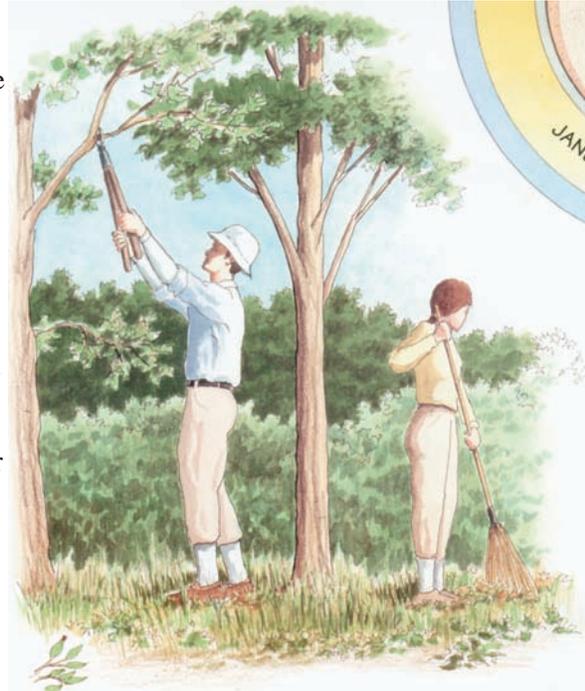


Landscape management

Residential landscapes are designed for a variety of aesthetic or environmental reasons and “tickscape” practices can be a part of the landscape in Lyme disease endemic areas. Landscape modifications can create an environment unattractive to primary tick hosts and may decrease the abundance of ticks that are present in parts of the yard. Fewer ticks have been found on well-maintained lawns, except on areas adjacent to woodlands, stonewalls, or heavy groundcover and ornamental vegetation. Deer-browse resistant exotic-invasive understory vegetation is associated with greater tick abundance. This section provides some ideas on how to incorporate tick management into the landscape. Clearing leaf litter and woodchip barriers have been documented to help reduce ticks on the lawn. However, landscape practices to create a lower risk tick zone will not directly eliminate many ticks and you may need to consider integrating other tick control practices into the overall program. Landscape work may also be expensive, not acceptable to



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some residents, and must be done by residents on their own property. In computer simulations of a hypothetical community of 10,000 individuals, a 90% habitat reduction on lawns, 80% habitat reduction in ecotone, and 10% reduction in forested areas by nearly half the residents resulted in the prevention of only 94 Lyme disease cases in comparison to 156 with the application of acaricides or 121-272 with the treatment or removal of deer. Landscape management alone may not reduce disease incidence, as the undetected bite of only one infected tick is required for transmission of *B. burgdorferi*.

Woodland edge and leaf litter are high-risk areas for nymphal blacklegged ticks!



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In most cases, alterations will be made to an existing landscape, although landscape architects and designers should also incorporate tick safe landscaping concepts into major renovations or new

construction. There are several basic interrelated concepts in modifying the landscape to create an area with fewer ticks and environmentally acceptable management practices.

- Open up the land to direct solar exposure, and include that part of the landscape used or traveled frequently by family members to reduce tick and small mammal habitat and cover. Bright, sunny areas are less likely to harbor ticks.
- Isolate areas used by the family or public (i.e., lawns, play areas, recreational or ball fields) from tick habitat or tick hot spots (i.e., woods, dense vegetation, groundcover, stonewalls).
- Use hardscape and xeriscape landscaping (i.e., brick, paving, decking, gravel, container plantings, low water requirement plantings) in areas immediately around the house that are frequently used.
- In cases where environmentally acceptable alternatives to large tracts of open lawn or only small lawn areas are desired, consider butterfly gardens, vegetable gardens, formal herb gardens, colonial style gardens, wildflower meadows and hardscapes. See the section on Environmentally Friendly Lawns and Backyard Wildlife Programs. Elimination of woodland and all wildlife habitats is not necessary or environmentally desirable. Some evidence suggests a lack of biodiversity and a landscape that specifically favors deer and mice increases tick abundance and transmission of *B. burgdorferi*. The key factor appears to be the presence and abundance of deer.
- Avoid invasive plant species and plantings that are inappropriate for where they will be growing. Several guides and listings of invasive plants and native alternatives are available. Some nurseries are helping to assess invasiveness and introducing alternative cultivars.



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Reducing tick habitat

Altering the landscape to increase sunlight and lower humidity may render an area less hospitable to ticks. Management of the habitat should focus on the areas frequently used by the family, not necessarily the entire property. To reduce ticks

adjacent to homes, prune trees, mow the lawn, remove leaf litter accumulations around the house and lawn perimeter, and cut grass, weeds, and brush along edges of the lawn, stonewalls, and driveways. Plants can be pruned to provide open space between the ground and base of the plant. Individual shade trees, with the exception of fruit trees like crab apple that are attractive to deer, and small ornamental stands in the open lawn will probably not contribute to the tick numbers unless surrounded by groundcover.

A. Yard before landscape intervention.



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B. Yard after landscape intervention.



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Ticks also may be found in groundcover such as *Pachysandra*. Restrict the use of groundcovers to less frequently used areas of the yard. Clean up the vegetation around or even seal stonewalls near the house. The removal of leaf litter has been shown to reduce the number of *I. scapularis* nymphs on some properties. Mowing and removing cover vegetation around the house also will discourage rodent hosts. Leaf litter and other plant debris can be raked or blown out from under shrubs and bushes. Composting or removal by appropriate bagging is an acceptable method of disposing leaf litter. Leaves should not be simply moved to another part of the property. Some communities will compost collected leaves and provide the compost to residents for free or a nominal charge.



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Move swing sets and playground areas out or away from the woodland edge!

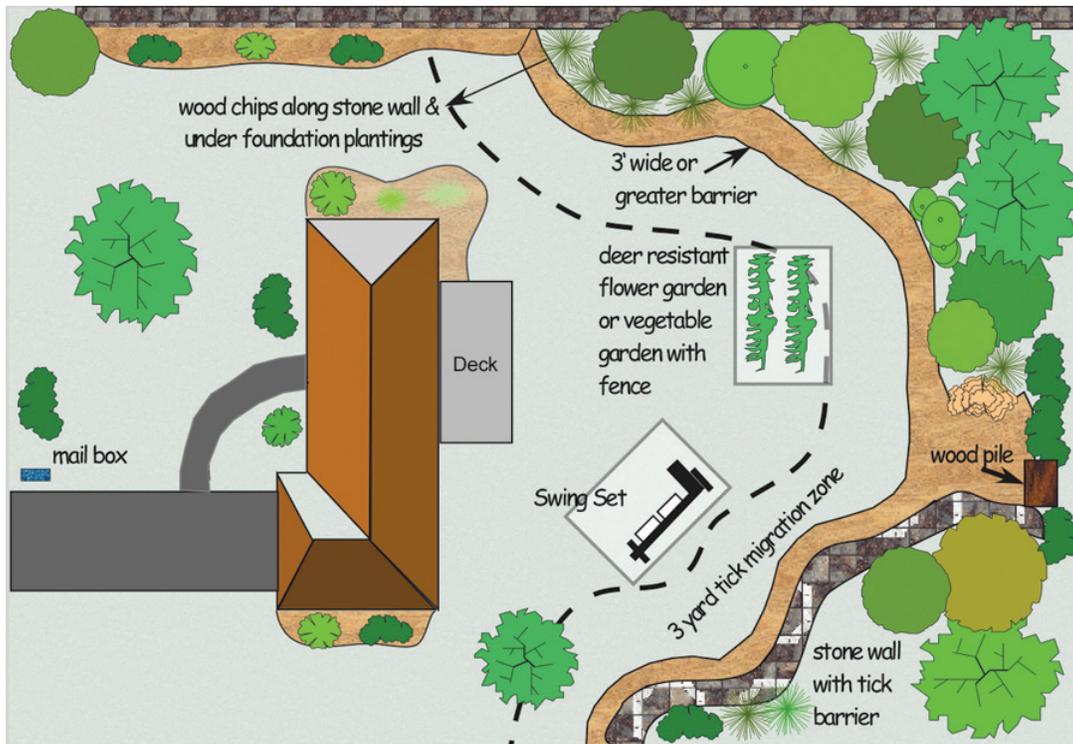
Play activity can be a high-risk activity for tick exposure, and children have some of the highest rates of Lyme disease.



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The use of hardscapes, mulches, and xericape landscaping techniques can help reduce tick habitat and isolate parts of the yard from tick hot spots. Hardscapes refer to nonliving features of the landscape like patios, decks, and paths. Mulches are used to suppress weeds and help retain soil moisture, but also can help reduce tick movement. In the laboratory, landscape materials have been shown to deter tick movement and around homes, a three-foot wide or broader woodchip barrier may help reduce tick abundance on the lawn, although results vary widely from home to home and from year to year depending upon other factors (i.e. density of woods, amount of shade, initial tick densities). Mulches are often organic materials like bark chunks or shredded bark, but can also be small stones or gravel. Wood chip and tree bark, gravel, or similar landscaping materials between woods or stonewalls and lawn as a buffer or barrier can help reduce the number of ticks on the lawn and delineate the tick zone. Quality of the landscape material may also influence results as wood chips from chipped trees, especially if it contains leaves, quickly degrade and may soon become no different than leaf litter. Properly maintained each year, the barrier may allow fewer ticks to migrate from the woodlands into the lawn. It also serves as a reminder that people who cross the barrier may be at higher risk of getting ticks. The application of a barrier or buffer will be easiest where there is a sharp delineation between the woods and lawn. A pesticide application can be focused on the landscape barrier or buffer zone to increase the effectiveness of the barrier. Move swing sets and sandboxes away from the woodland edges and place on a covering of smooth bark, mulch or other suitable material.



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Xeriscaping is the application of water conserving landscape practices. This approach reduces habitat cover; helps isolate frequently used areas, can provide an attractive focal area in the yard or garden and reduce maintenance and water, fertilizer, and chemical use. Many drought resistant plants are also deer resistant. Landscapes can incorporate formal or informal designs around play, eating, or pool areas. Landscape materials such as laid brick, wood decking, stone paving, raked gravel or pea gravel (set down slightly from bordering bricks, stone, or paved areas), and concrete (exposed aggregate can provide varying attractive colors and textures and edged with brick or tile) can be used to create a patio and paths. Gravel can be laid over a layer of crushed stone covered with black plastic to discourage weed growth. Some plantings can be in raised beds or containers.

Organic Land Care Practices

Standards for organic land care practices for design and maintenance of ecological landscapes have been developed and published by the Connecticut and Massachusetts chapters of the Northeast Organic Farming Association (NOFA). Tick IPM practices are covered under pest and wildlife management guidelines (*NOFA Standards for Organic Care*). Practices that are preferred to manage ticks would include personal protection measures, making the environment unsuitable for the pest (i.e., landscape modifications as reviewed in this section), deer resistant plantings (the use of native plants is generally encouraged), fencing against deer, and herbal-based deer repellents (reviewed in the next section on host management). Ammonia or hot sauce based deer repellents are allowed. The use of arthropod pathogens like entomopathogenic fungi (fungi that kill insects), diatomaceous earth, insecticidal soaps and botanical insecticides are allowed under the standards. However, botanicals cannot be formulated with EPA List 1 inert ingredients (i.e., inert ingredients of toxicological concern). Prohibited under the organic standards are all synthetic insecticides and piperonyl butoxide as an insecticide synergist, rodenticides containing warfarin, predator urine (due to collection practices), and products containing sewage sludge (e.g., Milorganite). Two other NOFA resource publications are the *NOFA Guide to Organic Land Care: Directory of Accredited Organic Land Care Professionals* (2007 Edition) and *The NOFA Lawn and Turf Handbook* (www.organiclandcare.net).

Environmentally Friendly Lawns and Backyard Wildlife Programs

A residential lawn of pure, carefully manicured grass has been the standard American suburban landscape for many decades. Lawns provide valuable areas for play and recreation and are esthetically pleasing to many communities. With increased environmental awareness, the focus for many backyards has been to provide a more natural or organic landscape (sometimes retaining the manicured front lawn for community relations), with reduced inputs of energy, water, pesticides, fertilizer and labor, and increased wildlife habitat. An alternative landscape may involve a lawn of mixed grasses and low-lying plants like clover, reducing the amount of lawn, or replacing the lawn entirely. Some shrubs and other plants are selected for their wildlife value due to the berries, fruit and cover they provide for birds and small mammals. Many resources are available to help create backyard wildlife habitats.

How can the desire to have a more natural, environmentally friendly habitat be balanced with the need to reduce contact with animals carrying ticks and the creation of a tick safe zone? The presence of deer and rodents can result in the presence of ticks. This is an area that has not been adequately explored and little information is available on how to best integrate the two different objectives. Open lawns harbor fewer ticks and wildlife that carry potentially infected ticks. There is limited evidence that increased animal diversity may reduce the rate of transmission of tick-associated disease, resulting in fewer infected ticks. However, the fragmented woodland and ecotone environment of suburbia favors the deer and mice most involved in the maintenance and transmission of tick-associated diseases.

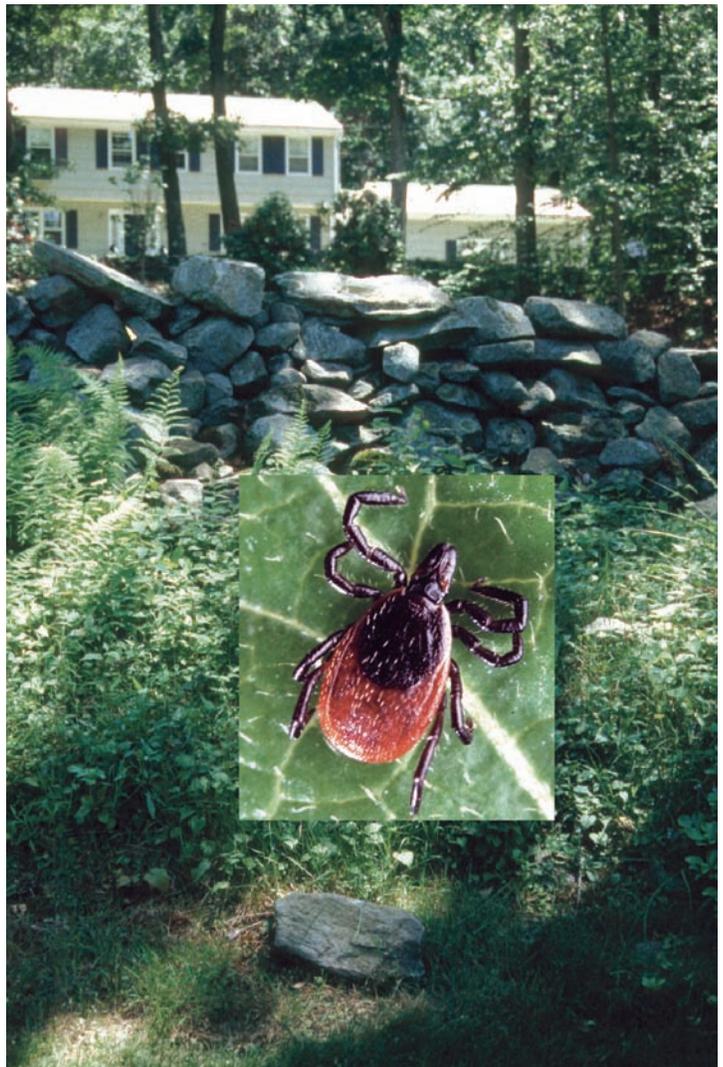
Tick Management Handbook

An integrated guide for homeowners, pest control operators, and public health officials for the prevention of tick-associated disease

Revised Edition

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