

# Jason S. Riggio

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*Research interests:* Spatial ecology of terrestrial wildlife; biodiversity conservation; avian ecology; landscape connectivity and habitat corridors; species distribution modeling; geospatial analysis and remote sensing

## EDUCATION

### **Doctor of Philosophy**, 2018

University of California, Davis – Graduate Group in Ecology

*Area of Emphasis:* Conservation Ecology. GPA 4.0

*Dissertation:* Protected Areas, Wildlife Corridors and Large Mammal Conservation in East Africa

### **Master of Environmental Management**, 2011

### **Master of Forestry**, SAF Accredited, 2011

Duke University - Nicholas School of the Environment, Durham, NC

*Concentration:* Ecosystems science and conservation. GPA 3.73

*Certification:* Geospatial Analysis

*Thesis:* The African lion (*Panthera leo*): a continent-wide species distribution study and population analysis

*Leadership role:* President and co-founder of The Nicholas Naturalists, 2009 – 2011

### **Bachelor of Arts**, 2008

University of Vermont, Burlington, VT

*Dual major:* Environmental Studies and Philosophy. GPA 3.63

*Honors:* Graduate of the Honors College; College Honors – John Dewey Scholar in the College of Arts & Sciences; Departmental Honors and Outstanding Senior Thesis Award in the Environmental Program

*Study abroad:* Coastal Ecology, Zanzibar, Tanzania, SIT. Spring 2006

## RESEARCH EXPERIENCE

### **Postdoctoral Scholar**, Museum of Wildlife & Fish Biology, University of California, Davis. Fall 2018 – Present

Responsible for project oversight, coordination of field staff, analysis of datasets and writing publications and annual reports for the Biomonitoring of California Department of Water Resources Delta Restoration Projects. Analyzing a long-term avian survey and nest box productivity dataset to determine long-term breeding bird density trends using Distance and Occupancy modeling, and the spatial and ecological predictors of avian productivity at local and landscape scales in the Putah Creek watershed of California's Central Valley. Participating in ongoing bird surveys along the creek and assisting in museum projects and outreach.

### **Science & Geospatial Advisor**, National Geographic Society. Spring 2017 – Fall 2018

Developed and implemented a methodology for mapping the Earth's Low Impact Areas based on various thresholds of human impact. Ranked the resulting areas based on biodiversity, human impact, net primary productivity, and protected area coverage, and analyzed both past and projected landscape change. Measured the economic valuation of the landscapes based on carbon storage. Assessed fragmentation of natural landscapes across terrestrial biomes globally based on the spatial location of these landscapes. Presented results at the scientific session of the first annual Half-Earth Day at National Geographic Society headquarters in Washington, DC. Helped organize and lead the National Geographic Society Mapping Earth's Remaining Intact Habitats Workshop. Leading a project in collaboration with researchers at Conservation Science Partners, The Nature Conservancy, Wildlife Conservation Society, and several universities on ensemble mapping of global human influence datasets to illuminate consensus and contentious areas of modification.

### **Field Researcher & GIS Analyst**, Wami-Mbiki Wildlife Management Area. Summer 2013-Spring 2018

Assessed the current status of wildlife corridors throughout Tanzania using a novel mapping technique. Designed and implemented a walking transect survey of large mammal presence and abundance throughout Wami-Mbiki. Conducted interviews in 66 villages surrounding the WMA to determine the location of wildlife corridors in the region.

### **Field Leader & GIS Analyst**, Yosemite National Park. Summer 2016 & Summer 2017

Created the spatial sampling design for tree sample collection in and around Yosemite National Park. Led groups of field assistants in the backcountry for up to 5 days at a time sampling off-trail in rugged terrain.

### **Research Web Page Designer**, Carbohydrate Observatory, UC Davis. Summer 2016

Designed, coded and implemented a web page using R software (RStudio Shiny) to allow real-time statistical analyses of carbohydrate data from orchards around the Central Valley of California.

[https://mzwienie.shinyapps.io/Shiny\\_test/](https://mzwienie.shinyapps.io/Shiny_test/)

### **Graduate Student Researcher**, Geospatial and Farming Systems Research Consortium. Spring & Summer 2015

Identified conservation priorities for six focal countries (Bangladesh, Burkina Faso, Cambodia, Ethiopia, Senegal and Tanzania) using Google Earth Engine, and applied machine learning techniques to predict future

agricultural expansion in sub-Saharan Africa. <https://gfc.ucdavis.edu/profiles>

**GIS Analyst**, National Geographic's Big Cats Initiative. Fall 2009 – Fall 2012

Assembled data on known lion populations, mapped species distribution and assessed population sizes and connectivity.

**Field Researcher & Volunteer Leader**, Carnivores of Madagascar. Summer 2011

Aided Dr. Luke Dollar in the collection of data for his long-term research project on the carnivores of Madagascar in Ankarafantsika National Park. Led groups of volunteers to check live capture trap lines for fossa, while recording all vertebrates along these transects.

**Field Researcher**, Tete Province, Mozambique. Summer 2010

Member of a team of students using call-in stations and interviews with local villagers and hunting concession owners to survey lion populations in the region.

**Wildlife Conservation Intern & Project Leader**, Wild South, Asheville, NC. Summers 2009 & 2010

Managed the wildlife conservation intern team and worked to implement NC's State Wildlife Action Plan with the NC Wildlife Resources Commission and the US Forest Service. Participated in field surveys for state-listed species of concern (e.g. cerulean warbler, green salamander, hellbender, and Carolina flying squirrel), and helped monitor the spread of white nose syndrome in local bat populations. Developed environmental variable layers in ArcGIS to create species distribution models for these species using Maxent.

**Field Researcher**, Saadani National Park, Tanzania. Spring 2006

Designed and ran a survey of large mammal species diversity, abundance and distribution on Saadani village lands within Saadani National Park using walking transects and interviews with community leaders.

### PEER-REVIEWED PUBLICATIONS

14. **Riggio, J.**, Baillie, J., Brumby, S., Ellis, E., Kennedy, C.M., Oakleaf, J.R., Tait, A., Tepe, T., Theobald, D.M., Venter, O., Watson, J.E.M., and Jacobson, A.P. (2020). Global human influence maps reveal clear opportunities in conserving Earth's remaining intact terrestrial ecosystems. *Global Change Biology*. doi:10.1111/gcb.15109
13. Godfrey, J., **Riggio, J.**, Orozco, J., Guzmán-Delgado, P., Tixier, A., and Zwieniecki, M. (2019). Ray fractions and carbohydrate dynamics of tree species along a 2,750 m elevation gradient indicate climate response, not spatial storage limitation. *New Phytologist*. doi:10/111/nph.16361
12. Jacobson, A.P., **Riggio, J.**, Tait, A., and Baillie, J. (2019). Global areas of low human impact ('Low impact areas') and fragmentation of the natural world. *Scientific Reports*. 9:1-13.
11. **Riggio, J.**, Hijmans, R., Jacobson, A., and Caro, T. (2019). How effective are the protected areas of East Africa?. *Global Ecology and Conservation*. E00573.
10. **Riggio, J.**, Mbwilo, F., Van de Perre, F., and Caro, T. (2018). The forgotten link between northern and southern Tanzania. *African Journal of Ecology*. 56:1012-1016. DOI: 10.1111/aje/12533
9. **Riggio, J.**, Kija, H., Masenga, E., Mbwilo, F., Van de Perre, F., and Caro, T. (2018). Sensitivity of Africa's larger mammals to humans. *Journal for Nature Conservation*. 43:136-145.
8. **Riggio, J.** and Caro, T. (2017). Structural connectivity at a national scale: wildlife corridors in Tanzania. *PLoS ONE*. 12:e0187407
7. **Riggio, J.**, Caro, T., Dollar, L., Durant, S.M., Jacobson, A.P., Kiffner, C., Pimm, S.L., and van Aarde, R.J. (2016). Lion populations may be decline in Africa but not as Bauer et al. suggest. *Proc Natl Acad Sci USA*. 113(2):E107-E108.
6. Masenga, E., Jackson, C., Eblate, E., Jacobson, A., **Riggio, J.**, Lyamuya, R., Fyumagwa, R., Borner, M., and Røskft, E. (2015). Insights into long-distance dispersal by African wild dogs in East Africa. *African Journal of Ecology*. 54:95-98.
5. Jacobson, A., Dhanota, J., Godfrey, J., Jacobson, H., Rossman, Z., Stanish, A., Walker, H., and **Riggio, J.** (2015). A novel approach to mapping land conversion using GE Grids: an application to East Africa. *Environmental Modelling and Software*. 72:1-9.
4. Caro, T., **Riggio, J.** (2014). Behavior and conservation of Africa's "Big Five". *Current Zoology*. 60:486-499.
3. Caro, T., **Riggio, J.** (2013). The big 5 and conservation. *Animal Conservation*. 16:261-262.
2. Jacobson, A. P., Cattau, M. E., **Riggio, J.**, Petracca, L. S., and Fedak, D. A. (2013). Distribution and abundance of lions in northwest Tete Province, Mozambique. *Tropical Conservation Science*. 6:87-107.
1. **Riggio, J.**, Jacobson, A., Dollar, L., Bauer, H., Becker, M., Dickman, A., Funston, P., Groom, R., Henschel, P., de Iongh, H., Lichtenfeld, L., and Pimm, S. (2013). The size of savannah Africa: a lion's (*Panthera leo*) view. *Biodiversity and Conservation*. 22:17-35.

### **PUBLICATIONS (in prep)**

- **Riggio, J.**, Truan, M.L., Cook, H., De Greef, E., and Engilis, Jr., A. (*in prep*). Influence of habitat and weather on nest-site selection, reproductive success and fledgling health in cavity-nesting songbirds.
- **Riggio, J.**, Radomille, D., Freedman, E., Hendler, D., Foreman, K., Rodriguez, R., Gottlieb, B., Kioko, J., and Kiffner, C. (*in prep*). Delineating corridors for multiple wildlife species in the Tarangire-Manyara Ecosystem, Tanzania.
- Dickman, A., Hinks, A., **Riggio, J.**, Jacobson, A., Bauer, H., Loveridge, A., Becker, M., Begg, C., Bhalla, S., Burnham, D., Henschel, P., Macdonald, E., and Macdonald, D.W. (*in prep*). Ecological and socio-political fragility of free-ranging African lion populations.

### **REPORTS, PROCEEDINGS & BOOK CHAPTERS**

5. Lindsey, P. Jacobson, A., and **Riggio, J.** (2018). International support for lion conservation and funding opportunities. In *Guidelines for the Conservation of Lions in Africa*. IUCN Cat Specialist Group.
4. Jacobson, A., and **Riggio, J.** (2018). Big Cats in Africa: Status Update on the African Lion, Cheetah and Leopard, with Recommendations for Effective Big Cat Conservation Funding. National Geographic Society, Washington, DC.
3. Caro, T., Charles, G., Clink, D., **Riggio, J.**, Weill, A., and Whitesell, C. (2016). Protected Areas under Threat. In Sample, V.A., Bixler, R.P., and Miller, C. (Eds.), *Forest Conservation in the Anthropocene. Science, Policy, and Practice* (pp. 83-98). University Press of Colorado, Boulder, CO.
2. Miller, S., **Riggio, J.**, Funston, P., Power, R.J., Williams, V. and Child, M. (2016). A Conservation Assessment of *Panthera leo*. In: M.F. Child, L. Roxburgh, D. Raimondo, E. Do Linh San, J. Selier and H. Davies-Mostert (Eds.), *The Red List of Mammals of South Africa, Swaziland and Lesotho*. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.
1. Caro, T., Charles, G., Clink, D., **Riggio, J.**, Weill, A., and Whitesell, C. (2014). Terrestrial protected areas: threats and solutions. *Proceedings: Forest Conservation and Management in the Anthropocene*. RMRS-P-71.

### **INVITED PRESENTATIONS**

16. Riggio, J., Baillie, J., Brumby, S., Ellis, E., Evans, T., Kennedy, C.M., Oakleaf, J.R., Tait, A., Tepe, T., Theobald, D.M., Venter, O., Watson, J.E.M., and Jacobson, A.P. **An analysis of global human influence maps illuminate consensus around locations and increasing rarity of non-anthropogenically modified ecosystems**. Oral presentation. 29<sup>th</sup> International Congress for Conservation Biology. July 2019.
15. Riggio, J., Kija, H., Masenga, E., Mbwilo, F., Van de Perre, F., and Caro, T. **Sensitivity of Africa's larger mammals to humans**. Oral presentation. UC Davis Wildlife, Fish and Conservation Biology Seminar Series. January 2019.
14. Riggio, J., Jacobson, A., Tait, A., Tepe, T., and Baillie, J. **Summary of Intactness Mapping Efforts**. Oral presentation. National Geographic Society and Leonardo DiCaprio Foundation Workshop: Mapping Earth's Remaining Intact Habitats. May 2018.
13. Riggio, J., Kija, H., Masenga, E., Mbwilo, F., Van de Perre, F., and Caro, T. **Sensitivity of Africa's larger mammals to humans**. Oral presentation. 11<sup>th</sup> Tanzania Wildlife Research Institute (TAWIRI) Scientific Conference. December 2017.
12. Riggio, J., Radomille, D., Freedman, E., Hendler, D., Foreman, K., Rodriguez, R., Gottlieb, B., Kioko, J., and Kiffner, C. **Delineating corridors for multiple wildlife species in the Tarangire-Manyara Ecosystem, Tanzania**. Poster presentation. 11<sup>th</sup> Tanzania Wildlife Research Institute (TAWIRI) Scientific Conference. December 2017.
11. Riggio, J., Jacobson, A., Dollar, L., and Baillie, J. **National Geographic's Last Wild Places**. Oral presentation. National Geographic Society's 1<sup>st</sup> Annual Half-Earth Day. October 2017.
10. Riggio, J. and Caro, T. **Assessing structural wildlife corridors at a national scale**. Oral presentation. Ecological Society of America Annual Meeting. August 2017.
9. Riggio, J., Masenga, E., Mbwilo, F. and Caro, T. **The last linkage: a forgotten wildlife management area and the final connection between northern and southern Tanzania**. Oral presentation. 10<sup>th</sup> Tanzania Wildlife Research Institute (TAWIRI) Scientific Conference. December 2015.
8. Riggio, J., Jacobson, A., and Caro, T. **Uncovering Tanzania's wildlife corridors using Google Earth**. Oral presentation. Bay Area Conservation Biology Symposium. May 2015.
7. Riggio, J. and Caro, T. **The other great national park network: Progress and challenges to East African protected areas**. Oral presentation. Science for Parks, Parks for Science: The Next Century. March 2015.
6. Riggio, J., Jacobson, A., Stanish, A., Godfrey, J. **Current status of Tanzania's wildlife corridors**. Oral presentation. Symposium on Animal Movement and the Environment. May 2014.

5. Riggio, J. **Why did the elephant cross the road? Habitat fragmentation and wildlife corridors in savannah Africa.** Oral presentation. Public mini-symposium on: Ecological Effects of Global Anthropogenic Change. April 2014.
4. Riggio, J, Jacobson, A., Stanish, A., Godfrey, J. **Current status of Tanzania's wildlife corridors.** Oral presentation. 9<sup>th</sup> Tanzania Wildlife Research Institute (TAWIRI) Scientific Conference. December 2013.
3. Riggio, J. **The size of savannah Africa: a lion's (*Panthera leo*) view.** African Lion Workshop. US Fish and Wildlife Service. June 2013.
2. Riggio, J. **The size of savannah Africa: a lion's (*Panthera leo*) view.** Oral presentation. 6<sup>th</sup> Annual Graduate Student Symposium in Ecology. University of California, Davis. February 2013.
1. Riggio, J., Jacobson, A., Pimm, S., Dollar, L. **The African lion (*Panthera leo leo*): A continent-wide species distribution study and population analysis.** Oral presentation. 25<sup>th</sup> International Congress for Conservation Biology. December 2011.

#### **TEACHING EXPERIENCE**

- 2019/2020: Adjunct Professor** – Vertebrate Study Design & Field Methods, American River College. (Spring)
- 2018/2019: Adjunct Professor** – Vertebrate Study Design & Field Methods, American River College. (Spring)
- 2017/2018: Adjunct Professor** – Vertebrate Study Design & Field Methods, American River College. (Spring)  
**Teaching Assistant** – Current Issues in the Environment, University of California, Davis. (Spring)  
**Teaching Assistant** – Ecology, Nature & Society, University of California, Davis. (Winter)
- 2016/2017: Instructor** – Introduction to Conservation Biology, University of California, Davis. (Spring)  
**Teaching Assistant** – Introduction to Biology (BIS 2B), University of California, Davis. (Spring)  
**Instructor** – Current Issues in the Environment, University of California, Davis. (Winter)  
**Teaching Assistant** – Trees and Forests, University of California, Davis. (Fall)
- 2015/2016: Teaching Assistant** – Current Issues in the Environment, University of California, Davis. (Winter)
- 2014/2015: Teaching Assistant** – Introduction to Biology (BIS 2B), University of California, Davis. (Spring)
- 2013/2014: Teaching Assistant** – Introduction to Biology (BIS 2B), University of California, Davis. (Spring)  
**Teaching Assistant** – Trees and Forests, University of California, Davis. (Fall)
- 2012/2013: Teaching Assistant** – Introduction to Biology (BIS 2A), University of California, Davis. (Spring)  
**Teaching Assistant** – Introduction to Biology (BIS 2A), University of California, Davis. (Winter)  
**Teaching Assistant** - Trees and Forests, University of California, Davis. (Fall)
- 2011/2012: Laboratory Coordinator/Instructor** – General Biology II, Pfeiffer University.  
**Teaching Assistant** – Wildlife Biology, Pfeiffer University.  
**Teaching Assistant** – Conservation Biology, Pfeiffer University.  
**Laboratory Coordinator/Instructor** – General Biology I, Pfeiffer University.  
**Teaching Assistant** – Vertebrate Morphology and Development, Pfeiffer University.
- 2010/2011: Course Designer/Instructor** - Terrestrial Wildlife Surveys, Duke University.
- 2006/2007: Teaching Assistant** – **International Environmental Studies**, University of Vermont.

#### **GUEST LECTURES**

9. Conservation Biology (BIOL 352). American River College. September 2013; April 2014; October 2015; April 2016; March 2017; April 2018; October 2018; October 2019; October 2020
8. Introduction to Wildlife Biology (NATR 302). American River College. April 2020
7. Environment & Sustainability Evening Lecture Series & Eco Lunch. Catawba College. March 2020
6. Big Cat Conservation (ENVIRON 590). Duke University. September 2016 & 2017; January 2019; March 2020
5. Natural History of California's Wild Vertebrates (WFC 50). University of California, Davis. January 2020
4. Wildlife Ecology and Conservation (WFC 10). University of California, Davis. May 2016; November 2017; May 2018; May 2019; October 2019
3. Principles of Ecology (NATR 320). American River College. April 2019; October 2019
2. Ecology of Tropical Latitudes (EVE 138). University of California, Davis. April 2018
1. Undergraduate Seminar in Conservation Biology (EVE 198). University of California, Davis. February 2013

#### **GRANTS AWARDED**

- 2015: Graduate Student Travel Award** – University of California, Davis.  
**Selma Herr Fund for Ornithological Research** – University of California, Davis.  
**Ecology Graduate Group Fellowship Award** – University of California, Davis
- 2014: Exploration Fund Grant** – The Explorers Club.  
**Lewis and Clark Fund for Exploration and Field Research** – American Philosophical Society.  
**Howard Wildlife Management Award** – University of California, Davis.  
**Jastro Graduate Research Scholarship** – University of California, Davis.
- 2013: Selma Herr Fund for Ornithological Research** – University of California, Davis.

**Howard Wildlife Management Award** – University of California, Davis.  
**African Studies Graduate Research Fellowship** - University of California, Davis.  
**Grant-in-Aid of Research** – American Society of Mammalogists.  
**Jastro Graduate Research Scholarship** – University of California, Davis.  
**2010: Big Cats Initiative Small Grants Program** – National Geographic Society.  
**Nicholas School of the Environment Internship Fund** – Duke University.

#### **ADDITIONAL INFORMATION**

Proficient in spatial and statistical analyses in ArcGIS, Google Earth Engine, and R software.  
Conversational in Swahili. SDI certified SCUBA diver. Avid backpacker, birder & snowboarder.  
North Carolina Calling Amphibian Survey Program (CASP) volunteer. Spring 2011

**Reviewer/referee for articles in wildlife and conservation journals:** African Journal of Ecology, Biodiversity & Conservation, Biological Conservation, Conservation Letters, Conservation & Society, Frontiers in Ecology and the Environment; Landscape Ecology, Oikos, One Earth, PeerJ, PLoS ONE, National Geographic Society Grants, South African Journal of Wildlife Research

**Professional Memberships:** African Lion Working Group; Ecological Society of America; IUCN WCPA Connectivity Conservation Specialist Group; IUCN World Commission on Protected Areas; Phi Kappa Phi Honor Society; Society for Conservation Biology