

Planners, Ticks, and the White-Footed Mouse

How can we best manage land to protect public health?

Theo Holtwijk, Director of Long-Range Planning, Town of Falmouth, Maine

[Lyme Disease Could Soar This Year](#)

Reports of confirmed Lyme disease cases have been pouring into the Maine Center for Disease Control and Prevention this year at a rate three times above normal.

Maine Sunday Telegram, April 4, 2010

Reading the recent headline above reminded me why I should write the following article for my fellow Maine planners.

Last fall I was invited by the U.S. Environmental Protection Agency (EPA) to participate in a first-ever interdisciplinary science workshop, titled *Biodiversity/Landscape Change and Lyme Disease: Science and Application*.

My first thoughts were: in my job I don't have anything to do with Lyme disease. I don't know much about ticks. What do I have to contribute to this effort? Isn't it enough to keep my pant legs tucked in and do regular tick checks?



Biodiversity and Human Health scientist Montira Pongsiri

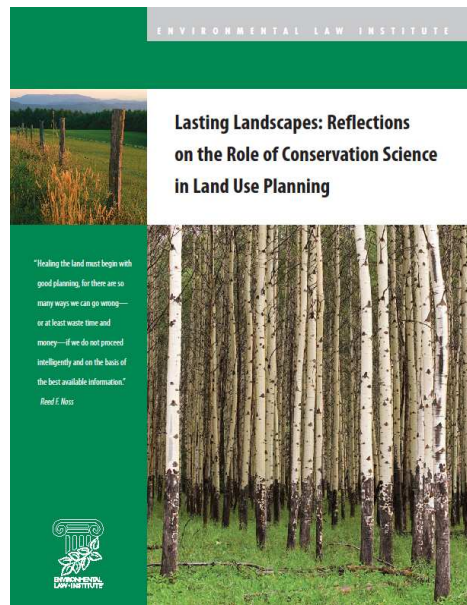
Source: <http://www.epa.gov/ncer/biodiversity/>

But as EPA Environmental Health Scientist Montira Pongsiri and I talked more about this topic on the phone, my eyes gradually opened. I learned about a new [Biodiversity and Human Health effort](#) by the EPA to better understand the relationships between habitat fragmentation, deforestation, climate change, changes in biodiversity, and infectious disease transmission to humans. And I found out that the agency was particularly interested in discussing with land use planners best practices on landscape design to conserve and enhance “ecosystem services.” Disease regulation is viewed as an ecosystem service that the EPA is trying to understand by asking: “how can we best manage land to protect public health?” Ah, interesting question, I thought.

As little as I knew about Lyme disease as little did the health scientists know about planning, I realized. The scientists were eager to know: How does land use planning work at the local level? How does development occur? How does land preservation happen at the local level? How does science support land use planning decisions? How might new science on Lyme disease and landscape use/condition be incorporated? What do land use

planners need from the scientific community to help support more conservation, and smarter development? OK, I think I can help was my reaction.

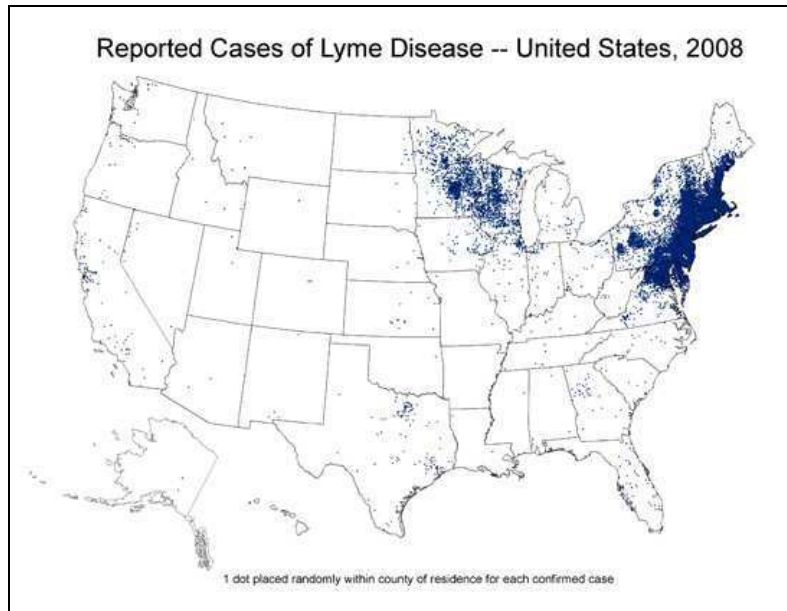
I put together a Land Use Planning 101 presentation that discussed one applicable Maine project: the Rural Brunswick Smart Growth effort. In the [Brunswick project](#) ecology scientists worked together with planners on mapping unfragmented wildlife habitats and corridors throughout the community and devising ways through which development impacts could be minimized. While looking into the relationship between planners and ecologists a bit more, I stumbled on an interesting report called [Lasting Landscapes: Reflections on the Role of Conservation Science in Land Use Planning](#) (2007) by the Environmental Law Institute. More lights went on!



Then I packed a bag, went to EPA’s regional lab in Chelmsford, Massachusetts, and mingled for two days with a diverse group of scientists, medical professionals, and wildlife managers. At the [workshop](#) I learned about the white-footed mouse, Lyme disease epidemiology, Babesiosis, tick management, field experiments in Lyme disease transmission, and more. I also learned how much we do not know yet, how serious a [health issue](#) Lyme disease really is, how much it is expected to increase in the coming years, and how we as planners better start paying attention.

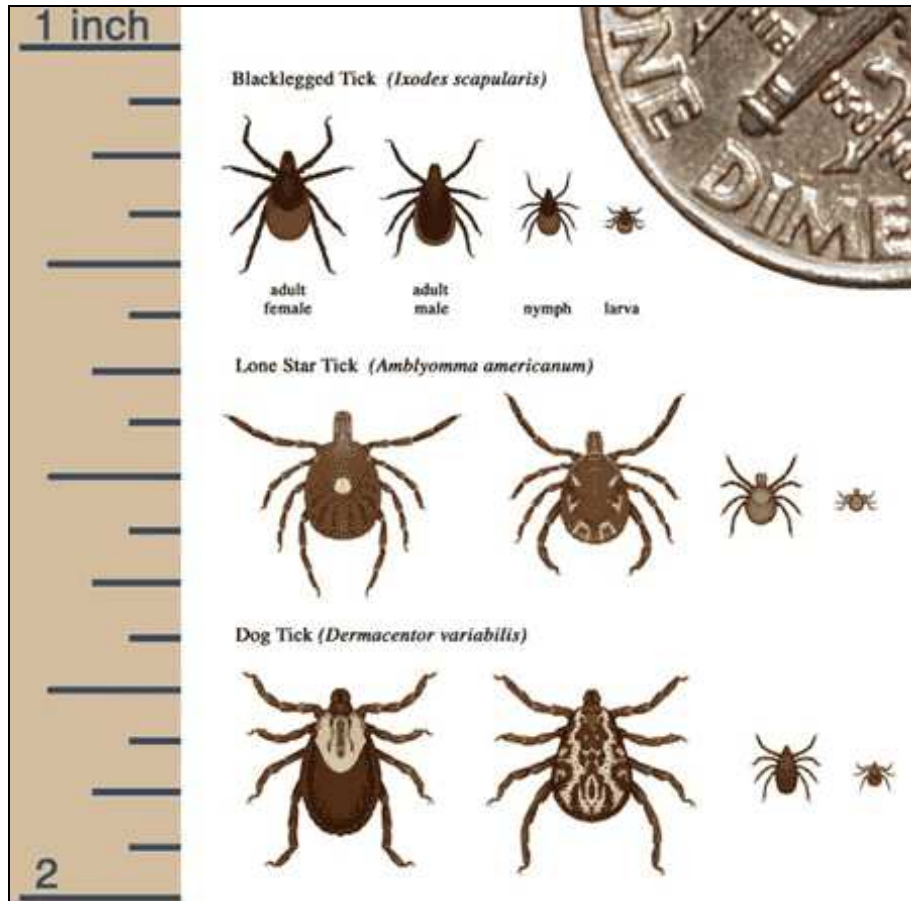
Here are a few quick excerpts from the workshop proceedings:

Lyme disease is the vector-borne disease with nearly 29,000 confirmed cases reported in 2008. Most cases are clustered in the Northeast and upper Mid-West.



Source: http://www.cdc.gov/ncidod/dvbid/lyme/ld_Incidence.htm

The human risk varies and is dependent upon the local distribution and abundance of vector competent tick species and the available vertebrate host community, such as white-footed mice and white-tailed deer, upon which the ticks across their various life stages depend.



Comparative Images of Black-legged, Lone Star and Dog Ticks

Source: http://www.cdc.gov/ncidod/dvbid/lyme/ld_blackleggedTick.htm

Not all mammals are equally effective or efficient at transmitting the disease to ticks. White-footed mice appear to be the most effective (or “competent”) when it comes to transmitting LD-causing bacteria to ticks. It appears that the abundance of white-footed mice is predictive of both the density of infected tick nymphs and the Lyme disease risk in the human population. Deer are the preferred animal hosts of adult-stage black-legged ticks. Fragmented habitat and forested areas, along with limited hunting access, contribute to the increasing abundance of deer in urban and suburban landscapes.



White-footed Mouse

Source: http://www.fcps.edu/islandcreekes/ecology/white-footed_mouse.htm

It is still unclear what ecological spatial scale is most appropriate to potentially manage public health risk. Many types and sizes of spatial units have been studied, from the backyard to landscapes measuring hundreds of square kilometers, with significant relationships found across scales among indicators of disease risk. Studies suggest that there is a connection between the abundance of animal hosts and tick vectors and the landscape they inhabit. Forest fragmentation and destruction in the U.S. have been shown to reduce mammalian species diversity and to increase populations of the white-footed mouse. EPA researchers are investigating whether the degree of fragmentation can serve as a surrogate for the density of infected ticks and, therefore, public health risk.

Currently, we rely mostly on self-protection measures to avoid being contracted with Lyme disease. A comprehensive and helpful [Tick Management Handbook](#) aimed at disease prevention was produced by the State of Connecticut. However, how we plan for our communities may have a considerable impact as well.

At the site plan scale, less risky landscapes can be created, for instance, by selecting certain plants and avoiding others and installing wood chip border areas. At the neighborhood scale we may be able to reduce exposure risk by not developing into forested areas. At a town-wide or regional scale, preservation of wildlife habitat may help to reduce tick abundance. But this is a complex issue and more research in this area is needed before we know if there any measures that are likely to be most effective.

Following the Fall 2009 Workshop, EPA established a so-called on-line “Community of Practice (CoP)” around the issue of biodiversity/landscape change and vector-borne (Lyme) disease in the hope that it will foster closer collaboration between public health practitioners, land use planners, ecologists, and the public to study those issues. All Maine planners are encouraged to participate in this effort.

How serious are ticks and Lyme disease in your community? Do you tuck your pant legs in?

SIDEBAR

An Invitation to Maine Planners to Participate

An Invitation to Maine Planners to Participate On-Line

If you are interested in participating on-line in a so-called "Community of Practice" organized by the EPA around *Biodiversity/Landscape Change and Lyme Disease: Science and Application*, please feel free to contact:

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