

## MARCELLA J. KELLY

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### EDUCATION

B.S. 1991 University of California, Davis. Wildlife and Fisheries Biology  
Ph.D. 2000 University of California, Davis. Ecology. Advisor: Dr. Tim Caro

### PROFESSIONAL EMPLOYMENT

2007 – Present Associate Professor, Department of Fisheries and Wildlife Sciences  
Virginia Polytechnic Institute and State University, Blacksburg, VA.  
2001 – 2007 Assistant Professor, Department of Fisheries and Wildlife Sciences  
Virginia Polytechnic Institute and State University, Blacksburg, VA.  
1999 – 2001 Adjunct Professor, Biology Department  
California State University, San Francisco, CA.

### TEACHING EXPERIENCE

#### Undergraduate courses:

Population Dynamics and Estimation (Virginia Tech), 2003 - present  
Wildlife Field Techniques (Virginia Tech), 2001-present  
Tropical Ecology and Conservation (SFSU), 1998 – 2002, 2008  
Wildlife Ecology (U.C. Davis), 2000  
Rainforest to Reef: Natural Resource Monitoring in Belize, Central America; Virginia Tech  
study abroad 2009-present  
Teaching Assistant for 15 courses while a graduate student at U.C. Davis, 1993-2000

#### Graduate Courses:

Carnivore Conservation Seminar (Virginia Tech), 2001  
Advanced Topics in Applied Population Ecology (Virginia Tech), 2005-2010; alternate years  
Parameter Estimation (Virginia Tech) 2011 – Present; alternate years

### RESEARCH SUPPORT (SELECTED)

- 2014-2019 – Philadelphia Zoo – Global Conservation Leader Award: \$100,000
- 2013-2014 – Black Bear Density and Ursid Research Center VDGIF: \$38,100
- 2013-2014 – Black Bear Research Center, Faile Foundation & Acorn Alcinda Foundation: \$34,000
- 2013-2014 – Bobcat Density VDGIF: \$37,500
- 2010-2014 – Eastern Coyote Ecology in the Appalachians: VDGIF \$300,000.
- 2011-2012 – Impact of increased harvest on deer distribution within and CWD containment area: \$38,052
- 2010-2011 – Black bear density and Ursid Research Center support VDGIF: \$24,600
- 2008-2011 United States Department of Agriculture Co-Pi with Dr. Glen Stevens. Integrating science, education, and extension - Belize and Virginia \$95,000
- 2008-2011 – Impacts of widening of highway 64 on movement, demography and sociality of endangered red wolves. North Carolina Department of Transportation (NCDOT). Co-PI: Michael Vaughan. \$408,320.
- 2008-2011 – Impacts of widening of highway 64 on movement, demography and sociality of black bears. North Carolina Department of Transportation. (NCDOT) Co-PI: Michael Vaughan. \$474,450.

- 2007-2008 National Science Foundation (NSF) Facilities Improvement Grant – Las Cuevas Research Center, Belize \$150,000.
- 2006-2008: Using remote acoustic detectors to predict bat species occurrence across the landscape for 14 bat species in Virginia. \$74,500.
- 2006-present. Tiger Conservation in Sumatra. World Wildlife Fund, \$24,500.
- 2004-2006: Horseshoe crab population modeling. National Marine Fisheries Service, \$62,000.
- 2003-2006: An evaluation of Quality Deer Management. Deer Hunters Association, \$95,652.
- 2002-2004: Small mammal abundance and community composition across a harvested landscape. MeadWestvaco, \$32,000.
- 2001-2002. ASPIRES, Virginia Tech. The Center Woods Wildlife Research and Training Center. \$36,000 plus matching funds. Total \$66,000.
- 2001-present: The use of remote cameras for wildlife studies, jaguars in Belize as a model: \$249,420

### **OTHER RESEARCH AND CAPACITY BUILDING EXPERIENCE**

- 2012 - present: Director of the Black Bear Research Center (BBRC). Provide housing for wild black bears that come into conflict with humans. Conduct studies on hibernation ecology and provide a mechanism for fostering orphaned cubs to impart a positive image of the Virginia Department of Game and Inland Fisheries.
- 2011: Nepal Tiger Genome Project (<http://ntgp.org.np>). Workshop: Non-invasive sampling for wildlife. Attendees ~30 park staff and field workers in Chitwan National Park; Nepal. Additionally, workshop on non-invasive sampling – design and analysis: Kathmandu Nepal. And final workshop for Center for Molecular Dynamics, Nepal (CMDN) staff on mark-recapture techniques.
- 2010 Ugyen Wangchuck Institute for Conservation and Environment (UWICE), Conference and Training Workshop - Bumthang, Bhutan. Conducted in collaboration with the University of Montana. Workshop on “Wildlife Research Techniques in Rugged Mountainous Environments in Asia.” Presentation: Wildlife Research Using Non-invasive remotely triggered cameras.
- 2008: Research and Capacity Building. Collaboration with Wildlife Conservation Society-Madagascar, to build a camera trapping biodiversity survey program for Masoala Reserve and for extension to other area of Madagascar - emphasis on rare terrestrial mammals
- 2008: Scientific Advisor for wildlife projects for the Institute of Forestry (IOF), Pokhara and Hetauda campuses, Tribhuvan University, Nepal. Development of internal capacity for wildlife sciences for the purpose of building a Center of Excellence at the IOF
- 2004-2006: Research and Capacity Building. Collaboration with the Carnivore Center of the Tanzanian Wildlife Research Institute (TAWIRI), and the Zoological Society of London (ZSL), Advisor for a country-wide, remote camera survey protocol for 35 species of carnivores.
- 2000: Researcher, University of California, Davis. Endangered Stephen’s kangaroo rat census and habitat requirements in Riverside County, Southern California.
- 2001 - present Present: Research and Capacity Building. Long-term monitoring project examining diversity and abundance of neotropical rainforest mammals, especially jaguars, pumas, and ocelots across Belize, Central America. To date advisor for 8 thesis and/or internships for University of Belize students in Natural Resource Management.
- 1996 - 1997: Researcher: Institute of Zoology, Zoological Society of London, England. Collaborated with Dr. Sarah Durant to conduct a population viability analysis for cheetahs.
- 1993 – 2000: Dissertation research. The use of photographic identification of Serengeti cheetahs to determine population demography, viability, effective population size.
- 1990-1991: Research Assistant: analysis of data on tail flagging in white-tailed deer.

- 1989: Research Assistant, Bodega Marine Laboratory, Dr. A. Peter Klimley. Using ultrasonic telemetry to track the movements and behavior of scalloped hammerhead sharks.

**REFERREED PUBLICATIONS** (\*graduate, \*\* undergraduate students under my direction)

- \*Wulsch, C.; Waits, L.P.; Hallerman, E. and M.J. Kelly. In Press. Optimizing Collection Methods for Noninvasive Genetic Sampling of Neotropical Felids. *Wildlife Society Bulletin*.
- \*Farris, Z.J.; Karpanty S.M.; Ratelolahy, F. and M.J. Kelly. 2014. Predator-primate distribution, activity, and co-occupancy in relation to habitat and human activity across fragmented and contiguous forests in northeastern, Madagascar. *International Journal of Primatology*. DOI 10.1007/s10764-014-9786-0
- \*Mesa Cruz, J.B.; Brown, J.L. and M.J. Kelly. 2014. Effects of natural environmental conditions on faecal glucocorticoid metabolite concentrations in jaguars (*Panthera onca*) in Belize. *Conservation Physiology*. In Press.
- \*Thapa, K.; Shrestha, R.; Karki, J.; Thapa, G.J.; Subedi, N.; Pradhan, N.M.B.; Dhakal, M.; Khanal, P. and M.J. Kelly. 2014. Leopard *Panthera pardus fusca* Density in the Seasonally Dry, Subtropical Forest in the Bhabhar of Terai Arc, Nepal. *Advances in Ecology: Vol. 2014, Article ID 286949, 12 pages*.
- \*Wulsch, C.; Waits, L. P. and M.J. Kelly. 2014. Noninvasive individual and species identification of jaguars (*Panthera onca*), pumas (*Puma concolor*) and ocelots (*Leopardus pardalis*) in Belize, Central America using Cross-Species Microsatellites and Fecal DNA. *Molecular Ecology Resources*. In press.
- \*Rich, L.N., Kelly, M.J., Sollmann, R., Noss, A.J., Maffei, L., Arispe, R.L., Paviolo, A., De Angelo, C.D., Di Blanco, Y.E. and M.S. Di Bitetti. 2014. Comparing capture–recapture, mark–resight, and spatial mark–resight models for estimating puma densities via camera traps. *Journal of Mammalogy* 95: 382-391.
- \*Sunarto; Sollmann, R.; Mohamed, Z. and M.J. Kelly. 2013. Camera trapping for the study and conservation of tropical carnivores. *Raffles Bulletin of Zoology. Supplement 28: 21-42*.
- Creel, S. et al. 2013. Conserving large populations of lions--the argument for fences has holes. *Ecology Letters* 16: 1413-1417; doi: 10.1111/ele.12145
- \*Farris, Z.J.; Gerber, B.; Patel, E.; Karpanty, S. and M.J. Kelly. 2013. Carnivore-Primate Interactions across fragmented and contiguous forests in NE Madagascar. *American Journal of Physical Anthropology* 150: 121.
- Dellinger, J.A.; \*Proctor, C.; Steury, T.D.; Kelly, M.J. and M.R. Vaughan. 2013. Habitat use of a large carnivore, the red wolf, in a human-dominated landscape. *Biological Conservation* 157: 324-330.
- \*Thapa, K., Kelly, M., Karki, J., Subedhi, N. 2013. First camera trap record of pack hunting dholes in Chitwan National Park. *Canid Biology and Conservation* 16: 4-7.
- \*Sunarto, S; Kelly, M.J.; Vaughan, M; Klenzendorf, S.; Zulfahmi, Z.; Maju, H. and K. Parakkasi. 2013. Threatened tigers on the equator: multi-point abundance estimates in central Sumatra. *Oryx* 47: 211-220.
- \*Farris, Z.J.; Kelly, M.J.; Karpanty, S.M.; Ratelolahy, F.; Andrianjakarivelo V. and C. Holmes. 2012. Photographic evidence of the brown-tailed mongoose (*Salanoia concolor*) in Makira Protected Area, Madagascar. *Small Carnivore Conservation* 47: 82-86.
- \*Sunarto, S; Kelly, M.J.; Parakkasi, K.; Klenzendorf, S.; Septayuda, E. and H. Kurniawan. 2012. Tigers Need Cover: Multi-Scale Occupancy Study of the Big Cat in Sumatran Forest and Plantation Landscapes. *PLoS One* 7: 1-14.
- Gerber, B.D.; Karpanty, S.M. and M.J. Kelly. 2012. Evaluating the potential bias in carnivore capture-recapture studies associated with the use of lure and varying density estimation techniques using photographic-sampling data of the Malagasy civet. *Population Ecology* 54: 43-54.
- \*Davis, M.L.; Kelly, M.J. and D. F. Stauffer. 2011. Carnivore coexistence and habitat use in the Mountain Pine Ridge Forest Reserve, Belize. *Animal Conservation* 14: 56-65.

- Berkson, J.; Hudy, S.F.; McMullin, S.L.; Murphy, B.R.; Prager, M.H.; Kelly, M.J. and N Thompson. 2009. Addressing the shortage of stock assessment scientists through undergraduate workshops. *Fisheries* 34: 220-227.
- Caso, A., Lopez-Gonzalez, C., Payan, E., Eizirik, E., de Oliveira, T., Leite-Pitman, R., Kelly, M. & Valderrama, C. 2008. *Panthera onca*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org> <http://www.iucnredlist.org/details/15953/0>
- Caso, A., Lopez-Gonzalez, C., Payan, E., Eizirik, E., de Oliveira, T., Leite-Pitman, R., Kelly, M., Valderrama, C. & Lucherini, M. 2008. *Puma concolor*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2
- Kelly, M., Caso, A. & Lopez Gonzalez, C. 2008. *Lynx rufus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>; <http://www.iucnredlist.org/details/12521/0>
- Kelly, M.J. 2008. Design, evaluate, refine: camera trap studies for elusive species *Animal Conservation* 11: 182–184.
- \*Dillon, A. and M.J. Kelly. 2008. Ocelot home range, overlap and density: comparing radio telemetry with camera trapping. *Journal of Zoology (London)* 275: 391-398.
- Kelly, M.J.; Noss, A.J.; Arispe L., R.; Di Bitetti, M.; De Angelo, C.D.; Paviolo, A.; Di Blanco, Y.E.; and L. Maffei. 2008. Estimating puma densities from remote cameras across 3 study sites: Bolivia, Argentina, and Belize. *Journal of Mammalogy* 89: 408-418.
- Kelly M. J. and E.L. Holub\*\* 2008. Camera trapping carnivores: Trap success among camera types and across species, and habitat selection by species on salt pond mountain, Giles Co., VA. *Northeastern Naturalist* 15:249-262.
- \*Laver, P.N. and M.J. Kelly. 2008. A critical review of home range studies. *Journal of Wildlife Management*.72: 290-298.
- \*Dillon, A.G. and M.J. Kelly. 2007. Ocelot activity, trap success, and density in Belize: the impact of trap spacing and animal movement on density estimates. *Oryx* 41: 1-9.
- Kelt, D.A.; Hafner, M.S.; Danielson, B.; Van Vuren, D. and M.J. Kelly. 2007. On the threat of hantavirus pulmonary syndrome to field biologists working with small mammals. *Emerging Infectious Diseases*. 13: 1285-1287.
- \*Kaminski, J.A.; Davis, M.L.; Kelly, M.J. and P.D. Keyser. 2007. Disturbance Effects on Small Mammal Communities in a Managed Appalachian Forest. *American Midland Naturalist*. 157: 385–397.
- \*Batts, G .K.; Lafon, N. W.; Kelly, M.J. and M. R. Vaughan. 2006. A modified approach to rocket netting white-tailed deer using a remote video. *Proceedings of the Southeastern Association of Fish and Wildlife Agencies* 60: 77–82
- Davis, M; Berkson, J, and M. Kelly. 2006. Delaware Bay Horseshoe Crab (*Limulus polyphemus*) Population Assessment Using a Surplus Production Model. *Fisheries Bulletin* 104: 215-225.
- Noss, A.J.; Kelly, M.J.; \*\*Camblos, H.B. and D.I. Rumiz. 2006. Pumas y Jaguares Simpátricos: Datos de Trampas-Cámara en Bolivia y Belize. *MEMORIAS*: 229-237
- Silver, S.C.; Ostro, L.E.T.; Marsh, L.K.; Maffei, L.; Noss, A.J.; Kelly, M.J.; Wallace, R.B.; Gomez, H. and G. Ayala. 2004. The use of camera traps for estimating jaguar abundance and density using capture/recapture analysis. *Oryx* 38: 148-154.
- Durant, S.M.; Kelly, M.J. and T.M. Caro. 2004. Factors affecting life and death in Serengeti cheetahs: Environment, Age and Sociality. *Behavioral Ecology* 15: 11-22
- Kelly, M.J. 2003. Jaguar monitoring in Western Belize. *Caribbean Geography* 13: 19-32.
- Kelly, M.J. and T.M. Caro. 2003. Low density of small mammals at Las Cuevas, Belize. *Mammalian Biology* 68:1-15
- Maehr, D.S.; Kelly, M.J.; Bolgiano, C.; Lester, T. and H. McGinnis. 2003. Eastern Cougar recovery is linked to Florida panther: Cardoza and Langlois revisited. *Wildlife Society Bulletin* 31: 849-853.
- Kelly, M.J. 2001. Conservation consequences of lineage loss, reproductive variance, and heritable fertility in Serengeti cheetahs. *Conservation Biology*. 15: 137-147.
- Kelly, M.J. 2001. Computer aided photograph matching in studies employing individual identification: An example from Serengeti cheetahs. *Journal of Mammalogy*. 82: 440-449.
- Caro, T.; Brock, R.E. and M.J. Kelly 2001. Diversity of mammals in the Bladen Nature Reserve, Belize, and factors affecting their trapping success. *Mammalian Biology*.66: 90-101.

- Caro, T.; Kelly, M.J.; Bol, N. and S. Matola. 2001. Inventorying mammals at multiple sites: the Maya Mountains of Belize. *Journal of Mammalogy*. 82: 43-50.
- Kelly, M.J. and S.M. Durant. 2000. Viability of the Serengeti cheetah population. *Conservation Biology* 14: 786-797.
- Gros, P.M.; Kelly, M.J. and T.M. Caro. 1996. Estimating carnivore densities for conservation purposes. Indirect ecological methods compared to long term field studies. *Oikos* 77: 197-206.
- Kelly, M.J.; Laurenson, M.K.; FitzGibbon, C. D.; Collins, D. A.; Durant, S.M.; Frame, G.W.; Bertram, B.C.R. and T.M. Caro. 1998. Long-term demography of the Serengeti cheetah population: the first 25 years. *Journal of Zoology, London* 244: 473-488.
- Caro, T.M.; Lombardo, L.; Goldzien, A.W. and M. Kelly. 1995. Tail-flagging and other anti-predator signals in white-tailed deer: new data and synthesis. *Behavioral Ecology* 6:442-450.

## BOOK CHAPTERS

- Kelly, M.J; Tempa, T and Y. Wangdi. 2013. Camera Trapping Protocols for Wildlife Studies (With Emphasis on Tiger Density Estimation). Pps. 92-113 in *Wildlife Research Techniques in Rugged Mountainous Asian Landscapes*, eds. Mills, Tempa, and Cheng. Ugyen-Wangchuck Institute for Conservation and Environment. Bumthang, Bhutan
- Cheng, E; Dorzang, K and M.J. Kelly. 2013. Assessing Distribution and Abundance of Three Small Felid Species in Royal Mana National Park, Bhutan. Pps. 200-214 in *Wildlife Research Techniques in Rugged Mountainous Asian Landscapes*, eds. Mills, Tempa, and Cheng. Ugyen-Wangchuck Institute for Conservation and Environment. Bumthang, Bhutan
- Kelly, M.J.; Betsch, J.; Wultsch, C.; Mesa, J.B.; L.S. Mills. 2012. Non-invasive sampling for carnivores. Pps.47-69 in *Carnivore Ecology and Conservation: A handbook of techniques*. Boitani, L. and R. Powell (eds). Oxford University Press, Inc., New York.
- Maffei, L; Noss, A. J.; Silver, S. and M.J. Kelly. 2011. Abundance/Density Case Study: Jaguars in the Americas. Pps 119-144, in: *Camera Traps in Animal Ecology: Methods and Analyses*. O'Connell Jr., A.F.; Nichols, J.D. and K.U. Karanth, editors. Springer, New York.
- Kelly, M. and Silver, S. 2009 .The suitability of the jaguar (*Panthera onca*) for reintroduction. In: Hayword, M and Seomers, M. eds. *Reintroduction of top-order predators*. Pp.187-205 Oxford, UK. John Wiley and Sons.
- Caro, T. and Kelly, M.J. 2001. Cheetahs and Their Mating System. Pages 512-532 in *Model Systems in Behavioral Ecology*. L.A. Dugatkin editor. Princeton University Press.

## HONORS AND AWARDS

- November 2013 - Global Conservation Leader Award; Philadelphia Zoo. 4<sup>th</sup> Annual Conservation Gala Event
- March 2012-College of Natural Resources, Curriculum Club Award for Excellence in Teaching
- March 2008-College of Natural Resources, Curriculum Club Award for Excellence in Teaching
- August 2006-FiW, Curriculum Club Award for Excellence in Teaching.
- March 2005-College of Natural Resources, Curriculum Club Award for Excellence in Teaching
- May 2003- Graduate Student Appreciation award; Virginia Tech.
- June 2001- Merton-Love Award for best Ph.D. dissertation in Ecology. UC Davis.
- June 2001- Finalist for Best Student Paper. Society for Conservation Biology, Missoula, MT.
- June 1998- Campus-wide award for Outstanding Graduate Student Teaching
- June 1997- Jastro-Shields Research Award for outstanding graduate student research
- Fall 1997- Spring 1998 - Ecology Block Grant Fellowship for outstanding research proposal.

## PROFESSIONAL MEMBERSHIPS

American Society of Mammalogists, American Association of Zoos and Aquariums, Mountain Lion Foundation (formerly Eastern Cougar Foundation) Advisory Board, IUCN cat specialist group,

Society for Conservation Biology, The Wildlife Society, Wild Felid Research and Management Association, International Bear Association