Tick, Tick, Tick . . . Time Running Out on Housing Bubble

by Marcia Merry Baker

In March 2006, Loudoun County, Virginia, was officially declared an epidemic region for Lyme disease, the bacterial illness which, if not treated promptly, can cause permanent pain and impairment in the joints, nervous system, heart, or elsewhere. Loudoun ranks third among counties nationally for the disease (in terms of rapid rate of increase of cases), after only Lyme, Connecticut, for which the disease is named, and a county in Rhode Island. This is right in line with various biological studies to date, showing that *the spread and incidence of Lyme disease over the past 15 years—outward from its original concentrations in New England and the North Central states—is directly related to the furtherance of Lyme disease vectors (ticks and mice) associated with the patterns of sprawl during the Alan Greenspan-era speculative home mortgage and commercial real estate binge.*

Thus, Loudoun County now has the double-distinction of being both the Ground Zero county for bursting of the real estate bubble (see "As LaRouche Warned: Loudoun County Real Estate Bubble Is Ready To Implode," *EIR,* April 28, 2006), and also for a disease rate associated with the bubble-producing speculative insanity. Loudoun stands as a proof-of-principle of how violating what's best for the economy, is dangerous for your health—man or beast.

The number of new Lyme disease cases in Loudoun County, located in northern Virginia, 40 miles west of Washington, D.C., topped 100 in 2005, up from 29 in 2000, and the county today represents over 40% of all cases in the state. At present, there are 371 known cases among Loudoun residents. Dr. David Goodfriend, director of the Loudoun Health Department, told *Leesburg Today* in March, that the actual, undiagnosed incidence could be twice as high as 371; some specialists estimate there are ten times as many unreported cases. Goodfriend said, "If you look at any measure of epidemic, it's an epidemic."

Suburbanization Creates Disease Habitats

How did this come about? First, a simplified overview, then some specifics. In brief, it's a matter of creating a habitat favorable to the most efficient Lyme disease vector pattern: 1) mouse hosts ticks; 2) infection is transmitted, 3) humans get disease from infected ticks (especially when they are tiny, hard-to-see nymphs) present in grass or other vegetation.

CDC

The two centers of concentration are in the Northeast and North Central states, shown by one dot for each case, in the county of residence, 2004. Nationwide, in 1991, there were in the range of 9,000 reported cases, reaching 24,000 in 2000. As of 2004, the Centers for Disease Control reported 19,804 cases, for a national average of 6.7 per 100,000 people. But in the 12 states where the disease is more common, the average was 27.4 cases for every 100,000 persons. Statewide high averages for 2003 included: 68.38 per 100,000 in Rhode Island; 40.28 in Connecticut; and 46.34 in Pennsylvania.

EIRNS/Stuart Lewis

A "McMansion" in Virginia's Loudoun County. Such patches of land carved out of former woods and agricultural areas are prime breeding grounds for the field mice that carry ticks, since predators of the mice have been eliminated.

During the recent decades of real estate speculation, land use has been altered so extensively, away from distinctly organized urban and agriculture patterns, into a suburban patchwork of housing developments and malls, carved out of former woods and farm fields, that a perfect habitat for the field mouse has been created. The mouse is believed to be the foremost host and transmitter of Lyme-infected ticks. Look at the clearings in the forest made for housing developments in the Pocono Mountains, Pennsylvania, for example. Look at the extensive areas of former farmland and woodlots carved up into home lots throughout Loudoun County.

What happens is twofold: In these kinds of settings, in particular in what researchers call "fragmented forests," the mouse population itself rises, because its predator and competitor population tends to fall—owls, hawks, squirrels, chipmunks, and many others. So there are simply more mice, hence more opportunity for ticks. And secondly, because these various other animals don't all acquire or transmit Lyme infection as easily as do mice—though the animals may well host ticks—the *rate of infected ticks rises* when the mouse population is high, and the number of other host creatures is low, which researchers call a low bio-diversity.

This puts one popular notion into a new perspective, namely that deer are the main culprits. Yes, deer do host ticks, especially in the adult tick phase, and contribute to the pool of ticks present. But deer themselves, even when bitten, do not necessarily get Lyme disease, nor transmit it. It's necessary to look at the entire ecology favoring the disease. Though "deer tick" is the common name for the black-legged variety of tick involved in transmitting Lyme disease, the specific culprit vector is the field mouse. Housing sprawl itself has advanced conditions for the mouse and for human contact with the ticks, in the grassy yards and surrounding woods.

What then predictably ensued, as more and more of the U.S. land use pattern was altered, especially during the past 15 years of the Greenspan Great Housing Bubble, is that Lyme disease "took off." Whereas historically, its presence was concentrated in mainly two areas—the Northeast, and North Central states, the new, favorable habitats for transmission from mice to ticks to humans, allowed the disease to move outward and intensify as suburbanization grew.

The map shows the geographic distribution of cases as of 2004. Loudoun County is on the front edge of the progressing pattern.

Epidemiology: Some Details

Lyme disease is caused by the spirochete bacterium *Borrelia burgdorferi;* typical symptoms include fever, headache, and fatigue. The bacteria are transmitted by ticks to humans and animals. Two black-legged ticks are involved, the *Ixodes scapularis,* common in the East and Central regions of the United States; and the *I. pacificus,* common in the West.

For humans, the tell-tale first-reaction (in some, but not all people) is a characteristic skin rash called erythema migrans, which has a bull's-eye pattern, caused by the reproduction of the spirochete. If Lyme is not diagnosed early, and treated rapidly with antibiotics, then comes the danger of chronic illness, including arthritis and central nervous system problems.

CDC

Photomicrograph of Borrelia burgdorferi, *the spirochete bacterium which causes Lyme disease.*

CDC/Michael L. Levin, Ph.D.

The black-legged tick, Ixodes scapularis*, otherwise known as the deer tick. It and* Ixodes pacificu *in the West, are vectors for Lyme disease. They transmit the bacteria to humans and animals during feeding, when they insert their mouth parts into the skin of a host, and take in nutrients from the host blood.*

Virgiania Dept. of Game & Inland Fisheries

The common, white-footed mouse, Peromyscus leucopus*.*

USDA/Scott Bauer

In the Northeast, the white-tailed deer, Odocoileus virginianus*, is the primary host for adult black-legged ticks.*

The key route of transmission by ticks is field mice. The white-footed mouse, *Peromyscus leucopus,* is considered the principal reservoir for the bacterium. The tick, at its earliest stage in life, acquires the bacteria from the blood of animals—most frequently the field mice. The tick's nymphal phase is when the disease is most commonly transmitted to humans, because the nymph, being so small, is not easily detected; and also, the nymph stage is usually late Spring and early Summer, when human presence outdoors is more frequent.

The other animal hosts for ticks, and for the bacteria, have varying degrees of efficiency in acquiring and transmitting infection. Compared to the mouse, these animals have lesser "reservoirs of competence" for infection, as the biologists say.

Therefore, the most obvious conditions favoring transmitting the disease to humans, are the habitats favoring field mice, and the interface with humans. This means the yards of suburban McMansion settings, five-acre "farmettes," and the other kinds of small patches carved out of former woods and agricultural areas surrounding the Eastern megalopolis, and other once-organized urban centers. In the ecology of these sprawl zones, field mice have a field day, because their predators and competitors have been eliminated.

Careful biological assays of cleared patches in forests, have shown that the density of infected ticks, and ticks overall, can be up to *seven times* as great in these situations—particularly in the range of 1 to 2 hectares (up to five acres), compared with standard forest areas, because mice thrive in these homelot sized land parcels.

A study published in 2003, of Duchess County, New York,[1] showed the phenomenon so distinctly, that its coauthor, Felicia Keesing, assistant professor of biology at Bard College, N.Y., told the *Poughkeepsie Journal* (Jan. 29, 2003), "It seems that this five-acre threshold is so clear that it would be really useful for planning boards to take this into account when allotting permits for multi-home developments."

Geography of Disease Habitat

In Loudoun County itself, Health Director Dr. Goodfriend is completing a zip code study to determine the epidemiological geography and other patterns of those afflicted with the disease in his jurisdiction. Multiple households along the roads of Loudoun's new housing developments, and whole families have been hit.

The National Institutes of Health has begun an investiga-

1. See Brian F. Allan, Felicia Keesing, and Richard S. Ostfeld, "Effect of Forest Fragmentation on Lyme Disease Risk," *Conservation Biology,* Vol. 17, No. 2, February 2003, pp. 267-272.

tion of how suburbanization works as a disease vector in the case of Lyme disease. Some of the principles involved are documented in articles in several scientific journals reporting on empirical studies.

"Forest fragmentation" is the term used by the team of researchers to describe the area they studied in 2001 in New York's Duchess County, where they went into various-sized patches of de-forested land and did "drag-sampling" to collect *I. scrapularis* ticks and check for density and infection prevalence. They used a one-meter-square drag cloth, close to the ground, along pre-drawn transects. The results showed dramatically higher numbers of infected ticks in the small patches of land—where field mice density was highest—contrasted to the far lesser rate of infection among the ticks counted in larger zones.

The researchers have discussed many contributing causes. One group of investigators uses the term, "dilution effect" to describe the fact that the rate of infected ticks associated with field mice goes down, when there is a diversity of other animals present for ticks to feed on. This is because the others have lower "reservoirs of competence" at transmitting the bacteria.

One laboratory test did a comparative study of animals commonly found in the outdoor settings in question. It showed, for example, that whereas the white-footed mouse tends to pass on the infection to ticks about 92% of the time, the eastern chipmunk did so 55% of the time. So, as the authors of one study said, "Forest fragmentation decreases mammalian biodiversity and results in areas of very high mouse density." The principal researcher, Dr. Kathleen LoGiudice, of Union College, N.Y., said more explicitly, "Sprawling development . . . may be increasing our exposure to Lyme and similar vector-borne diseases. Biodiversity can have some very real implications for our health and quality of life."[2]

On the implications for higher risk of human infection, the authors of the Duchess County tick-measurement study concluded: "The incidence of Lyme disease is particularly high in regions where dense human habitation is juxtaposed with forest habitat that supports tick vectors and their hosts. Our results suggest that efforts to reduce the risk of Lyme disease should be directed toward decreasing fragmentation of the deciduous forests of the northeastern United States into small patches, particularly in areas with a high incidence of Lyme disease. The creation of forest fragments of less than 1-2 hectares should especially be avoided, given that these patches are particularly prone to high densities of white-footed mice, low density of vertebrate hosts, and thus higher densities of infected nymphal blacklegged ticks."

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2. See K. LoGiudice, R.S. Ostfeld, K.A. Schmidt, and F. Keesing, "The Ecology of Infectious Disease: Effects of Host Diversity and Community Composition on Lyme Disease Risk," *Proceedings of the National Academy of Sciences,* Jan. 21, 2003; 100:567-71. Available online at: www.pnas.org/cgi/content/full/100/2/567.