian community. *Ecology and Evolution*, 13:e10629.
- Brooks, G. C.**, T. A. Gorman, *K. C. Jones, H. C. Chandler, *B. K. Rincon, M. A. Sission, J. Himes, and C. A. Haas. 2023. Removing duff layers in fire-suppressed wetlands can aid habitat restoration efforts. *Wetlands*, 43:95.

- Chandler, H. C., N. M. Caruso, D. L. McLaughlin, Y. Jiao, **G. C. Brooks**, and C. A. Haas. 2023. Forecasting the flooding dynamics of flatwoods salamander breeding wetlands under future climate change scenarios. *PeerJ*, 11:e16050.
- *Evans, L., **G. C. Brooks**, *M. G. Anderson, *A. M. Campbell, and L. Jacobs. 2023. Environmental complexity and reduced stocking density promote positive behavioral outcomes in broiler chickens. *Animals*, 13:2074.
- Hopkins, W. A., *B. F. Case, *J. Groffen, **G. C. Brooks**, C. M. Bodinof Jachowski, S. T. Button, *J. J. Halligan, *R. S. M. O'Brien, and H. K. Kindsvater. 2023. Filial cannibalism leads to chronic nest failure of eastern hellbender salamanders. *The American Naturalist*, 202:92-106.
- Brooks, G. C.**, J. H. Roberts, *A. S. Wendt, and C. A. Haas. 2023. Comparing estimates of census and effective population size in an endangered amphibian. *Animal Conservation*, 26:839-850.
- Brooks, G. C.** and H. K. Kindsvater. 2022. Early development drives variation in amphibian vulnerability to global change. *Frontiers in Ecology and Evolution*, 10:813414.
- Brooks, G. C.** and C. A. Haas. 2021. Using historical dip net data to infer absence of flatwoods salamanders in stochastic environments. *PeerJ*, 9:e12388.
- Brooks G. C.**, T. A. Gorman, Y. Jiao, and C. A. Haas. 2020. Reconciling larval and adult sampling methods to model growth across life-stages. *PLoS One*, 15:e0237737.
- Petters, J. L., **G. C. Brooks**, J. A. Smith, and C. A. Haas. 2019. The impact of targeted data management training for field research projects. *Data Science Journal*, 18:1-7.
- Brooks, G. C.**, J. A. Smith, E. Frimpong, T. A. Gorman, H. C. Chandler, and C. A. Haas. 2019. Indirect connectivity estimates of amphibian breeding wetlands from spatially explicit occupancy models. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 29:1815-1825.
- Brooks, G. C.**, J. A. Smith, T. A. Gorman, and C. A. Haas. 2019. Discerning the environmental drivers of annual migrations in an endangered amphibian. *Copeia*, 107:270-276.
- Brooks, G. C.** 2013. A chance encounter with copulating cottonmouths (*Agkistrodon piscivorus*). *IRCF Reptiles and Amphibians*, 20:20-22.

CONFERENCE PRESENTATIONS

- Oral Presentations** (* indicates co-author is a student or technician)
- Castello, L., *A. Abreu, E. S. Brondizio, **G. C. Brooks**, S. J. Campos, *P. Cunha, A. Fleischmann, *C. Franco, *E. A. Hultin, *D. Hymans, H. K. Kindsvater, E. Martins, and M. Sorice. 2024. An approach to assess the integrated social-ecological dynamics of freshwater fisheries. Workshop on the Ostrom Workshop, Bloomington, Indiana, USA.
- *Hultin, E. A., **G. C. Brooks**, H. K. Kindsvater, and L. Castello. 2024. Predicting fishery sustainability with integrated socio-ecological models. Workshop on the Ostrom Workshop, Bloomington, Indiana, USA.
- Chandler H. C., **G. C. Brooks**, K. Jones, *B. Rincon, and C. A. Haas. 2024. Lessons learned from long-term monitoring and research of Reticulated Flatwoods Salamander (*Ambystoma bishopi*) populations on Eglin Air Force Base. Southeast Partners in Amphibian and Reptile Conservation Annual Meeting, Nauvoo, AL, USA.
- *Hultin E. A., H. K. Kindsvater, **G. C. Brooks**, and L. Castello. 2024. Predicting population dynamics of *Arapaima spp.* from social and ecological variables. World Fisheries Conference, Seattle, WA, USA.
- Brooks, G. C.**, W. A. Hopkins, and H. K. Kindsvater. 2023. Concurrent threats jeopardize the viability of Virginia's hellbender populations. Joint Meeting of Ichthyologists and Herpetologists, Norfolk, VA, USA.
- Chandler, H. C., N. M. Caruso, **G. C. Brooks**, and C. A. Haas. 2023. Reticulated flatwoods salamander phenology under future climate change. Southeast Partners in Amphibian and Reptile Conservation Annual Meeting, Black Mountain, NC, USA.

- *Ullans, A., **G. C. Brooks**, and L. Jacobs. 2023. Anxiety in broiler chickens is affected by strain, body weight, and environmental complexity. The 56th Congress of the International Society for Applied Ethology, Tallin, Estonia.
- Uyeda J. C., **G. C. Brooks**, H. K. Kindsvater, *N. Bone, C. Mull, and *H. Conrad. 2022. Macroevolutionary modeling of life history evolution in vertebrates. Evolution, Cleveland, OH, USA.
- Brooks, G. C.** and C. A. Haas. 2021. On the importance of critical race theory in science. Academic Symposium on Critical Race Theory, Virginia Tech, VA, USA.
- Brooks, G. C.**, D. C. Childs, T. A. Gorman, and C. A. Haas. 2019. Assessing population viability and the efficacy of future management scenarios for an endangered amphibian. Joint Meeting of Ichthyologists and Herpetologists, Snowbird, UT, USA.
- *Hawkins, R., J. Metzgar, **G. C. Brooks**, and C. A. Haas. 2019. A tale of natural history collections education at Virginia Tech. Society for the Preservation of Natural History Collections Conference, Chicago, IL, USA.
- *Nelson, C. A., **G. C. Brooks**, C. A. Haas, and M. R. Stocker. 2019. Incorporating technology and multidisciplinary thinking into university collections. Society for the Preservation of Natural History Collections Conference, Chicago, IL, USA.
- Petters, J., J. A. Smith, **G. C. Brooks**, and C. A. Haas. 2018. Building data management capacity for field projects in a research group. American Geophysical Union Centennial Meeting, Washington, D.C., USA
- Brooks, G. C.** and C. A. Haas. 2018. The effects of agricultural and forestry systems on wildlife in aquatic ecosystems. Private and Commercial Pesticide Applicator Recertification Course, Virginia Tech, VA, USA
- Brooks, G. C.**, J. A. Smith, E. A. Frimpong, T. A. Gorman, H. C. Chandler, and C. A. Haas. 2018. Indirect connectivity estimates of amphibian breeding wetlands from spatially explicit occupancy models. Joint Meeting of Ichthyologists and Herpetologists, Rochester, NY, USA
- Brooks, G. C.**, Y. Jiao, T. A. Gorman, and C. A. Haas. 2017. A novel Bayesian approach to model biphasic growth in an endangered salamander, *Ambystoma bishopi*. Annual Meeting of the Ecological Society of America, Portland, OR, USA

Poster Presentations (* indicates co-author is a student or technician)

- *Hultin, E. A., **G. C. Brooks**, H. K. Kindsvater, and L. Castello. 2024. Identifying drivers of Arapaima population dynamics in a floodplain ecosystem. Southern Division American Fisheries Society Meeting, Chattanooga, TN, USA.
- Chandler, H. C., **G. C. Brooks**, Y. Jiao, and C. A. Haas. 2023. Predicting the long-term viability of Reticulated Flatwoods Salamander (*Ambystoma bishopi*) populations under future climate changes. Joint Meeting of Ichthyologists and Herpetologists, Norfolk, VA, USA.
- *Engler, T., C. A. Haas, N. M. Caruso, and **G. C. Brooks**. 2023. Tracking the decline and recovery of salamanders in Appalachian forests for 30 years following timber harvest. Joint Meeting of Ichthyologists and Herpetologists, Norfolk, VA, USA.
- *Leipold, A. E., N. M. Caruso, **G. C. Brooks**, and C. A. Haas. 2019. Variations of growth within the breeding and non-breeding seasons of the Reticulated Flatwoods Salamander (*Ambystoma bishopi*). Annual Southeastern Partners in Amphibian and Reptile Conservation Meeting, Black Mountain, NC, USA
- *Rincon, B., N. M. Caruso, **G. C. Brooks**, *K. C. Jones, and C. A. Haas. 2019. Monitoring Reticulated Flatwoods Salamanders with PIT tag antennas: Our first season of insights. Annual Southeastern Partners in Amphibian and Reptile Conservation Meeting, Black Mountain, NC, USA
- Brooks, G. C.**, J. A. Smith, T. A. Gorman, and C. A. Haas. 2018. Discerning the environmental drivers of annual migrations in an endangered amphibian. Joint Meeting of Ichthyologists and Herpetologists, Rochester, NY, USA

EXTERNAL GRANTS

- 2023: Creating a framework to guide restoration and management of longleaf pine embedded wetlands in the southeastern United States. H.C. Chandler (PI), **G.C. Brooks**, D. McLaughlin, and C.A. Haas. U.S. Department of Agriculture Natural Resources Conservation Service, \$200,000
- 2023: Eglin Air Force Base Endangered Species Adaptive Management and Monitoring on Eglin Air Force Base, Florida. C.A. Haas (PI), L.I. Blanc, T.A. Gorman, **G.C. Brooks**, J.R. Walters. U.S. Fish and Wildlife Service, \$165,000
- 2023: Predicting the persistence of salamanders: Consequences of phenological shifts for species of management concern on DoD lands. C.A. Haas (PI), H.C. Chandler, N.M. Caruso, and **G.C. Brooks**. Department of Defense Strategic Environmental Research and Development Program, \$27,000
- 2022-2023: Preliminary assessments for translocation of Reticulated Flatwoods Salamanders onto private lands. **G.C. Brooks** (PI), C.A. Haas, and H.C. Chandler. U.S. Fish and Wildlife Service, \$100,000
- 2019: Temporal patterns in the reproductive ecology of the Florida Bog Frog. **G.C. Brooks** and C.A. Haas. The Society for the Study of Amphibians and Reptiles Roger Conant Grant in Herpetology, \$500
- 2023 (rejected): Predicting the response of pond-breeding amphibians to contaminant exposure, altered fire regimes, and climate change. **G.C. Brooks** (PI), A. Burrow, E. Carter, N.M. Caruso, H.C. Chandler, B. Fitzpatrick, C.A. Haas, S. Lance, J. Maerz, and L. Smith. Department of Defense Strategic Environmental Research and Development Program, *successfully made it past the preproposal stage, full proposal rejected*, \$3,200,000

INTERNAL GRANTS

- 2022: Wetland loss along the Blue Ridge Parkway. **G.C. Brooks** (PI), C.A. Haas, H.C. Chandler, E. Brooks, J. Petters, and K. Diaz. University Libraries Collaborative Research Grant. \$10,000
- 2019: Fish and Wildlife Graduate Student Association Travel Grant to attend the Joint Meeting of Ichthyologists and Herpetologists, Snowbird, UT, USA. \$600
- 2019: College of Natural Resources Instructional Support Fund to purchase teaching microscopes. **G.C. Brooks** (PI), C.A. Haas, L. Castello, D. Orth. \$2,000
- 2018: Virginia Tech Graduate Student Association Travel Fund to attend the Joint Meeting of Ichthyologists and Herpetologists, Rochester, NY, USA. \$250

HONORS AND AWARDS

- Georgia Pacific Dean's Graduate Fellowship, 2019
- Dwight Chamberlain Graduate Wildlife Fellowship, 2019
- Departmental nominee for Virginia Tech's Instructor of Record Award, 2019
- Fish and Wildlife Conservation's Outstanding Teaching Assistant of the Year Award, 2018

TEACHING EXPERIENCE

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| Instructor <i>Inclusive Pedagogy</i> | Spring 2022 |
| <ul style="list-style-type: none">• Designed and co-taught monthly workshops for graduate students• Introduced students to modern teaching methods and DEI related issues in the classroom | |
| Instructor <i>Introduction to Ecological Modeling in R</i> | Spring 2022 |
| <ul style="list-style-type: none">• Taught weekly workshops throughout the semester to graduate students• Introduced students to coding best practices and the philosophy of statistical modeling | |
| Instructor <i>4344 Herpetology</i> | Spring 2020 |

- Taught lecture and 2 lab sections to 40 undergraduate students
- Developed all lecture and lab material, field trips, and assignments

Instructor 2324 *Wildlife Field Biology* Spring 2019

- Taught lecture and lab to 40 undergraduates
- Developed lecture and lab material, quizzes, exams, and homework assignments
- Evaluated highly by students for approachability, enthusiasm, and improving students' understanding of difficult concepts

Course Assistant 4984 *Natural History Collections and Curation* Spring 2019

- Collaborated with faculty across three departments to design and plan the course
- Organized guest speakers and led in-class discussions
- Supervised 5 undergraduate research projects in the natural history collection

Mentor 4994 *Undergraduate Research* 2018-2019

- Mentored 2 undergraduate independent research projects
- One student presented a poster at a regional conference, the other has a manuscript in prep

Teaching Assistant 2324 *Wildlife Field Biology* 2016-2018

- Taught lecture and lab to 40 undergraduates
- Coordinated grading, labs, and field trips typically with a team of 3 undergraduate TAs

Guest Lectures

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| <i>Evolution</i> , Department of Biology, The Citadel | 2023 |
| <i>Animal Behavior</i> , Department of Biology, Randolph College | 2023 |
| <i>Herpetology</i> , Department of Fish and Wildlife Conservation, Virginia Tech | 2021-2023 |
| <i>Wildlife Biology</i> , Department of Biology, Randolph College | 2022 |
| <i>Graduate Seminar</i> , Department of Fish and Wildlife Conservation, Virginia Tech | 2019-2022 |

CURATION EXPERIENCE

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| Collections Manager , <i>Vertebrate Natural History Collection</i> | 2015-2019 |
| Department of Fisheries and Wildlife Conservation, Virginia Tech | |
| <ul style="list-style-type: none"> • Coordinated loans with on average 3 lab courses each semester, and handled 4-5 loan and tour requests each month • Trained on average 6 undergraduate and 2 graduate teaching assistants each semester in care and use of the collection and health and safety • Increased the museum's visibility through outreach events, press releases, blog posts, and developing a website for the collection | |

TRAINING AND CERTIFICATES

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| Anti-Racist Teaching, Virginia Tech | 2022 |
| Creating an Inclusive Workplace, Virginia Tech | 2022 |
| AIBS Writing for Impact and Influence Workshop, online | 2020 |
| PIT Tag Methodologies Workshop, Virginia Tech | 2020 |
| Natural History Collections Club Network Workshop, Chicago Field Museum | 2019 |
| Certificate of Professional Development, Virginia Tech | 2019 |
| Reducing Implicit Bias and Stereotype Threat in the Classroom, Virginia Tech | 2019 |
| Advancing Diversity Workshop, Virginia Tech | 2019 |
| Preparing the Future Professoriate Certificate, Virginia Tech | 2018 |

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| Carl Gans Workshop on Best Practices in Natural History Collections | 2018 |
| Disrupting Academic Bullying Workshop, Virginia Tech | 2018 |
| Graduate Education Development Institute Pedagogy Certificate, Virginia Tech | 2017 |

PROFESSIONAL SERVICE

Referee for Manuscripts

The American Naturalist, Functional Ecology, Herpetologica, Hydrobiologia, Ichthyology and Herpetology, Journal of Wildlife Management, PeerJ, Proceedings of the Southeastern Association of Fish and Wildlife Agencies, and Scientific Reports.

Societal Memberships

American Society of Ichthyologists and Herpetologists, American Society of Naturalists, British Herpetological Society, Herpetologists League, Society for the Study of Amphibians and Reptiles, Society of Systematic Biologists, Virginia Herpetological Society

Broader Impacts

- Helped to found the Natural History Collections Club (NHCC) at Virginia Tech in 2017. Coordinated various museum events for the NHCC and the Virginia Tech chapter of the Wildlife Society (TWS), the Virginia Tech Science Festival, local 4-H groups, and preschoolers from the Virginia Tech Child Development Center for Learning and Research.
- Taught wildlife field techniques and natural history to high-schoolers as part of the Philadelphia ZooCREW's summer field course at Mountain Lake Biological Station, 2017-2018.
- Acted as the web developer and guest speaker chair for the Fish and Wildlife department's Graduate Student Assembly (FIWGSA) at Virginia Tech, 2016-2019

FIELD EXPERIENCE

Europe

- Air and water quality monitoring at landfill sites across southern England
- Great Crested Newts (*Triturus cristatus*) surveys for Surrey Amphibian and Reptile Group
- Herpetofaunal surveys in England for the National Amphibian and Reptile Recording Scheme
- Behavioral study of waterfowl breeding ecology in South Yorkshire
- Heathland restoration prior to reintroduction of Sand Lizards (*Lacerta agilis*) in England
- Manipulative experimental study of plant-pollinator interactions in southern Portugal

United States

- Radiotelemetry of reintroduced Eastern Indigo Snakes (*Drymarchon couperi*)
- Drift fence and dipnet for Reticulated Flatwoods Salamanders (*Ambystoma bishopi*)
- Sampling invertebrate communities of ephemeral wetlands in longleaf pine forests
- Wetland restoration in longleaf pine flatwoods
- Frog Call surveys on Eglin Air Force Base
- Surveys to assess the population status of Bog Turtles (*Glyptemys muhlenbergii*)