

*Mary E Killilea*

Cary Institute of Ecosystem Studies  
2801 Sharon Turnpike; PO Box AB  
Millbrook NY 12545-0129  
Telephone: (845) 677-5343 -- FAX: (845) 677-5976  
E-mail: killileam@ecostudies.org

**Education:**

- 2005 Ph.D., Environmental Information Science, Cornell University
- 1999 M.S., Ecology, State University of New York College of Environmental Science and Forestry
- 1994 B.A., Environmental Studies, Binghamton University

**Professional Positions:**

- 2006 to present Postdoctoral Research Associate with Richard S. Ostfeld, Cary Institute of Ecosystem Studies, Millbrook, NY
- 2005 to 2006 Postdoctoral Researcher with Jonathan Adams, Department of Biological Science, Rutgers University-Newark, Newark, NJ
- 2002 to 2004 Graduate Research Assistant, Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY
- Spring 2001 Graduate Research Assistant, Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY
- Fall 2000 Teaching Assistant, Department of Crop and Soil Sciences, Cornell University, Ithaca, NY
- Summer 2000 GIS Intern, Trust for Public Lands, New York, NY
- Spring 2000 Teaching Assistant, Department of Crop and Soil Sciences, Cornell University, Ithaca, NY

**Selected Professional Honors:**

- 2003 McDonald-Musgrave Graduate Student Recognition Award, Department of Crop and Soil Sciences, Cornell University
- 2003 Cornell University Biogeochemistry Small Grant Award
- 2003 Student of the Year Award, Central New York Region, American Society for Photogrammetry and Remote Sensing
- 2002 Cornell University Biogeochemistry Small Grant Award

### **Research Interests and Activities:**

A central theme in my research has been how ecosystem form and function varies over space and time, and how environmental change influences these patterns. I use and develop predictive models to assess the impacts of future environmental change. My broad interests and strong spatial analysis skills have led to a variety of interesting collaborative projects, something I enjoy and hope to continue.

My current research at the Cary Institute of Ecosystem Studies focuses on the spatial dynamics of Lyme disease in Dutchess County, NY and Marin County, CA which includes collaboration with researchers at UC Berkley and UC Santa Barbara. Lyme disease is caused by the spirochete bacterium, *Borrelia burgdorferi*, which is vectored by the ticks *Ixodes scapularis* (in eastern and central areas) and *Ixodes pacificus* (in the west). A suite of vertebrate hosts act as reservoirs. For the actual disease to occur, the pathogen, vector, one or more reservoir hosts, and the human victim must all overlap in space and time. In other words, Lyme disease is an inherently spatial process, and these processes occur in a heterogeneous and changing landscape.

In Marin County, CA, Sudden Oak Death has altered tree species composition and forest structure, which may in turn alter the distribution and abundance of both the reservoir hosts and vectors of Lyme disease. At our field sites that have been affected by Sudden Oak Death. The resulting loss of coast live oaks and tanoaks has created gaps in the canopy and covered the forest floor with coarse woody debris. My research focuses on how the canopy gaps alter the site microclimate and how these microclimatic changes effect tick survival, and then how these changes scale up to the landscape level. Thus far, we know that the gaps experience more extremes in temperature and relative humidity than adjacent areas with intact canopies, which will likely impact tick survival. This link will be tested in field experiments next spring.

Similarly, in Dutchess County, NY, I am interested in how microclimate and other factors influence tick survival. These interests have resulted in several collaborations and projects. During this past summer, for instance, I worked with an REU student on the effects of invasive earthworms on habit suitability and density of ticks. I am also working on likelihood-based models to use a suite of field measurements to predict tick densities. This comes after an extensive literature review of the spatial aspects of Lyme disease risk and actual cases, which revealed an unfortunate dearth of multi-factor studies done at an appropriate spatial scale to actually address how Lyme disease might be influenced by the landscape. This is a deficiency I intend to remedy.

### **Selected Publications:**

Killilea, M.E., Swei, A., Lane, R.S., Briggs, C.J., Ostfeld, R.S. (2008) Spatial dynamics of Lyme disease: A review. *EcoHealth*

LoGiudice, K., Duerr, S.T.K., Newhouse, M.J., Schmidt, K.A., Killilea, M.E., and Ostfeld, R.S. (in press) Impact of host community composition on Lyme disease risk. *Ecology*.

Andrea Swei, Daniel J. Salkeld, Mary E. Killilea, Richard S. Ostfeld, Robert S. Lane, Cheryl J. Briggs (in Review) Ecological heterogeneity of Lyme disease risk and impacts of a changing world. *Frontiers in Ecology*

Killilea, M. 2005. Spatial Modeling of Carbon Sequestration by Forest Ecosystems in the Hudson River Valley, New York. Ph.D. Dissertation. Cornell University.

Killilea, M. 1999. Variation in Abundance and Tree Growth in New York State as a Function of Environmental Gradients. M.S. Thesis. State University of New York College of Environmental Science and Forestry.