

## KEVIN T SHOEMAKER

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### EDUCATION

SUNY-ESF*	Conservation Biology	PhD (J.P Gibbs, advisor)	2011
SUNY-ESF	Conservation Biology	MS (J.P. Gibbs, advisor)	2007
Haverford College	Biology	BS	2000

\* State University of New York, College of Environmental Science and Forestry, Syracuse, NY

### EMPLOYMENT

Jan 2014 to present, Senior Scientist, Applied Biomathematics, Inc., Setauket, NY (1/2 time)  
June 2011 to present, Post-doctoral Associate, Stony Brook University, Stony Brook, NY (1/2 time)  
June 2011 to 2013, Research Ecologist, Applied Biomathematics, Inc., Setauket, NY (1/2 time)  
May 2011 to Dec 2011, Post-doctoral Associate, SUNY-ESF, Syracuse, NY

### RELEVANT EXPERTISE

- Simulation modeling of wildlife populations using Ramas, Vortex, HexSim, and R
- Global sensitivity analysis using machine learning methods (e.g., random forest, gradient boosting)
- Bayesian statistical analysis and hierarchical models using Markov Chain Monte Carlo
- Approximate Bayesian Computation (ABC)
- Estimating life history parameters with capture-recapture data
- Scripting and software development using R, Java, C#, and Pascal/Delphi
- Ecoinformatics: development and application of scientific workflow management systems (e.g., Kepler, VisTrails) and integrated environmental modeling frameworks (e.g., OpenMI, MetaModel Manager)
- Spatial analysis and visualization using GRASS, QGIS, R, and ArcGIS
- Field methods in ecology and wildlife conservation

### TEACHING EXPERIENCE

- For two years (2005-2006) I collaborated with high school science teachers in Syracuse, NY and surrounding area to develop and deliver innovative hands-on lab exercises and learning activities and to mentor high school students conducting research projects as part of an NSF-funded GK-12 program at SUNY-ESF.
- For three summers (2007-2009) I co-taught a field ecology course in which I introduced hundreds of undergraduate students to field methods in herpetology.
- I have delivered guest lectures in Conservation Biology, Population Ecology and Herpetology at SUNY-ESF, Stony Brook University, and University of Georgia.
- In spring 2010 I co-taught a seminar-style course (1 credit) at SUNY-ESF on using software tools for population biology (e.g., Program Presence, Program MARK).

- In spring 2012 I co-taught a seminar-style course (1 credit) on population viability analysis (PVA) at Stony Brook University.
- In fall 2013 I co-led two 1-day seminars on methods in risk analysis at the annual meeting of the Society for Risk Analysis, 2013, Baltimore MD.

#### MENTORSHIP

- I am currently serving as a dissertation committee member for a doctoral candidate at Fordham University.
- As a postdoc and PhD student, I have helped to mentor and advise several graduate students at Stony Brook university and SUNY-ESF.
- Supervising and training of field technicians
  - Dissertation Research, SUNY-ESF 2008-2011 (3 undergraduate, 1 Master's student)
  - Master's Research, SUNY-ESF 2005-2007 (2 undergraduates, 1 Master's student)

#### SERVICE

- I am currently serving on the editorial board of the journal *Population Ecology* as a handling editor. My term began in fall 2014.
- I am proud to serve as an advisor to USFWS in revising the Recovery Plan for the bog turtle (*Glyptemys muhlenbergii*), an endangered freshwater turtle of the eastern United States (the primary focus of my doctoral research, and for which I developed the first estimates of population viability and long-distance gene flow).
- I am currently helping the Mid-Atlantic Center for Herpetology and Conservation to develop and implement a regional monitoring plan for the bog turtle across its northern range.
- In fall 2012 I taught a 2-day workshop on PVA methods for agency biologists at the New York State Department of Environmental Conservation (NYS-DEC).
- After publishing work that demonstrated the surprising viability of small turtle and tortoise populations, I have been invited by policymakers and managers to assist in conservation efforts for small and fragmented populations. In this capacity, I recently delivered keynote addresses to wildlife managers, policymakers and environmental consultants at the 2013 annual meeting of the Gopher Tortoise Council in Ponte Vedra, FL and at a 2014 Wildlife Mitigation Strategy workshop in Peterborough, ON organized by the Ontario Ministry of Transportation.
- Since 2010 I have served in various capacities as a consulting biostatistician for regulators and industry consultants for the wind power industry in New York, assisting in the analysis of large data sets related to avian and bat fatalities at wind power facilities. This work has cast some doubt on the utility of pre-construction radar and avian acoustic surveys for predicting bird and bat fatalities at wind farms. In addition, this work has resulted in two white papers for the electric power industry detailing the ecological risks of wind and solar power to bats and golden eagles.
- *Service as peer reviewer:* Conservation Biology, Conservation Genetics, Global Change Biology, Ecography, Population Ecology, Landscape Ecology, Northeastern Naturalist, Journal of Herpetology, Canadian Journal of Zoology, Herpetologica, PLOS ONE.

## OTHER RELEVANT ACTIVITIES

- *Professional society memberships*: Society for Conservation Biology, Ecological Society of America, The Wildlife Society.
- Co-developed a generic simulation model (RAMAS IIR) for assessing the rate of insect pest evolution to transgenic crops. This software is currently being used by industry and consultants to develop best management practices for optimizing crop durability. By providing a rigorous framework for exploring the effects of alternative agricultural practices, this software platform facilitates more effective communication among industry, regulators and academic ecologists. In addition, an educational version of this software will be made available to enhance inquiry-based learning for students of applied evolution.

## GRANTS AND FELLOWSHIPS

- Principal Investigator for USDA SBIR grant #2014-02598 (2014-2016), "Effect of Human Population on Land Use and Species Viability: Methodology and Software": (\$450,000)
- Co-principal Investigator for USFWS Great Lakes Research Initiative grant (2012-2014), "Restoring critical habitat, mitigating multiple threats in Bergen Swamp" (\$128,064)
- I have helped to draft several successful grant applications, including a 5-year NSF-RCN metamodeling grant which has supported much of my postdoctoral work at Stony Brook University, and a grant from the New York State Biodiversity Research Institute, which supported my master's research at SUNY-ESF.

## JOURNAL ARTICLES

Gibbs, J.P., Shoemaker, K.T., Hunter, E.A., Cayot, L., & Tapia, W. 2014. Giant Tortoise Reintroduction to Española Island, Galapagos: Demographic Outcomes and Ecosystem Implications. *PLoS ONE*. [DOI: 10.1371/journal.pone.0110742]

Stanton, J.C., Shoemaker, K.T., Pearson, R.G., & Akçakaya, H.R. 2015. Warning Times For Species Extinctions Due To Climate Change. *Global Change Biology* [doi: 10.1111/gcb.12721]

Shoemaker, K.T. & Akçakaya, H.R. 2015. Inferring the nature of anthropogenic threats from long-term abundance records. *Conservation Biology* **29**:238–249.

Penone, C., Davidson, A.D., Shoemaker, K.T., Graham, C. Di Marco, M. Rondinini, C. Hedges, B., & Costa, G.C. 2014. Imputation of missing data in life-history traits datasets: which approach performs the best? *Methods in Ecology and Evolution*. **5**:961–970.

Fordham, D.A., Shoemaker, K.T., Schumaker, N.H., Akçakaya, H.R., Clisby, N., & Brook, B.W. 2014. How interactions between animal movement and landscape processes modify local range dynamics and extinction risk. *Biology Letters* **10**:20140198.

Davidson, A. D., Friggens, M.T., Shoemaker, K.T., Hayes, C. L., Erz, J., Duran, R. 2014. Population Dynamics of Reintroduced Gunnison's Prairie Dogs in the Southern Portion of their Range. *Journal of Wildlife Management* **78**:429-439.

- Shoemaker, K.T., Breisch, A.R., Jaycox, J.W., & Gibbs, J.P. 2014. Disambiguating the Minimum Viable Population Concept: Response to Reed and McCoy. *Conservation Biology* **28**:871-873.
- Pearson, R.G., Stanton, J.C., Shoemaker, K.T., Aiello-Lammens, M.E., Ersts, P.J., Horning, N., Fordham, D.A., Raxworthy, C.J., Ryu, H.Y., McNees, J., & Akçakaya, H.R. 2014. Life history and spatial traits predict extinction risk due to climate change. *Nature Climate Change* **4**:217–221.
- Shoemaker, K.T., Lacy, R.C., Verant, M.L., Brook, B.W., Livieri, T.M., Miller, P.S., Fordham, D.A., & Akçakaya, H.R. 2014. Effects of prey metapopulation structure on the viability of black-footed ferrets in plague-impacted landscapes: a metamodeling approach. *Journal of Applied Ecology* **51**: 735-745.
- Chan, H-K, Shoemaker, K.T. & Karraker, N.E. 2014. Demography of *Quasipaa* frogs in China reveals high vulnerability to widespread harvest pressure. *Biological Conservation* **170**:3-9.
- Shoemaker, K.T., A.R. Breisch, J. Jaycox, and J.P. Gibbs. 2013. Re-examining the minimum viable population concept for long-lived species. *Conservation Biology* **27**:542-551.
- Shoemaker, K.T., and J.P. Gibbs. 2013. Genetic Connectivity Among Populations of the Threatened Bog Turtle (*Glyptemys muhlenbergii*) and the Need for a Regional Approach to Turtle Conservation. *Copeia* **2013**:324-331.
- Shoemaker, K.T., and J.P. Gibbs. 2010. Evaluating basking-habitat deficiency in the threatened eastern massasauga rattlesnake. *Journal of Wildlife Management* **74**:504-513.
- Schlaepfer, M.A., W.D. Helenbrook, K.B. Searing, and K.T. Shoemaker. 2009. Assisted colonization: evaluating contrasting management actions (and values) in the face of uncertainty. *Trends in Ecology and Evolution* **24**:471-472.

#### BOOK CHAPTERS:

- Shoemaker, K.T., G. Johnson and K.A. Prior. 2009. Habitat manipulation as a viable conservation strategy. Pp. 221–243 in (S.J. Mullin and R.J. Seigel, eds.) *Snakes: Applied Ecology and Conservation*. Cornell Univ. Press.

#### BOOK REVIEWS:

- Shoemaker, K.T. Design and Analysis of Long-Term Ecological Monitoring Studies (R.A. Gitzen et al., editors). *The Quarterly Review of Biology* **88**: 334.

#### RECENT PUBLISHED REPORTS:

- Friedenberg, N.A. and Shoemaker, K.T. 2013. Population-Level Impacts of Wind Energy Development on Golden Eagles (*Aquila chrysaetos*). Electric Power Research Authority (EPRI) publication #3002004770.

Shoemaker, K.T., J. Stanton, J. Ray, and N.A. Friedenber. 2013. Assessing Population-level Risks of Wind Power Development for the Indiana Bat (*Myotis sodalis*). Electric Power Research Authority (EPRI). 95 pp.

Friedenberg, N.A. and Shoemaker, K.T. 2012. Ecological risks associated with wind and solar power. Electric Power Research Authority (EPRI). 69 pp.

Friedenberg, N.A. and Shoemaker, K.T. 2013. Golden Eagle Nesting Habitat in the Contiguous Western United States. Electric Power Research Authority (EPRI) publication #3002002401.

#### REPORTS TO STATE AGENCIES:

Shoemaker, K.T., A.T. Krofta and J.P. Gibbs. 2007. Management recommendations for the eastern massasauga rattlesnake at Cicero Swamp Wildlife Management Area based on recent surveys. Unpublished report prepared for the New York State Department of Environmental Conservation, Albany, NY. 13 pp.

Shoemaker, K.T., A.T. Krofta and J.P. Gibbs. 2006. Is Management Intervention Necessary for the Conservation of the Massasauga Rattlesnake at Cicero Swamp? A Report Based on a 2-year Ecological Study. Unpublished report prepared for the New York State Department of Environmental Conservation, Albany, NY. 39 pp.

#### OTHER PUBLICATIONS

Shoemaker, K.T. 2011. Demography and population genetics of the bog turtle (*Glyptemys muhlenbergii*): implications for regional conservation planning in New York State. Dissertation, State University of New York College of Environmental Science and Forestry, Syracuse, NY. May 2011. 221 pp.

Shoemaker, K.T. 2007. Habitat manipulation as a viable strategy for the conservation of the massasauga rattlesnake in New York State. Masters Thesis, State University of New York College of Environmental Science and Forestry, Syracuse, NY. May 2007.

#### PROFESSIONAL PRESENTATIONS AND INVITED TALKS

Shoemaker, K.T. et al., "Modeling the recovery of the black-footed ferret in a linked predator-prey-disease system". Invited talk for the seminar series at Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA, Oct 2014.

Shoemaker, K.T. et al., "Improving regional abundance dynamics and range-shift forecasts by coupling individual-based dispersal models with matrix-based population projections." At the Ecological Society of America 99th Annual Meeting, Sacramento, CA, Thu., Aug. 14, 2014.

Shoemaker, K.T. et al. "Can the IUCN Red List provide sufficient advance warning of extinction under climate change?" At the North American Congress for Conservation Biology. Missoula, MT. Monday, 14 July, 2014.

- Shoemaker, K.T. et al. "Population Viability Analysis (PVA) for assessing population-level effects of roads and mitigation strategies". Keynote address for the Ontario Ministry of Transportation (MTO) Wildlife Mitigation Strategy meeting, Peterborough, ON, Canada, Mar. 2014.
- Shoemaker, K.T. et al. "Assessing the conservation value of small gopher tortoise populations: lessons from a bog turtle metapopulation in New York". Keynote address for the annual meeting of the Gopher Tortoise Council, Ponte Vedra, FL, Nov. 2013.
- Shoemaker, K.T. et al. "Mixing good data with bad: How to do it and when you should not". At the Society for Risk Analysis annual meeting. Baltimore, MD. 8 December 2013.
- Shoemaker, K.T. et al. "Modeling the recovery of the black-footed ferret in a linked predator-prey-disease system". At the International Congress for Conservation Biology. Baltimore, MD, 22 July 2013.
- Friedenberg, N.A. and K.T. Shoemaker. "RAMAS IRM: Software for risk-based durability assessment". At the Entomological Society of America Annual Meeting, Knoxville TN. Nov 2012.
- Shoemaker, K.T. et al. "Assessing Population-level Risks of Wind Power Development for the Indiana bat (*Myotis sodalis*)". At the Electric Power Research Institute (EPRI) annual meeting, Nashville TN. Oct 2012.
- Shoemaker, K.T. and H.R. Akcakaya. "Inferring the nature of anthropogenic threats from long term abundance records". At the Ecological Society of America 97th Annual Meeting, Portland, OR. Aug 2012.
- Friedenberg, N.A., and K.T. Shoemaker. "Wildlife risk assessment for new wind and solar facilities". At the Electric Power Research Institute (EPRI) annual meeting, Boston MA, Sep 2011.
- Shoemaker, K.T. "Monitoring and restoring bog turtle metapopulations in NY". Invited presentation for USFWS, New York Ecological Services Field Office, Cortland, New York, NY. April 27, 2011.
- Shoemaker, K.T. Assessing the status of massasauga rattlesnakes (*Sistrurus c. catenatus*) in New York State. Paper presented at the Northeast Natural History Conference. Albany, NY. April 17–18, 2008.
- Shoemaker, K.T. and J.P. Gibbs. Assessing the case for thermal limitation in a threatened population of massasauga rattlesnakes at Cicero Swamp, New York. Paper presented at the Snakes of the Northeast. Amherst, MA. Dec. 30, 2007.
- Shoemaker, K.T. Conservation of the Eastern Massasauga Rattlesnake in New York State. Keynote address delivered at the annual meeting of the Bergen Swamp Preservation Society. Bergen, NY. Oct. 26, 2007.
- Shoemaker, K.T. The Eastern Massasauga Rattlesnake: a New York State Conservation Priority. Invited presentation for the Seneca Park Zoo (SPZ) Conservation Committee. Rochester, NY. Oct. 11, 2007.

Shoemaker, K.T. and J.P. Gibbs. Assessing the case for thermal limitation in a threatened population of massasauga rattlesnakes at Cicero Swamp, New York. Paper presented at the Joint Meeting of Ichthyologists and Herpetologists (JMIH). St. Louis, MO. July 11, 2007.

#### POSTER PRESENTATIONS

Shoemaker, K.T. and J.P. Gibbs. Are small turtle populations worth protecting? Insights from Population Viability Analysis. Poster presented at the Student Conference on Conservation Science. New York, NY. Nov. 3-9, 2010.

Shoemaker, K.T. and J.P. Gibbs. Demography of a viable bog turtle metapopulation in New York. Poster presented at the Turtle Survival Alliance meeting. Orlando, FL. Aug. 16-19, 2010.

Shoemaker, K.T., G. Johnson, and J.P. Gibbs. Relating habitat structure, thermal quality, and massasauga habitat use in Central New York: implications for management. Poster displayed at the Spotlight on Student Research and Outreach. SUNY-ESF, Syracuse, NY. Apr. 19, 2006

Shoemaker, K.T. and J.P. Gibbs. Relating habitat structure and operative temperatures in massasauga habitat in central New York: implications for management. Poster displayed at the Third International Conference and Workshop on the Conservation of the Massasauga Rattlesnake, Toronto Zoo, Toronto, ON. Oct. 12-14, 2005.