Information on things to consider to assist citizens having problems with deer.
Background on the committee

Approach
We talked to other communities who had citizens complain about deer. All went through a process of talking to citizens. All looked at all options. All chose bowhunts.

Questions
Is there a problem? Depends on who you ask.

How many deer do we have in the city limits?
Enough so that many feel there is a problem. Problems are health issues, ticks, ticks that get on children or pets in the yard.
Enough so that many feel there is a economic problem relative to growing plants, gardens, flowers, etc.
Enough so that many are concerned about safety and health.
But others are not bothered by these things and like the deer.

We do not know how many deer are here and the techniques that might give an answer are expensive and probably not doable. We know that in South Park there is one feeder location that has 17 deer. There are other such areas in South Park. We are considering getting an estimate of deer, recognizing that no matter what the result, some will feel there are too many and others will not. We do know that there are many more deer than 10 years ago and the growth will probably continue..

How many deer should there be in the city, from an ecological point of view?
Studies show that in agricultural areas, the habitat can sustain 40 deer per sq mile
Studies show that in total forests, such as Coopers Rock, the number is 21 deer per sq mile
The Dept of Agriculture states in urban environments, 2-5 deer per sq mile is good relative to habitat, safety, health.

Can lowering deer numbers impact damage to habitat, gardens, etc.? Studies show it does.

Can lowering deer numbers impact auto accidents with deer? Studies show it does
The police dept does not keep records of deer/auto accidents, but an interview of several officers revealed that in past two years, 31 deer that were hit by cars and were still alive, were shot by the police as they laid by the road. They noted that other deer are hit that go and die somewhere else, and others are hit that do not die.

Can lowering deer numbers impact incidence of Lyme Disease? Studies show it does.

Options to Lowering Deer Numbers and/or Preventing Damage

1. *Immunocontraception, chemosterilants*
Done by either darting does with a hormone injection, or capturing does and injecting them or putting a hormone implant under the skin. While the Humane Society of the United States says this is used all over the country, the truth is that only a few exclusive developments are spending the money to do this, and several of those are doing so as part of on-going research.

Why this cannot be done in Morgantown
It doesn't work for wild populations. You cannot treat enough does to be effective in lowering numbers. Research shows that because mortality of does in urban environments is low, you would have to treat at least 70% of the does in the area to be effective. Since research shows that 10% of does treated with GonaCon are not responsive to that drug, *you really need to treat 80% of all does to keep deer numbers from growing*. This would be impossible, even if one could find the money to do so, and get approval to do so. It has been relatively effective in pens.
There is only one contraceptive (GonaCon) registered by the EPA for use in free-ranging deer populations. It can only be used by hand injection. Cannot use darts. This is to prevent humans from stumbling across a loaded dart that may have missed a deer.

The DNR would not approve of someone shooting drugged darts in towns.
The costs are prohibitive. Estimates run $500 to $1000 per deer due to capture and handling costs.

2. *Fencing*
Eight foot fences will prevent deer from entering gardens. However, there is a city ordinance that fences cannot exceed 6 feet. Those could be changed. Obviously one *could place small fences around individual shrubs and trees*, and some people do that. Two potential problems that all citizens who want to protect shrubs with fences are, *cost*, and *how unsightly such fences are*. One study notes that with fences for deer, *property values* go down, not just for the individual, but for the entire neighborhood.

Electric fences are prohibited inside the City. Such fences are less obtrusive than other fences, but require much more *maintenance and cost.*

Finally, citizens of St. Clair Township near Pittsburgh noted that *fencing only directs deer somewhere else where they cause problems*. Fences "do not address the underlying cause of the problem, i.e. too many deer."

3. *Sharpshooters*
A few exclusive communities use the services of sharpshooters. The one consulting firm that provides this service (White Buffalo is the name of the company, www.whitebuffaloinc.org), states that they charge $100-$400 per deer. However, In March of 2005, Greenwich, Connecticut paid *$646 per deer* to remove 80 deer. In 2009, Greenwhich paid White Buffalo Inc. *$585 per*

deer to remove 65 deer. They bait and shoot at the bait sites, and they drive to areas where they can safely use guns with spotlights at night. They are very effective and do kill deer safely. They also can trap and kill deer. They have been involved with several research projects on drugs, but none were successful.

There is one town that uses the police force as sharp-shooters. They started this practice over 20 years ago and continue it today. My guess is that other towns have not used this option due to *cost and time constraints*. Also, such sharpshooting involves *guns and safety* is an issue. I've just learned that Helena, Montana used police to bait deer into clover traps. They then released the fawns, and shot 50 adult deer. Cost was $2000 per deer.
Advantages are: can harvest deer relatively quickly.
Disadvantages are: Requires police to patrol and prevent disruption of bait sites. Noise of firearms may be a concern. Cost.

4. *Repellents*
There are various repellents that people use, and run the gamut from scarecrows to chemicals. Scarecrows, etc. may work once or twice, but deer soon figure them out and will not leave the area. Chained dogs bark and may scare deer for a few days, but the deer learn that the dogs are chained, and so they come and go without fear. Studies show that dog urine, droppings, human hair, soap, etc. have also proven to be *relatively ineffective* as deer soon learn that there is nothing to fear.

Chemical repellents can work to a degree for individual home owners, but are not effective on a wider scale. They are *expensive and must be reapplied often*, after rains, etc. *Effectiveness varies.* One repellent may work in one area, but not another. Most chemicals work less effectively in winter. Effectiveness also varies depending on deer density. They can be relatively effective at low deer densities and less effective as densities increase.

5. *Trap and Euthanize*
Before beginning on this option, note that trap and transplants do not work. Many questions arise when considering this option. How do you pay to capture them? Where will you move them? Research shows that most *moved deer are dead within 6 months*. Many die after 3 months. The reasons are obvious; you are moving deer into areas that have a full complement of deer so food is a problem. Also you are moving deer into a strange area so mortality will increase. Also, there is the potential to move diseases into new areas. Some states do not allow trap and transplant for these reasons. *Our DNR will nt allow it either.* Finally, this is an expensive approach with studies showing costs from *$400 per deer to $3000 per deer.*

6. *Roadside reflectors, ultrasonic devices for yards and cars*
Research done at the University of Georgia shows that *none of these options work at all.*

7. *Supplemental Feeding*
Because deer utilize microorganisms in their stomach to digest food, switching diet to supplemental feed in winter can lead to starvation. The deer eat the food, but cannot digest it for

up to 4 weeks. Research shows that it can also spread disease. In *many communities they ban feeding of deer because it attracts deer and increases deer damage to neighbors*. In the county around St. Louis, they banned all feeding of deer for this very reason.

In addition, even if supplemental feeding helped the deer survive the winter, this would mean that there would be more deer to feed the next winter.

8. *Bowhunting*
Is this approach used in other areas?
Hundreds, if not thousands, of towns use this approach to control deer numbers.

Is it safe?
Very strict rules and regulations are used, such that there has never been an accident anywhere in the country using bowhunting to lower deer numbers.

When would it be done?
Approximately two-three weeks prior to the regular bow season (which starts in mid-October), and then thru the bow season. Some areas may be limited to a certain number of days or certain hours of certain days. Safety is a primary concern. .

Where would the hunt take place?
Only on city property that is 10 acres in size or bigger. Only on private property that is about 10 acres or more *and* where the private property owner has given approval.

What about city parks?
We don't know yet and are in discussions with Boparc. We know they have a deer problem relative to vegetation, and we know that deer bed there and move out at night into the properties of city residents. We also know that the parks are used heavily, so anything done there would have to be highly restricted, with certain days or hours, and very specific locations used.

What about University Farms within the city limits?
The University has a major deer problem on all their farms and the deer are destroying research projects there. Thus, WVU has approved the bowhunt, but only if we can get enough bowhunters to hunt all the farms and not just that portion that borders the city. Apparently they have a lot of deer and those deer do come into town and cause problems.

Who will bowhunt?
Those who fill out a detailed application and are approved, and who take a 10 hour bowhunter education course, and who pass a shooting proficiency test, and who attend meetings prior to the hunt.

How will they know where to bowhunt?
Exact trees on huntable property will be marked and the bowhunters assigned to that exact location. Most will be in a small ravine, the hunter will use a climbing treestand to about 15 feet, and thus shoot down on deer to prevent arrows ricocheting. Most sites will be baited.

Can they walk around with bows?
No. Hunters must carry bows to the tree, and only hunt from the assigned tree location.

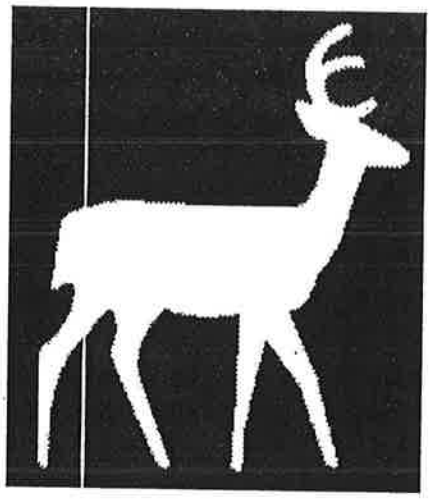
Will deer run around and die in peoples back yards?
It is possible, but other towns tell us that it rarely happens.

What will be done with the meat?
The first 100 deer shot will be butchered and donated to local needy groups such as Bartlett House and the Salvation Army. Thereafter, hunters may keep the meat, but from our experience, some will pay to have the animal butchered and donate the meat as well.

Will the entrails be left in the woods after a deer is harvested?
No. The entire deer will be removed.

Will all the deer be killed?
No. That would be impossible.

Recommendations for Deer Management
West St. Louis County Deer Task Force



July 2005

WEST ST. LOUIS COUNTY DEER TASK FORCE REPRESENTATIVES

Jeff Mitchell, Task Force Chair

City of Ballwin: Jerry Klein, Code Enforcement Officer

City of Chesterfield: Wendy Geckeler, Resident

City of Clarkson Valley: Susan Shea, Alderperson

City of Creve Coeur: Jeff Mitchell, City Council Member

City of Eureka: Missy Rathmann, Parks and Recreation Specialist

City of Kirkwood: Curt Carron, Parks Superintendent

City of Maryland Heights: Matt Shatto, Assistant City Administrator

City of Town & Country: Joe Williamson, Resident

City of Valley Park: Mike White, Alderperson

City of Wildwood: Joe Vujnich, Director of Parks and Planning

Missouri Department of Conservation: Erin Shank, Urban Wildlife Biologist

Missouri Department of Natural Resources: Richard Love, Superintendent of Castlewood State Park

St. Louis County Council: Skip Mange, Councilman

St. Louis County Parks: Mike Hodges, Parks Supervisor

Beaumont Scout Reservation: Harry Mauchenheimer, Camping Committee Member

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WEST ST. LOUIS COUNTY DEER TASK FORCE
RECOMMENDATIONS FOR DEER MANAGEMENT
Approved 7/6/05

The objective of the West St. Louis County Deer Task Force is to make recommendations for deer management in the West St. Louis County region. Following a comprehensive review of information on suburban deer populations and management alternatives, a resident attitude survey examining the acceptability of management alternatives, responses of the public to a Preliminary Report and two public forums, the Task Force has developed these recommendations for deer management in West St. Louis County.

The Task force recommends that area communities strive to reduce deer populations to approximately 20 deer per square mile of habitat. While residents will generally tolerate greater densities of deer (up to approximately 40 per square mile), this density is recommended as a goal in order to maximize benefits associated with deer while minimizing negatives. Further, the Task Force encourages West St. Louis County communities use these recommendations to develop a long-term deer management plan and coordinate across municipal boundaries to meet management goals.

Population Control Options

Firearms hunting
Includes potential to use one or all of the following: centerfire rifles, shotguns, muzzleloaders, and crossbows.

Advantages and Disadvantages:

- Crossbows can be useful in urban areas and have the added benefit of no noise.
- Firearms are the most efficient method for harvesting deer.
- Firearms hunting with centerfire rifles is not appropriate for many suburban areas.
- Less powerful firearms such as shotguns & muzzleloaders can be useful to harvest deer quickly but still may not be appropriate for many areas.
- Noise is a factor with rifles, shotguns, and muzzleloaders.

Recommendations:
While a successful deer management program does not necessarily require the use of firearms, the Task Force recommends municipalities consider allowing for the use of crossbows to harvest deer under Missouri wildlife regulations.

The Task Force recommends that Missouri Department of Conservation consider allowing the use of crossbows to harvest antlerless deer in select urban counties, including St. Louis County, during archery season (currently not allowed).

The Task Force recommends that each municipality examine the appropriateness of shotguns, muzzleloaders, and rifles in their community and consider allowing these methods to harvest deer in areas that are safe.

Bow hunting

Use of longbow or compound bow. Shots are usually taken from 20 yards or less from an elevated tree stand.

Advantages and Disadvantages:

- Close range of shots, minimal risk of ricochet, and tree stands make this the safest form of deer hunting.
- Noise is not a problem.
- Can be done at no cost to city or landowner. Hunter would be required to purchase tags & be responsible for meat processing.
- Task Force resident attitude survey shows this as the most acceptable method for population control.
- Landowners unfamiliar with hunting would need to be provided with guidelines for selecting bowhunters & setting rules for hunting on their property.
- Archery methods can provide an effective deer management program if applied at appropriate levels over time.
- Potential for injured deer to run onto a neighboring property can be a concern of neighbors.

Recommendations:

The Task Force recommends municipalities consider allowing the use of archery equipment to harvest deer where appropriate. The Task Force has suggestions for implementation that municipalities may find helpful (see Appendix 1: Urban Deer Hunting and Sharpshooting Process Recommendations).

The Task Force recommends that Missouri Department of Conservation offer an Urban Bowhunter Education course, similar to the current Bowhunter Education course, but with a component that addresses the special considerations of hunting in suburban areas.

Sharpshooting

Use of hired marksmen to shoot deer over bait sites. Requires a special permit from MDC.

Advantages and Disadvantages:

- Can be used to harvest many deer quickly to achieve desired deer population.
- Task Force resident attitude survey indicates this as the second most acceptable method for population control.
- Requires cooperation with police to prevent disruption of bait sites.
- A long-term plan for maintaining the deer population at reduced levels would be necessary.
- Noise of firearms may be a concern.
- Landowner(s) and/or the city would be responsible for cost of hired marksmen and meat processing. As a requirement for the permit, all deer would be donated through Share The Harvest.

Recommendations:

The Task Force recommends that sharpshooting should be used only as part of a long-term management plan to maintain the population at acceptable levels. A municipality or agency should have a management plan in place before using sharpshooters to harvest deer.

The Task Force recommends that each municipality examine the appropriateness of sharpshooting in their community and consider allowing this method to harvest deer when safe. The Task Force has suggestions for implementation that municipalities may find helpful (see Appendix 1: Urban Deer Hunting and Sharpshooting Process Recommendations).

Trap and euthanasia

Deer are trapped, most often individually in clover traps, and euthanized with a captive bolt device. Drop nets or rocket nets can be used to trap larger numbers of deer but these also require additional people and more time to run the trap; both of these trapping methods require the use of explosives. Requires a special permit from MDC.

Advantages and Disadvantages:

- Can be useful in lowering a local population if utilized for several years.
- Landowner is responsible for running trap and associated costs (MDC has traps that could be loaned).
- All deer must be donated and landowner must pay for meat processing.
- Trap and euthanasia can be useful for reducing deer numbers in small pockets. However, unless an adequate number of traps are used, this is not an efficient tool for managing overall populations.
- Task Force resident attitude survey indicates that this method is less acceptable than bowhunting and sharpshooting.
- Time and effort involved in removing each deer is greater than for other methods.

Recommendations:

The Task Force recommends the use of trap and euthanasia with captive bolt for landowners where other lethal methods are not an option.

The Task Force recommends that cities or agencies consider using trap and euthanasia only as part of a larger, long-term management program.

Trap and relocation

Deer are trapped similar to the trap and euthanasia program, with clover traps, drop nets, or rocket nets. Deer are sedated and transported to a rural location and released.

Advantages and Disadvantages:

- Not currently approved by MDC as a deer management alternative. Would require permission from the Missouri Conservation Commission.
- Due to concerns over chronic wasting disease, the transfer of live deer across county lines is prohibited by MDC.
- Cost; trapping and transport of deer is time-intensive and overall cost is high.
- Unless an adequate number of traps are used, trap and relocation is not an efficient tool for managing overall populations.
- Some deer (~20%) die from myopathy within 30 days due to the stress of relocation.
- Many additional relocated deer (~70%) die within one year from hunting, cars, poaching and dogs. Trap and relocation is not necessarily a non-lethal method.

Recommendations:

The Task Force recommends that Missouri Department of Conservation re-examine their reasoning and position on allowing trap and relocation in urban areas to reduce deer densities.

If trap and relocation is allowed in the future, the Task Force recommends that cities or agencies consider using this method only as part of a larger, long-term population management program.

Managed hunts

Through a statewide lottery system run by MDC, hunters can apply to participate in hunts on specified public lands in Missouri. Special regulations apply at each hunt, specifying what hunting method may be used, what deer can be harvested, and in what quantity.

Advantages and Disadvantages:

- May be an option for certain State, County, and Municipal Parks, or other public lands.
- Managed hunts offer an opportunity to manage deer on public lands in a controlled situation.
- Not feasible for individual landowners.

Recommendations:

The Task Force recommends that Missouri Department of Conservation continue to administer annual managed hunts at Rockwoods Reservation, Rockwoods Range and Forest 44 Conservation Area. The Task Force also recommends that Missouri Department of Natural Resources (DNR) continue to administer the managed hunt at Babler State Park.

The Task Force recommends that Missouri Department of Natural Resources and St. Louis County Parks consider cooperating with Missouri Department of Conservation to administer managed hunts at other state and county park areas in west St. Louis County, such as Route 66 State Park, the Lincoln Beach addition of Castlewood State Park, Greensfelder County Park, and West Tyson County Park. A partnership between agencies to administer a managed hunt across several of these properties would increase the overall success of the management program.

The Task Force recommends Missouri Department of Conservation, Missouri Department of Natural Resources and St. Louis County Parks study the deer populations closely on public lands and conduct aerial deer population surveys over areas that have potential to be sites for future managed hunts.

The Task Force recommends that municipalities examine their city parks and other public lands, and consider working with Missouri Department of Conservation to administer managed hunts on appropriate areas.

Fertility Control

While a variety of fertility control methods have been the subject of research, SpayVac© is the method sought by many suburban residents as a solution to deer overpopulation. With this method, does are trapped, tagged, and treated with a vaccine to prevent conception. Subsequent treatments are necessary. Permits from MDC and the Food and Drug Administration (FDA) are required to use SpayVac© for experimental purposes; the project must prove to have unique research value to receive the permit.

Advantages and Disadvantages:

- Would require a group to apply and administer the project.
- Long-term efficacy of immunocontraception in whitetails has been demonstrated only for populations of confined deer, not free-ranging populations.
- Population reduction would be slow without any deer removal.
- Effect on breeding behavior of deer is unknown as does continue estrous cycles after treatment.
- Cost; trapping and treatment of deer is time-intensive and overall costs are high.

Recommendations:

Due to the experimental nature and various unknowns regarding fertility control with immunocontraception, the Task Force does not recommend the use of immunocontraception (i.e., SpayVac© or other Porcine Zona Pellucida immunogenic drugs) as deer management.

The Task Force recommends that Missouri Department of Conservation and municipalities reconsider the use of immunocontraception in the future if researchers determine it can be effectively and efficiently applied in free-ranging populations to reduce deer numbers.

The Task Force does not recommend the use of other types of fertility control (sterilization, contraception, and contragestation) as deer management. These methods are impractical for reducing populations of free-ranging deer.

Damage control alternatives:

Traffic safety devices

Lower speed limits, deer crossing warning signs, road construction with wildlife corridors, roadside reflectors, and roadside fencing.

Advantages and Disadvantages:

- Deer crossing signs can be a good tool to warn motorists who are unfamiliar with an area of the potential for deer on roadway.
- While research on the effectiveness of roadside reflectors is mixed, reflectors have not proven to reduce incidence of deer-vehicle collisions.
- Roadside fencing is expensive and impractical due to miles of roadway.
- Lower speed limits is not a long-term solution and may not be realistic.

Recommendations:

Lower speed limits: The Task Force recommends municipalities and St. Louis County examine areas with a high incidence of deer-vehicle collisions and consider lowering speed limits or increasing enforcement in those areas, especially during October through December when most deer-vehicle accidents occur.

Deer crossing signs: The Task Force recommends the use of "deer crossing" warning signs along roads with a high incidence of deer vehicle collisions. Although drivers may become accustomed to such warnings over time, they are an important and economical way to warn motorists about the risk of deer on the roadway.

The Task Force also recommends the use of an alternate deer crossing sign, which flashes lights or flips down to reveal a "Deer Active!" warning during the months of October through December. A change in the standard warning during the highest risk months may help to remind drivers, who are otherwise accustomed to the standard warning, of the increased chance of hitting a deer.

Road construction with wildlife corridors: The Task Force recommends that, when feasible, planners consider the construction of wildlife corridors under newly constructed roadways to reduce the number of deer-vehicle collisions.

Roadside reflectors: The Task Force does not recommend St. Louis County or municipalities utilize reflectors in an attempt to reduce deer-vehicle collisions.

Roadside fencing: The Task Force does not recommend the use of roadside fencing to minimize deer-vehicle collisions because fencing roads is impractical.

Landscape repellants

Advantages and Disadvantages:

- Can be a good tool for small landowners, but not practical for large properties or large-scale, community-wide efforts.
- Many repellants are on the market; all have mixed results.

Recommendations:
The Task Force recommends that landowners in areas of high deer densities consider using repellants on valued landscape plants to protect them from deer browse. Periodically changing the type of repellant used and following application instructions may increase effectiveness.

The Task Force recommends that Missouri Department of Conservation continue to provide information on repellants, deer resistant landscaping, and deer damage control methods to landowners and land managers.

Fencing

Advantages and Disadvantages:

- Exclusion fencing and electric fencing can be very effective for damage control on individual properties.
- Single or double wire electric fencing is relatively inexpensive and unobtrusive. It can be an effective and safe method of protecting valuable landscaping from deer damage.
- Some municipalities and neighborhood organizations prohibit one or both types of fencing, making deer damage worse for certain landowners.

Recommendations:
While exclusion fencing may not be desirable in many neighborhoods, the Task Force recommends that municipalities and neighborhood organizations consider allowing the use of exclusion fencing as appropriate to help alleviate severe deer damage.

The Task Force recommends that municipalities consider allowing the use of electric fencing, which is unobtrusive, for landowners experiencing deer damage to their gardens and landscaping.

The Task Force recommends that Missouri Department of Conservation staff provide technical assistance to landowners in installing electric fencing to prevent deer damage.

Prohibit supplemental feeding

Advantages and Disadvantages:

- Can help alleviate problems of severe damage to landscaping and deer feces around feeding sites.
- Supplemental feeding of deer is often not healthy for deer and can promote the spread of diseases like tuberculosis.

Recommendations:
When residents in an area experience increased deer damage because of neighbors providing supplemental food to deer, the Task Force recommends municipalities consider a prohibition on the feeding of deer. The Task Force has suggestions for implementation that municipalities may find helpful (see Appendix 2: Prohibiting Supplemental Feeding of Deer Ordinance Recommendations).

The Task Force recommends that municipalities consult Missouri Department of Conservation for technical assistance in writing an ordinance that prohibits the supplemental feeding of deer.

APPENDIX 1:

WEST ST. LOUIS COUNTY DEER TASK FORCE
URBAN DEER HUNTING & SHARPSHOOTING
PROCESS RECOMMENDATIONS

In reviewing deer harvest opportunities and making recommendations for implementing lethal deer population control, we divided opportunities into two categories: (1) hunting under statewide archery and/or firearms seasons and (2) sharpshooting (which requires a special deer damage permit).

Statewide archery and firearms regulations allow unlimited amount of antlerless harvest in the St. Louis area. Utilizing statewide deer seasons to control the population focuses on long-term management and requires no additional permits beyond deer tags from Missouri Department of Conservation (MDC). It is recommended that urban communities faced with overabundant deer populations allow landowners to participate in the annual statewide archery and/or firearms seasons before pursuing a deer damage permit for sharpshooting. By allowing for deer harvest during archery and/or firearms seasons, a community provides the framework for long-term management of deer. Additional permits for sharpshooting, when combined with annual hunting under statewide regulations, will allow for the most efficient and cost-effective reduction and maintenance of deer numbers.

Statewide Archery or Firearms Regulations: Recommended Process for Implementation
When suburban communities implement strategies for harvesting of deer during statewide deer hunting seasons, we recommend the following process:

1. Ordinance revision. Many suburban communities currently have "no projectile" ordinances that prohibit residents from participating in annual statewide archery (bowhunting) and firearms seasons. Revising restrictive ordinances to allow for bowhunting of deer under statewide regulations is necessary in these cases. A city may choose to allow bowhunting while restricting firearms. The subcommittee suggests that an ordinance regarding projectiles (archery) in a municipality should include the following key factors:
    a. Allow for archery and/or firearms under statewide regulations (seasons and limits set annually by MDC).
    b. Allow for archery and/or firearm hunting on properties of (1-5) acres or greater. Actual acreage requirement will depend on the desires of a given municipality.
    c. Allow landowners to combine adjoining properties to meet the acreage requirement.
    d. If a city has a "no firearms" ordinance, we recommend that the city provide an exception that allows for the use of firearms for sharpshooting with special deer damage permit, issued by MDC in coordination with city (sharpshooting process outlined below).
    e. City may choose to require landowners to register hunted properties.

2. Landowner education. Many suburban landowners are unfamiliar with hunting. It is recommended that the city coordinate with MDC's urban wildlife biologist to provide education for landowners on how to choose hunters and how to negotiate 'permission to hunt' agreements (see #3).
3. 'Permission to hunt' agreement. A template 'permission to hunt' agreement should be developed for landowners to use when setting rules and guidelines for hunters on their property. Items in a "Permission to Hunt Agreement" template should include target number of antlerless deer to be harvested, dates of agreement, any non-huntable areas, and other special landowner requirements.
4. Written record of notification. A city may choose to require landowners who are allowing hunting to maintain a written record of notification of contiguous landowners. Such record should include a checklist of neighboring landowners to be notified. The landowner would be responsible for recording who, when, and how they notified neighboring landowners that their property will be hunted (e.g., Notified landowner Smith on 9/10/2004 by phone conversation).
5. Bowhunter education course. An optional Bowhunter Education course should be made available through MDC. Bowhunters could take the course to gain a better understanding of the unique factors involved in urban bowhunting and learn how to be a responsible and discreet urban bowhunter. A list of bowhunters who completed the course and are interested in hunting urban properties could then be made available to cities.

<u>Sharpshooting Using Firearms: Recommended Process for Implementation</u>
When implementing strategies to allow for harvest of deer in a suburban community by sharpshooting with firearms, we recommend the following process:

1. Ordinance revision. (See #1 under Statewide Archery or Firearms Regulations). Before a sharpshoot program is pursued, it is recommended that a city first have an ordinance in place that allows for the harvest of deer during the statewide archery season. Without this strategy for long-term management, a short-term solution will have limited effectiveness.
2. Special deer damage permit. A sharpshoot program to harvest deer using firearms and bait requires a special deer damage permit. This permit is issued by an MDC Conservation Agent. It is recommended that a landowner or community interested in receiving a permit contact MDC at least 2 months prior to the preferred start of the permit. A site visit by MDC staff is recommended to assess deer damage and the appropriateness of the site.
3. Designation of sharpshooters. The permit holder must decide whether or not to hire professionals to conduct the sharpshooting. The permit holder may decide to hire professional sharpshooters or designate other sharpshooters to be listed on the special permit.
    a. Cities may require and administer additional proficiency tests to screen potential sharpshooters. Such tests would need to be administered at a municipal level. It may be possible to cooperate with MDC shooting ranges to make this possible.

4. Notification requirements. The permit holder should meet certain notification requirements, which may include some or all of the following:
    a. Notification of neighboring landowners. At least 2 weeks prior to the start of the permit, neighboring landowners (which may be contiguous landowners or the entire neighborhood) should be notified of the sharpshoot program by a neighborhood meeting, mailing, newspaper posting, and/or through a notification checklist (see #4 under Statewide Archery or Firearms Regulations).
    b. Notification of police. The police responsible for patrolling the area where the sharpshooting will take place should be notified of the program before the start of the permit. City or police may require the landowner to notify police dispatch before each sharpshoot session. Sharpshooters should coordinate with police to prevent tampering with bait sites.
    c. Notification of other city residents. City residents who are not neighboring landowners of the permitted property may receive information about the dates and locations of special deer damage permits by contacting the city or MDC.

APPENDIX 2:

WEST ST. LOUIS COUNTY DEER TASK FORCE
PROHIBITING SUPPLEMENTAL FEEDING OF DEER
ORDINANCE RECOMMENDATIONS

Providing supplemental food to suburban deer in areas of high deer densities can exacerbate conflicts between neighbors and deer by leading to extensive landscape damage. Often, education on the subject can solve individual problems; MDC can provide educational materials and assistance in outreach to homeowners regarding the feeding of urban deer. In other cases, municipal ordinances prohibiting the feeding of deer may be beneficial to the overall community.

The following is a template ordinance which cities may use or modify to prohibit the supplemental feeding of deer in their community:

Section 1. The feeding of white-tailed deer within the City limits, which feeding results in the deposit of refuse, debris, fecal matter or other offensive substance or in the attraction of wildlife, creating the prejudice or annoyance of any person, unless otherwise permitted by law, is prohibited.

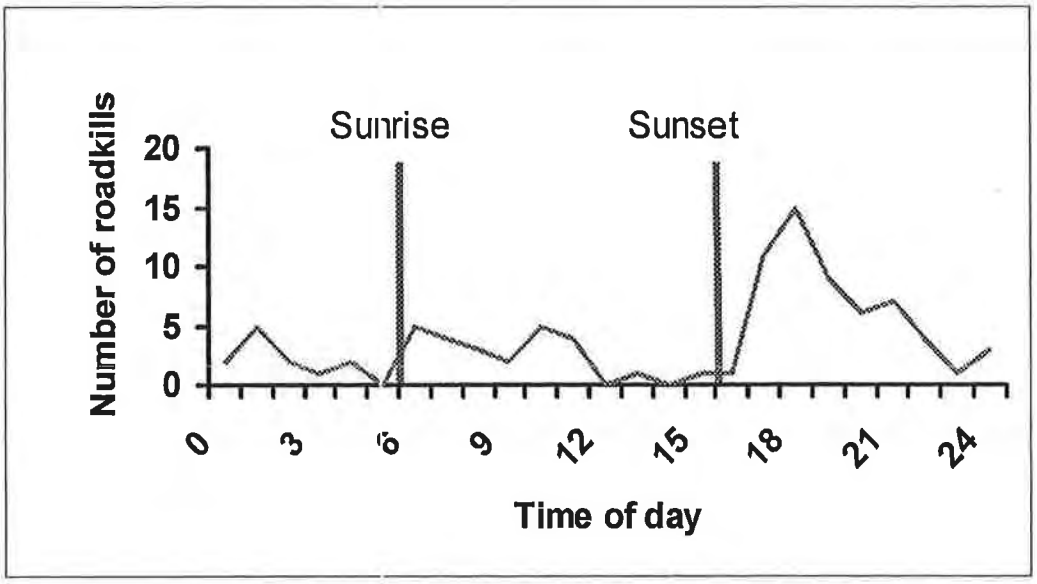
Section 2. No person shall deposit, place, distribute or leave any food, of any kind or nature, with the intent to feed white-tailed deer on public or private lands, within the City.

Section 3. The provisions of this Ordinance shall not apply to any resident or agent of the City authorized to implement a wildlife management program and who possesses the necessary permits from the Missouri Department of Conservation, nor shall it apply to any public officer or public employee in the performance of his or her duties. The provisions of this Ordinance shall not apply to the feeding of domestic animals.

Section 4. Any person who shall violate or fail to comply with the provisions of this Ordinance may, upon conviction, be punished by a fine not to exceed Five Hundred Dollars ($500) or confinement not to exceed ninety (90) days, or both. Each act in which a person violates this Ordinance shall be considered a separate incident and may be punished as a separate occurrence.

Section 5. This Ordinance shall be in full force and effect from and after its passage and approval.

Figure 5. Number of deer-vehicle accidents relative to time of day (24 hours).



How much land do I need to allow hunting?

No minimum property size is required for hunting with a shotgun or bow and arrow. However, loaded firearms cannot be carried or discharged within 500 feet of an occupied dwelling while deer hunting (Regulations of Connecticut State Agencies Sec. 26-66-1d) unless written permission from the owner of the dwelling is obtained. No minimum discharge distance exists for bowhunters. A minimum of 10 acres is required for hunting with a rifle. Homeowners also have the option of placing additional restrictions (beyond existing hunting laws) on hunters before allowing access to their property, such as time of day or days of the week that hunting can occur. Persons who hunt deer on private property are required to obtain and carry written consent from the landowner dated for the current year. Hunting consent forms can be found in the current Connecticut Hunting and Trapping Field Guide, which is available at town halls or on the DEP's website (www.ct.gov/dep/hunting).

When can I allow hunting on my property?

Archery hunting is permitted from mid-September to the end of December statewide and until the end of January in zones 11 and 12 (Figure 3). The firearms season occurs from mid-November to late December. Deer hunting is permitted from 1/2-hour before sunrise until sunset. Currently, all hunting is prohibited on Sundays in Connecticut. For specific season dates and hunting laws, consult the current Connecticut Hunting and Trapping Guide, which is available from town halls or on the DEP's website (www.ct.gov/dep/hunting).

What is done with excess game?

Several organizations assist in distributing donated game meat to food charities. Farmers and Hunters Feeding the Hungry (FHFTH) processed and distributed over

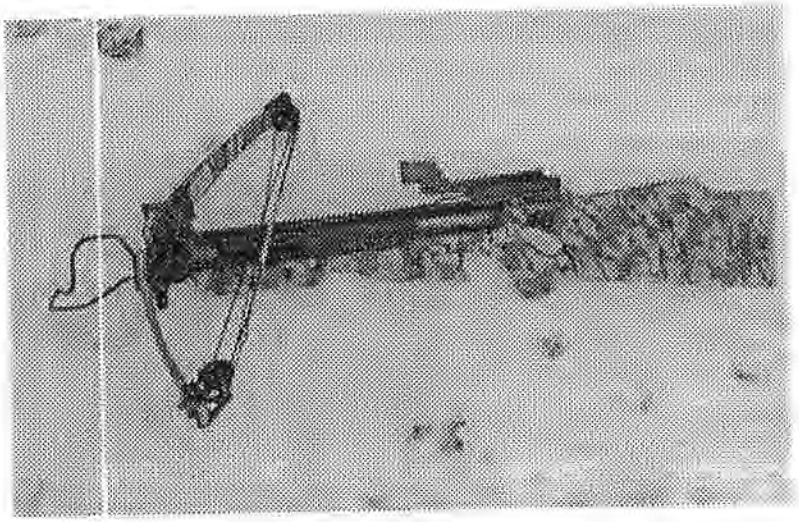
750 tons of deer meat over a 4-year period (1997-2000) to food shelters throughout the United States.[52] In Connecticut, the Hunters for the Hungry Program (HFTH) assists in distributing donated game to food charities. Over a 10-year period (1995-2005), Connecticut hunters have donated over 41,000 pounds of venison to food charities, which contributed over 164,000 meals valued at over $204,000. Most hunters either pay to have deer processed or butchers may volunteer their services at little or no cost. A program that would help pay for the cost of processing donated venison may increase hunter interest in donating harvested deer. Food charities are extremely grateful for the donations they receive, and demand far exceeds supply.

Archery hunting is the preferred method of hunting in developed areas. The archery season is 4 $^1/_2$ months long and there is no minimum property size requirement.

Can hunters use crossbows?

Currently, crossbows may be used in Connecticut by physically disabled hunters only. Crossbows have technological advantages over traditional archery equipment, including scopes, mechanical releases, and pre-drawn arrows that are mechanically held. Crossbows typically are more powerful than traditional bows, resulting in greater arrow speed and slightly greater effective range. These advantages may increase hunter efficiency through increased range, accuracy, and precision of arrow placement. They also may make crossbows an effective tool for managing urban-suburban deer populations. In 2003, legislation allowing crossbow hunting in special urban deer management zones was approved in Pennsylvania and Maryland. Currently, the

DEP is evaluating the potential of crossbows to further increase deer harvest levels in urban-suburban areas in Connecticut.



Crossbows have technological advances over traditional archery equipment, including scopes, mechanical releases, and pre-drawn arrows that are mechanically held.

What about liability?

Private landowners who make land available to the public without charge, rent, fee, or commercial service for recreational purposes, such as hunting, receive protection from liability pursuant to the Connecticut Recreational Land Use Act (C.G.S. 52-557f).

Non-private landowners (such as municipalities) do not receive protection from liability under the Connecticut Recreational Land Use Act and may want to consult with their town attorney before allowing hunting on their property. Some towns have addressed liability concerns by requiring hunters to sign an indemnity agreement similar to one drafted by an attorney for a town-sponsored hunt in Darien (Appendix 1).

Can my town pass an ordinance restricting hunting?

The courts have concluded that towns have no authority to regulate hunting on federal, state, or private property within their borders. This conclusion was affirmed by the Appellate Court, which concluded that local ordinances that seek to regulate hunting are illegal. Towns may restrict hunting on town-owned land only. Ordinances that restrict or prohibit hunting on private and state-owned lands are illegal. The only exception is the Town of Westport. In 1933, Special Act 33-254 empowered the Town of Westport to determine when and where hunting could occur. Currently, a town ordinance prohibits all deer hunting within Westport's boundaries.

How can I initiate a deer management program?

Individual homeowners, neighborhood groups, homeowner associations, and communities throughout Connecticut have initiated deer management programs. The towns of Darien, New Canaan, Redding, Ridgefield, Weston, and Wilton have appointed "deer committees" to assess the deer situation and explore options to manage the deer herds. The towns of Greenwich, New Canaan, and Wilton conducted studies to assess the distribution and abundance of deer and to assess residents' perceptions about deer and deer management. The towns of Darien, Redding, Ridgefield, and Wilton have implemented controlled deer hunting programs.

The DEP's Deer Management Program has worked with communities and neighborhoods to design hunts that have safely and successfully reduced deer populations in residential areas.

Concerned citizens interested in developing regional deer management programs should contact local officials, the Fairfield County Municipal Deer Management Alliance (FCMDMA), or the Connecticut DEP Deer Management Program (see pages 25 and 26).

Examples of Special Deer Reduction Programs in Connecticut

Cooperative deer hunts have been designed specifically for communities and conservation organizations to reduce deer populations while addressing safety concerns of residents. The following case studies illustrate hunt programs designed for sensitive areas or residential communities in Connecticut. These customized hunts have successfully and safely reduced deer populations with minimal impact to existing uses of the properties.

Devils Den (2001-present): Over a 15-year period, the director of the Connecticut Chapter of The Nature Conservancy's (TNC) Devil's Den Preserve observed the gradual loss of native flowering plants, such as pink lady slipper and red trillium, throughout the Preserve except on inaccessible ledge sites. Many tree species, especially oaks, were unable to regenerate because deer consumed acorns and saplings. Because deer at Devil's Den were having a long-term deleterious effect on

the Preserve's forest ecology, TNC initiated an annual controlled deer management program during the shotgun/rifle hunting season in 2001. The Connecticut DEP provided technical assistance to initiate the management program. Between 2001 and 2005, no hunting accidents occurred and 127 deer were removed. Damage to the ecosystem caused by deer can take years to recover; however, reemergence of some wildflowers, shrubs, and oak seedlings has been observed since the deer management program was implemented.

Greenwich Audubon (2003-present): In 2003, a deer management program was implemented on portions of the Audubon property in Greenwich to reduce the local deer population that was impacting native flora and fauna (Greenwich.center.audubon.org/deermanagement.doc). The program used archery hunters from a local sportsmen's club. Hunting was limited to specific days and specific time periods. During the first year of the hunt, 16 hunters harvested 31 deer from the 285-acre sanctuary, reducing deer densities by about 50%. In 2004, an additional 135 acres were opened up for hunting. In 2004 and 2005, a total of 25 and 19 deer were removed from Audubon properties in Greenwich.

Mansfield Hollow (2002-2003): In 2002 and 2003, a deer management program was implemented in Windham on the Army Corps of Engineers property to reduce the local deer population, which was impacting a scrub oak and pitch pine barren ecosystem. This ecosystem provides critical habitat to several rare and endangered species of moths and butterflies. Licensed hunters were used to remove deer on 6 days during the 3-week shotgun deer hunting season. Hunters were required to be graduates of the DEP hunter safety course, pass a shooting proficiency test, and attend a mandatory orientation meeting. Over a 2-year period, 30 deer were removed from approximately 100 acres, reducing deer densities by about 83%.

Mumford Cove and Groton Long Point (1996-present): Mumford Cove and Groton Long Point are adjacent communities in southeastern Connecticut that voted to implement deer management programs in cooperation with the DEP to significantly reduce the resident deer population. The DEP assisted the Mumford Cove Deer Committee in designing a safe and effective hunt for both communities.

Removing antlerless deer (primarily adult females) is the most effective method of reducing population growth.

In 1996 and 1997, an archery hunt was conducted in Groton Long Point due to limited areas where firearms could be used and the quiet nature of bowhunting. During

Managing Urban Deer in Connecticut

A Guide for Residents and Communities

Second Edition

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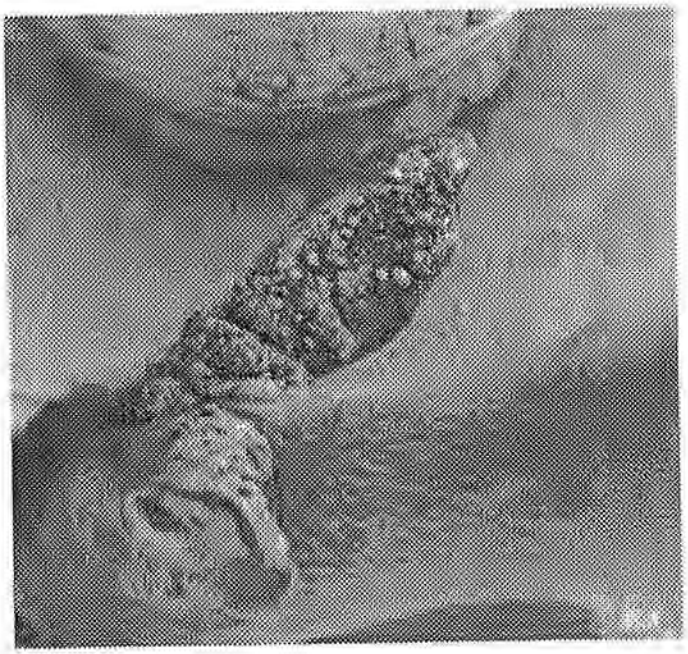
Consequences of Deer Overabundance

Deer-vehicle Accidents

An estimated 18,000 deer are killed each year on Connecticut roadways.

Nationwide deer-vehicle accidents cause about 29,000 human injuries, 200 human fatalities, and $1 billion in property damage annually.[11, 12] In Connecticut, the Department of Environmental Protection (DEP) receives reports from law enforcement officers of about 3,000 deer killed on Connecticut roadways annually.[27] However, many deer-vehicle accidents are not reported, including those where deer survive or die away from the road. Based on deer carcass removal data from the Connecticut Department of Transportation (DOT 2001-2002), for every dead deer picked up off the road and reported to the DEP, 5 additional deer go unreported. Therefore, about 18,000 deer are actually killed along Connecticut's roadways each year (49 deer per day). The total number of deer actually struck by motor vehicles whose fate is unknown (some may survive and some may die away from the road) is much higher. Using an average repair cost for deer-vehicle accidents of $1,577,[11] about $28 million in damage is caused by deer-vehicle accidents in Connecticut annually. In 2000, 172 human injuries resulted from motorists hitting wildlife (primarily deer) crossing roads[9] and several human fatalities have occurred from deer-vehicle collisions in Connecticut over the past 15 years.

Lyme Disease



Deer are the primary host for the adult deer tick and are key to the reproductive success of the tick. Deer have been documented with up to 100 ticks on them during peak adult tick activity.

Another issue associated with deer overabundance is the increased risk of contracting tick-borne diseases such as Lyme disease. Since 1996, over 29,000 human cases of Lyme disease have been reported in Connecticut.[2, 8] Two other tick-borne diseases,

Babesiosis and Ehrlichiosis, recently have become more common in the United States.[3] Since Babesiosis and Ehrlichiosis were first documented in Connecticut in 1991 and 1995, over 250 cases of Babesiosis and 500 cases of Ehrlichiosis have been documented.[8]

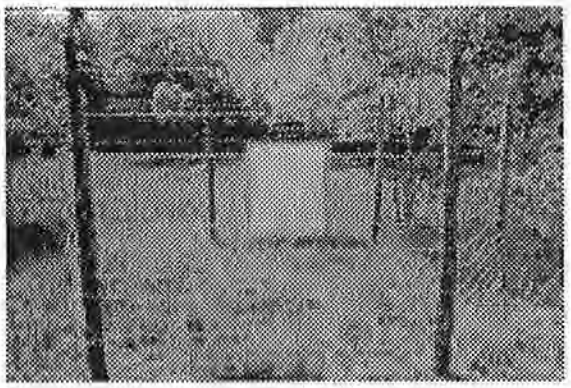
Since 1996, over 29,000 human cases of Lyme disease have been reported in Connecticut.[2, 8] Ticks are abundant in brushy areas.

High incidences of Lyme disease have been associated with deer overabundance. Larval and nymph stages of the deer tick feed on birds and mammals. The adult tick, however, requires a blood meal from a medium to large size mammal to reproduce and lay thousands of eggs. Deer are the primary host for the adult deer tick and are key to the reproductive success of the tick.[44] Numerous studies have shown that abundance and distribution of ticks are correlated with deer densities.[42, 44, 49, 50] For example, when the deer population was reduced by 74% (from 249 to 64 deer per square mile) at a 248-acre study site in Bridgeport, Connecticut, the number of nymphal ticks collected at the site decreased by 92%[44] (Figure 1). On Monhegan Island in Maine, where the deer population was eliminated, tick abundance was significantly reduced, as was the infection rate of remaining ticks 3 years later.[42]

Although the threshold at which deer densities need to be reduced to document a significant reduction in transmission rates of Lyme disease to humans is unknown, the relationship between deer abundance and human cases of Lyme disease was well documented in the Mumford Cove community in Groton, Connecticut, from 1996-2004. The deer population in Mumford Cove was reduced from about 77 deer per square mile to about 10 deer per square mile after 2 years of controlled hunting. After the initial reduction, the deer population was maintained at low levels using bowhunters. Incidences of Lyme disease among residents decreased 83% and have remained at low levels (Figure 2). Reducing deer densities to 10 deer per square mile was adequate to significantly reduce the risk of humans contracting Lyme disease in Mumford Cove. Deer population management must serve as the main tool in any long-term strategy to reduce human incidences of Lyme disease.[48]

Bluff Point Coastal Reserve in Groton, Connecticut, serves as a good example of how overabundant deer herds can impact plant communities. In 1975, the Connecticut General Assembly designated Bluff Point as a Coastal Reserve to protect its unique plant and animal communities for the benefit of present and future generations. Deer hunting was not permitted at Bluff Point. In the late 1980s, the DEP documented severe deer overbrowsing of vegetation, and in the mid-1990s, surveys estimated the deer population exceeded 200 deer per square mile. Deer exclosures (8-foot high fenced areas) were constructed in 1990 to visually document the impacts of overabundant deer populations on the plant ecosystem. After 5 years of no deer management (1995), vegetation outside the exclosure remained unchanged, while vegetation structure and diversity within the deer exclosure increased dramatically. In January 1996, a deer reduction program was initiated at Bluff Point. During the following 5-year period (1996-2001), the deer population was reduced from about 222 to 20 deer per square mile. The reduced deer population resulted in a significant increase in vegetation structure and diversity outside the deer exclosure.

In residential areas, overabundant deer herds can impact flower and vegetable gardens and defoliate landscape plantings. Some homeowners who enjoy observing deer occasionally feed deer during winter. Deer also will take advantage of bird feeders in residential areas as a source of food during winter.[33] Supplemental feed may enhance deer productivity and artificially congregate deer into small areas, which increases damage to natural vegetation[16] and the potential of bringing ticks into residential areas.



Deer exclosures (fenced area) were constructed at Bluff Point Coastal Reserve in 1990 to visually document the impacts of the deer population (220 deer/mi²) on the ecosystem.

After 5 years of no deer management (1995), vegetation outside the exclosure at Bluff Point remained unchanged, while vegetation inside the exclosure increased.

After 5 years of implementing a deer management program at Bluff Point (2001), the vegetation structure and diversity increased dramatically inside and outside the deer exclosure.

Supplemental feed may enhance deer productivity and artificially congregate deer into small areas, which increases damage to natural vegetation and increases the potential of bringing ticks into residential areas.

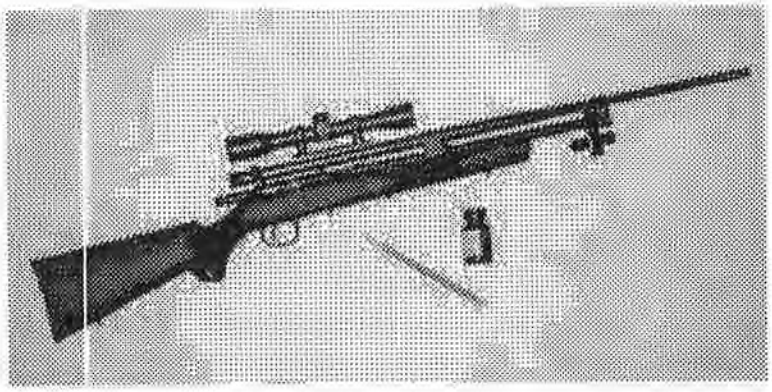
Non-lethal Management Options

Birth Control

Immunocontraception is a birth control method that uses the body's immune system to prevent pregnancy. It is the most common method of inducing infertility in deer. Most earlier experiments with immunocontraception used porcine zona pellucida (PZP), a vaccine extracted from pig ovaries. The original PZP vaccines required 2 doses, delivered remotely with a dart gun the first year, followed by a booster dose each year thereafter. A 3-year study (1997-1999) evaluating the effectiveness of PZP was conducted by The Humane Society of the United States in cooperation with the Connecticut Wildlife Division and University of New Hampshire. The study demonstrated that, even with good access to a relatively small and isolated free-ranging deer population (about 30 females), an adequate number of female deer could not be successfully treated to limit population growth. It is believed that 70-90% of females need to be treated to effectively limit population growth.[21, 43, 47, 49] Aside from the difficulties of treating enough deer, the estimated cost was over $1,000 per deer treated.[49]

SpayVac™: SpayVac™, a new formulation of PZP developed in the early 1990s for seals, requires only a single-dose vaccine. At a captive deer research facility at Pennsylvania State University, SpayVac™ was nearly 100% effective for 3 years and 80% effective for 5 years at preventing fertility in deer. However, failure in

more recent clinical trials stemming from changes in how the vaccine was manufactured, combined with limited financial resources, has slowed down the testing and development of SpayVac™.



A dart gun is most commonly used to remotely deliver birth control agents to free-ranging deer.

Gonacon™: Recently, the United States Department of Agriculture's National Wildlife Research Center developed a fertility control agent similar to SpayVac™ called GonaCon™. GonaCon™ only requires a single treatment and initial studies have shown it to be effective in some deer for up to 4 years. Current studies in Maryland, New Jersey, and Pennsylvania are examining the practicality and efficiency of administering GonaCon™ to free-ranging and captive deer. Studies with free-ranging deer have provided poor results. Despite increased failure rates in current studies using GonaCon™, a proposal is expected to be submitted for federal approval to allow limited use in 2007. To learn more about GonaCon™, visit www.aphis.usda.gov/ws/nwrc/research/reproductive control.

Summary: As of May 2007, no fertility control agents have been federally approved for commercial use on free-ranging deer populations in the United States. If such agents receive federal approval in the future, a state permit would be required prior to their use in Connecticut because DEP regulates the application of any chemicals, including fertility control agents, to wildlife (C.G.S. 26-70). Recent increases in the efficiency of birth control agents improve the prospect for limited applications of wildlife contraception in the future. However, the cost and practicality of treating an adequate number of deer to effectively reduce free-ranging deer populations likely will limit the practical use of birth control agents. A survey of residents in Greenwich, Connecticut, found that most homeowners were unaware of the cost or effectiveness associated with administering birth control agents to free-ranging deer populations.[29] The high cost associated with administering birth control agents may require communities to raise funds. For birth control methods to be effective at limiting population growth, it may be necessary to first reduce deer populations to desired densities using lethal methods. Birth control may be of value on small isolated deer populations, but will not replace hunting for controlling free-ranging deer populations on a large scale.

Trap and Relocate

Studies have shown that about half of all deer trapped and relocated die from capture-related stress or from wandering extensive distances after release, resulting in highway mortality.[24] Relocation can spread diseases, and it costs $400 to $3,000 per deer.[17, 22, 23] In addition, because deer are abundant throughout most of the United States, there is no suitable place to release Connecticut's excess deer. Recent

concerns about Chronic Wasting Disease (CWD) have caused most states to ban the importation of live deer and elk. To learn more about CWD and changes in regulations pertaining to CWD, visit the DEP's website at www.ct.gov/dep or the CWD Alliance website at www.cwd-info.org.

Trapping and relocation require the use of traps, nets, or immobilization equipment to capture deer.

Fencing and Deterrents

Many different types of fencing (electric, woven wire, chain-link, stockade, PVC, rubber-coated chicken wire) can be used to exclude deer from specific areas. Fencing, if properly installed and maintained, can be very effective in restricting deer activity around houses and reducing damage to plantings. Initial costs for fencing materials and installation are substantial, and fencing usually requires periodic maintenance.

Many different types of fencing can be used to exclude deer from specific areas.

Many different types of taste and odor repellents (Deer Off®, Tree Guard®, Hinder®, Deer Away®) are available to reduce deer damage to plantings. Generally, repellents are relatively effective at low deer densities, but become less effective as deer densities increase. Repellents can be costly and labor intensive, have varying degrees of effectiveness, and require multiple applications. Recently, ultrasonic devices have been used as an alternative to standard fencing and repellents. The detection of motion triggers the emission of sound waves at frequencies mostly inaudible to

Motion-activated ultrasonic devices emit high-frequency sound waves to deter deer as an alternative to standard fencing and repellents.

humans, but disturbing to deer. Sound configurations on devices need to be adjusted frequently to minimize the likelihood of deer habituating to one particular sound. To date, no scientific studies have evaluated the effectiveness of these devices. Fencing, repellents, and ultrasonic devices provide varying degrees of success at protecting specific areas from deer damage; however, they do not address the underlying problem of deer overpopulation.

Several different types of deterrents (taste, sound, or noise) are available to reduce deer damage to plantings.

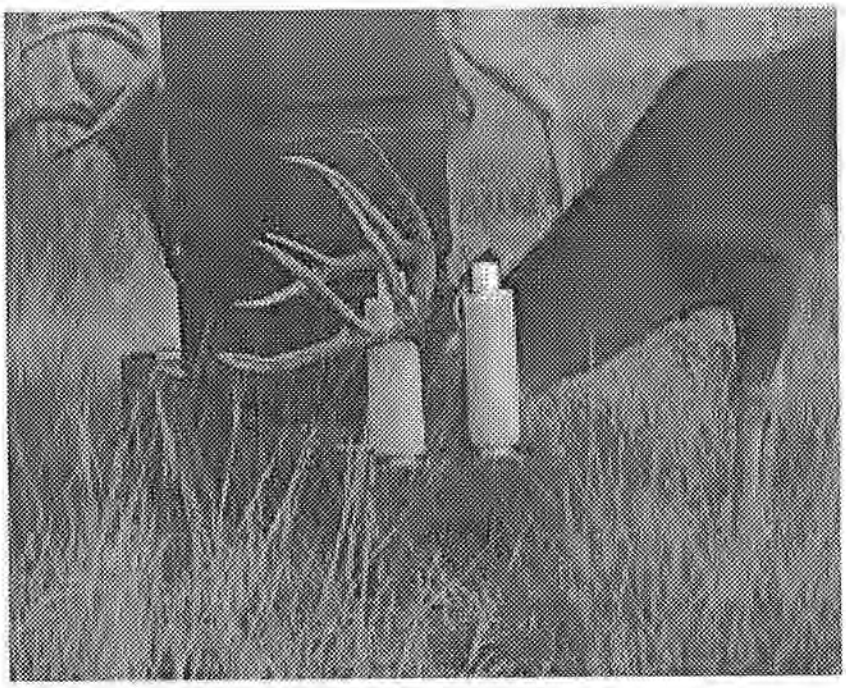
Deer Resistant Plants

Deer preferences for specific plants vary seasonally and geographically. Deer are considered generalists; however, they do have preferences for certain plant species. When deer populations are low and food is abundant, deer select more desirable plant species. As deer populations increase or food becomes less available, less desirable species will be consumed. Planting less desirable plant species around homes may reduce the likelihood of damage caused by deer. In areas with high deer densities, almost all plant species are at risk. Check with your local nursery or landscaper for recommendations on landscape plantings for your area.

Use of a "4-Poster Device" to Reduce Lyme Disease

A "4-poster device" consists of a supplemental feeding station with 4 rollers that apply a pesticide to kill ticks on deer as they feed. In 2004, the "4-poster device" was patented and became commercially available to the public to help kill ticks on deer as a means of reducing tick populations. According to the manufacturer's recommendations, this device cannot be used within 100 yards of any home, apartment, playground, or place where children may be present without adult supervision or applied directly to water or where water is present. Caution signs must be posted at each device, and anyone who comes in contact with the device or a treated animal is required to wear protective gloves. Other limitations or concerns about this device include: providing supplemental feed (up to 1 ton of corn per year per device) and cost (devices are only sold in packages of 9 at a cost of $425 each, or $3,825 per package, excluding cost of corn, rollers, tickicide, signs, applicator gun, and shipping) (American Lyme Disease Foundation, www.aldf.com). Costs of hiring a licensed pesticide operator to "treat" the rollers once every 7-10 days and feeder maintenance also must be added. Studies in Lyme, Connecticut, have shown a reduction in tick populations when 4-poster devices were used.[45] However, infection rates of the remaining ticks increased, and it is unknown if the treatment of deer reduced human incidence of Lyme disease in the treatment area.[45] Ability to treat an adequate number of deer each year to affect tick populations varied

annually and was influenced by abundance of alternate food sources such as acorns. DEP permits are required for use of 4-poster devices (C.G.S. 26-70) and may be issued experimentally on a site-specific basis. Contact the DEP Wildlife Division (see page 26) for additional information.



A "4-poster" device consists of a bait station that supplies corn to attract deer and 4 rollers that apply a pesticide to deer as they feed. The pesticide is meant to kill ticks.

Deer Herd Reduction Options

Sharpshooting

"Sharpshooting" usually means hiring experienced marksmen who have special authorization from the state wildlife agency to remove overabundant deer. Sharpshooting has been successful in addressing small-scale deer problems in many states.[13, 15, 17, 25] For sharpshooting to be successful, special equipment and techniques, such as silencers, bait, and the ability to shoot deer at night with the aid of lights or night-vision equipment, are required. Deer harvested during sharpshooting programs often are donated to food charities.

In 2003, the Connecticut General Assembly passed a bill (Public Act 03-192) that allows municipalities, homeowner associations, and nonprofit land holding organizations to use methods, such as sharpshooting, when severe nuisance or ecological damage can be demonstrated (C.G.S. 26-82). Individual landowners are not eligible under the law to implement sharpshooting programs. Authorization to conduct a sharpshooting program must be obtained from the Connecticut DEP. Applicants must be experiencing severe nuisance (deer-vehicle accidents, property damage, agricultural damage) or ecosystem damage caused by deer. Applicants must prepare and submit a deer management plan to the DEP for review and approval. For complete details about requirements for implementing a sharpshooting program, log onto the DEP's website at www.ct.gov/dep or contact the DEP's Deer Management Program (see page 25).

In March 2005, the Town of Greenwich contracted sharpshooters who removed 80 deer in 4 nights at an estimated cost to the community of $646 per deer. A total of 2,400 pounds of venison was donated to the lower Fairfield County food pantry.

Regulated Hunting

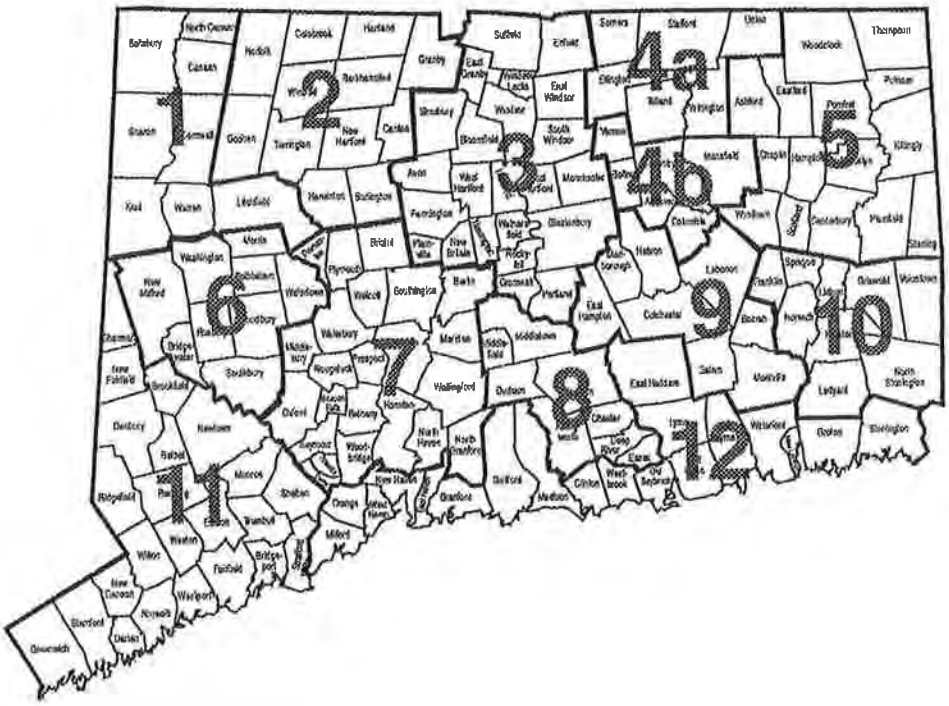
Hunting results in immediate removal of animals from the population, is cost-effective, and is the principal management tool used by all state agencies to manage free-ranging deer. Deer spend their life in a defined area called a home range. In urban-suburban areas in Connecticut, deer home ranges are relatively small (about 100-300 acres). Research on urban deer has shown that when deer are removed from an area, other deer will not abandon their home range to fill that void.[34, 38, 41] However, over time, young deer searching for their own home range will disperse in random directions, slowly repopulating the area. Because urban deer typically have small home ranges, hunting can produce localized reductions in deer populations.

Sharpshooters are experienced marksmen with special equipment who have authorization from the state wildlife agency to remove deer outside the normal regulated hunting season.

In Connecticut, all new hunters are required to take a 16-hour Conservation Education/ Firearms Safety (CE/FS) course administered by the DEP before they can purchase a hunting license. All Connecticut bowhunters are required to pass an 8-hour CE/FS bowhunting safety course before they can purchase an archery permit. No hunting accidents have occurred during special controlled hunts implemented in residential communities.[13, 32, 36] In many circumstances, additional hunting requirements, such as passing a shooting proficiency test, hunter interviews, and restricting hunting hours or hunting methods (i.e., archery only or hunting from tree stands), have been imposed to address specific concerns of communities.[13, 32, 36]

The DEP continues to liberalize the regulated deer hunting season framework to control population growth especially in urban-suburban areas (deer management zones 11 and 12) where deer populations are high (Figure 3). In 1998, a new antlerless replacement tag program allowed hunters to harvest unlimited numbers of antlerless deer in these zones. The reported annual archery harvest increased four-fold during the first 6 years of the antlerless tag program. Removal of antlerless

Figure 3. Statewide map of hunting requirements and opportunities in Connecticut, 2007.



Bowhunting opportunities statewide and in zones 11 and 12.

	Statewide	Zones 11 & 12
Hunter safety course required	Yes	Yes
Landowner permission required	Yes	Yes
Archery season length	9/15-12/31	9/15-1/31
Use of bait	No	Yes
Unlimited antlerless tags	No	Yes
Earn-a-buck program	No	Yes
Minimum property size	No	No
Minimum distance from house	None	None
Special crossbow season	No	Under consideration

deer (primarily adult females) is the most effective method for reducing population growth. In 2002, the archery season was extended to include the month of January (27 extra days) and in 2003, hunters were allowed to hunt over bait (private land only). Using bait during the hunting season increases hunter ability to position deer for better shot placement, shooting safety, and hunter success. During the 2003 season, the deer harvest in areas where baiting was allowed increased nearly 17%, while harvest in other zones increased less than 2%.

A survey of deer hunters in Connecticut found that the opportunity to earn an

additional buck tag was an important incentive for hunters to harvest additional antlerless deer.[29] Based on this information, an earn-a-buck program was initiated in 2005 to provide hunters an incentive to harvest additional antlerless deer. After harvesting 3 antlerless deer from zones 11 and 12 during the same hunting season, hunters were eligible to receive an extra either-sex tag that allows a buck to be harvested. These liberalizations have reduced population growth in these areas. The DEP Wildlife Division will continue to monitor harvest trends and develop innovative strategies for controlling deer population growth.

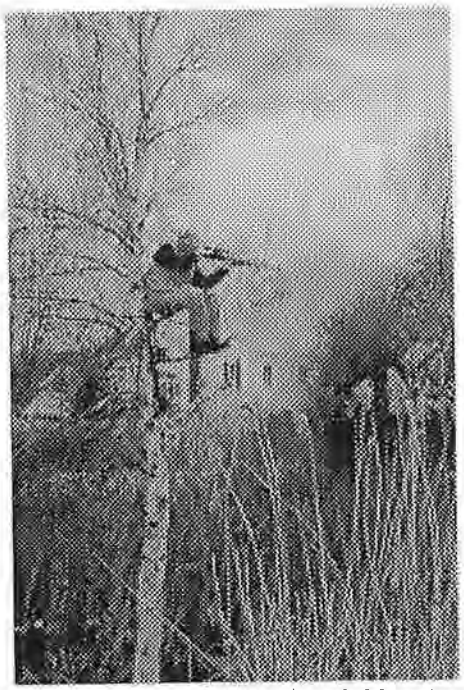
Using bait during the hunting season increases hunter ability to position deer for better shot placement, shooting safety, and hunter success.

Controlled Hunts

Controlled deer hunts are specialized hunts tailored to meet the needs and objectives of landowners. Controlled hunts usually include restrictions imposed by the landowner, such as limiting hunter numbers, restricting days or times for hunting, requiring shooting proficiency tests, and strategically distributing hunters on the property, often in

An "earn-a-buck" program was initiated in 2005 to provide hunters incentives to harvest antlerless deer. In special deer management zones, hunters can earn an either-sex tag for harvesting an extra buck after harvesting 3 antlerless deer.

elevated tree stands.[37] The DEP may provide technical assistance to large landowners in developing effective controlled hunt programs.



Controlled hunts are special hunts designed to meet the needs and objectives of landowners.

Common Questions About Hunting

Why use hunters?

Licensed hunters take to the woods each year to harvest deer for food and enjoy the outdoors with friends and family. Most hunters are willing to help landowners who are experiencing problems with deer, free of charge. Harvested deer provide families with lean healthy meat for the dinner table and hides for making leather goods. Hunters who harvest more deer than their families and friends can consume may offer venison to landowners or may donate excess venison to food charities. On average, Connecticut hunters spend $7-8 million annually on deer hunting-related goods and services, contributing significantly to the state's economy.[27]

Will hunting cause deer populations to rebound?

Removing deer from healthy populations will not increase reproductive rates of the remaining deer. Healthy females typically produce 2 fawns and occasionally will produce 3. Only if a deer herd is in poor health due to lack of food will it be possible for reproductive rates to change from an unnaturally suppressed level back to a normal reproductive level. Reproduction in a nutritionally-stressed herd may increase to normal levels if a significant number of deer are removed and the habitat improves. However, deer reproduction physiologically cannot increase to supernormal levels to compensate for reduced deer densities.

Will hunting cause an increase in deer-vehicle accidents?

During fall, deer naturally move more due to increased activity associated with the breeding season (rut). Some hunting opponents have claimed that deer-vehicle accidents are highest during fall because hunters are chasing deer through the woods and these deer are crossing roads, causing an increase in deer-vehicle accidents. The DEP Wildlife Division investigated the frequency, distribution, and timing of deer-vehicle accidents during fall, based on reports received from state and local police departments. The distribution and timing of vehicular traffic also was investigated. During the fall season, deer hunting occurs Monday through Saturday from 1/2-hour before sunrise to sunset. Hunting is prohibited on Sundays. If hunting activity contributed to deer-vehicle accidents, it would be expected that more deer-vehicle accidents would occur on Saturday when most hunting occurs.

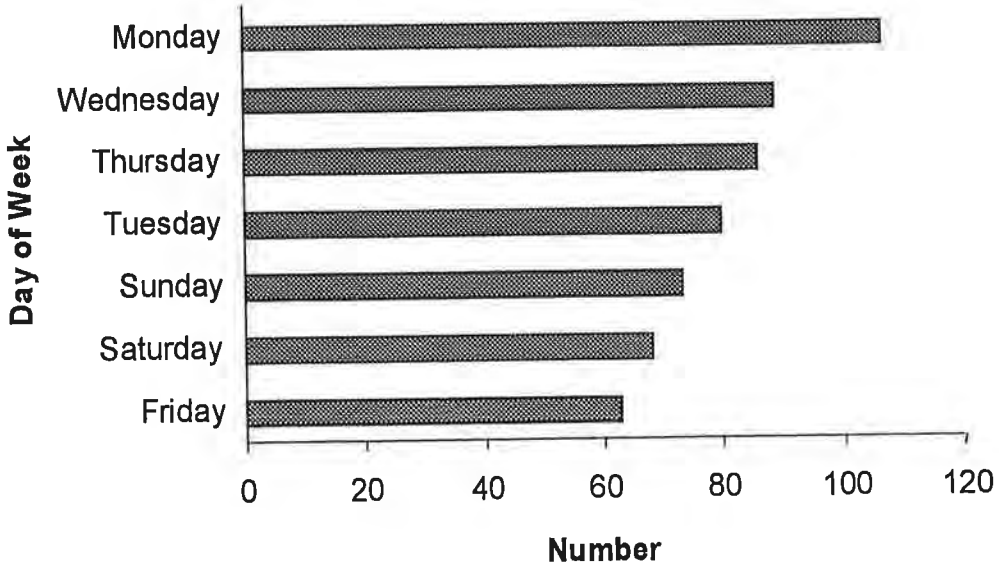
During the five-week firearms deer hunting season in November and December, Fridays and Saturdays had the lowest number of deer-vehicle accidents. More accidents actually occurred on Sundays when no hunting is allowed. Interestingly, deer-vehicle accidents were relatively high on weekdays and relatively low on weekends (Figure 4). This closely corresponds with vehicular traffic patterns. Vehicle traffic volume was higher on weekdays and lower on weekends. This suggests that traffic volume was an important factor in deer-vehicle accident rates.

If hunting activity contributed to deer-vehicle accidents, then it would also be expected that deer-vehicle accidents would be highest during hunting hours (1/2-hour before sunrise to sunset) when hunters are in the woods and lowest at night when hunting is prohibited. Data on time-of-day of deer-vehicle accidents do not support this concept. Deer-vehicle accidents actually peak about 1-4 hours after dark (Figure 5). Again, this peak closely corresponds with peak traffic volume at the end of the workday. These data suggest that vehicular traffic patterns have a significant influence on deer-vehicle accidents. Removing deer through hunting or other deer management techniques are effective methods for reducing deer populations. Reducing deer populations will reduce the risk of deer-vehicle accidents.

Where can I find hunters to hunt on my property?

Connecticut issues over 60,000 deer hunting permits each year. Landowners who would like to use hunters on their property should talk to friends or neighbors who may hunt or know someone who hunts, or contact a local sportsmen's club. Homeowners and communities can interview hunters and select only those hunters they are comfortable with.

Figure 4. Deer-vehicle accidents during the 5-week firearms deer hunting season (Nov-Dec 2005) by day of week.



Feeding Wild Animals - For Non-Hunting Purposes is Prohibited. **Wisconsin Law**
1 person may place, deposit or allow the placement of any material to feed or attract wild animals for non-hunting purposes including recreational and supplemental feeding, except as allowed below for birds and small mammals.
Feeding Birds and Small Mammals: Material may be placed solely for the purpose of attracting and feeding wild birds and small mammals if:
• Placed in bird feeding devices and structures at a sufficient height or design to prevent access by deer, and
• The structures and devices are within 50 yards of a dwelling devoted to human occupancy.
• When deer, bear or elk are found to be utilizing bird feeding devices or structures, the devices or structures shall be enclosed or elevated higher to prevent access by deer.
Note: The placement of plain water for drinking or for birdbaths is allowed.

Part 189 of Title 6 of the Codes, Rules and Regulations of the State of **New York** was adopted on July 30, 2003. Part of this rule restricts the feeding of deer.*In New York, it is illegal to feed deer by putting out any material that attracts deer to feed.*

There are five exceptions to the rule:

1. Agricultural crops including wildlife food plots.
2. Distribution of food to livestock.
3. Distribution of food to captive deer.
4. Cutting of trees and brush.
5. Scientific research, wildlife damage abatement, and wildlife population reduction programs, but only under a permit issued by DEC.

Richmond, VA — Effective September 1, 2009 it will be illegal to feed deer statewide in **Virginia**. The annual prohibition runs through the first Saturday in January. The regulation designating the prohibition went into effect in 2006. This regulation does NOT restrict the planting of crops such as corn and soybeans, wildlife food plots, and backyard or schoolyard habitats. It is intended to curb the artificial feeding of deer that leads to negative consequences.

Problems with feeding deer include: unnaturally increasing population numbers that damage natural habitats; disease transmission, including tuberculosis as well as many deer diseases; and human-deer conflicts such as deer/vehicle collisions and inappropriate semi-taming of wildlife. It is not unheard of for deer to take advantage of birdfeeders and begin to eat spilled birdseed. Individuals who inadvertently are feeding deer through their birdfeeders may be requested by VDGIF conservation police officers to temporarily remove feeders until the deer disperse.

Deer Are Wild Animals

In their natural state, deer are wild animals that have a fear of humans because we have preyed upon deer for thousands of years. However, when deer are fed by people, they lose this fear, becoming less wild and often semi-domesticated.

2. Fed deer are often emboldened to seek human foods, leading them into conflict with people. Despite their gentle appearance, they can become lethally dangerous during mating season capable of goring and slashing with their sharp hooves and antlers. There are numerous cases across the country of individuals injured, and

in some cases even killed, by deer they treated as pets.

People often treat the deer they feed as if they own them, even going so far as to name individual deer. Not only does this association diminish the "wildness" of "wildlife", it also leads to a mistaken notion regarding ownership of wildlife. Deer and other wildlife are owned by citizens of the Commonwealth and are managed by the Department as a public resource.

Deer Feeding Congregates Animals, Increasing the Spread of Disease

The increase in deer feeding that has taken place in Virginia over the past decade now represents one of Virginia's biggest wildlife disease risk factors. Deer feeding sets the stage for maintaining and facilitating the spread of disease.

Diseases are a big issue in deer management today across the United States. Feeding deer invariably leads to the prolonged crowding of animals in a small area, resulting in more direct animal to animal contact and contamination of feeding sites. Deer feeding has been implicated as a major risk factor and contributor in the three most important deer diseases in North America today. These include tuberculosis, brucellosis, and chronic wasting disease (CWD). Fortunately, none of these diseases have been found in deer in Virginia, although CWD is present in West Virginia, less than 5 miles from Frederick County, Virginia.

Please Don't Feed Deer

It is clear that the negative consequences of feeding deer outweigh the benefits. If you are not feeding deer, you should not start. If you are currently feeding deer, you should now stop. Feeding deer is against the law between September 1 and the first Saturday in January

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Vermont wildlife experts don't want people feeding or baiting deer because it can cause the animals to congregate in new ways.

Deer will change their habits to follow a food source, especially in the winter. Because chronic wasting disease can quickly spread through a deer herd, the state is discouraging any practice that could bring a deer into close proximity to each other.

Massachsetts DNR Please Do Not Feed Deer! Everyone should be aware that the artificially high deer densities associated with feeding create the potential for increased spread and prevalence of CWD both from infected feed and close contact among individual deer. Deer feeding provides no benefits to deer but adds significantly to the risk that diseases could be spread more quickly and widely.

Rhode Island Feeding/Baiting - the act of using, placing, giving, exposing, depositing, distributing, or scattering any material, or any act to maintain the availability of such material, that attracts, or is reasonably intended to attract wild white-tailed deer to feed on such material. Any person who violates any section of these rules and regulations shall, upon conviction by a court of competent jurisdiction, be punished by a fine of up to three hundred dollars ($300.) or imprisonment not exceeding one (1) year per violation.

SPRINGFIELD- The Illinois Department of Natural Resources (IDNR) is reminding Illinois residents and visitors of the state's ban on the feeding of wild deer and other wildlife in areas where wild deer are present. The ban was enacted in 2002 as part of the state's continuing effort to limit the spread of chronic wasting

disease (CWD) in the Illinois wild deer herd.

The ban includes food, salt, mineral blocks and other food products, with some exceptions. For example, bird and squirrel feeders close to homes and incidental feeding of wildlife within active livestock operations are exempt from the ban.

Pennsylvania Game Commission

While feeding deer may enhance wildlife viewing and, under certain extreme circumstances, provide some benefits, decades of research has clearly shown that supplemental feeding leads to increased disease risk, longterm habitat destruction, increased vehicle collisions, habituation to humans and alteration of other deer behavioral patterns and, ultimately, the demise of the value of deer and deer-related recreation. With CWD approaching our borders, the increased potential for disease transmission and outbreak is perhaps our greatest and most immediate concern, but habitat degradation, loss of wildlife diversity and abundance, and the introduction and invasion of exotic plants are consequences of feed that have been documented throughout North America and are a concern for Pennsylvania. Supplemental feeding congregates deer in unnatural densities. Gathering large numbers of deer into small areas creates a serious risk for spreading terminal diseases such as chronic wasting disease, tuberculosis and, in turkeys that feed on "deer corn," aspergillosis. Mange is another disease that spreads between animals in close contact. The spread of disease within and among species is encouraged by repeated and prolonged contact at feeding sites.

Supplemental feeding alters the normal avoidance behavior of deer toward humans. Animals conditioned to human food sources lose their natural wariness and may become aggressive toward people either in protection of, or in seeking, human food sources. We've all heard sobering stories of people suffering the direct attacks of habituated deer and other wildlife. Feeding sites reduce animals' home ranges, and deer that are fed continuously can become dependant on supplemental feed. Wild deer that are fed may adopt the habits of domestic animals. When deer spend lots of time on private property, landowners often feel as if they are personal possessions rather than wild animals that belong to all citizens.

Feeding can cause more deer to survive than the natural habitat can support, leading to long-term degradation of the habitat and diminishing the carrying capacity of the area. This is not new. A 1944 study reported, "feeding serves to concentrate deer in small areas year after year where animals do serious and possibly irreparable damage to native forage species, which in turn further reduces the carrying capacity of the range and makes deer increasingly dependent upon supplements." Over years, the composition of the plant and animal communities can change markedly – diversity is reduced and less desirable plant species up to a mile from feeding locations increase. Weeds contained in feed can threaten the integrity of a community, and feeding increases the likelihood of invasion by exotic plant species. The forest understory declines and ground cover disappears, trees become larger and the number of dead trees increases. With less nesting cover available and nest predators such as raccoons and skunks being drawn to feeding sites, ground-nesting bird populations such as wild turkeys decline in feeding areas.

It takes two to four weeks of feeding on a new food source for deer to establish the microorganisms necessary to obtain nutrients from that food. The time and energy it takes to convert to new microorganisms uses precious fat reserves that could have been spared if the deer had fed continually on natural winter browse. Studies have documented the death of wild ruminants from feeding on highly digestible, high energy, low fiber feed such as corn in winter. This rapid exposure to a concentrated grain diet can cause a fatal disruption of the animal's acid-base balance. Those that survive the immediate effects of "grain overload" often die in the days or weeks that follow, due to secondary complications of the disease. High densities of

deer at feed sites create increased competition and stress within and among deer and other wildlife. Compounding the problem is that stress from crowding and competitive aggression weakens immune systems. Social hierarchies prevent the deer most susceptible to starvation (fawns and those that are already weakened) from feeding. Most of the supplemental feed, in reality, is consumed by a small number of deer, and they are the same deer that got their choice of food in the autumn, and were able to put on a thick layer of fat. Deer in the poorest condition don't get fed, yet waste energy they can't afford to lose by traveling to feed sites with the herd.

Lincolnshire, IL

1. Shall be illegal to make available food, salt, mineral blocks, or other products for ingestion by wild deer or other wildlife in areas where wild deer are present. Exempted from this Section are the following:

a. elevated bird/squirrel feeders providing seed, grain, fruit, worms or suet for birds or squirrels located within 100 feet of a dwelling devoted to human occupancy.

Austin TX **CHAPTER 10-8. INTENTIONAL FEEDING OF DEER.**

ARTICLE 1. GENERAL PROVISIONS.

§ **10-8-1** Definition

§ **10-8-2** Community Education

ARTICLE 2. OFFENSE.

§ **10-8-3** Feeding of Deer Prohibited

§ **10-8-4** Affirmative Defense

§ **10-8-5** Enforcement

§ **10-8-6** Penalty

ARTICLE 1. GENERAL PROVISIONS.

§ 10-8-1 DEFINITION. In this chapter FOOD means corn, fruit, oats, hay, nuts, wheat, alfalfa, salt blocks, grain, vegetables, and commercially sold wildlife feed, birdseed or livestock feed, but excludes shrubs, live crops, plants, flowers, vegetation, gardens, trees, and fruit or nuts that have fallen on the ground from trees. Source: Ord. 20090212-009.

§ 10-8-2 COMMUNITY EDUCATION.The city manager shall establish and implement a program to educate the community about the dangers of overpopulation of deer in urban and suburban areas. *Source: Ord. 20090212-009.*

ARTICLE 2. OFFENSE.

§ 10-8-3 FEEDING OF DEER PROHIBITED.

(A) Except as provided in subsection (C), a person commits an offense if the person intentionally feeds deer or makes food available for consumption by deer on private or public property within the territorial limits of the city.

(B) A person shall be presumed to have intentionally fed deer, or made food available for consumption by deer, if the person places food, or causes food to be placed, on the ground outdoors or on any outdoor platform that stands fewer than five feet above the ground.

(C) This section does not apply to an animal control officer, veterinarian, peace officer, City employee, federal or state wildlife official, or property owner who is authorized by a local, state, or federal government to treat, manage, capture, trap, hunt, or remove deer and who is acting within the scope of the person's authority. *Source: Ord. 20090212-009.*

§ 10-8-4 AFFIRMATIVE DEFENSE. It is an affirmative defense to prosecution under this chapter if a person places food, in good faith, for the purpose of feeding domestic livestock or pets located on the property. *Source: Ord. 20090212-009.*

§ 10-8-5 ENFORCEMENT.

(A) A person may report a violation of this chapter to the director of the Health and Human Services Department.

(B) The director of the Health and Human Services Department may enforce this chapter and may seek injunctive relief.

(C) The city manager may authorize a City employee conducting an inspection under any provision of the city code to also inspect for

compliance with this chapter and issue a citation for violation of this chapter. *Source: Ord. 20090212-009.*

3-6 PENALTY.

A person who violates this chapter commits an offense. An offense under this chapter is a Class C misdemeanor punishable as provided in Section **1-1-99**(*Offenses; General Penalty*) by a fine of not less than $75 or more than $125. *Source: Ord. 20090212-009.*

The town of Decorah. The new rule states "no person may place … any fruit, grain, mineral, plant, salt, vegetable or other materials outdoors on any public or private property for the purpose of attracting or feeding deer."

a. The penalty for violating the ordinance could be up to a $500 fine and up to 30 days in jail.

FEEDING DEER PROHIBITED

§ 91.50 DETERMINATION OF CITY. FT THOMAS, KY

It is hereby determined that an increasing population of deer within the City of Fort Thomas: poses a threat to public safety by increasing the likelihood of deer-vehicle collisions, deer attacks on residents, pedestrians and visitors, and the transmission of diseases to humans from deer; poses a threat to native plant and animal life by excessive foraging which disturbs natural ecological balances; and poses a threat to the quality of life by deer-related damage to landscaping and vegetable gardens.

§ 91.51 FEEDING PROHIBITED.

(A) No person shall knowingly, purposely or intentionally feed deer, cause deer to be fed or provide food to deer in the City of Fort Thomas on any public or private property. This prohibition includes, but is not limited to, disbursement of food on the ground, at a feeding station, in a feeding device, or in a container of any form; providing a salt or mineral lick/block; or any other means which serves to provide feed to any deer in the City of Fort Thomas.

A person shall be deemed to have knowingly, purposely or intentionally fed deer, caused deer to be fed, or provided food to deer if the person places, or allows to be placed, wheat, pelleted livestock food, corn in any form, fruit, vegetables, hay or alfalfa, human food scraps, any form of commercially sold wildlife feed, birdseed or livestock feed, or any other edible matter that deer will consume on the ground or within the reach of deer. This prohibition shall not include live vegetation such as ornamental landscaping, flowers, trees, vines, vegetable gardens, edible matter located either in an enclosed building or stored in a securely sealed package, or unmodified commercially purchased bird feeders or their equivalent when placed out of the reach of deer.

§ 91.52 REMOVAL OF FEED.

Any person, upon written notification by the city, violating § 91.51 shall immediately and permanently remove feed and feeding devices utilized to feed deer, and discontinue the activity for which the notification was given.

§ 91.99 PENALTY.

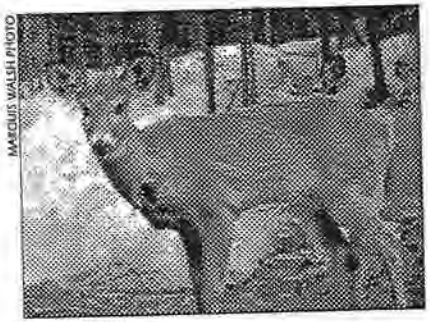
(H) Any person violating § 91.51 of this Ordinance shall be deemed to have committed a civil offense, and be subject to a fine of $100.00 for a first violation, $250.00 for a second violation, and $500 for a third and each subsequent violation. Each violation shall constitute a separate offense.

Prohibition

No person shall feed or allow the feeding of deer within any area of the City of Mankato. For the purpose of this section, feeding shall mean provision of one-half cubic foot or more of grain, fruit, vegetables, nuts, hay or other edible material, either on the ground or at a height of less than five (5) feet above the ground, in a manner that attracts deer on a regular basis. Living food sources such as fruit trees and other vegetation, shall not be considered as deer feeding.

Exceptions

This prohibition shall not apply to veterinarians, city animal control officers and park maintenance staff or county, state or federal game officials who in the course of their duties have deer in their custody or under their management.



MARCUS WALSH PHOTO

"I fed deer one winter, but have since stopped because the bigger deer kicked at the smaller ones. I know people care about deer, but wild animals are supposed to live on wild food. If deer depend on us for food, then they are no longer wild."

Harmony Anderson
Strafford landowner

For more information:

- "Feeding Wildlife . . . Just Say No!" a 34-page booklet by the Wildlife Management Institute. $3.25: WMI Publications, PO Box 34646, Washington, D.C. 20043.
- "Supplemental Feeding of White-Tailed Deer During Winter." Visit www.state.me.us/ifw/hunt/deerfeed.htm. Also available in print by the Maine Department of Inland Fisheries and Wildlife, 207-287-8000.
- "Feeding Adirondack Deer in Winter: Let's Understand What We're Doing." Visit www.esf.edu/aec/id81.htm. Also available in print by calling State University of New York, College of Environmental Science and Forestry, 315-470-6644.
- Visit www.dec.state.ny.us/website/dfwmr/wildlife/deerfeed.htm.

Your purchase of hunting and fishing equipment and motorboat fuels supports Wildlife and Sport Fish Restoration and boating facilities.

New Hampshire
Fish and Game Department
2 Hazen Drive ▪ Concord, NH 03301
(603) 271-3211
www.wildlife.state.nh.us

University of New Hampshire
Cooperative Extension

Forestry and Wildlife Program
214 Nesmith Hall ▪ 131 Main Street
Durham, NH 03824-3597
(603) 862-1028
http://ceinfo.unh.edu

F&W01014 P65

More Harm Than Good

Here's why the New Hampshire Fish and Game Department urges you to NOT feed the deer.

Feeding deer often makes them more vulnerable to starvation, predation, disease, and vehicle collisions, among other things.

CHARLES WILLEY PHOTO

A Little Deer Biology

White-tailed deer in New Hampshire are at the northern limit of their range and have several natural adaptations that help them survive the winter. These include a thick winter coat of hollow hairs and the storage of fat in fall for later use during winter.

Adult deer lose up to 20 percent of their body weight during winter, regardless of the amount or quality of food present. Adult deer get as much as 40 percent of their daily energy during winter from their fat tissue.

During winter, cover – not forage – becomes the key to survival. Deer seek softwood cover (deer yards) to avoid deep snow, high winds and extreme cold. Deer move little in these areas and use a network of trails collectively created. Travel is easier, as is escape from predators. Wintering deer tend to disperse over an area large enough to reduce competition for food and risk of predation.

Despite these adaptations, some deer will die in winter. This occurs more commonly in older or smaller deer, especially among those with fewer fat reserves. If winter ends before the fat reserves are expended, the deer survives. If fat reserves are gone before winter ends, the deer dies. Therefore, any activity that increases energy use can lead to the death of individual deer and reduce the population.

Supplemental Feeding Can Harm Deer

Feed sites congregate deer into unnaturally high densities.

These high deer densities can:

- attract predators and increase risk of death by coyotes or domestic dogs.
- spread disease among deer.
- cause aggression, wasting vital energy reserves and leading to injury or death.
- reduce fat reserves as deer use energy traveling to and from the feed site.
- result in over-browsing of local vegetation and ornamental plants.
- deny access to food, because subordinate deer are kept away from feeding stations, and over-browsing by larger deer removes food available to fawns.
- increase deer-vehicle collisions. Vehicle-killed deer near feed sites can outnumber those that would naturally succumb to winter mortality.

MARQUIS WALSH PHOTO

It's an unsettling sight — even for seasoned wildlife biologists – deer that succumb to predators, starvation or other causes because feed sites concentrate deer into unnaturally high densities.

MARQUIS WALSH PHOTO

White-tailed deer are fascinating to watch. But backyard feed sites can result in a number of unintended problems for deer. And the results are seldom seen from the home.

Other Problems Associated with Feed Sites:

- **Tamer Deer**

Feed sites cause deer to depend less on their natural environment and more on humans. Deer may lose their fear of humans and become habituated to feed sites.

- **Transition from Browse to Feed**

Deer receive little nutritional value from a new food source for about two weeks of feeding, since stomach microorganisms must adjust to the diet change. Ironically, while well-intentioned people try to help the deer by feeding, they may be harming them due to the time and energy needed to convert the microorganisms.

M.D. TARR PHOTO

Because feed sites attract deer into tight densities, natural nearby browse is often depleted. Smaller, younger deer are the first to lose access to that browse.

- **Inferior Habitat and Traveling Energy**

Feed sites lure deer away from natural wintering areas. This attraction can trap deer in inferior winter habitat and increase the chance of malnutrition and predation.

- **Unintended Impacts on Good Winter Cover**

Timber companies and other landowners alter cutting practices to protect good deer yards. If deer go to feed sites instead of protected deer yards, then the timber companies will see little value in continuing to protect the wintering areas. Further, young deer that associate feeding sites with winter habitat may never learn to occupy natural winter habitat. Thus, feeding may produce long-term habitat loss and critical behavioral change.

The New Hampshire Fish and Game Department's Position

The New Hampshire Fish and Game Department recognizes the long-term viability of the deer herd is not dependent on supplemental winter feeding anywhere in the state.

■ **The Fish and Game Department does not advocate the supplemental feeding of deer, will not participate in winter feeding efforts and urges landowners to not provide supplemental feed to deer.**

MARQUIS WALSH PHOTO

Feed sites draw can draw deer toward inferior habitat, where they can be vulnerable to a host of problems, from predators to malnutrition.

How You Can Help Deer

For the long-term health of deer, the best management strategy is to keep deer dependent on their natural food and cover. A healthy deer population will be sustained if New Hampshire maintains mature softwood wintering areas, young hardwood stands, nut-producing trees (like oak and beech) and forest openings.

Landowners can help by developing a management plan that uses wildlife and its habitat as guiding objectives. Sustainable timber harvesting is compatible with protecting winter deer yards and other deer habitat features. Also, landowners can recognize the role of hunters as the primary tool for wildlife biologists to regulate deer densities. Allowing hunter access to huntable lands is an effective way to maintain a healthy balance between deer and their habitat.

MARQUIS WALSH PHOTO

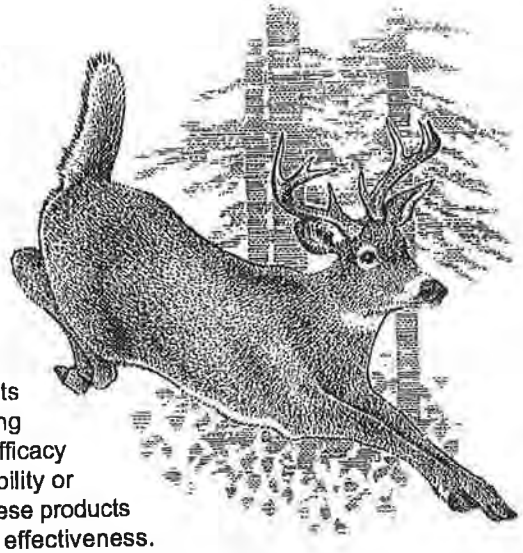
Deer need to adjust gradually to a diet of feed formulas. Sometimes the energy adjusting to feed outweighs the nutrition deer get from that feed.

Timber Tech Tips

United States Department of Agriculture
Forest Service
Technology & Development Program
July 2001
2400 0124-2331-MTDC

Comparison of Commercial Deer Repellents

Andy Trent, Project Leader; Dale Nolte and Kimberly Wagner, USDA Animal Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center



Foraging deer can severely hinder regeneration of newly stocked stands. Chemical repellents (along with fencing and individual tree shelters) are socially acceptable nonlethal tools to reduce deer damage. New products are continually entering the market, but their efficacy varies greatly. Availability or even registration of these products does not equate with effectiveness. Some repellents may contain active ingredients at concentrations below avoidance thresholds. Others may contain ingredients that don't repel the target species. The Olympia Field Station of the USDA Animal and Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center has conducted numerous studies to identify trends that could help predict the efficacy of repellents. A recent test evaluated 20 commercially available repellents representing a variety of active ingredients (Wagner and Nolte 2001).

How Repellents Work

Deer repellents generally rely on fear, conditioned avoidance, pain, or taste.

Fear-inducing repellents contain compounds that emit sulfurous odors (such as predator urine, meat proteins, or garlic). We interpret the avoidance of these odors as a fear response, suggesting herbivores perceive sulfurous odors as indicators of predator activity.

Conditioned avoidance occurs when ingestion of a food is paired with nausea or gastrointestinal distress. Animals generally don't eat as much of a food if it is associated with illness.

Active ingredients, such as capsaicin, allyl isothiocyanate, and ammonia, cause pain or irritation when they contact trigeminal receptors in the mucous membranes of the mouth, eyes, nose, and gut. An inherent problem of using pain repellents is that they are universally aversive to all mammals.

Bad taste can also induce avoidance. Bittering agents are often used to induce a bad taste. Unfortunately, while omnivores normally avoid bitter tastes, herbivores are generally indifferent, at least at the concentrations used in most repellents.

Delivering Repellents

Repellents may be incorporated into the plant (systemic delivery), spread throughout an area (area delivery), or applied to the plant (contact delivery).

Systemic repellents are compounds absorbed and translocated by the plant, rendering the foliage less desirable. Systemic delivery is ideal. The repellents are contained within the plant. They cannot be washed off, and the aversive agents are moved to new foliage as it grows. Few, if any, products have effectively incorporated repellents into a plant at concentrations that did not harm the plant.

For additional information, contact: *Andy Trent, Project Leader, USDA Forest Service, MTDC; Bldg. 1, Fort Missoula; Missoula, MT 59804-7294. Phone: 406-329-3912; Fax: 406-329-3719; Lotus Notes: Andy Trent/WO/USDAFS; E-mail: atrent@fs.fed.us*

Area repellents are products that create a chemical barrier animals will not cross, or products that permeate an area with an odor that cause animals to avoid the area. Little evidence suggests animals will abandon areas treated with area repellents except when highly palatable alternative foods are readily available elsewhere.

Contact repellents are products that are topically applied or attached directly to a plant. If the goal is to reduce consumption of plants, available evidence suggests that chemical repellents are most effective when they are applied directly to the plants.

Test of Commercial Repellents

A study directly compared 20 commercially available deer repellents (table 1). These products relied on fear, conditioned avoidance, pain, and taste. Fifteen products were contact repellents. The others were area repellants. All products were applied according to the manufacturer's recommendations. An initial test to screen all 20 repellents was conducted during the winter while seedlings were dormant.

Tests were conducted in five pastures containing five or six captive black-tailed deer (*Odocoileus hemionus columbianus*). Pastures varied from 2 to 5 acres with natural habitat consisting of Douglas-fir, alder, and associated understory vegetation (figure 1). Trees were planted in 21 plots scattered evenly across each pasture. A separate plot was used for each repellent with one plot of untreated seedlings serving as a control. Plots consisted of three rows of three western red cedar (*Thuja plicata*) seedlings planted at about

Table 1—Product names, sources, active ingredients, and modes of action for repellents evaluated as a means of reducing black-tailed deer damage to western red cedar seedlings during deer repellent tests from October 1998 to July 1999 at Olympia, WA.

Mode	Product and Manufacturer	Active Ingredient
[1]CA	**Detour** (Sudbury Consumer Products Co., Phoenix, AZ)	7% thiram
Fear	**Deerbuster's Coyote Urine Sachet** (Trident Enterprises, Frederick, MD)	50% coyote urine
Fear	**Wolfin** (Pro Cell Bioteknik, Hornefors, Sweden)	Di (N-alkyl) sulfides
Fear	**Deerbuster's Deer and Insect Repellent** (Trident Enterprises, Frederick, MD)	99.3% garlic juice
Fear	**Deer Away Big Game Repellent Powder** (IntAgra, Inc., Minneapolis, MN)	36% putrescent whole egg solids
Fear	**Deer Away Big Game Repellent Spray** (IntAgra, Inc., Minneapolis, MN)	4.93% putrescent whole egg solids
Fear	**Bye Deer** (Security Products Co., Phoenix, AZ)	85% sodium salts of mixed fatty acids
Fear	**Hinder** (Pace International LP, Kirkland, WA)	0.66% ammonium soaps of higher fatty acids
Fear	**Plantskydd** (Tree World, Lackawanna, NY)	87% edible animal protein (in concentrate)
Pain	**Hot Sauce** (Miller Chemical and Fertilizer Corp., Hanover, PA)	0.53% capsaicin and related compounds
Pain	**Get Away Deer and Rabbit Repellent** (DRR), IntAgra, Inc., Minneapolis, MN)	0.625% capsaicin and related compounds, 0.21% isothiocyanate
Taste	**Ropel** (Burlington Scientific Corp., Farmington, NY)	0.065% denatonium benzoate, 0.35% thymol
Taste	**Tree Guard** (Nortech Forest Technologies, Inc., St. Paul, MN)	0.2% denatonium benzoate
Taste	**Orange TKO** (TKO Industries, Calgary, Alberta, Canada)	d-limonene
Multiple	**Deer Stopper** (Landscape Plus, Chester, NJ)	3.8% thiram, 0.05% capsaicin, 1.17% egg solids
Multiple	**Not Tonight Deer** (Not Tonight Deer, Mendocino, CA)	88% dehydrated whole egg solids, 12% Montok pepper (in concentrate)
Multiple	**Plant Pro-Tec** (Plant Pro-tec, LLC, Palo Cedro, CA)	10% oil of garlic, 3% capsaicin and related compounds
Multiple	**Dr. T's Deer Blocker** (Dr. T's Nature Products, Inc., Pelham, GA)	3.12% putrescent whole eggs, 0.0006% capsaicin, 0.0006% garlic
Multiple	**Deerbuster's Deer Repellent Sachets** (Trident Enterprises, Frederick, MD)	99% meat meal, 1% red pepper
Multiple	**N.I.M.B.Y.** (DMX Industries, St. Louis, MO)	0.027% capsaicin and capsaicinoid product, 4.3% castor oil

[1]Conditioned avoidance

Figure 1—Penned black-tailed deer (*Odocoileus hemionus columbianus*) in one of the five pastures used during deer repellent tests from October 1998 to July 1999 at Olympia, WA.

3-foot intervals. At planting, seedlings were about 20 inches high with many lateral branches (figure 2). All seedlings were planted immediately before treatment.

Seedlings were examined for browse damage at 24 hours, 48 hours, and 1 week after planting, and then at 1-week intervals for 18 weeks. Damage was determined by counting the number of bites taken from each seedling. No more than 25 bites were recorded because seedlings were generally defoliated by then. Seedlings pulled from the ground were considered destroyed and recorded as having 25 bites.

Efficacy of repellents may vary depending on several factors, including available resources and seasonal changes in plant palatability. Red cedar seedlings are generally more palatable after winter dormancy has broken. Therefore, repellents that worked during the winter were tested again during the spring when seedlings were actively growing.

Results

Figure 3 shows the results of the winter test. None of the repellents eliminated deer browsing throughout the 18-week test. However, there were distinct differences among the repellents. In general, topical repellants performed better than area repellents. Fear-inducing repellents performed better than the other types of repellents. Eight of the nine repellants considered most effective for the first 11 weeks emitted sulfurous odors. Repellents containing decaying

Figure 2—Olympia Field Station personnel planting western red cedar for the deer repellent tests. The 20-inch seedlings were planted at 3-foot intervals in three rows.

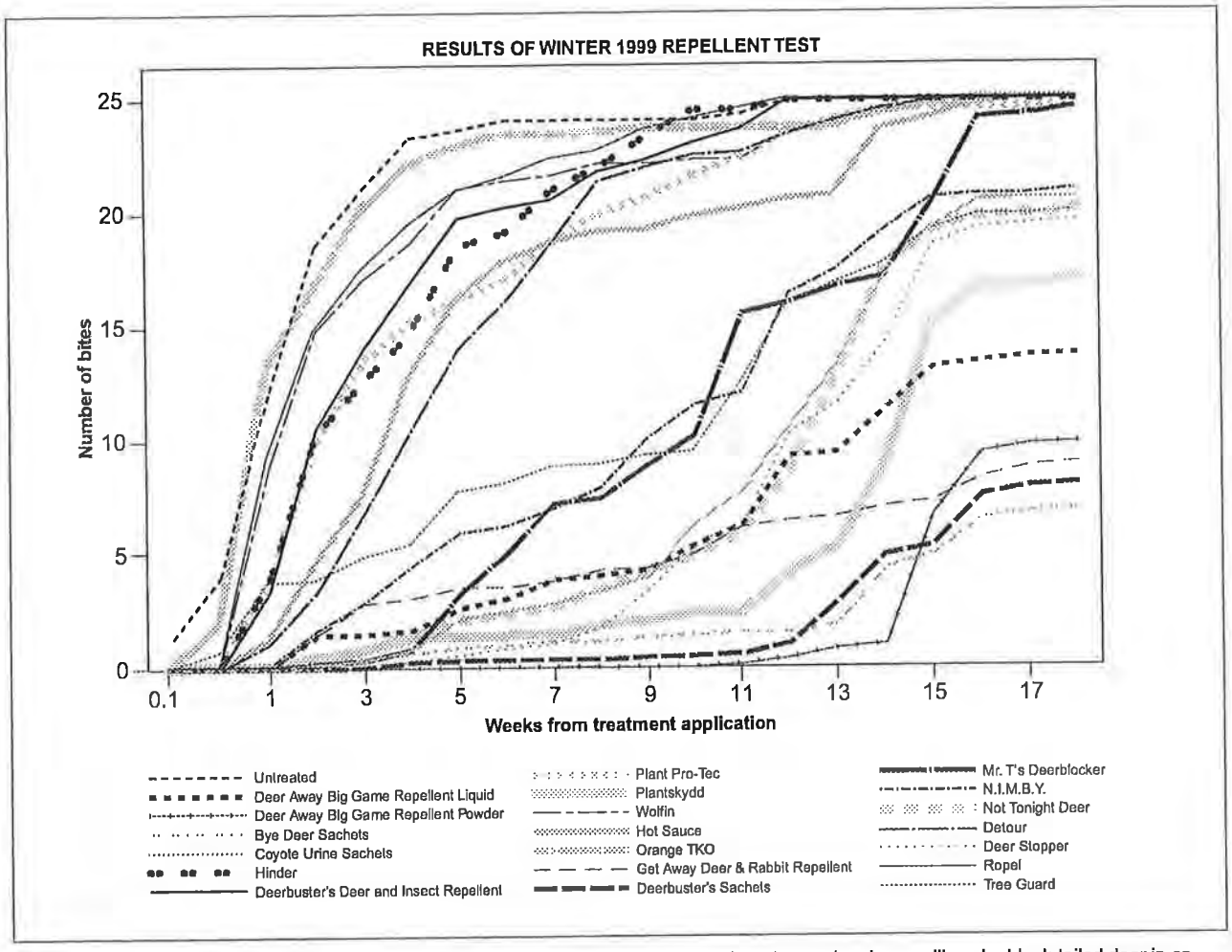


Figure 3—Average number of bites (maximum bites = 25) taken from repellent-treated western red cedar seedlings by black-tailed deer in an outdoor pen study from October 1998 to March 1999 at Olympia, WA.

animal proteins, such as egg or slaughterhouse waste, appeared to be the most effective. These repellents include Deer Away Big Game Repellent Powder (and liquid), Bye Deer Sachets, Deerbuster's Sachet, and Plantskydd.

Results were similar for the test conducted during spring 1999 (figure 4). None of the repellents provided complete protection throughout the 11-week test. Deer Away Big Game Repellent Powder was the most effective repellent tested, followed by Plantskydd, Deerbuster's Sachets, and Bye Deer Sachets. Get Away Deer and Rabbit Repellent failed to protect seedlings during this test.

Conclusions

During trials comparing the efficacy of repellents, those emitting sulfurous odors are generally the most effective. Deer Away Big Game Repellent Powder has been effective in several trials conducted by the Olympia Field Station, as well as in trials conducted by others. Browsing generally is eliminated for 4 weeks. The repellent provides good protection for 8 to 12 weeks, sometimes longer. Efficacy can be expected to decline significantly after 12 to 16 weeks.

Surprisingly few commercial repellents have effectively incorporated trigeminal irritants as active ingredients. Most likely, current repellents that depend on pain to induce avoidance are ineffective because concentrations are too low. Taste repellents, such as bittering agents, have proven ineffective in most trials. Efficacy of repellents based on conditioned avoidance is generally limited because

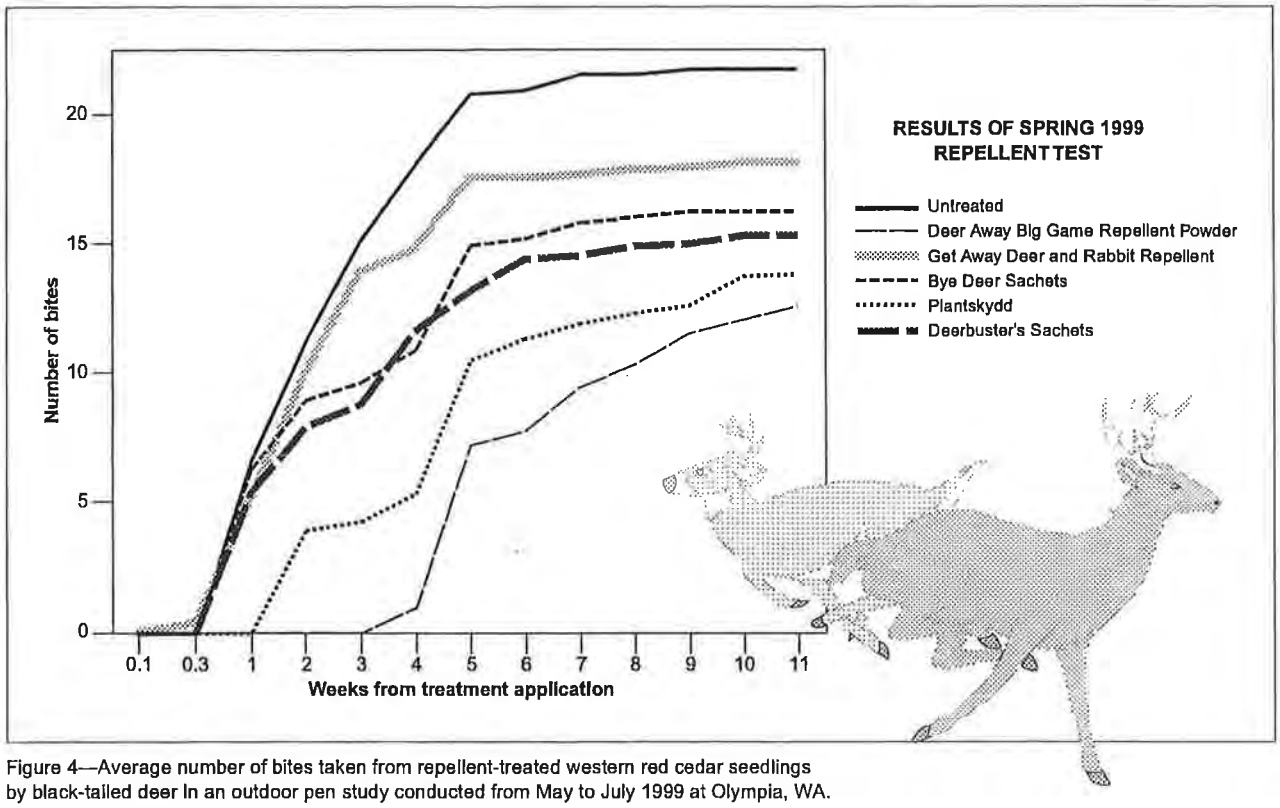


Figure 4—Average number of bites taken from repellent-treated western red cedar seedlings by black-tailed deer in an outdoor pen study conducted from May to July 1999 at Olympia, WA.

animals must be trained to avoid these materials. Damage inflicted on seedlings during training or subsequent sampling can be extensive. Repellents based on training are not likely to be effective for a transitory or migratory species (such as elk moving from winter to summer range).

Repellency is always susceptible to failure (Mason 1998). Many factors other than aversive properties affect a repellent's efficacy. Ultimately, avoidance of the protected plant is affected by:

- Number and density of the animals inflicting problems.
- Mobility of the problem animals.
- Prior experience of animals with foods and their familiarity with the surroundings.
- Accessibility of alternative sites.
- Availability of alternative foods.
- Palatability of the treated plants.
- Weather conditions.

Repellents that protect highly palatable plants from dense animal populations with few alternative foods will probably be effective under more favorable conditions. However, repellents that are successful under favorable conditions are not necessarily likely to be successful under less favorable conditions. It is difficult for someone to predict the efficacy of repellents in the field by extrapolating from empirical data. Anecdotal or testimonial evidence is even less reliable.

Source Material

This Tech Tip summarizes two manuscripts produced by the Olympia Field Station:

Nolte, D. L.; Wagner, K. K. 2000. Comparing the efficacy of delivery systems and active ingredients of deer repellents. In: Proceedings of the 19th Vertebrate Pest Conference. 19: 93–100.

Wagner, K. K.; Nolte, D. L. 2001. Comparison of active ingredients and delivery systems in deer repellents. Wildlife Society Bulletin. 29: 322–330.

Another report with information on this subject is:

Mason, J. R. 1998. Mammal repellents: options and considerations for development. In: Proceedings of the Vertebrate Pest Conference. 18: 325–329.

Message :
I am sorry it took this long to address your article of, "Lyme disease in Morgantown" in the Dominion Post.
I have had lyme since 1997. Yes it was reported as a documented case for that year in West Virginia. I also know that my husband's case was Dx in 1993. He had relapses several times as did I.
He and I are both dealing with the lingering affects of Lyme. He missed many years of work due to Lyme, and is now disabled with Rhumetoid Arthritis and Lyme. We have both been treated several times with IV antibiotics. You point to data that says there is alot of lyme disease in PA well I don't think ticks respect the boundaries that say now entering WV. I had to force the issue with the health dept. to make mine and my husbands recordable. When you have lyme there is criteria that has to be answered on a scale. Ours was very high. I even had a 7 inch bullseye rash, joint problems, etc.....
As for solutions --- I don't know of any that will stop the spread of Lyme.
I do know that education would be a key element--- such as school room information grades 3-12.
Another great element is Doctor education.
Many times doctors just don't know enough about lyme to treat it properly.
I could go on but I just wanted you to know that there are many cases in Monongalia County and other counties as well.

Thanks
Kathy
ph # 304-328-5352

I've lived at my address for close to 20 years now. It seems to me that we did not have so many deer present in upper South Park until my neighbor started feeding them. I may be incorrect, because I am not a wildlife specialist, but my gut feeling is that the constant presence of this food source is a big contributor to the problem. She told me last year that she is buying and putting out 50 lbs. a week of cracked corn. That is a lot! Two summers ago I experienced shrub damage in my yard when a doe had fawns. Yes I agree with everyone that they are beautiful, elegant and wonderful creatures. But Lyme disease weighs much more heavily on my mind. My beautiful daughter suffered terribly with it throughout her high school years. She is only recently free of the illness. The costs, which were financial, social, emotional, and educational, were staggering for her and us. Through her illness I have become acquainted with other people in Morgantown who also have Lyme disease.

Terry Imhoff-Gannett

Dear Dr. Samuel,

I wish your friend well and am pleased to hear that Dr. Hubbard is not only acknowledging but also treating Lyme.

The belief that there is no Lyme in this area is rooted in a self-fulfilling fallacy. Doctors believe it isn't here and therefore actually refuse to test for Lyme, therefore they find none. Patients are dismissed as crazy and their illness progresses into a horrible debilitating condition. I have had local patients test positive for Lyme only to have the tests repeated on antibiotics and their therapy withdrawn based of subsequent negative outcomes. They are repeatedly reassured they never had Lyme and are left to decline. There is no reliable test on the market to screen for Borrielia infection. A screening test should have 99 % sensitivity and those available have 60 % sensitivity at best.

My practice is so swamped with Lyme patients that I was forced to stop taking new patients almost a year ago. That said, folks slip through and I still get new patients. They come from far and wide. I have patients from as far away as Cincinnatti and Kentucky. They come from north of Pittsburgh, and east of Cumberland. I have had many from these parts as well. I have asked my office manager to help me compile a list, and when I get it I'll try to figure out how many of them probably contracted their illness in this area. Several for sure!! One girl got a tick bite in Marilla Park, one family took in a faun and all got sick with severe Illness.

The WV Dept of Public Health numbers hinge on the CDC criteria, adopted for epidemiologic purposes. This is at the core of the LYME WARS as these criteria were never intended for diagnosis and patient care. They were however incorporated into the IDSA guidelines which have been judged as faulty by the Attorney General of Connecticut and are now under revision. My point is that the Dept of health has dismissed many reported cases. They also ignore the reality that any single tick can carry many human pathogens and many "Lyme" patients are extra sick due to these multiple co-infections such as Babesia, Bartonella, and Ehrlichia.

As you can see this is an issue close to my heart. I would be happy to speak with you if you ever want to discuss this issue further.

More when I get my clinic numbers.....

Sincerely

Erika

Reported cases of Lyme Disease for 2004

Reported cases in W.V.

1993 — 50
1994 — 29
1995 — 26
1996 — 22
1997 — 20
1998 — 13
1999 — 20
2000 — 35
2001 — 16
2002 — 26
2003 — 31
2004 — 58
2005 — 65
2006 — 28
2007 — 84
2008 — 135
2009 — 170

Study predicts 33% increase by 2012

Hemorrhagic Disease

Incidences of hemorrhagic disease (HD), including both epizootic hemorrhagic disease (EHD) virus and bluetongue virus, were few and far between in 2008. That's good news, as 2007 went in the books as the worst year for the disease in at least 50 years. The high profile of the disease that year raised concerns among hunters across the nation about whether HD impacts deer populations or negatively affects Quality Deer Management (QDM) efforts, and whether HD can be prevented.

According to the Southeastern Cooperative Wildlife Disease Study (SCWDS), HD is an infectious, viral disease of deer and elk. It is a blood-borne disease transmitted to deer by biting midges or flies. HD is the most important infectious disease of white-tailed deer, and outbreaks occur nearly every year in the Southeast. HD is caused by either of two closely related viruses, EHD virus or bluetongue virus. Since the disease features produced by these viruses are indistinguishable, a general term, "hemorrhagic disease," often is used when the specific virus responsible is unknown. Since EHD and bluetongue viruses are transmitted by biting flies (gnats, no-see-ums) HD is seasonal and occurs in late summer and early fall. It was first reported in the U.S. in 1955 in New Jersey and has been confirmed in more than 30 states since. The Southeast is most affected, but the disease ranges as far north as New York and New Jersey in the Northeast, across the Midwest to Montana and southern Canada, and to Washington, Oregon and California on the west coast.

Quotable QDMA:
"While hunters may focus on losses of individual mature bucks, the evidence indicates that HD strikes bucks and does of all ages equally."

Record-Breaking Outbreak of 2007

The map at left, created by the Southeastern Cooperative Wildlife Disease Study (SCWDS) at the University of Georgia, depicts nationwide distribution of HD in wild deer from 1980 to 2003. The map below shows locations of positive cases from 2007 alone, the most severe outbreak on record. This outbreak included several strains of both bluetongue and EHD viruses in whitetails, and a few pronghorn and mule deer (states in gray are those that submitted samples to SCWDS for testing). Note the impact in areas with less history of HD, plus the first-ever case in New York state.

The International Lyme and Associated Diseases Society

Evidence-based guidelines for the management of Lyme disease

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KEYWORDS:
antibiotics, *Babesia*, *Bartonella*, *Borrelia burgdorferi*, *Ehrlichia*, guidelines, Lyme disease, tickborne diseases

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Summary & disclaimer

These guidelines represent an evidence-based review of Lyme and associated tickborne diseases by the International Lyme and Associated Diseases Society (ILADS). Although the guidelines present evidence-based approaches to the diagnosis and treatment of Lyme and associated tickborne diseases, they were not intended to be a standard of medical care. Physicians must use their own judgment based on a thorough review of all available clinical information and the Lyme disease literature to decide on the best course of treatment for an individual patient.

Acknowledgements

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Section I: Introduction to guidelines

This report, completed in November 2003, is intended to serve as a resource for physicians, public health officials and organizations involved in the evaluation and treatment of Lyme disease.

1. International Lyme and Associated Diseases Society (ILADS)

ILADS is an interdisciplinary organization of health science professionals established in 1999 to accomplish the following objectives:

- Analyze the medical literature, position statements and practice parameters related to Lyme and associated diseases
- Improve the management of these diseases through evaluation of established and innovative therapies
- Educate a broad range of healthcare providers and serve as an effective advocate for clinicians seeking cost-effective state-of-the-art treatment regimens

ILADS identified the need for new and expanded guidelines for the diagnosis and treatment of Lyme and associated diseases. In 2001, a working party was formed to evaluate current practices and to encourage new standards of care. This report, completed in November 2003, is intended to serve as a resource for physicians, public health officials and organizations involved in the evaluation and treatment of Lyme disease.

2. Chronic Lyme disease: a growing epidemic

The Centers for Disease Control and Prevention (CDC) consider Lyme disease the fastest growing vector-borne disease in the USA. By conservative estimate, the number of new Lyme disease infections per year may be ten times higher than the 17,730 cases reported to the CDC during 2000 [1,2].

The prevalence of chronic Lyme disease ranges from 34% in a population-based, retrospective cohort study [3] to 62% in a specialty clinic located in an area endemic for Lyme disease [4]. Clinic patients presented with arthralgia, arthritis, cardiac and neurologic symptoms [4].

A widening array of chronic presentations is associated with the Lyme spirochete, *Borrelia burgdorferi*. There are great challenges in determining optimal cost-effective means for appropriate diagnosis, clinical management and public health control of Lyme disease throughout the world. Additional problems include the identification and management of tickborne coinfections including *Ehrlichia*, *Babesia* and *Bartonella* species [5].

3. The need for new guidelines

Guidelines of the Infectious Disease Society of America (IDSA) fall short of meeting the needs for diagnosis and treatment of individuals with chronic Lyme disease [6]. The latest IDSA Guidelines (2000) fail to take into account the compelling, peer-reviewed, published evidence confirming persistent, recurrent and refractory Lyme disease and, in fact, deny its existence [6].

The IDSA's symptomatic approaches to Lyme disease are limited and exclude many individuals with persisting clinical and laboratory evidence of active *B. burgdorferi* infection. In addition, physicians treating individuals with Lyme and other tick-borne infections recognize the need for new guidelines to better serve the patient population [6].

Previous guidelines for management of Lyme disease have been published in the *New England Journal of Medicine* in 1990 by Rahn [7]; in *Conn's Current Therapy* in 1997 by Burrascano and in 1998 by Steere [8,9]; in Burrascano's Guidelines on the ILADS website (www.ilads.org); and in the *Journal of Infectious Diseases* by Wormser and colleagues in 2000 [6]. The ILADS Guidelines expand on these protocols using the evidence-based approach and Cochrane methodology employed by the IDSA [6,10].

Our goal is to present practitioners with practical and defensible guidelines for treating all individuals with Lyme disease including those with persistent, recurrent and relapsing symptoms of *B. burgdorferi* infection.

The ILADS Guidelines focus on which patients to evaluate, what tests to order, what antibiotics to use and what steps to take to ensure that concerns over antibiotic use are addressed.

The ILADS Working Group that formulated these guidelines included primary care clinicians, researchers, community healthcare providers and patient advocates. In developing these treatment guidelines, the group considered factors such as incidence of Lyme disease; severity of disease in terms of morbidity; comorbidities and determinants of when Lyme disease is most likely to become chronic; feasibility, efficacy and cost of antibiotic treatment; impact of antibiotic therapy on quality of life, including adverse drug events; and the potential for drug resistance to develop.

Because of the complexity and variability of Lyme disease symptoms, the guidelines are flexible. Treatment depends on the severity of each case, the patient's response to therapy and the physician's own clinical judgment.

4. A problem of definitions

Lyme disease was initially investigated by CDC epidemiologists focusing on erythema migrans, heart block, meningitis and arthritis. The ELISA test and later, the western blot, were introduced for seroepidemiologic studies. Chronic, persistent, recurrent and refractory Lyme disease were not included in these studies; consequently cases of chronic Lyme disease still go unrecognized.

For the purpose of the ILADS guidelines, 'chronic Lyme disease' is inclusive of persistent symptomatologies including fatigue, cognitive dysfunction, headaches, sleep disturbance and other neurologic features, such as demyelinating disease, peripheral neuropathy and sometimes motor neuron disease; neuropsychiatric presentations; cardiac presentations including electrical conduction delays and dilated cardiomyopathy; and musculoskeletal problems. Symptoms may continue despite 30 days of treatment (persistent Lyme disease). The patient may relapse in the absence of another tickbite or erythema migrans rash (recurrent Lyme disease), or be poorly responsive to antibiotic treatment (refractory Lyme disease).

By these definitions, almost two-thirds of 215 Lyme disease patients in a recent retrospective cohort from an endemic region had chronic Lyme disease [4]. Case definitions for Lyme disease have evolved and will continue to develop as a better understanding of chronic Lyme disease emerges to shape a common lexicon.

5. Competency and training

The appropriateness of treatment hinges on the clinician's experience in treating Lyme disease. Competence requires diagnostic and treatment skills heretofore not offered in medical school or postresidency training.

Clinicians more practiced in treating Lyme disease achieve better outcomes and encounter fewer complications because of an enhanced ability to interpret clinical data, the prompt prescription of antibiotics and the use of measures to reduce adverse events, e.g., employing acidophilus to replace normal intestinal flora that is depleted by antibiotics.

6. The increasing role of primary care

The primary care physician has an important role as the first and at times, the principal medical contact for the person with Lyme disease.

Primary care physicians focus on the resolution of symptoms, monitoring for side effects, maintenance or improvement of functional status and prevention of recurrent symptoms.

These guidelines incorporate the evidence used by primary care physicians for the care of patients with Lyme disease.

7. Highlights of guidelines

- Since there is currently no definitive test for Lyme disease, laboratory results should not be used to exclude an individual from treatment
- Lyme disease is a clinical diagnosis and tests should be used to support rather than supersede the physician's judgment
- The early use of antibiotics can prevent persistent, recurrent and refractory Lyme disease
- The duration of therapy should be guided by clinical response, rather than by an arbitrary (i.e., 30 day) treatment course
- The practice of stopping antibiotics to allow for delayed recovery is not recommended for persistent Lyme disease. In these cases, it is reasonable to continue treatment for several months after clinical and laboratory abnormalities have begun to resolve and symptoms have disappeared

Section II: New presentatons

Lyme disease was first described in 1977 as 'Lyme arthritis' among patients initially thought to have arthritis or juvenile rheumatoid arthritis [11]. It was later renamed 'Lyme disease' following recognition of a combination of cardiac, neurologic and rheumatologic presentations, including heart block, meningitis and Bell's palsy. For more than 10 years, variable symptomatic conditions have been recognized including encephalopathy and neuropsychiatric presentations.

8. Symptomatic presentation

Variable symptomatic presentations have been increasingly documented in Lyme disease, with the best example being encephalopathy [12]. Encephalopathic presentations were described in an initial cohort of 27 patients as a symptom complex including memory loss (81%), fatigue (74%), headache (48%), depression (37%), sleep disturbance (30%) and irritability (26%), often without objective markers [12]. Only two of the 27 patients presented with objective findings on lumbar puncture: one had pleocytosis (seven cells) and a second had an antibody index of greater than one [12].

Neuropsychiatric presentations in acute and chronic Lyme disease have been increasingly recognized and can include depression, anxiety and rage [13]. These are presumably related to persistent infection and are potentially reversible with antibiotics. Neuropsychiatric symptoms may reflect additional psychosocial processes including the stress of coping with a chronic illness.

Asch and colleagues found that more than half of 215 patients in a Lyme-endemic region had symptomatic presentations of chronic Lyme disease [4]. The patients presented with chronic fatigue, headaches and joint pain (but not headaches alone) in this retrospective cohort study.

9. Symptoms of Lyme disease

- Fatigue
- Low grade fevers, 'hot flashes' or chills
- Night sweats
- Sore throat
- Swollen glands
- Stiff neck
- Migrating arthralgias, stiffness and, less commonly, frank arthritis
- Myalgia
- Chest pain and palpitations
- Abdominal pain, nausea
- Diarrhea
- Sleep disturbance
- Poor concentration and memory loss
- Irritability and mood swings
- Depression
- Back pain
- Blurred vision and eye pain
- Jaw pain
- Testicular/pelvic pain
- Tinnitus
- Vertigo
- Cranial nerve disturbance (facial numbness, pain, tingling, palsy or optic neuritis)
- Headaches
- 'Lightheadedness'
- Dizziness

10. Increasing evidence of persistent infection

Persistent, recurrent and refractory presentations from ongoing infection are the most feared of the long-term complications of Lyme disease.

Laboratory culture of *B. burgdorferi* has documented persistent infection in chronic Lyme disease patients, but the yields are quite low by current methods [14]. In fact, there is no reliable, commercially available culture assay that can confirm the eradication of the organism. Using experimental techniques, however, *B. burgdorferi* has been detected in virtually every organ in the body, and the spirochete has a strong predilection for the central nervous system. Oral antibiotic levels in the central nervous system are low, and this fact may necessitate the addition of drugs with good penetration across the blood–brain barrier [15], such as intravenous ceftriaxone or cefotaxime.

Most studies demonstrate a beneficial effect of antibiotics in the management of chronic Lyme disease, but the extent of optimal treatment is still uncertain [4,12,13,16–22]. Recent clinical trials questioning the benefits of antibiotics have been criticized for enrolling patients with refractory Lyme disease who were sick for a mean of 4.7 years despite an average of three courses of antibiotics, and for relying only on one treatment protocol (1 month of i.v. ceftriaxone followed by 2 months of low-dose oral doxycycline) [23]. In view of these methodological problems, persistent infection remains a continued concern for physicians.

11. Disappointing results of symptomatic treatment

A theoretical immune mechanism has been proposed to explain persistent symptoms in chronic Lyme disease, but no clinical or laboratory test can confirm this theory. The immune mechanism theory is based on physiological events (often in the form of cascades) that are not reversed by simply killing the infecting organism.

The presentation of chronic Lyme disease can be identical to that of other multisystem disorders, including systemic lupus erythematosus, rheumatoid arthritis and fibromyalgia. In the seminal article describing fibromyalgia in a Lyme disease population, antibiotic treatment failure and relapse of symptoms were considered to be proof of the absence of *B. burgdorferi* infection, and persistent symptoms were assumed to be due to postinfectious sequelae [24]. However, the failure of short-course (2–4 week) antibiotic treatment in 14 (94%) of 15 fibromyalgia patients is consistent with a persistent, inadequately treated infection with *B. burgdorferi* [24].

The increasing successes of repeated and prolonged antibiotic treatment in chronic Lyme disease are more consistent with a persistent infection mechanism.

12. Severity of chronic Lyme disease

For patients with chronic Lyme disease, the quality of life has been evaluated in a clinical trial sponsored by the National Institutes of Health (NIH) using a standardized questionnaire [23]. The quality of life of the 107 individuals with chronic Lyme disease was worse than that of patients with Type 2 diabetes or a recent heart attack, and equivalent to that of patients with congestive heart failure or osteoarthritis. Moreover, the average Lyme disease duration of 4.7 years in subjects enrolling in the study emphasized the chronic nature of the condition. Finally, the failure of 1 month of i.v. ceftriaxone followed by 2 months of oral doxycycline delineated the potential for a poor outcome in chronic Lyme disease [25].

Section III: Diagnostic concerns

The most important method for preventing chronic Lyme disease is recognition of the early manifestations of the disease.

13. Atypical early presentations

Early Lyme disease classically presents with a single erythema migrans (EM or 'bullseye') rash. The EM rash may be absent in over 50% of Lyme disease cases, however [25]. Patients should be made aware of the significance of a range of rashes beyond the classic EM, including multiple, flat, raised or blistering rashes. Central clearing was absent in over half of a series of EM rashes [26]. Rashes can also mimic other common presentations including a spider bite, ringworm, or cellulitis. One series of eleven EM rashes was misdiagnosed and treated as cellulitis, with all eleven patients showing clinical evidence of Lyme disease progression [27].

Physicians should be aware that fewer than 50% of all Lyme disease patients recall a tickbite [28]. Early Lyme disease should also be considered in an evaluation of 'off-season' onset when flu-like symptoms, fever and chills occur in the summer and fall. Early recognition of atypical early Lyme disease presentation is most likely to occur when the patient has been educated on this topic.

14. New chronic Lyme disease presentations

A detailed history may be helpful for suggesting a diagnosis of chronic Lyme disease. Headache, stiff neck, sleep disturbance and problems with memory and concentration are findings frequently associated with neurologic Lyme disease. Other clues to Lyme disease have been identified, although these have not been consistently present in each patient: numbness and tingling, muscle twitching, photosensitivity, hyperacusis, tinnitus, lightheadedness and depression.

Most patients diagnosed with chronic Lyme disease have an indolent onset and variable course. Neurologic and rheumatologic symptoms are characteristic, and increased severity of symptoms on wakening is common. Neuropsychiatric symptoms alone are more often seen in chronic than acute Lyme disease. Although many studies have found that such clinical features are often not unique to Lyme disease, the striking association of musculoskeletal and neuropsychiatric symptoms, the variability of these symptoms and their recurrent nature may support a diagnosis of the disease.

15. The limitations of physical findings

A comprehensive physical examination should be performed, with special attention to neurologic, rheumatologic and cardiac symptoms associated with Lyme disease.

Physical findings are nonspecific and often normal, but arthritis, meningitis and Bell's palsy may sometimes be noted. Available data suggest that objective evidence alone is inadequate to make treatment decisions, because a significant number of chronic Lyme disease cases may occur in symptomatic patients without objective features on examination or confirmatory laboratory testing.

Factors other than physical findings, such as a history of potential exposure, known tickbites, rashes or symptoms consistent with the typical multisystem presentation of Lyme disease, must also be considered in determining whether an individual patient is a candidate for antibiotic therapy.

16. Sensitivity limitations of testing

Treatment decisions should not be based routinely or exclusively on laboratory findings [2,25]. The two-tier diagnostic criteria, requiring both a positive ELISA and western blot, lacks sensitivity and leaves a significant number of individuals with Lyme disease undiagnosed and untreated [29,30]. These diagnostic criteria were intended to improve the specificity of tests to aid in identifying well-defined Lyme disease cases for research studies [31]. Though arbitrarily chosen, these criteria have been used as rigid diagnostic benchmarks that have prevented individuals with Lyme disease from obtaining treatment. Diagnosis of Lyme disease by two-tier confirmation fails to detect up to 90% of cases and does not distinguish between acute, chronic, or resolved infection [21].

The CDC considers a western blot positive if at least 5 of 10 IgG bands or 2 of 3 IgM bands are positive [31]. However, other definitions for western blot confirmation have been proposed to improve the test sensitivity [30,32–36]. In fact, several studies showed that sensitivity and specificity for both the IgM and IgG western blot range from 92 to 96% when only two specific bands are positive [34–36].

Lumbar puncture has also been disappointing as a diagnostic test to rule out concomitant central nervous system infection. In Lyme disease, evaluation of cerebrospinal fluid is unreliable for a diagnosis of encephalopathy and neuropathy because of poor sensitivity (see Section II.8). For example, pleocytosis was present in only one of 27 patients (sensitivity 3%) and with only seven cells [12]. The antibody index was positive (>1) in only one of 27 patients (sensitivity 3%) [12]. An index is the ratio between Lyme ELISA antibodies in the spinal fluid and Lyme ELISA antibodies in the serum. The proposed index of 1.3 would be expected to have even worse sensitivity.

Several additional tests for Lyme disease have been evaluated. These include antigen capture, urine antigen and polymerase chain reaction. Each has advantages and disadvantages in terms of convenience, cost, assay standardization, availability and reliability. These tests remain an option to identify people at high risk for persistent, recurrent and refractory Lyme disease but have not been standardized.

17. Seronegative Lyme disease

A patient who has tested seronegative may have a clinical presentation consistent with Lyme disease, especially if there is no evidence to indicate another illness.

Although many individuals do not have confirmatory serologic tests, surveillance studies show that these patients may have a similar risk of developing persistent, recurrent and refractory Lyme disease compared with the seropositive population. A prospective observational study of 1094 patients [21] and the Klempner clinical trials [23] found no difference in measured outcomes (e.g., success of retreatment) among seropositive or seronegative Lyme disease patients.

18. Continued importance of differential diagnosis

The differential diagnosis of Lyme disease requires consideration of both infectious and noninfectious etiologies. Among noninfectious causes are thyroid disease, degenerative arthritis, metabolic disorders (vitamin B12 deficiency, diabetes), heavy metal toxicity, vasculitis and primary psychiatric disorders.

Infectious causes can mimic certain aspects of the typical multisystem illness seen in chronic Lyme disease. These include viral syndromes such as parvovirus B19 or West Nile virus infection, and bacterial mimics such as relapsing fever, syphilis, leptospirosis and mycoplasma.

The clinical features of chronic Lyme disease can be indistinguishable from fibromyalgia and chronic fatigue syndrome. These illnesses must be closely scrutinized for the possibility of etiological *B. burgdorferi* infection.

19. Clinical judgment

Clinical judgment remains necessary in the diagnosis of late Lyme disease. A problem in some studies that relied on objective evidence was that treatment occurred too late, leaving the patient at risk for persistent and refractory Lyme disease.

As noted, time-honored beliefs in objective findings and two-tier serologic testing have not withstood close scrutiny [21,30,34,37]. Lyme disease should be suspected in patients with newly acquired or chronic symptoms (headaches, memory and concentration problems and joint pain). Management of patients diagnosed on the basis of clinical judgment needs to be tested further in prospective trials, and diagnostic reproducibility must be verified.

20. Testing for coinfection

Polymicrobial infection is a new concern for individuals with Lyme disease, and coinfection is increasingly reported in critically ill individuals [25,38]. Although *B. burgdorferi* remains the most common pathogen in tickborne illnesses, coinfections including *Ehrlichia* and *Babesia* strains are increasingly noted in patients with Lyme disease, particularly in those with chronic illness. *Bartonella* is another organism that is carried by the same ticks that are infected with *B. burgdorferi*, and evidence suggests that it is a potential coinfecting agent in Lyme disease [25].

Recent animal and human studies suggest that Lyme disease may be more severe and resistant to therapy in coinfected patients [25,38]. Thus, concurrent testing and treatment for coinfection is mandatory in Lyme disease patients.

Section IV: Treatment considerations

Since Lyme disease can become persistent, recurrent and refractory even in the face of antibiotic therapy, evaluation and treatment must be prompt and aggressive.

21. Prompt use of antibiotics

Although no well designed studies have been carried out, the available data support the prompt use of antibiotics to prevent chronic Lyme disease. Antibiotic therapy may need to be initiated upon suspicion of the diagnosis, even without definitive proof. Neither the optimal antibiotic dose nor the duration of therapy has been standardized, but limited data suggest a benefit from increased dosages and longer treatment, comparable to the data on tuberculosis and leprosy which are caused by similarly slow-growing pathogens [25].

22. Choosing an antibiotic

In acute Lyme disease, the choice of antibiotics should be tailored to the individual and take into account the severity of the disease as well as the patient's age, ability to tolerate side effects, clinical features, allergy profile, comorbidities, prior exposure, epidemiologic setting and cost.

Conversely, persistent and refractory Lyme disease treatment is more likely to include intravenous and/or intramuscular antibiotics. The choices depend in part on the patient's response to antibiotic therapy and on the success of antibiotics in treating other Lyme disease patients (see below).

Therapy usually starts with oral antibiotics, and some experts recommend high dosages. The choice of antibiotic therapy is guided by weighing the greater activity of intravenous antibiotics in the central nervous system against the lower cost and easy administration of oral antibiotics for *B. burgdorferi*.

23. Oral antibiotic options

For many Lyme disease patients, there is no clear advantage of parenteral therapy. Along with cost considerations and pressure to treat patients with Lyme disease with the least intervention, there is growing interest in the use of oral therapy.

First-line drug therapies for Lyme disease may include (in alphabetical order): oral amoxicillin, azithromycin [39–41], cefuroxime [42], clarithromycin [43], doxycycline and tetracycline. These antibiotics have similar favorable results in comparative trials of early Lyme disease. In one study, azithromycin performed slightly less well when compared to amoxicillin and doxycycline. However, the efficacy of azithromycin was underestimated because the antibiotic was only given for 10 days [39].

One study has suggested that oral doxycycline (100 mg twice daily for 30 days) is as effective as intravenous ceftriaxone (2 g daily for 30 days) in early disseminated Lyme disease [40]. Two European studies have demonstrated similar efficacy of oral doxycycline and parenteral penicillin and ceftriaxone in early Lyme disease [44,45].

There are no studies comparing oral with intravenous antibiotics for persistent, recurrent and refractory Lyme disease.

24. Intravenous antibiotic options

It is common practice to consider intravenous antibiotics upon failure of oral medications in patients with persistent, recurrent or refractory Lyme disease, and as the first line of therapy for certain conditions, (i.e., encephalitis, meningitis, optic neuritis, joint effusions and heart block).

Ideally, the intravenous antibiotic should be selected on the basis of *in vitro* sensitivity testing or clinical experience [101]. Intravenous antibiotics are also justified by concern for penetration into the central nervous system [15].

Until recently, ceftriaxone, cefotaxime and penicillin were the only intravenous antibiotics routinely studied for use in Lyme disease. Intravenous imipenem, azithromycin and doxycycline have an adequate antispirochetal spectrum of activity and may represent suitable alternative therapies. However, the latter two drugs are often considered for intravenous use only if they are not tolerated orally.

There is a paucity of data on alternative intravenous antibiotics, and their success is less predictable in chronic Lyme disease.

25. Intramuscular antibiotic options

Intramuscular benzathine penicillin (1.2 to 2.4 million units per week) is sometimes effective in patients who do not respond to oral and intravenous antibiotics. If intramuscular benzathine penicillin is used, long-term therapy may be necessary due to the low serum concentration of this form of penicillin [46]. Luft and colleagues report, "It was demonstrated that while *B. burgdorferi* may be sensitive to relatively small concentrations of penicillin and ceftriaxone, the organism is killed slowly. This implies that, as in syphilis, prolonged blood levels of these drugs may be necessary in order to ensure cure" [46].

One-third of a chronic Lyme disease population responded to intramuscular benzathine penicillin (1.2 to 2.4 million units per week) [16–18]. Benzathine penicillin has mainly been used in patients who have had multiple relapses while receiving oral or intravenous antibiotic therapy or who are intolerant of oral or intravenous antibiotics.

26. Combination antibiotic treatment

Combination therapy with two or more antibiotics is now increasingly used for refractory Lyme disease [11,41,45,46–49] and has also been given as initial therapy for some chronic presentations.

This approach is already used for another tickborne illness, babesiosis [50]. Oral amoxicillin, cefuroxime or (more recently) cefdinir combined with a macrolide (azithromycin or clarithromycin) are examples of combination regimens that have proven successful in clinical practice, although controlled clinical trials are lacking in persistent, recurrent and refractory Lyme disease.

Combination therapy in patients with Lyme disease raises the risk of adverse events. This risk must be weighed against the improved response to combination therapy in Lyme disease patients failing single agents [47–49].

27. Sequential treatment

Clinicians increasingly use the sequence of an intravenous antibiotic followed by an oral or intramuscular antibiotic [19,37,101,47,48]. In two recent case series that employed combination therapy and sequential therapy, most patients were successfully treated [19,47]. A logical and attractive sequence would be to use intravenous therapy first (e.g., intravenous ceftriaxone), at least until disease progression is arrested and then follow with oral therapy for persistent and recurrent Lyme disease.

28. Dosage

Increasingly, clinicians recommend that certain drugs used for Lyme disease be given at higher daily doses: for example, 3000–6000 mg of amoxicillin, 300–400 mg doxycycline and 500–600 mg of azithromycin. Some clinicians prescribe antibiotics using blood levels to guide higher doses. Close monitoring of complete blood counts and chemistries are also required with this approach.

With higher doses, there may be an increase in adverse events in general and gastrointestinal problems in particular. Acidophilus has reportedly reduced the incidence of *C. difficile* colitis and non-*C. difficile* antibiotic-related diarrhea.

Serious adverse effects of antibiotics, however, were less common than previous estimates. In a recent clinical trial of chronic Lyme disease, the overall serious adverse event rate was 3% after three months of antibiotics, including 1 month of intravenous antibiotics [23]. Clinicians who have experience with higher-dose antibiotic therapy must balance the benefit of higher drug levels achieved with this therapy against the modest risk of gastrointestinal and other side effects.

Research is needed to determine the added benefits of higher doses of antibiotics in chronic Lyme disease.

29. Duration of therapy

Because of the disappointing long-term outcome with shorter courses of antibiotics, the practice of stopping antibiotics to allow for a delayed recovery is no longer recommended for patients with persistent, recurrent and refractory Lyme disease. Reports show failure rates of 30–62% within 3 years of short-course treatment using antibiotics thought to be effective for Lyme disease [3,4,12]. Conversely for neurologic complications of Lyme disease, doubling the length of intravenous ceftriaxone treatment from 2 to 4 weeks improved the success rate from 66 to 80% [12,51].

The management of chronic Lyme disease must be individualized, since patients will vary according to severity of presentation and response to previous treatment.

Concurrent risk factors (i.e., coinfections, previous treatment failures, frequent relapses, neurologic involvement, or previous use of corticosteroids) or evidence of unusually severe Lyme disease should lead to the initiation of prolonged and/or intravenous antibiotic treatment. Physicians should always assess the patient's response to treatment before deciding on appropriate duration of therapy (i.e., weeks versus months).

30. Empiric treatment

The importance of establishing the diagnosis of Lyme disease is heightened in light of increasing concern about antibiotic overuse. After an appropriate history, physical examination and laboratory testing are completed, empiric antimicrobial therapy should be initiated on the basis of clinical clues, the severity of the patient's acute illness, underlying disease and the likelihood of *B. burgdorferi* infection. The ILADS working group recommends that empiric treatment be considered routine for patients with a likely diagnosis of Lyme disease.

31. Persistent Lyme disease

Persistent Lyme disease is more resistant to treatment and more likely to produce a relapse. Although persistent Lyme disease may resolve without additional therapy, many experts believe that this condition should be treated with repeated and prolonged antibiotics. Physicians should extend the duration of antibiotics to prevent or delay recurrent and refractory Lyme disease.

32. Recurrent Lyme disease

Despite previous antibiotic treatment, Lyme disease has a propensity for relapse and requires careful follow-up for years. The data suggest that failure to eradicate the organism may be the reason for a recurrence of symptoms [12]. Early and aggressive treatment with antibiotics is indicated for recurrent Lyme disease. The ultimate impact from retreating each episode of recurrent Lyme disease is currently unclear.

33. Refractory Lyme disease

Refractory Lyme disease is a devastating condition that usually affects patients with persistent symptomatology and long-term disability. Prompt and aggressive institution of antibiotic therapy may be essential to prevent refractory disease. Increasing evidence shows that antibiotics have a beneficial effect on the course of refractory Lyme disease even in cases where the patient is intolerant of antibiotics or when a previous regimen has failed. Several months of therapy are often required to produce clear evidence of improvement. During this time, symptomatic treatment may be combined with antibiotic treatment.

34. Treatment failure

When patients fail to respond or their conditions deteriorate after initiation of empiric therapy, a number of possibilities should be considered other than Jarisch-Herxheimer reaction. These include adverse events that limit treatment, allergic history to medication, inappropriate or inadequate dosing regimen, compliance problems, incorrect medication, immune sequelae and sequestering of the organism (e.g., in the central nervous system). An alternative diagnosis or coinfection should also be considered.

35. Symptomatic treatment

Although there may be a potential role for symptomatic treatment in chronic Lyme disease, this approach has little support due to the strong possibility of persistent infection. Owing to the potential hazard of immunosuppression and the poor outcome in

one study, steroid therapy is not recommended [52]. Surgical synovectomy is associated with significant morbidity and does not address neurologic presentations; it should be reserved for knee pain failing antibiotic treatment [53]. Intra-articular steroid injection may be useful as a temporizing procedure in patients with persistent knee pain but this runs the risk of masking persistent infection.

Symptomatic therapy (particularly anti-inflammatory medications, tricyclic antidepressants, selective serotonin re-uptake inhibitors and hydroxychloroquine) may be useful in concert with antibiotics and in individuals failing antibiotics.

Hyperbaric oxygen therapy (HBOT) is under study but is not recommended for routine therapeutic use [25,54]. Other treatments, including cholestyramine (CSM), antifungal therapy and antiviral agents require further study.

Since patients are becoming more interested in alternative therapies (e.g., traditional Chinese medicine, anti-oxidants, hyperthermia, bee venom, naturopathy and homeopathy), physicians should be prepared to address questions regarding these topics.

36. Fibromyalgia

The outcome of treating fibromyalgia secondary to Lyme disease with nonantibiotic regimens has been poor. The most encouraging clinical trial showed success in only one of 15 patients and only modest improvement in 6 of 15 individuals with fibromyalgia despite 2 years of treatment [24].

Antibiotic therapy has been much more effective than supportive therapy in symptomatic patients with fibromyalgia secondary to Lyme disease.

Fibromyalgia treatment alone without antibiotics raises the risk of conversion to refractory chronic Lyme disease and/or exacerbation of an undiagnosed persistent infection and is not recommended. Increasingly, clinicians do not feel comfortable treating fibromyalgia in Lyme disease without antibiotics.

37. Decision to stop antibiotics

Several studies of patients with Lyme disease have recommended that antibiotics be discontinued after 30 days of treatment. Complicating the decision to stop antibiotics is the fact that some patients present with disease recurrence after the resolution of their initial Lyme disease symptoms. This is consistent with incomplete antibiotic therapy. Although the optimal time to discontinue antibiotics is unknown, it appears to be dependent on the extent of symptomatology, the patient's previous response to antibiotics and the overall response to therapy (see below).

Rather than an arbitrary 30-day treatment course, the patient's clinical response should guide duration of therapy. Patients must therefore be carefully evaluated for persistent infection before a decision is made to withhold therapy.

The decision to discontinue antibiotics should be made in consultation with the patient and should take into account such factors as the frequency and duration of persistent infection, frequency of recurrence, probability of refractory Lyme disease, gains with antibiotics, the importance to the patient of discontinuing antibiotics and potential for careful follow-up.

The ideal approach would be to continue therapy for Lyme disease until the Lyme spirochete is eradicated. Unfortunately there is currently no test available to determine this point [25]. Therefore, the clinician must rely on the factors outlined above to decide on the length of antibiotic therapy for chronic Lyme disease.

38. Alternative antibiotics

There is compelling evidence that Lyme disease can result in serious and potentially refractory illness. Use of alternative antibiotics to treat early Lyme disease with erythema migrans is generally not indicated unless coinfection is suspected.

The ILADS Working Group believes that the risk of alternative antibiotics is acceptable in selected Lyme disease patients presenting with chronic Lyme disease. Alternative antibiotics include less commonly used oral antibiotics (cefixime, cefdinir, metronidazole) and intravenous antibiotics (imipenem, azithromycin). The role of alternative antibiotics in low-risk patients is less certain and there is less consensus within the Working Group as to whether the potential benefits outweigh the risks.

39. Therapy for coinfection

Therapy for polymicrobial infection in Lyme disease is a rapidly changing area of clinical practice [25]. Uncomplicated Lyme disease may be managed without addressing coinfection by means of standard oral or parenteral antibiotic therapy. Some but not all experts recommend therapy for subclinical or chronic coinfection with *Ehrlichia*, *Babesia* or *Bartonella* on the basis of their belief that responses are more prompt with this approach.

The dose, duration and type of treatment for coinfections have not been defined. Published reports of coinfection are limited to a small number of patients treated in open-label, nonrandomized studies. Doxycycline has been indicated for *Ehrlichia*. A recently published randomized trial determined that treatment of severe *Babesia microti* with the combination of atovaquone and azithromycin was as effective as the use of standard oral therapy with clindamycin and quinine [55].

The decision to use alternative antibiotics should be based on the individual case, including a careful assessment of the patient's risk factors and personal preferences. Patients managed in this way must be carefully selected and considered reliable for follow-up. Further controlled studies are needed to address the optimal antimicrobial agents for coinfections and the optimal duration of therapy.

Additional research is needed to determine which antibiotics work best for *Bartonella*, but fluoroquinolones, azithromycin, doxycycline and rifampin have good *in vitro* activity.

Section V: Research needs

The ILADS Working Group encourages centers that treat large numbers of Lyme disease patients symptomatically using IDSA treatment guidelines to perform a formal evaluation of their own programs. This will allow researchers to compare the results of treatment guidelines that use more antibiotics with those that do not.

40. Ongoing development of treatment guidelines

The IDSA guidelines recommending one-time short-term antibiotic therapy have not been successful. Physician demands for better outcomes have led to the development of the ILADS guidelines, and the continued evolution of an evidence-based approach is critical for the treatment of persistent, recurrent and refractory Lyme disease.

41. Validation of guidelines

Most studies of Lyme disease were retrospective, unblinded and uncontrolled. Furthermore, the antibiotic dose and duration of therapy were not standardized.

The first double-blind clinical trial found that weekly benzathine penicillin for 3 weeks was more effective than placebo for Lyme arthritis [56]. At the other end of the spectrum, a recently completed randomized clinical trial failed to demonstrate any efficacy of 90 days of antibiotic therapy in previously treated patients with neurologic Lyme disease [23].

Two additional randomized trials are examining the practice of retreating chronic Lyme disease patients with antibiotics, and these results should be available shortly [57,58]. The retreatment approach is being validated using a single-center, prospective surveillance database.

42. Comparative studies

The IDSA and ILADS Guidelines differ substantially, revealing the wide variation in diagnosis and treatment (TABLE 1) [59,60]. This variation suggests that physicians do not use a uniform strategy to diagnose and treat Lyme disease. Physicians often treat for Lyme disease longer than 4 weeks and also retreat [8,19,47,48,57–62]. These decisions are made despite warnings against overdiagnosis and overtreatment [63–65].

Community-based clinicians and academic centers often have different criteria for diagnosis and divergent goals of care [8]. The guidelines and standards of practice used for diagnosis of Lyme disease in academic research settings may not be applicable or appropriate for community-based settings. Moreover, the clinical manifestations of Lyme disease are often subtle or atypical in the community.

Because important data concerning the treatment of chronic Lyme disease was not considered by the IDSA expert panel, ILADS introduced an evidence-based review to determine which recommendations warranted revision. This evidence-based review gave rise to the current guidelines.

Section VI: Periodic review of guidelines

New data on treatment of Lyme disease is emerging, and randomized controlled trials that address various unresolved issues in Lyme disease are ongoing. The ILADS Working Group has therefore developed a mechanism for routinely and periodically reviewing this information and for updating the guidelines on a regular basis. The most recent information will be available from the ILADS website at www.ILADS.org.

43. Grading system for evidence-based guidelines

The ILADS system for grading recommendations is similar to that used by the expert panel of the IDSA. However, the ILADS panel includes primary care clinicians, researchers and international leaders in the treatment of Lyme disease. Thus, the ILADS group is more inclusive and clinically oriented than the IDSA panel, and the ILADS guidelines reflect this diversity.

44. Table 1. Comparison of key IDSA and ILADS guidelines.

Condition	IDSA	ILADS
Lyme arthritis	B - II	A - II
Encephalopathy	A - II	A - II
Retreatment	None	A - II
Prolonged antibiotics	None	A - II
Benzathine penicillin	D - III	B - III
Intra-articular steroid	B - III	D - III
Arthroscopic Synovectomy	B - II	D - II
Coinfection	B - III	B - III
Seronegative Lyme disease	None	A - III
Combination treatment	None	B - III
Empiric treatment	None	B - III

45. Criteria for evidence-based guidelines

The ILADS recommendations are based on two criteria [10]:

- The strength of the evidence (denoted by categories A–E)
- The quality of the data (denoted by Roman numerals I–III)

Recommendations rated 'A' are considered good evidence to support the recommendation. Those rated 'B' have moderate evidence to support the recommendation. Those rated 'C' are considered optional. Measures designated 'D' generally should not be offered; those designated 'E' are contraindicated.

A rating of I indicates that at least one randomized controlled trial supports the recommendation; II, evidence from at least one well-designed clinical trial without randomization supports the recommendation; and III, 'expert opinion'.

Sources

Our data sources are English-language articles published from 1975 to 2003. The selection panel synthesized the recommendations from published and expert opinion. Human studies of Lyme disease were identified from MEDLINE (1975 to 2003) and from references in pertinent articles and reviews. Also included are abstracts and material presented at professional meetings and the collective experience of the ILADS Working Group treating tens of thousands of Lyme disease patients.

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IDSA

For Release: Thursday, May 01, 2008

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Agreement Ends Lyme Disease Investigation By Connecticut Attorney General

Medical Validity of IDSA Guidelines Not Challenged

The Infectious Diseases Society of America (IDSA) has entered into an agreement with the Attorney General of Connecticut ending his investigation of the Society's Lyme disease guidelines. Under the agreement, the guidelines remain in effect; but in an effort to clear the air, IDSA is voluntarily agreeing to an extra step: a one-time special review of the Lyme disease guidelines. The agreement ends the investigation of IDSA and its volunteer guideline panel members without the filing of a complaint or the entry by a court of factual or legal findings, without IDSA paying any fines or penalties, and without imposing on IDSA any restrictions on its right to promulgate guidelines for Lyme disease or any other disease or condition in the manner it believes best serves public health.

"IDSA has agreed to this unique, singular review of our guidelines because the panel will consist solely of physicians and scientists," said IDSA President Donald Poretz, MD. "We are confident that our guidelines for the diagnosis and treatment of Lyme disease represent the best advice that medicine currently has to offer, as is the case with all of the medical guidelines issued by the Society, and we look forward to the opportunity to put to rest any questions about them."

The IDSA Lyme disease **guidelines recommend against long-term antibiotic therapy, an unproven and potentially dangerous treatment. A small group of physicians outside the medical mainstream and their patients endorse such long-term treatment, despite the compelling medical evidence that it is ineffective and can have serious, life-threatening complications—and, furthermore, is extremely expensive.** This agreement does not change the medical advice to patients: The 2006 Lyme disease guidelines remain in place.

Under the terms of the agreement announced today, IDSA will convene a review panel to conduct a comprehensive review of the Lyme-related literature to determine whether the 2006 guidelines should be revised or updated. While IDSA periodically reviews all of its treatment guidelines in order to keep them current, the agreement allows for an expanded process that includes an opportunity for public presentation and submission of information to ensure that all points of view are presented to and considered by the review panel.

IDSA is voluntarily agreeing to this extra scrutiny in the hope that it will help put to rest assertions that have been made – all of them unfounded – that IDSA has ignored divergent opinions in developing its Lyme disease guidelines. This expanded review process is pertinent to this unique case only. IDSA has not agreed to use it as a model for other IDSA guidelines, nor is IDSA urging other medical organizations and societies to use it.

The main actions of the agreement include:

1. Complete resolution of the Attorney General's investigations, issues, and potential claims and causes of action against IDSA and its volunteer panel members.

The current Lyme disease guidelines remain in effect. The medical and scientific basis of the 2006 guidelines remains in place and unchallenged.

IDSA will convene a review panel to determine whether the 2006 Lyme disease guidelines should be revised or updated. Howard Brody, MD, PhD, who has been jointly selected by the Office of the Attorney General and IDSA, will serve as an ombudsman who will have a limited role that will focus on screening potential conflicts of interest. The ombudsman will not be involved in the operation of the review panel. Any proposed changes to the guidelines would require a supermajority vote of 75 percent of the panel.

IDSA strongly disagrees with the Attorney General's assertion that panel members had significant conflicts of interest. Panel members had no financial interests that would have affected, or been affected by, recommendations in the guidelines. The guidelines recommend generic drugs and generic diagnostic tests. Panel members do not stand to profit from any recommendation in the guidelines. In fact, the panel members denied themselves and their colleagues an opportunity to generate a significant amount of revenue when they recommended against expensive, repeated, long-term antibiotic therapy.

IDSA also strongly disagrees with the Attorney General's allegation that the Lyme disease guideline panel excluded competing viewpoints. In fact, the panel offered an opportunity for other organizations and individuals to submit additional evidence and carefully considered all information provided. In 2000, a single member of the panel voluntarily stopped participating. He was not removed from the panel, as the Attorney General has alleged. Furthermore, all IDSA guidelines are subjected to a rigorous, multi-level review and approval process before they are published, which allows other clinicians who did not serve on the panel that developed the guidelines to ensure that the guidelines are relevant, accurate, useable, and balanced.

IDSA's guidelines—like all medical societies' guidelines—are voluntary. They are for the benefit of physicians seeking the best possible advice from experts in the field. Medical societies do not have the authority or the desire to dictate to physicians how to practice medicine. Nor do they have the ability to dictate to insurance companies how to reimburse for services. No ties exist between IDSA and any insurance company.

The physicians who wrote IDSA's 2006 guidelines concluded that, for nearly all patients, a short course of antibiotics is an effective treatment for Lyme disease. Studies have proven that long-term antibiotic treatment, which is usually given through a needle and a catheter, is ineffective, expensive, and potentially harmful. The overuse of antibiotics also contributes to an important public health threat: the development of drug-resistant infections that are difficult if not impossible to treat.

"We recognize that medicine is always evolving, and we welcome the opportunity that the review panel provides to examine any new evidence and vet our earlier findings," said Dr. Poretz. "We are pleased that under this agreement, the proper diagnosis and treatment for Lyme disease will be decided in a medical forum, not a courtroom. We hope this special review of the guidelines will help quell the unfortunate controversy surrounding the treatment of Lyme disease and ensure that patients receive advice and treatment based on the best available scientific and medical evidence."

Connecticut Attorney General's Office

1. Press Release

Attorney General's Investigation Reveals Flawed Lyme Disease Guideline Process, IDSA Agrees To Reassess Guidelines, Install Independent Arbiter

May 1, 2008

Attorney General Richard Blumenthal today announced that his antitrust investigation has uncovered serious flaws in the Infectious Diseases Society of America's (IDSA) process for writing its 2006 Lyme disease guidelines and the IDSA has agreed to reassess them with the assistance of an outside arbiter.

The IDSA guidelines have sweeping and significant impacts on Lyme disease medical care. They are commonly applied by insurance companies in restricting coverage for long-term antibiotic treatment or other medical care and also strongly influence physician treatment decisions. Insurance companies have denied coverage for long-term antibiotic treatment relying on these guidelines as justification. The guidelines are also widely cited for conclusions that chronic Lyme disease is nonexistent.

"This agreement vindicates my investigation -- finding undisclosed financial interests and forcing a reassessment of IDSA guidelines," Blumenthal said. "My office uncovered undisclosed financial interests held by several of the most powerful IDSA panelists. The IDSA's guideline panel improperly ignored or minimized consideration of alternative medical opinion and evidence regarding chronic Lyme disease, potentially raising serious questions about whether the recommendations reflected all relevant science.

"The IDSA's Lyme guideline process lacked important procedural safeguards requiring complete reevaluation of the 2006 Lyme disease guidelines -- in effect a comprehensive reassessment through a new panel. The new panel will accept and analyze all evidence, including divergent opinion. An independent neutral ombudsman -- expert in medical ethics and conflicts of interest, selected by both the IDSA and my office -- will assess the new panel for conflicts of interests and ensure its integrity."

Blumenthal's findings include the following:

The IDSA failed to conduct a conflicts of interest review for any of the panelists prior to their appointment to the 2006 Lyme disease guideline panel;

Subsequent disclosures demonstrate that several of the 2006 Lyme disease panelists had conflicts of interest;

The IDSA failed to follow its own procedures for appointing the 2006 panel chairman and members, enabling the chairman, who held a bias regarding the existence of chronic Lyme, to handpick a likeminded panel without scrutiny by or formal approval of the IDSA's oversight committee;

The IDSA's 2000 and 2006 Lyme disease panels refused to accept or meaningfully consider information regarding the existence of chronic Lyme disease, once removing a panelist from the 2000 panel who dissented from the group's position on chronic Lyme disease to achieve "consensus";

The IDSA blocked appointment of scientists and physicians with divergent views on chronic Lyme who sought to serve on the 2006 guidelines panel by informing them that the panel was fully staffed, even though it was later expanded;

The IDSA portrayed another medical association's Lyme disease guidelines as corroborating its own when it knew that the two panels shared several authors, including the chairmen of both groups, and were working on guidelines at the same time. In allowing its panelists to serve on both groups at the same time, IDSA violated its own conflicts of interest policy.

IDSA has reached an agreement with Blumenthal's office calling for creation of a review panel to thoroughly scrutinize the 2006 Lyme disease guidelines and update or revise them if necessary. The panel -- comprised of individuals without conflicts of interest -- will comprehensively review medical and scientific evidence and hold a scientific hearing to provide a forum for additional evidence. It will then determine whether each recommendation in the 2006 Lyme disease guidelines is justified by the evidence or needs revision or updating.

Blumenthal added, "The IDSA's 2006 Lyme disease guideline panel undercut its credibility by allowing individuals with financial interests -- in drug companies, Lyme disease diagnostic tests, patents and consulting arrangements with insurance companies -- to exclude divergent medical evidence and opinion. In today's healthcare system, clinical practice guidelines have tremendous influence on the marketing of medical services and products, insurance reimbursements and treatment decisions. As a result, medical societies that publish such guidelines have a legal and moral duty to use exacting safeguards and scientific standards.

"Our investigation was always about the IDSA's guidelines process -- not the science. IDSA should be recognized for its cooperation and agreement to address the serious concerns raised by my office. Our agreement with IDSA ensures that a new, conflicts-free panel will collect and review all pertinent information, reassess each recommendation and make necessary changes.

"This Action Plan -- incorporating a conflicts screen by an independent neutral expert and a public hearing to receive additional evidence -- can serve as a model for all medical organizations and societies that publish medical guidelines. This review should strengthen the public's confidence in such critical standards."

THE GUIDELINE REVIEW PROCESS

Under its agreement with the Attorney General's Office, the IDSA will create a review panel of eight to 12 members, none of whom served on the 2006 IDSA guideline panel. The IDSA must conduct an open application process and consider all applicants.

The agreement calls for the ombudsman selected by Blumenthal's office and the IDSA to ensure that the review panel and its chairperson are free of conflicts of interest.

Blumenthal and IDSA agreed to appoint Dr. Howard A. Brody as the ombudsman. Dr. Brody is a recognized expert and author on medical ethics and conflicts of interest and the director of the Institute for Medical Humanities at the University of Texas Medical Branch. Brody authored the book, "Hooked: Ethics, the Medical Profession and the Pharmaceutical Industry."

To assure that the review panel obtains divergent information, the panel will conduct an open scientific hearing at which it will hear scientific and medical presentations from interested parties. The agreement requires the hearing to be broadcast live to the public on the Internet via the IDSA's website. The Attorney General's Office, Dr. Brody and the review panel will together finalize the list of presenters at the hearing.

Once it has collected information from its review and open hearing, the panel will assess the information and determine whether the data and evidence supports each of the recommendations in the 2006 Lyme disease guidelines.

The panel will then vote on each recommendation in the IDSA's 2006 Lyme disease guidelines on whether it is supported by the scientific evidence. At least 75 percent of panel members must vote to sustain each recommendation or it will be revised.

Once the panel has acted on each recommendation, it will have three options: make no changes, modify the guidelines in part or replace them entirely.

The panel's final report will be published on the IDSA's website.

ADDITIONAL FINDINGS OF BLUMENTHAL'S INVESTIGATION

IDSA convened panels in 2000 and 2006 to research and publish guidelines for the diagnosis and treatment of Lyme disease. Blumenthal's office found that the IDSA disregarded a 2000 panel member who argued that chronic and persistent Lyme disease exists. The 2000 panel pressured the panelist to conform to the group consensus and removed him as an author when he refused.

IDSA sought to portray a second set of Lyme disease guidelines issued by the American Academy of Neurology (AAN) as independently corroborating its findings. In fact, IDSA knew that the two panels shared key members, including the respective panel chairmen and were working on both sets of guidelines a the same time -- a violation of IDSA's conflicts of interest policy.

The resulting IDSA and AAN guidelines not only reached the same conclusions regarding the non-existence of chronic Lyme disease, their reasoning at times used strikingly similar language. Both entities, for example, dubbed symptoms persisting after treatment "Post-Lyme Syndrome" and defined it the same way.

When IDSA learned of the improper links between its panel and the AAN's panel, instead of enforcing its conflict of interest policy, it aggressively sought the AAN's endorsement to "strengthen" its guidelines' impact. The AAN panel -- particularly members who also served on the IDSA panel -- worked equally hard to win AAN's backing of IDSA's conclusions.

The two entities sought to portray each other's guidelines as separate and independent when the facts call into question that contention.

The IDSA subsequently cited AAN's supposed independent corroboration of its findings as part of its attempts to defeat federal legislation to create a Lyme disease advisory committee and state legislation supporting antibiotic therapy for chronic Lyme disease.

In a step that the British Medical Journal deemed "unusual," the IDSA included in its Lyme guidelines a statement calling them "voluntary" with "the ultimate determination of their application to be made by the physician in light of each patient's individual circumstances." In fact, United Healthcare, Health Net, Blue Cross of California, Kaiser Foundation Health Plan and other insurers have used the guidelines as justification to deny reimbursement for long-term antibiotic treatment.

Blumenthal thanked members his office who worked on the investigation -- Assistant Attorney General Thomas Ryan, former Assistant Attorney General Steven Rutstein and Paralegal Lorraine Measer under the direction of Assistant Attorney General Michael Cole, Chief of the Attorney General's Antitrust Department.

- (PDF-2,532KB)

)r Release: Thursday, May 01, 2008 **Contact Information**

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The agreement ends the investigation of IDSA and its volunteer guideline panel members without the filing of a complaint or the entry by a court of factual or legal findings, without IDSA paying any fines or penalties, and without imposing on IDSA any restrictions on its right to promulgate guidelines for Lyme disease or any other disease or condition in the manner it believes best serves public health.

"IDSA has agreed to this unique, singular review of our guidelines because the panel will consist solely of physicians and scientists," said IDSA President Donald Poretz, MD. "We are confident that our guidelines for the diagnosis and treatment of Lyme disease represent the best advice that medicine currently has to offer, as is the case with all of the medical guidelines issued by the Society, and we look forward to the opportunity to put to rest any questions about them."

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The main actions of the agreement include:

- Complete resolution of the Attorney General's investigations, issues, and potential claims and causes of action against IDSA and its volunteer panel members.
- The current Lyme disease guidelines remain in effect. The medical and scientific basis of the 2006 guidelines remains

in place and unchallenged.

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IDSA strongly disagrees with the Attorney General's assertion that panel members had significant conflicts of interest. Panel members had no financial interests that would have affected, or been affected by, recommendations in the guidelines. The guidelines recommend generic drugs and generic diagnostic tests. Panel members do not stand to profit from any recommendation in the guidelines. In fact, the panel members denied themselves and their colleagues an opportunity to generate a significant amount of revenue when they recommended against expensive, repeated, long-term antibiotic therapy.

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Connecticut Attorney General's Office Press Release

Attorney General's Investigation Reveals Flawed Lyme Disease Guideline Process, IDSA Agrees To Reassess Guidelines, Install Independent Arbiter May 1, 2008

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"This agreement vindicates my investigation -- finding undisclosed financial interests and forcing a reassessment of IDSA guidelines," Blumenthal said. "My office uncovered undisclosed financial interests held by several of the most powerful IDSA panelists. The IDSA's guideline panel improperly ignored or minimized consideration of alternative medical opinion and evidence regarding chronic Lyme disease, potentially raising serious questions about whether the recommendations reflected all relevant science.

"The IDSA's Lyme guideline process lacked important procedural safeguards requiring complete reevaluation of the 2006 Lyme disease guidelines -- in effect a comprehensive reassessment through a new panel. The new panel will accept and analyze all evidence, including divergent opinion. An independent neutral ombudsman -- expert in medical ethics and conflicts of interest, selected by both the IDSA and my office -- will assess the new panel for conflicts of interests and ensure its integrity."

Blumenthal's findings include the following:

- The IDSA failed to conduct a conflicts of interest review for any of the panelists prior to their appointment to the 2006 Lyme disease guideline panel;
- Subsequent disclosures demonstrate that several of the 2006 Lyme disease panelists had conflicts of interest;
- The IDSA failed to follow its own procedures for appointing the 2006 panel chairman and members, enabling the chairman, who held a bias regarding the existence of chronic Lyme, to handpick a likeminded panel without scrutiny by or formal approval of the IDSA's oversight committee;
- **The IDSA's 2000 and 2006 Lyme disease panels refused to accept or meaningfully consider information regarding the existence of chronic Lyme disease, once removing a panelist from the 2000 panel who dissented from the group's position on chronic Lyme disease to achieve "consensus";**
- **The IDSA blocked appointment of scientists and physicians with divergent views on chronic Lyme who sought to serve on the 2006 guidelines panel by informing them that the panel was fully staffed, even though it was later expanded**;
- The IDSA portrayed another medical association's Lyme disease guidelines as corroborating its own when it knew that the two panels shared several authors, including the chairmen of both groups, and were working on guidelines at the same time. In allowing its panelists to serve on both groups at the same time, IDSA violated its own conflicts of interest policy.

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THE GUIDELINE REVIEW PROCESS Under its agreement with the Attorney General's Office, the IDSA will create a review panel of eight to 12 members, none of whom served on the 2006 IDSA guideline panel. The IDSA must conduct an open application process and consider all applicants. The agreement calls for the ombudsman selected by Blumenthal's office and the IDSA to ensure that the review panel and its chairperson are free of conflicts of interest. Blumenthal and IDSA agreed to appoint Dr. Howard A. Brody as the ombudsman. Dr. Brody is a recognized expert and author on medical ethics and conflicts of interest and the director of the Institute for Medical Humanities at the University of Texas Medical Branch. Brody authored the book, "Hooked: Ethics, the Medical Profession and the Pharmaceutical Industry." To assure that the review panel obtains divergent information, the panel will conduct an open scientific hearing at which it will hear scientific and medical entations from interested parties. The agreement requires the hearing to be broadcast live to the public on the Internet via the IDSA's website. The Attorney General's Office, Dr. Brody and the review panel will together finalize the list of presenters at the hearing. Once it has collected information from its review and open hearing, the panel will assess the information and determine whether the data and evidence supports each of the recommendations in the 2006 Lyme disease guidelines.The panel will then vote on each recommendation in the IDSA's 2006 Lyme disease guidelines on whether it is supported by the scientific evidence. At least 75 percent of panel members must vote to sustain each recommendation or it will be revised. Once the panel has acted on each recommendation, it will have three options: make no changes, modify the guidelines in part or replace them entirely. The panel's final report will be published on the IDSA's website.

ADDITIONAL FINDINGS OF BLUMENTHAL'S INVESTIGATION IDSA convened panels in 2000 and 2006 to research and publish guidelines for the diagnosis and treatment of Lyme disease. Blumenthal's office found that the IDSA disregarded a 2000 panel member who argued that chronic and persistent Lyme disease exists. The 2000 panel pressured the panelist to conform to the group consensus and removed him as an author when he refused.IDSA sought to portray a second set of Lyme disease guidelines issued by the American Academy of Neurology (AAN) as independently corroborating its findings. In fact, IDSA knew that the two panels shared key members, including the respective panel chairmen and were working on both sets of guidelines a the same time -- a violation of IDSA's conflicts of interest policy.The resulting IDSA and AAN guidelines not only reached the same conclusions regarding the non-existence of chronic Lyme disease, their reasoning at times used strikingly similar language. Both entities, for example, dubbed symptoms persisting after treatment "Post-Lyme Syndrome" and defined it the same way.When IDSA learned of the improper links between its panel and the AAN's panel, instead of enforcing its conflict of interest policy, it aggressively sought the AAN's endorsement to "strengthen" its guidelines' impact. The AAN panel -- particularly members who also served on the IDSA panel -- worked equally hard to win AAN's backing of IDSA's conclusions.

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View the entire IDSA agreement - (PDF-2,532KB)Content Last Modified on 5/14/2008 8:40:39 AM

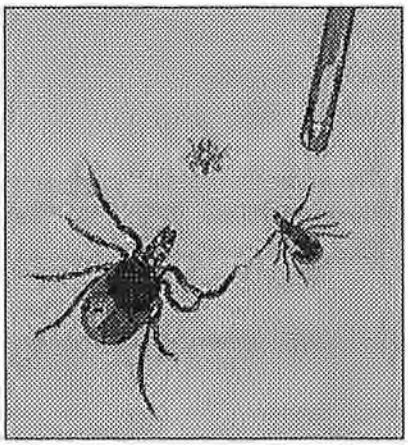
Deer Tick Ecology

What is a tick?

Ticks are not insects but Arachnids, a class of Arthropods, which also includes mites, spiders and scorpions. They are divided into two groups - hard bodied and soft bodied - both of which are capable of transmitting diseases in the United States.

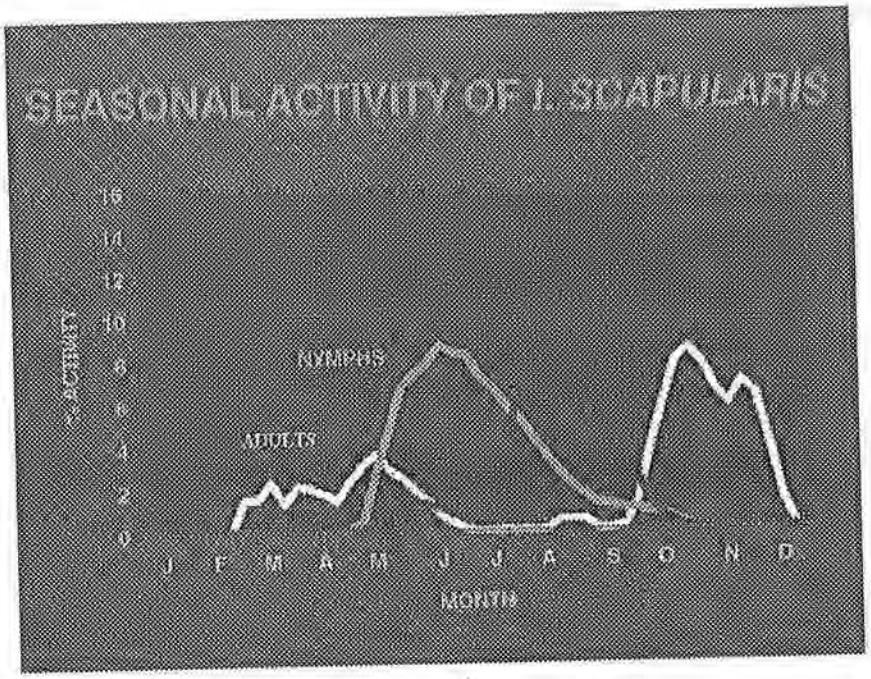
Ticks are parasites that feed by latching on to an animal host, imbedding their mouthparts into the host's skin and sucking its blood. This method of feeding makes ticks the perfect vectors (organisms that harbor and transmit disease) for a variety of pathogenic agents. Ticks are responsible for at least ten different known diseases in humans in the U.S., including Lyme disease, Rocky Mountain spotted fever, babesiosis, and more recently, anaplasmosis and ehrlichiosis.

The Deer Tick Life Cycle

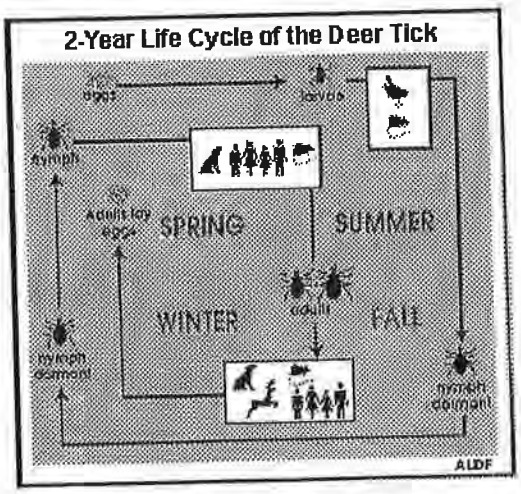


The deer (or black-legged) tick in the East and the related western black-legged tick are the only known transmitters of Lyme disease in the United States. Both are hard-bodied ticks with a two-year life cycle. Like all species of ticks, deer ticks and their relatives require a blood meal to progress to each successive stage in their life cycles.

The life cycle of the deer tick comprises three growth stages: the larva, nymph and adult. In both the northeastern and mid-western U.S., where Lyme disease has become prevalent, it takes about two years for the tick to hatch from the egg, go through all three stages, reproduce, and then die. Detailed descriptions of this life cycle and the seasonal timing of peak activity, as they occur in these regions, are provided below.



The above graph shows the host-seeking behavior of *I. scapularis* ticks according to life-stage and season. Larval activity peaks in August, nymphs are active during the summer months, and adults are active during the spring and fall. People primarily acquire *Borrelia burgdorferi* (the causative agent of Lyme disease) from infected nymphs because of their small size. Host-seeking larvae are not infected. Infected adults are large enough to be noticed and are usually removed by people before *B. burgdorferi* is transmitted. Consequently, very few Lyme disease cases are reported during spring and fall. Click here (news.shtml#SpirochetePoster) to learn about the probability of *B. burgdorferi* transmission according to how long an infected tick feeds on a person.



Stage 1: Larva - As shown in the upper left corner of the life-cycle diagram to the right, eggs laid by an adult female deer tick in the spring hatch into larvae later in the summer. These larvae reach their peak activity in August. No bigger than a newsprinted period, a larva will wait on the ground until a small mammal or bird brushes up against it. The larva then attaches itself to its host, begins feeding, and over a few days, engorges (swells up) with blood.

If the host is already infected with the Lyme disease spirochete (a form of bacterium) from previous tick bites, the larva will likely become infected as well. In this way, infected hosts in the wild (primarily white-footed mice, which exist in large numbers in Lyme-endemic areas of the northeast and upper mid-west) serve as spirochete **reservoirs**, infecting ticks that feed upon them. Other mammals and ground-feeding birds may also serve as natural reservoirs of infection. Larval ticks are not born infected, they cannot transmit Lyme disease to nimal or human hosts. Instead, "reservoir" hosts infect the larvae. Having already fed, an infected larva will not seek another host, human or otherwise, until after it reaches the

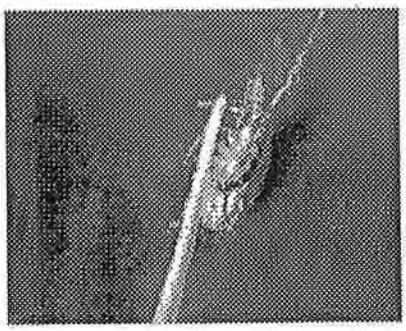
next stage in its life cycle. Therefore, larvae do not, in themselves, pose a threat to humans or pets.

Stage 2: Nymph - Larvae, after feeding, drop off their hosts and molt, or transform, into nymphs in the fall. The nymphs remain inactive throughout the winter and early spring.

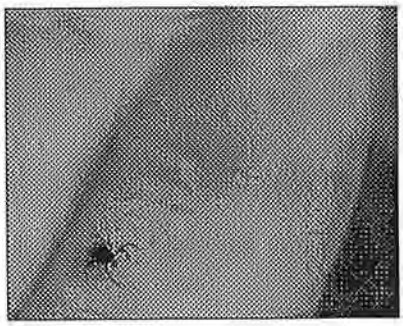
In May, nymphal activity begins. Host-seeking nymphs wait on vegetation near the ground for a small mammal or bird to approach. The nymph will then latch on to its host and feed for four or five days, engorging with blood and swelling to many times its original size. If previously infected during its larval stage, the nymph may transmit the Lyme disease spirochete to its host. If *not* previously infected, the nymph may *become* infected if its host carries the Lyme disease spirochete from previous infectious tick bites. In highly endemic areas of the northeast and upper midwest, 25% of nymphs have been found to harbor the Lyme disease spirochete.

Too often, humans are the hosts that come into contact with infected nymphs during their peak spring activity (late May through July). Although the nymphs' preferred hosts are small mammals and birds, humans and their pets are suitable substitutes. Because nymphs are about the size of a poppy seed, they often go unnoticed until fully engorged, and are therefore responsible for nearly all of human Lyme disease cases.

Stage 3: Adult - Once engorged, the nymph drops off its host into the leaf litter and molts into an adult. These adults actively seek new hosts throughout the fall, waiting up to 3 feet above the ground on stalks of grass or leaf tips to latch onto deer (its preferred host) or other larger mammals (including humans, dogs, cats, horses, and other domestic animals). Peak activity for adult deer ticks occurs in late October and early November. Of adults sampled in highly endemic areas of the northeast, 50% have been found to carry the Lyme disease spirochete. However, few cases of Lyme disease are acquired from adult tick bites because they are relatively large (about the size of an apple seed) and attached ticks are usually found and removed before spirochete transmission occurs (more than 36 hrs).



Adult deer tick questing for a host. Note the upper legs are raised in preparation for latching on to a passing animal.

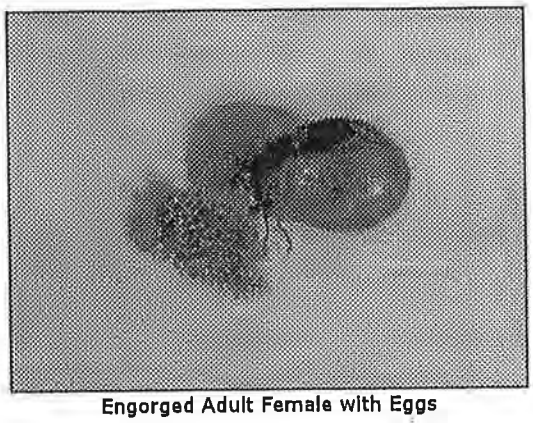


Adult deer tick seeking a suitable spot to feed.

As winter closes in, adult ticks unsuccessful in finding hosts take cover under leaf litter or other surface vegetation, becoming inactive in temperatures below 45° F. Generally, winters in the

northeast and upper mid-west are cold enough to keep adult ticks at bay until late February or early March (an exception was the warm winter of 1997-1998) when temperatures begin to rise. At this time, they resume the quest for hosts in a last-ditch effort to obtain a blood meal allowing them to mate and reproduce. This second activity peak typically occurs in March and early April.

Adult female ticks that attach to deer, whether in the fall or spring, feed for approximately one week. Males feed only intermittently. Mating may take place on or off the host, and is required for the female's successful completion of the blood meal. The females then drop off the host, become gravid (egg-laden), lay their eggs underneath leaf litter in early spring, and die. Each female lays approximately 3,000 eggs. The eggs hatch later in the summer, beginning the two-year cycle anew.



Engorged Adult Female with Eggs

Now is the time to take precautions against Lyme disease

June is peak season for Lyme disease in the Northeast and Midwest where nymphal deer ticks are most abundant. Nearly all of the cases will be acquired within the next three months. You can prevent Lyme disease by avoiding tick infested areas. Where there were adult deer ticks earlier this spring, there are now nymphal stage ticks which are much harder to see. If you know you will be exposed to deer ticks, there are some important precautions to consider. Insect repellents offer effective protection against deer ticks. Use products with permethrin on clothing and products with DEET on exposed skin. If you find ticks on pets, clothing, or people around your home, repellants may not be practical for preventing tick bites. Lawns, gardens and other areas of frequent usage can be treated with insecticides to kill nymphal deer ticks. A single application now will reduce tick numbers by up to 95% for the rest of the nymphal tick season. Granular formulations can be easily applied by the average homeowner. Commercial applicators experienced in tick control can also be employed, but be cautions about over-treating. One application now is all that is necessary. For more information on tick control visit the website of the Connecticut Agricultural Experiment Station (http://www.caes.state.ct.us/FactSheetFiles/IndexHeadingFiles/FStick.htm) where research on this subject has been done.

xodes scapularis is responsible for most of the cases of Lyme disease in the northeastern United States. These ticks are d in grassy areas (including lawns), and in brushy, shrubby and woodland sites, even on warm winter days. They prefer areas where some moisture is present. The tick has three life stages: larva, nymph and adult. Each stage takes a single blood meal. They feed on a variety of warm blooded animals including man, dogs, cats, horses and cows. The bite is painless so most victims do not know they have been bitten. The nymphal stage appears to be responsible for most Lyme disease cases. Both the larval stage (about the size of a grain of sand) and nymphal stage (about the size of a poppy seed) attach to a variety of small mammals, but prefer the white-footed mouse, the main reservoir of the Lyme disease bacteria. The adult ticks (about the size of a sesame seed) prefer to feed on white-tailed deer. The entire life cycle requires three separate hosts and takes about two years to complete.

While it's true that the small mammals are the hosts for the disease, it is our overabundance of deer that allows the overabundance of the deer tick (black-legged tick, ixodes scapularis).

The mice help the ticks in the first year of their two-year life cycle, but the deer give the transportation and last blood meal for the adult tick.

Studies have shown that if you reduce the deer density to about 10 per square mile, you dramatically reduce the tick abundance, and Lyme disease is dramatically reduced also.

Studies of this nature include Monhegan Island, ME; Great Island, MA; and Mumford Cove, CT; and there are more. In the first two cases, they removed essentially all the deer and Lyme disease dropped to non-existent. But it is not necessary to remove all the deer, just get them down to 10 per square mile. This is what happened at Mumford Cove, and it dropped the Lyme cases from a peak of 30 per year, down to two or less.

confirmed though laboratory testing (Williams et al. 2002). There is no scientific evidence that CWD can, through natural routes of infection, be transmitted to either humans or livestock (Hamir et al. 2005, MaWhinney et al. 2006). The Game Commission has been actively testing wild deer for CWD since 1998. As of December 2009, CWD has not been detected in captive or wild deer herds in Pennsylvania. In the event of detecting CWD, the Game Commission will respond according to Pennsylvania's CWD Interagency Response Plan.

Lyme disease was first recognized in the U.S. in 1975. Lyme disease is caused by the spirochete *Borrelia burgdorferi* and is spread through the bite of an infected tick. The black-legged tick or deer tick (*Ixodes scapularis*) primarily spreads Lyme disease in the northeastern and north-central U.S., but the Lyme bacterium can be carried and spread by other species of tick (CDC 2006, Schulze et al. 2005). Lyme disease poses a significant threat to humans. If left untreated, it could lead to serious health issues including arthritis; nervous system symptoms including numbness, pain, and nerve paralysis; and problems with memory or cognition, fatigue, headache, and sleep disturbances (CDC 2006). Deer were once thought to be a factor in the transmission of Lyme disease serving as a reservoir for the disease during winter months and primary host for the adult deer tick (Davis et al. 1984, Habicht et al. 1987). However, further research has shown that deer are dead-end hosts for the disease and play no role in the transmission cycle (Underwood 2005, Perkins et al. 2006). Humans are most likely to contract Lyme disease from the bite of an infected nymph stage tick (Ostfeld et al. 2006). Woodland rodents, especially white-footed mice, are most likely to infect larval and nymph stages of *I. scapularis* with the Lyme disease bacterium (Ostfeld et al. 2006, Perkins et al. 2006). Deer play a part in the complex life cycle of *I. scapularis*. Adult ticks primarily feed on deer or other large vertebrates hosts in mid-autumn to complete their life cycle (Underwood 2005, Perkins et al. 2006). Reducing deer numbers in an area does not always reduce the number of ticks (Ostfeld et al. 2006, Perkins et al. 2006). Abundance of rodent hosts (i.e., mice and chipmunks) and acorns (rodent food supply) were found to be the most important factors affecting the risk of Lyme disease in a 13-year study. A 3-fold variation in deer abundance did not affect the risk of Lyme disease (Ostfeld et al. 2006).

Epizootic Hemorrhagic Disease (EHD) and Bluetongue are diseases of wild ungulates caused by viruses of the genus *Orbivirus* and are considered the most important infectious agents for white-tailed deer (Thomas 1981). EHD viruses are widespread throughout North America and periodically cause epidemics in wild deer populations. Severity of EHD outbreaks is variable and may be related to herd immunity. EHD is transmitted by various species of Culicoides midges. EHD outbreaks occur in late summer and early fall (Thomas 1981). This is thought to be related to seasonal wind patterns moving the insect vector northwards from endemic areas in the U.S. Signs and symptoms of EHD are variable, ranging from none to sickness or sudden death. Sick and dead animals are often found near water, as a result of the high fever that accompanies the disease. Other symptoms include swelling of the face, tongue, or neck; weakness and disorientation; lameness; extensive hemorrhaging in many tissues including the liver, intestinal tract, lungs, and heart; ulcers in the mouth, tongue, and stomachs; and curved and cracked hooves. EHD does not infect humans (Thomas 1981). Losses due to EHD have occurred in Pennsylvania in 1996, 2002, and 2007. While mortality associated with EHD may seem dramatic, local populations rebound quickly after an outbreak. And animals that survive an EHD infection develop antibodies that protect them from future outbreaks (Davidson 2006).

: Jordan Robert A; Schulze Terry L; Jahn Margaret B

ffects of reduced deer density on the abundance of Ixodes scapularis (Acari: Ixodidae) and Lyme disease incidence in a northern New Jersey endemic area. Journal of medical entomology 2007;44(5):752-7.

We monitored the abundance of Ixodes scapularis Say (Acari: Ixodidae) and the Lyme disease incidence rate after the incremental removal of white-tailed deer, Odocoileus virginianus Zimmermann, within a suburban residential area to determine whether there was a measurable decrease in the abundance of ticks due to deer removal and whether the reduction in ticks resulted in a reduction in the incidence rate within the human population. After three seasons, the estimated deer population was reduced by 46.7%, from the 2002 postfawning estimate of 2,899 deer (17.6 deer per mi2) to a 2005 estimate of 1,540 deer (9.3 deer per mi2). There was no apparent effect of the deer culling program on numbers of questing I. scapularis subadults in the culling areas, and the overall numbers of host-seeking ticks in the culling areas seemed to increase in the second year of the program. The Lyme disease incidence rate generated by both passive and active surveillance systems showed no clear trend among years, and it did not seem to vary with declining deer density. Given the resources required to mount and maintain a community-based program of sufficient magnitude to effectively reduce vector tick density in ecologically open situations where there are few impediments to deer movement, it may be that deer reduction, although serving other community goals, is unlikely to be a primary means of tick control by itself. However, in concert with other tick control interventions, such programs may provide one aspect of a successful community effort to reduce the abundance of vector ticks.

Stafford et al 2003 Journal of Medical Entomology 40: 642-652

Figure 1: This study demonstrates a dramatic reduction in tick numbers (purple line) in 1995, 2 years after deer populations were reduced in 1992-3. Tick numbers fell by 92% to almost zero, even though deer were only reduced by 6. This dramatic reduction in tick numbers is typical when deer numbers are brought back to stable balanced numbers.

Connecticut Department of Environmental Protection data

Figure 2: At Mumford Cove an attempt to control deer numbers using contraceptives for 3 years failed to prevent a rising deer population. **Between 1996 and 2000 there were between 20 and 30 cases of Lyme a year.** In 1999, after the failed immunocontraception study, the community formed a deer-tick committee. The committee talked to experts and provided the residents with options. (see Kilpatrick and LaBonte 2003; WSB 31:340-348). A lethal deer management program was chosen and instigated in 2000 when **deer were reduced from 100 per sq mile down to 10.4 per sq mile** through controlled hunts from elevated tree stands. **There are now only 2 to 3 Lyme cases a year in this community compared to 30 new cases a year prior to deer reduction**. The deer are now maintained at a steady 10 or so per square mile very easily by two pairs of hunters once a year. A combination of archery and shotgun hunting was used. Shotgun was used on tracts of 30 to 100 acres plus. The deer have been maintained at that same level of 10 per sq mile for the following 8 years by removing just 10 deer each year, also using tree stands in just 3 locations. There are now virtually no ticks to be found in this community.

Figure 3. Relationship of tick density to deer abundance (Rand et al. 2003).

Figure 3: In a mainland situation where deer roam freely, Rand's study 5compared the abundance of adult deer ticks with the presence of deer along multiple 1000 ft transects within 8 study sites throughout southern Maine. Sampling included 74 transects, each examined from 1 to 3 years, for a total of 155 records (a total of 29 transect miles). Deer density, here in terms of ticks per square mile, was estimated from pellet group counts using a published conversion factor. As seen in the accompanying plot, **deer density was highly positively correlated with tick abundance. In this study we found**

ew **ticks where deer densities dropped below 15/mi2.**

'acts from the "<**http://www.ct.gov/dep/lib/dep/wildlife/pdf_files/game/urbandeer07.pdf**>Connecticut Department of Environmental Protection Booklet: Managing Urban Deer in Connecticut. A guide for Residents and Communities" 2nd Edition:

* **"Deer population management must serve as the main tool in any long term strategy to reduce human ncidences of Lyme disease."** Dr Sam Telford (page 3).

* "**Deer are the primary host for the adult deer tick and are essential to the reproductive success of the tick.**" Dr Kirby Stafford

* Larval and nymph stages of the deer tick feed on birds and mammals. The adult tick, however, requires a blood meal from a medium to large size mammal to reproduce and lay thousands of eggs. (page 3) The only large mammal present in sufficient numbers in Ct is the white tailed deer.

* "Hunting results in immediate removal of animals from the population, is cost effective, and is the principal management tool used by all state agencies to manage free ranging deer." (page 11).

* The relationship between deer abundance and human cases of Lyme disease was well documented in Groton, Ct from 1996-2004 (page 3)

* "In six days, 92% of the deer population was removed." DEP: Mumford Cove, Connecticut. (page 21)

* **Lyme disease rates were "greatly reduced in subsequent years (from 30 a year down to 2 to 3 cases per year)"** DEP: Mumford Cove (page 21)

FAQ

DEER MANAGEMENT AND FOREST HEALTH

The objective of the Monmouth County Park System's Deer Management Program is to reduce and maintain deer populations at a level that is compatible with a healthy forest. This sheet explains what the Park System is doing to evaluate the effectiveness of the Program in pursuing this objective.

How is the Park System assessing deer impact on forest health?

The Park System has initiated two related studies that over time will enable staff and others to evaluate where hunting is decreasing deer impact by stabilizing or reducing the deer population at various parks. The Forest Health and Composition Study, initiated in 2006, has sampled the species of trees, saplings, shrubs, vines and herbaceous plants as well as measuring height and percent of vegetative cover in fourteen parks. The Deer Exclosure Study, initiated in 2003, creates permanent plots within and outside fenced areas or "exclosures" that allow a comparison of vegetation between plots that are and are not protected from deer damage. There are currently eight exclosures in six parks.

How will the Forest Health and Composition Study influence decisions about deer management?

This study yields a description of each forest type and results in the assignment of a Floristic Quality Assessment Index (FQAI) and a Plant Stewardship Index (PSI) for each sampled plot. The processing of the data in Geographic Information System software results in the mapping and quantification of the forest communities within a park and supports the assessment of the potential quality of the forest community and the extent to which it may be degraded. By comparing the mature trees present to the quantity of samplings and seedling trees, it can be determined whether deer browsing pressure may be limiting forest regeneration. Over time, this information will enable the Park System to evaluate the need for and effectiveness of its management activities, including both deer management and invasive species control, and to identify the higher quality and more vulnerable forest areas where action is a priority.

Will additional park areas be included in the Forest Health and Composition Study?

The initial surveys of seven park areas in 2006 allowed Park System staff to determine the variability of forest types. By establishing a profile of each type, a less-intensive sampling protocol can be applied in other like park areas to determine their specific composition and general health. Priority for future study will be given to the better definition of forest types, to targeted elements of the forest community such as spring ephemerals, and to specific species populations and utilization.

What information does the Deer Exclosure Study provide?

The pressure of deer on the forest vegetation can be measured by comparing species composition and vigor inside and outside an exclosure. By repeating the sampling over multiple years it can be determined whether deer pressure is increasing or decreasing; this can be evaluated in the context of the management activities in place during that same period. The plot comparisons also provide important information about the ability of the forest to recover from deer damage if the pressure of the deer population is removed.

Are more Deer Exclosures pl[illegible]?

The eight current deer exclosur[illegible] have been situated in parks that represent different forest types. These exclosures can be used as reference sites in order to determine the deer browsing pressure in other parks of the same forest type; for example, conditions observed in Huber Woods Park can be compared t[illegible]ditions in an exclosure at Hartshorne Woods Park. In this manner, it is not necessary to m[illegible] exclosures in every forested area. If, through the Forest Health and Composition Study, [illegible] types are identified that are not yet surveyed with a deer exclosure, additional exclosures [illegible]e installed.

Do these studies conform to [illegible]ed scientific practice?

Forest plot sampling is ubiquit[illegible] scientific community as a method for evaluation of plant communities. Every Federal la[illegible]gement agency, including the US Forest Service, National Park Service, and Bur[illegible] and Management, employs plot sampling as a measure for evaluation. It is the standard [illegible] Ecological Society of America, The Nature Conservancy, and other similar science-based [illegible]izations.

The Floristic Quality Assessme[illegible] (FQAI) is a practical and standardized tool for natural area assessment developed in [illegible]est by Floyd Swi[illegible] and Gerald Wilhelm (1994). The method replaces earlier subjec[illegible]sures of quality with a quantitative index that allows comparison of the floristic quali[illegible]g many sites and the tracking of changes at the same site over time. The Plant Stewa[illegible] Index (PSI) is a variation of FQAI developed by Bowman's Hill Wildflower Pr[illegible]ifically for habitats [illegible] New Jersey and eastern Pennsylvania; many land tru[illegible]ation groups, and [illegible] governments in the region are implementing it.

Deer exclosures studies are a [illegible]hnique accepted and conducted by the National Park Service, National Forest Servic[illegible] and local government agencies, and scientific and conservation communities at la[illegible]me have been ongoing for decades, and exist at many scales from ten-meter squar[illegible]tiple acre exclosur[illegible].

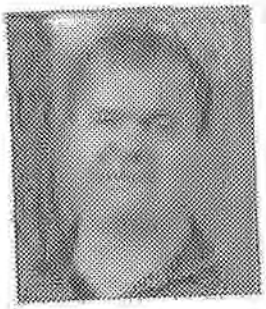
What have the studies sh[illegible]?

The studies support the conclus[illegible]at browsing pressure is still too high at the current level of deer population and that fore[illegible]parate when br[illegible] pressure is reduced or removed. Until sufficient forest health [illegible]ed to establish tr[illegible] that can be compared to deer harvest data, staff will be un[illegible]ing if the deer m[illegible]gement activities as currently implemented are having the [illegible]ct on deer populati[illegible]nd densities.

Why not just count the nu[illegible]

It is the impact of the deer on [illegible]th, their ecological sustainability, which is of concern to the Park System. A reliable, [illegible]essment of vegetative health is achievable. Counting deer is less reliable and mo[illegible] and the fact that they spend a good deal of time under co[illegible]r be seen or counted. Nevertheless, the Park System is committed to continuing it[illegible]ount deer populations from the air by helicopter during periods of snow cover and [illegible]ch spring at those parks where the methodology is most a[illegible]ting methods is scientifically valid, they can be useful in [illegible] estim[illegible] of deer densities. Data collected from these efforts is include[illegible] Management Pro[illegible] Annual Report.

Can small deer exclosures work?



by Karl Martin

Understanding the impact of deer density levels on forest regeneration is critical for determining acceptable deer populations. Deer are a natural component of the ecosystem, however, a variety of human impacts on the landscape may have resulted in deer numbers exceeding their natural densities in some areas.

Researchers, resource managers, and the general public have noted negative impacts from high deer densities on tree regeneration, herbaceous plants, aquatic systems, and vertebrate and invertebrate species. These impacts can result in severe ecological degradation and economic losses, as has been observed in forestry regeneration projects in many parts of the country, including Wisconsin.

A common technique to assess the impact a wildlife species has on a system is to exclude the particular species from all or a portion of the system that you are interested in. For deer this most often involves the construction of a fence type structure to exclude deer from an area. One of the challenges with this approach is that deer have the ability to jump over fences in excess of 8-feet in height. Construction of 8-foot high or higher deer fence is expensive, time consuming, and often involves modifying vegetation near the fence as part of the construction process. In addition, it can be extremely difficult to install an 8-foot high deer proof fence in remote areas because of the logistical constraints of getting supplies to the field site.

We wanted to assess the effectiveness of relatively short fences (5-foot high hog wire) for excluding deer from relatively small plots (5, 6, and 7 meters[1] on a side). We decided that food was the most logical tool for us to assess the effectiveness of various exclosures since this would be the primary motivation for a deer to jump a fenced exclosure in a wild setting or backyard garden.

[1] One meter equals 39.4 inches.

To amplify the desire we decided to test our exclosures in the middle of winter in northern Wisconsin; a time when deer should be physiologically stressed and most in need of food. The ultimate goal of this research project was to evaluate low fence exclosures as an economical, logistically feasible method to assess deer impacts on tree regeneration and understory development.

This initial research was aimed at developing a solution for installing remote deer exclosures for research as well as for landowners who want to exclude deer from their gardens or a small regeneration site. This is the first part of what will be a longer research project that installs 420 deer exclosures distributed evenly in northern Wisconsin where we have a silvicultural experiment designed to accelerate and evaluate development of old-growth characteristics

Study

We established 4 replicate study areas on private property in northern Wisconsin to assess the effectiveness of a 5-foot high fence at keeping deer excluded from an area. Since deer have the ability to jump a 5-foot high fence with ease the real issue is how a deer perceives its ability and willingness to jump into and out of a relatively small enclosed area. To test this we set up 3 exclosures of 3 different sizes at each of our 4 study sites. After a 2-week period of prebaiting to get deer habituated to each site we built 3 square exclosures that measured 5, 6 and 7 meters on a side at each of the 4 study sites. Experience has shown that once deer begin using a location, like a garden, it is more difficult to exclude them. Thus, prebaiting deer and habituating them to the exact sites added to the rigor of our test.

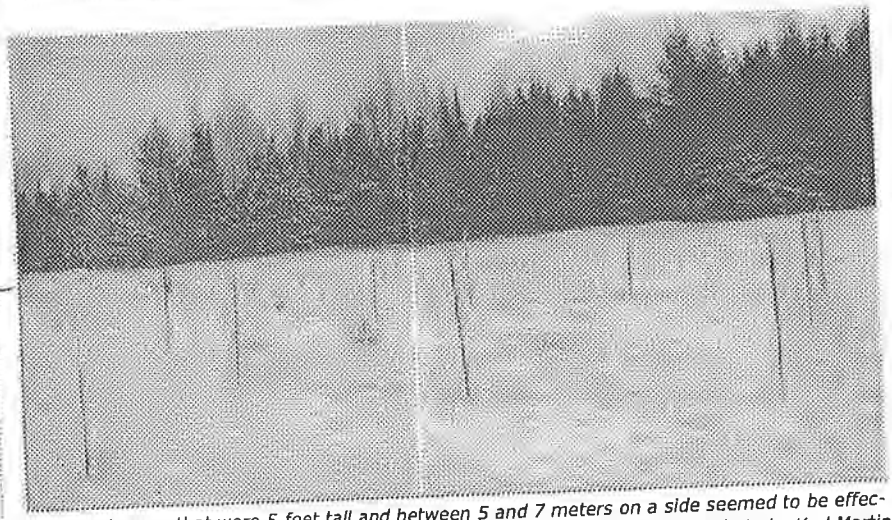
Each study site was at least three miles apart, to evaluate different individual deer at several sites, while maximizing the number of deer visiting each of the exclosures and allow our cameras to monitor multiple exclosures at one time.

Baiting

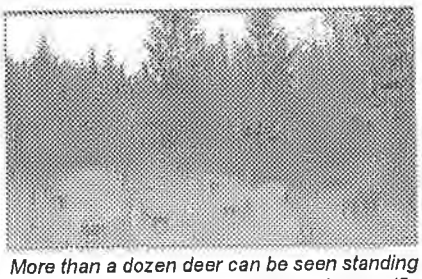
In January 2005, we started prebaiting each site with a mixture of corn and black sunflower seeds. Once the exclosures were built on a site we continued to check each exclosure every other day. Two gallons of bait were at the center of each exclosure and we distributed 2 gallons of the bait mixture on the outside of the 3 exclosures to keep deer interested and returning to the site daily. The outside bait was completely consumed during each 2-day period and had to be replenished on every visit. The bait was often removed within the first few hours of the 48-hour period between rebaiting.

Monitoring

Each site was monitored by digital, motion sensitive, infrared cameras to observe deer movements at each site and to determine if deer jumped over the fence into any exclosure. We also used tracks as evidence of deer activity inside and outside of each exclosure which worked extremely well since fresh snow was common during the study. Snow depth at the time of the study ranged from



Deer exclosures that were 5-feet tall and between 5 and 7 meters on a side seemed to be effective in keeping deer away from bait during a 2005 test in northern Wisconsin. Photo by Karl Martin



More than a dozen deer can be seen standing around the outside of three small exclosures (5, 6. and 7 meters on a side) in Karl Martin's research project. Photo by Bruce Kohn

12 to 20 inches. Deer were observed for 10 days after the installation of the fences at each site, with one site maintained for several additional months as an anecdotal assurance that deer might not become accommodated to the fence after a longer period.

Results

Each study site had more than 10 deer visiting nightly, with one site having more than 22 deer observed . The bait placed on the outside of the fence was consumed each night and eventually deer started to visit the exclosures in the daytime.

On the first night a single deer jumped into one of the four 7x7 meter exclosures. The deer ate the bait mixture for about 16 minutes while several deer stood on the outside of the exclosure and watched. The deer on the outside of the exclosure made no attempt to jump into the exclosure even though there was no bait remaining on the outside of the exclosed area. This was the only deer we observed inside our exclosures at any of the study areas during the 10-day monitoring period following the installation of the exclosures.

Deer used their heads and necks to bend the hog wire down several inches at each of the sites, but no deer entered the exclosures at those sites.

No more deer entered the 7 x 7-meter exclosure even though bait was provided there for several months longer than the study.

Discussion

Our results support the use of 5-foot high fences for excluding deer from areas up to 7 by 7 meters for research purposes, but these exclosures should also be effective at excluding deer from small areas such as home gardens or planting areas. We purposely tested the effectiveness of fencing at a time of year when conditions were extremely harsh and using food that was highly palatable and being eaten by deer. The desire of a deer to enter a vegetation exclosure in the forest should be significantly lower than the conditions we set up in our study. In addition, at the time of year when home gardens are at their peak production the amount of highly palatable food outside the exclosure will be significantly higher than the available food in this study. Establishing an exclosure prior to deer use should add insurance of protection against deer.

A remaining unknown is the size area that can be effectively protected with a 5-foot high fence. Will such a fence protect an area as large as 10x 10 meters? Meanwhile, gardeners might consider using a dividing (intermediate) fence if they want to protect a garden significantly larger than 7x7 m.

The supplies we used included 7.5-foot T-posts, hog wire, post maul, and wire—all of which are available at hardware stores. In addition, these supplies can be hauled out and installed in remote areas without the use of machines such as ATV's or post-hole diggers.

Karl Martin. Ph.D. (karl.martin@dnr.state.wi.us) *is a forest research scientist at the DNR in Rhinelander. He provided this article for information for WWOA members. Future research plans include a long-term research project using deer enclosures to understand deer impact on forest ecosystems.* *Funding for this research was provided by DNR Divisions of Forestry and Enforcement and Science.*

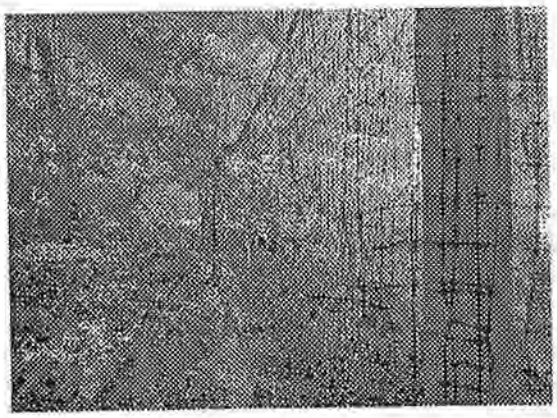
Parks and Recreation

Warwick County Park's
Community Partner in Research & Conservation

West Chester University Department of Geography and Planning
Dr. Joan Welsh

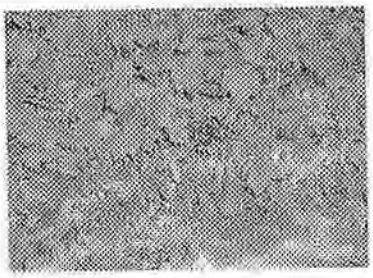
Warwick County Park Deer Browse Study 1996-2005

In March 1996, six sites at Warwick County Park were randomly selected for a Deer Browse Study. Research began by collecting baseline data for areas where deer exclosures were built later that spring. The exclosures were fenced off areas, 20 x 20 meters with seven foot high fences, in the park's forest. The exclosures kept deer out of the area so vegetation could grow without deer browsing. Unfenced control sites of the same size were adjacent to each exclosure.



Dr. Welch and her students collected browse data for the plants under 1.8 meters (about 7 feet) - about as high as deer can browse in the exclosures and at the control sites.

What did they find after a decade of research?



At the control sites browsed by deer:
Maple leaf viburnum maintained its position as the most dominant understory woody plant throughout the study period (1996-2005).

Beech (*Fagus grandifolia*) is more important in the control site understory because deer do not like to browse beech. Having some oaks remained of low importance.

In the exclosure with no deer browsing:
There was an increased presence of tree canopy species in the understory as expected. The oaks all exhibited higher species importance values. This means the Chestnut oak (*Quercus prinus*), white oak (*Quercus alba*) and red oak (*Quercus rubra*) generated more seedlings that grew in the understory.

At both control sites and exclosures:
Plant species diversity increased, but there is a higher species diversity or the exclosures, as expected.

In general:
Warwick County Park showed notable recovery of the understory woody plants since the deer exclosures were built and hunting was implemented as a forest resource management tool. The recovery in the deer exclosures appears to be ahead of the control sites, in that maple leaf viburnum is still the dominant understory woody plant outside of the deer exclosures, and species diversity is higher in the exclosures than in the control sites. The research showed that plant diversity increases where deer cannot browse, and there is some

Mark,

The following is a list of the plant material that was damaged by deer at Dorsey Knob. It was planted March 25, 2009 in a new bed near the pavilion.

Planted 5 Globosa Blue Spruce @ $79.00 each, 4 damaged, loss = $ 316.00

2 Aronia 'Brilliantisima' @ $25.00 each, 2 damaged, loss = $ 50.00

3 Oxydendron (sourwood) @ $50.00, 3 damaged, loss = $ 150.00

1 Spanish Pin Fir @ $75.00, totally decimated, loss = $ 75.00

2 Witchhazel @ $99.00, 2 damaged, loss = $ 198.00

7 Bearberry @ $31.00, 7 damaged heavily, loss = $ 217.00

2 Flowering Almond @ $36.00, 2 damaged, loss = $ 72.00

Total loss = $899.70

Sincerely,

Marchetta Maupin

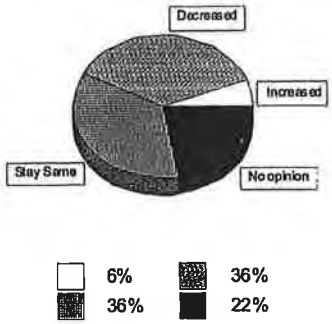
Extension Service
West Virginia University

Urban West Virginia Deer Damage Assessment

December 2002

Deer damage presents a significant cost to property owners in urban areas of West Virginia. On a statewide basis, the deer-caused damage in urban areas totaled an estimated $3,135,945. This would amount to $61.95 per urban household if every household shared equally in the costs. The estimates include plant damage, control costs, and vehicle damage reported in a survey conducted by WVU Extension agents.

Deer Population Size



Methodology

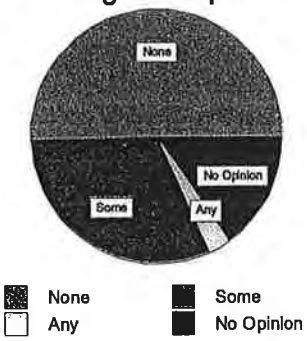
The survey was created by Leanne Moorman, Hancock County Extension agent, with the assistance of William Grafton, WVU Extension specialist-wildlife, and Ed Collins, associate director of the Center for Agricultural and Natural Resources Development at WVU. Funding was provided by the West Virginia University Integrated Pest Management Program.

Extension agents mailed the survey to a total of 2,023 (4 percent of the housing units) randomly-selected addresses in Charleston, Hurricane, Morgantown, Parkersburg, and Weirton during May 2001. Return-address, stamped envelopes were included. The 829 completed survey responses represented a 41 percent return rate.

Major Findings

The estimated total deer damage cost to the property owners in West Virginia urban areas was $3,135,945 in 2000. This would amount to $61.95 for every household in the cities if the cost of deer damage was shared by all. This includes plant damage, control costs, and vehicle damage.

Damage Acceptable



Thirty-six percent of the property owners thought that the deer population in their urban area should be decreased. Thirty-six percent thought that it should stay the same, and 6 percent thought it should be increased.

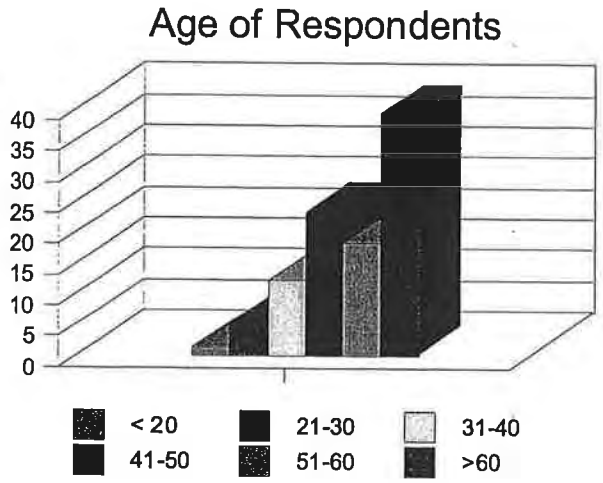
Fifty-four percent saw deer on their property in 2000.

Thirty percent of property owners reported experiencing damage that they attribute to deer. Sixty-nine percent reported no deer damage. Since the deer damage cost was only paid for by 35 percent (7,153) of the property owners, the actual average cost was $438.41.

According to the survey, 50 percent of property owners felt that deer damage is not acceptable on their property. Thirty-one percent were willing to deal with some deer damage, and 3 percent were willing to deal with any amount of deer damage.

The ages of respondents are similar to the most current census figures for West Virginia.

Programs and activities offered by the West Virginia University Extension Service are available to all persons without regard to race, color, sex, disability, religion, age, veteran status, political beliefs, sexual orientation, national origin, and marital or family status. Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Director, Cooperative Extension Service, West Virginia University. West Virginia University is governed by the Board of Trustees of the University System of West Virginia.



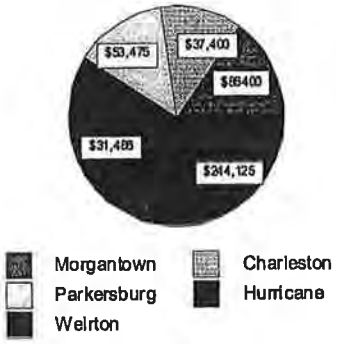
Specific Results

City	Households according to 1990 Census	4% random selected addresses	Returned surveys	% Return
Charleston	15,080	603	147	24%
Hurricane	1,771	70	43	61%
Morgantown	9,551	382	162	42%
Parkersburg	14,579	583	177	30%
Weirton	9,642	385	300	78%
W.Va. Urban Areas	50,623	2,023	829	41%

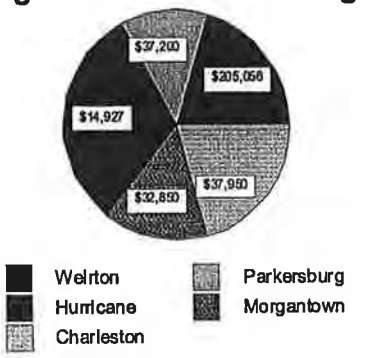
- 97% of the respondents lived on the property that they provided information about.
- 54% have seen deer on their property during 2000; 45% have not.
- 4% have hit a deer with their automobile; the average cost of that damage was $1,723. At that rate, the estimated total for damage to vehicles in West Virginia urban areas is $1,507,625.
- More than 34% of the respondents thought that the deer population in their city should be decreased. Only 6% thought that it should be increased, and 36% thought it should stay the same.
- 35% of the respondents are or were hunters, but 65% never have hunted.
- 90% do not object to hunting.
- 18% either are farmers or were farmers; 81% are not nor were never farmers.
- 53% of the respondents are male; 45% are female.
- 30% of these property owners have experienced damage that they attribute to deer; 69% reported no deer damage.
- 50% of the property owners feel that deer damage is not acceptable on their property, but 31% are willing to deal with some deer damage.

Damage as Reported in the Survey

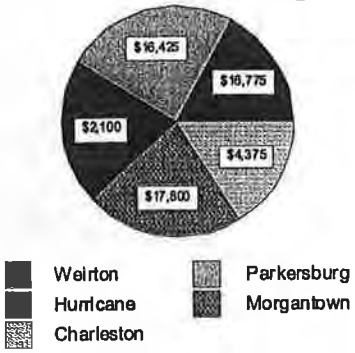
Shrub Damage



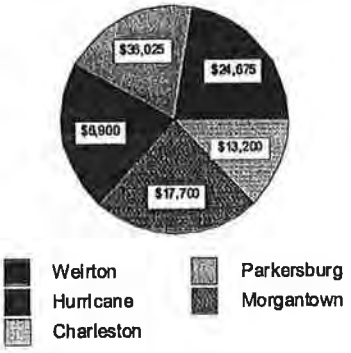
Vegetable Garden Damage



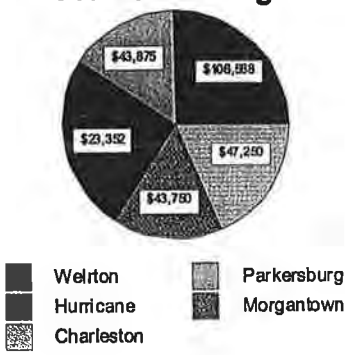
Small Fruit Damage



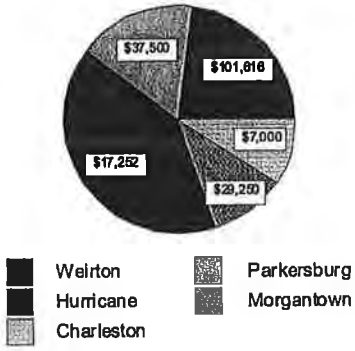
Fruit Tree Damage



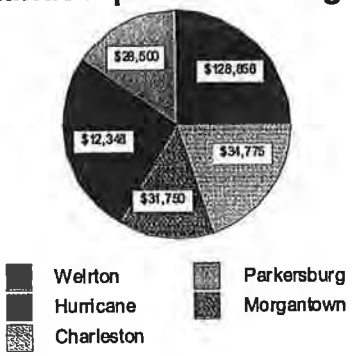
Flower Damage



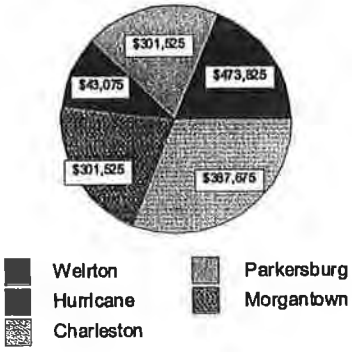
Lawn Damage



Landscape Tree Damage



Automobile Damage



Controls Used

Control	% Used	% Successful	% Not Successful
Repellent	5%	19%	81%
Fencing	7%	48%	52%
Shooting	1%	67%	33%
Scaring materials	4%	22%	78%
Dog	4%	41%	59%

Thirteen percent of the households have tried some type of control, with fencing being the one most used. Most controls used (repellent, fencing, shooting, scaring materials, dogs, and other) were not successful.

Ephemeral Beauty - Spring 2007

Deer threaten woodland wildflowers

Story and Photos by Cece Fabbro

In mid-April, long-time Bedford, New York, resident Pat Keesee walks the woodlands there searching for some of the earliest-blooming wildflowers in the eastern deciduous forests. She hopes to find bright-yellow marsh marigolds, snow-white bloodroot, pale-blue Virginia bluebells and yellow-brown adder's tongue.Disappointed at how few of these spring ephemerals she's able to find, Keesee shakes her head. "When I moved here 49 years ago, the woodland floor was carpeted with swaths of yellow, pink, blue and white. It was such a delight to step out after final frost and stumble upon these little gems; I just knew spring was on its way. All that has changed, however. Now, I only see a few here and a few there. My walks have become treasure hunts."

Spring ephemerals are a group of fleeting woodland wildflowers that must grow, bloom and set seed within a two-month period after last frost and before the trees' leaves block the sun. Many are long-lived, and their early appearance makes them a critical source of nectar for early-emerging insects, especially bumblebees. But spring ephemerals, like other woodland wildflowers, are in danger.

"There appear to be a number of factors contributing to their demise, including habitat destruction, aging forests, encroaching invasive species, air and water pollution, non-native worms, unrestrained collecting and especially rampant over-browsing by white-tailed deer," says Bill Cullina, nursery director and chief propagator at New England Wildflower Society (NEWFS).

Although scientific studies regarding the disappearance of ephemerals are few, one long-term study in Wisconsin addresses the impact that deer are having on woodland wildflowers in general. Dr. Tom Rooney, an assistant professor at Wright State University, has been studying changes in forest plant communities over the past 50 years. Using a baseline data set from a quantitative survey conducted in the 1950s, Rooney has resampled a number of sites originally surveyed. "The sites that we resurveyed in northern Wisconsin indicated an 18 percent decline in species richness from what was present around 1950," says Rooney. "In addition, we found that these sites were gaining in exotic species and becoming more similar to each other."

Sites where deer hunting was limited showed a greater loss of species than sites where the hunting was allowed - 65 percent compared with 12 percent. "We found that the deer population, which has been on the increase since the 1960s, was having a profound effect on wildflowers. Clearly, deer are a major force driving ecological change in our forests."

Another study begun in 2001 at the Miamia River Gorge Preserve outside of New York City evaluates similar effects on the 750-acre oasis of rich woodlands. Five deer exclosures of one-quarter acre each were erected at various locations on the preserve to learn what impact deer were having on wildflower populations and other native vegetation and to assess competition from invasive species if deer were absent.

1. "We used trillium as an indicator species because stands of the wildflower have disappeared from various sites on the preserve, and it's a species we know deer eat," says Rod Christie, executive director of the Preserve. "In 2001 we counted 7 mature trillium plants in one of the exclosures. In two years we counted 175 plants, and in 2006, 280 plants. In addition, we noticed dramatic increases in populations of other ephemerals, particularly bloodroot." From this the preserve implemented a deer management program that included selective culling to try and restore a balance between the native vegetation and the deer.

Until recently, the issues of herd reduction by selective culling have been controversial. However, public sentiment may be changing as an increasing number of deer invade suburban gardens, cause auto accidents and spread the deer tick that carries the bacterium known to cause Lyme disease.

Susan L. Stout The direct impact of deer on forests is limited to the zone from the forest floor to about five feet (1.5 meters) above – the zone that deer can easily reach. When deer impact is moderate or low for even a short time, trees can grow out of this zone, so that even as deer browse the branches that remain within their reach, the top of the plant grows unaffected by deer. For wildflowers and many shrubs, however, height escape is not possible. Thus, deer can change the abundance, size, and flowering of understory plants, which in turn affects the plants' ability to reproduce. The preferences of deer can change the species composition and diversity of understory communities. The plants that deer like to eat decrease in abundance or disappear, while the plants that deer do not like or that are able to bounce back from deer browsing increase as a proportion of the understory. This affects food and cover for other wildlife species, and affects the visual variety that we see as we hike or hunt in the woods.

1. Many scientists have noticed the effect of deer on spring wildflowers. Several species of trillium, a wildflower that can form a carpet in eastern forests in the spring, have been studied, but the most work has been done on white trillium, or Trillium grandiflorum. Scientists have studied this plant in Illinois[2], Minnesota[3], Pennsylvania[4], and other locations. Deer eat both the flowers and the fruit of this plant, and where deer impact is severe, the flowers disappear. Ben Moyer, a hunter and outdoor writer from Pennsylvania, tells of a steep slope on which he and his grandfather hunted turkey together in the spring. When he hunted with his grandfather as a child, trillium flowers covered the opposite slope of the valley during turkey season. One spring when he revisited the valley to hunt turkey as an adult, he was struck by the fact that the opposing hillside had only a few remaining trillium blossoms – and as he watched, a doe walked across the hillside eating each and every remaining blossom.

Rooney[5] focused on Maianthemum canadense (Canada mayflower) and Oxalis acetosella (wood sorrel). Canada mayflower is a preferred browse species and wood sorrel is not. Rooney found that on high boulders, there were more nada mayflower shoots per unit surface area, and their leaves – the vital surface for photosynthesis – were larger. There were no such differences for wood sorrel. Maybe even more important was the fact that only 1 of the Canada mayflower plants he found on low, deer-accessible, boulders was flowering, and therefore able to produce seed, compared to nearly 20% of the Canada mayflowers on high, deer-inaccessible, boulders.

1. In 2005, Comiskey and others also examined wildflowers on high and low boulders in the same region of northwestern Pennsylvania. They found 1300 reproducing wildflowers

of ten different species on the tops of boulders more than 1.5 meters tall. On an equivalent area of low boulders (0.5 meters or less) and forest floor, they found six reproducing wildflowers!

1. The region of northwestern Pennsylvania where Rooney, Comiskey and others[6] worked had high deer impact levels through most of the twentieth century, making it a region where deer impacts are particularly vivid and where long-term change can be studied. In 2001, Ristau[7] revisited plots in an old-growth area known as Hearts Content where Lutz[6,8] sampled wildflowers in 1928. Using the same methods as Lutz used, Ristau found that 24 species found on the plots in 1928 were rarer in 2000, with seven not found at all. In particular, Lutz found Viburnum alnifolium, or witch hobble, on half the plots in 1928 but Ristau did not find it on any of the plots in 2000. Ferns that are not preferred by deer increased in abundance from 3 to 21 percent, on average. There were also new species found near the trails through the area.

Wildflower is published quarterly by the Wildflower Center. Its content is national in scope with articles about the conservation and use of native plants as well as news from the Wildflower Center. A subscription is provided to Wildflower Center members as a benefit of membership.

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The height of white-flowered trillium (Trillium grandiflorum) is a useful indicator of deer browsing intensity. In their foraging activities deer select larger plants over smaller plants. Because flowering plants are larger than nonflowering plants, the number of plants in flower decreases with increasing browsing intensity. As browsing intensity increases, the height of the Trillium becomes shorter in successive growing seasons, presumably due to the loss of photosynthetic capacity and reduction in belowground resources. Trillium stem height was positively correlated with reproductive output by perennial herbaceous plants and negatively correlated with the percent of the herbaceous understory that is browsed. This indicates change in stem height is as indication of the general status of the herbaceous flora as influenced by deer browsing. Based on deer population densities associated with study sites supporting Trillium populations with stable stem heights and flowering plants, maintenance of deer densities of 4-6 individuals/km^2 is recommended for deciduous forests in northeastern Illinois. In eastern United States, research workers who assume they are studying relatively undisturbed sites should be aware that intense deer browsing may have imposed an alteration on their study sites.

Effects of White-Tailed Deer on Populations of an Understory Forb in Fragmented Deciduous Forests

DAVID J. AUGUSTINE*‡ AND LEE E. FRELICH†

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Abstract: *The effects of grazing by white-tailed deer (*Odocoileus virginianus*) on populations of* Trillium *spp. were examined in remnant, old-growth patches of the highly fragmented Big Woods forest ecosystem in southeastern Minnesota. We conducted three separate studies involving an exclosure experiment, transplant experiments, and comparisons of* Trillium *populations among study sites. The highest grazing intensity was observed where deer occurred at high overwinter concentrations (~25–35/km^2); significantly lower grazing intensities occurred at low overwinter density (~5–10/km^2). Deer focused their grazing on large, reproductive plants; at sites with high deer density,* Trillium *population structure was skewed toward small plants, and deer consistently caused over 50% reduction in reproduction during the growing season. Protection of individual plants from deer for two growing seasons resulted in dramatically increased flowering rates and significantly greater leaf area compared to control plants. No significant impact of current-year herbivory on reproduction in the following year was detected. Nevertheless, flowering rates at one site with high overwinter deer densities for at least the past 5 years suggest that the cumulative effects of grazing over several years can reduce reproduction in subsequent years. Transplant experiments with* Trillium grandiflorum *also showed that deer had significant effects on growth and reproduction where deer occur at high density. Our results suggest that changes in landscape structure and local deer abundance have altered plant-deer relationships such that grazing can lead to the local extirpation of sensitive forbs such as* Trillium *spp. As a result, active, long-term management of deer at low densities appears necessary for the conservation and restoration of fragmented forest communities in eastern North America.*

Efectos del Venado Cola Blanca en Poblaciones de *Trillium* spp. en Bosques Decidous Fragmentados

Resumen: *Los efectos de ramoneo por venado cola blanca (*Odocoileus virginianus*) en poblaciones de* Trillium *spp. fueron examinadas en parches remanentes de bosque maduro del ecosistema altamente fragmentado del bosque Big Woods en el sureste de Minnesota. Realizamos tres estudios separados que involucraron un experimento en un encierro, experimentos de transplante y comparaciones de poblaciones de* Trillium *entre sitios de estudio. La intensidad del ramoneo más alta se observó donde los venados se concentraron para pasar el invierno (~25–35/km^2), mientras que intesidades menores de ramoneo ocurrieron a bajas densidades durante el invierno (~5–10/km^2). Los venados enfocaron su consumo en plantas reproductivas grandes; en sitios con alta densidad de venados la estructura poblacional de* Trillium *estuvo sesgada a plantas pequeñas y los venados consistentemente ocasionaron una reducción mayor al 50% en la reproducción durante la temporada de crecimiento. La protección de plantas individuales de la depredación de los venados por dos temporadas de crecimiento resultó en un dramático incremento en la tasa de florecimiento y una cobertura de hojas significativamente mayor comparando con plantas control. No se detectó un impacto significativo de la herbivoría del año en curso en la reproducción del año siguiente. Sin embargo, las tasas de florecimiento en un sitio con alta densidad de venados durante el invierno por al menos cinco años consecutivos sugiere que el efecto acumulativo del ramoneo a lo largo de varios años puede reducir la reproducción*

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Conservation Biology, Pages 995–1004
Volume 12, No. 5, October 1998

browsing pressure. But when browsing pressure lasts for decades or longer, we can only guess that this survival strategy will eventually fail.

Torn Rooney has done two studies on the Allegheny National Forest concerning impacts of white-tailed deer on wildflower communities (Rooney and Dress 1997; Rooney 1997). Additional research in Wisconsin, Illinois, and Ohio also shows that deer can have very important impacts on this part of the forest community (Anderson 1994; Augustine 1998). For example, Rooney (1997) showed that, on rocks too' high for deer to climb, communities of wild-lily of the valley *(Maianthemum canadense)* included larger plants with a higher proportion of reproducing plants than were found in comparable populations on low rocks exposed to deer browsing.

Ash Hough was one of the First Forest Service researchers in northwestern Pennsylvania. He was very active in convincing the Forest Service of the value of old-growth reserves like the Tionesta Scenic and Research Natural Areas. He described the gradual disappearance of the shrub hobbiebush (Viburnum *alnifolium)* from these old growth reserves through the thirties and forties (Hough 1965). Today, we find **one** remnant plant underneath a huge log within the 4000 acres of the Tionesta, a few more along some roadways where deer may be shy to browse, and a few in the Hearts Content Scenic Area. Another key shrub that's a species of concern in Pennsylvania is Canadian yew *(Taxus canadensis)*. Studies in the Upper Lake States show that deer at high numbers devastate this species (Beals and others 1960; Balgooyen and Waller 1995). Another species that plays an important role in the shrub layer of northern forests is Eastern hemlock *(Tsuga canadensis)*. This slow-growing species can spend many years in the shrub layer as a seedling/ sapling stem, and it provides important thermal protection to deer in winter. Several studies show that deer have important impacts on regeneration of hemlock (Anderson and Loucks 1979; Frelich and Lorimer 1985; Alverson and others 1988; Aiverson and Waller 1997, Whitney 1984). But in Pennsylvania, deer impacts on the shrub layer are more than just the sum of impacts on individual species. The next time you hike in Penn's Woods, ask yourself if there is a shrub layer where you're hiking—through much of the state, the whole layer has disappeared.

Deer also have devastating impacts on tree seedlings. As the forests created by turn of the century cutting in Pennsylvania began to reach the sizes associated with timber products in the late 1960s and early 1970s, foresters tried to manage those harvests as harvests were managed in other regions. Far too often, the forest was replaced by fields of ferns, grasses, and asters—plants of low preference to white-tailed deer. Foresters suspected that deer were the problem, so they built fences in several harvest areas. Early studies showed that regeneration failures occurred in 42 to 68% of the trials (Marquis 1975, 1981). In 87% of the problem areas, simply excluding deer made the difference between success and failure as Ear as tree seedlings were concerned (Marquis 1981). Comparisons of forests inside and outside fences showed that these deer impacts had important economic consequences. Forests inside fences were more valuable than chose outside, to the tune of $13/acre/year (Marquis 1981). A recent update of that estimate using current timber prices and costs of protective measures suggests that the forestry community in Pennsylvania is spending something like $75 million dollars a year on deer browse (Stout, testimony to Pennsylvania Game Commission Deer Management Working Group, November 4, 1998).

The studies described above occured in the dense forested landscape of northwestern Pennsylvania during the 60s and 70s, when deer densities were 40-60 per square mile. We wanted to know how many deer *were compatible* with our values of diverse and productive forests. During the late 1970s, my predecessors at the Forestry Sciences Laboratory teamed with many cooperators, including the Game Commission, the Bureau of Forestry, and the Society of American Foresters to design a study to answer that question. At four different sites in northwestern Pennsylvania, we erected fences around 160 acres of managed forest. Inside our fences, we created four pens—one 1/10th square mile pen and three 1/20th square mile pens. We managed the forests inside the pens in a typical intensive manner, to create deer food levels like those that would be found in a managed forest. We put clearcuts on 10% of the ground within each pen for high deer food production, and thinning on 30%, to produce moderate amounts of deer food. Then we put 1 deer in the 1/10th square mile pen and 1, 2, and 4 deer respectively in the 1/20th square mile pens. That simulated 10, 20, 40, and 80 deer per square mile. And we watched and measured as the forest grew under the impacts of these different deer densities.

In the high deer density pens, winter mortality was high. We also lost some deer through the course of the study to poaching, escapes, and predation. So the densities we actually achieved, averaged over the eleven years that deer were in the pens and the four different study areas, were 10, 20, 38, and 64 deer per square mile. The forests that developed were very different. There were important differences in seedling height. seedling species composition, and in the distribution of seedlings on the forest floor. Although the clearcuts offered the earliest and most vivid examples of the effects of deer on seedling heights, the effects were evident in the thinned and

Deer and Forests.org. But as deer impact increases, deer can begin to affect the quality of habitat for other species. This is perhaps most true in oak forests. One study in Pennsylvania found there were 19 percent fewer acorns outside a fence, where deer had access to them, compared to the number inside a fence where only other animals could reach them[1]. In Virginia, another study showed that deer removed 10 to 30 percent of the acorns in a good seed year, and tha they were choosy – these acorns were more likely than the acorns they left behind to be free of weevils. Deer consumed 16 to 67 percent of the weevil-free acorns[2].

1. Scientists use many methods to understand deer, habitat, and other wildlife species. In Virginia, McShea and Rappole noticed that as the density of plant life on the forest floor increased, so did the abundance and number of species of birds that use those plants as habitat. Then they installed movement-tripped cameras in the forests with high- and low-density forest floor plants and found twice as many deer using the forests with low understory density[3]. We can't be sure that deer caused the lower understory density, but that is one possible explanation.

Because most plants start their lives as small seedlings on the forest floor and within the reach of deer, deer can literally consume the important habitat for other species. In Pennsylvania, deCalesta compared forests that had been thinned 12 years earlier, and then grew back with different densities of deer, ranging from 10 to 64 deer per square mile. In the low deer density enclosures, birds that nest in the mid-canopy – birds like eastern wood pewee and indigo bunting -- were far more abundant. At the higher deer densities, trees that created mid-canopy habitat were missing, because deer had eaten them when they were seedlings, and the habitat for those bird species never developed[4]. In Massachusetts, DeGraaf and others found a similar result. Birds that gleaned for food in the tree canopy were less abundant, and there were fewer species of those birds, in forests that had high densities of deer for many decades. Rufus-sided towhees were an example of a species that was more abundant in low deer density areas.

)t the changes that deer make in forest habitat can be positive for some species as well. In the Massachusetts study, hermit thrushes were more abundant in the high deer density areas[5].

Sometimes, when deer impact is high enough to give plants they don't like a big advantage in their competition with plants they prefer to eat, this can change animal habitat as well. Deer very rarely eat fern, especially hay-scented fern, and in many places were deer impacts have been high, large areas of the forest have a beautiful carpet of fern at mid-summer. Royo, working in such forests in Pennsylvania, wondered if small mammals would behave differently under fern cover than they did out in the open, presumably visible to other predators. He found that small mammals ate a higher proportion of the seeds they found under fern cover than seeds that were in the open. He also found that small mammals were choosier under fern cover. When he put equal numbers of large and small seeds under fern cover, small mammals favored the larger seeds as food[6].

Height of White-Flowered Trillium (Trillium Grandiflorum) as an Index of Deer Browsing Intensity Roger C. Anderson *Ecological Applications*, Vol. 4, No. 1 (Feb., 1994), pp. 104-109 Published by: Ecological Society of America

Total Cost Results

Plant material damage, including controls	Cost of damage reported in survey	Average cost to property owner	Estimated cost to property owners in W.Va. urban areas
Shrubs	$18,135.00	$117.40	$453,492.00
Vegetable gardens	$12,995.00	$115.80	$324,990.00
Small fruits	$2,310.00	$66.10	$57,750.00
Tree fruits	$3,922.00	$74.90	$98,050.00
Flower beds	$10,458.00	$63.90	$261,513.00
Lawns	$7,725.00	$103.10	$193,125.00
Landscaping trees	$9,576.00	$133.70	$239,400.00
Total Home Property Damage	$65,121.00		$1,628,320.00
Damage to vehicles	$60,305.00	$1,723.00	$1,507,625.00
Total Damage	$125,426.00		$3,135,945.00

Conclusions

Deer caused more than $3 million worth of damage in the urban areas of West Virginia in 2000, according to property owners. Shrubs and vegetable gardens had $31,130 worth of damage, nearly half (48 percent) of the total home property damage. Flower beds were next in damage cost to the urban household. Very little success has occurred in trying to control the damage caused by deer. Fencing has been the control measure used by the largest percent of households.

Some general implications of the survey are:

1. Deer damage is not acceptable by 50 percent of the property owners.
2. Shrubs and vegetable gardens have been the two leading areas of damage.
3. Population numbers cannot be agreed to by the property owners because 36 percent say decrease the population and 36 percent say the current population level is okay.

From these general implications, one could conclude that the deer are doing damage to urban properties. The property owners are not sure what population of deer should exist, but they do not want deer damage. Property owners have tried to keep the deer from damaging their property, but their methods are not working.

Future Research

1. What are the best ways to prevent deer from damaging homeowners' plants?
2. How do urban residents feel about using deer management techniques like urban hunting and population thinning; should the Division of Natural Resources pay for deer damage, what is an acceptable population level, etc.
3. What is the cost of deer damage to the agriculture, fruit production, and forestry industries?

WVU Extension Faculty Involved

Leanne Moorman, Hancock County and WVU Assistant Professor
Wayne Bennett, Putnam County and WVU Associate Professor
H.R. Scott, Wood County and WVU Assistant Professor
Beth Massey, Monongalia County and WVU Extension Instructor
Charles "Bud" Cottrill, Kanawha County
William Grafton, Extension Specialist and WVU Associate Professor
Mary Beth Bennett, Berkeley County and WVU Associate Professor
Ed Collins, Retired Associate Director, ANRD Center
Rakesh Chandran, Extension Specialist and WVU Clinical Assistant Professor

2/2

Wheeling

Ordinance No. 12525

Introduced September 3, 2002

AN ORDINANCE AMENDING AND REENACTING THE ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE CITY OF WHEELING IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES REGULATIONS.

WHEREAS, by Ordinance No. 10793, adopted the 1st day of August 1995, the Council of the City of Wheeling adopted special regulations for a limited bow hunt within the city limits.

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF WHEELING:

Section 1. A limited bow hunt within the city is hereby authorized in accordance with the following special regulations, the statutes and regulations of the State of West Virginia, and the Codified Ordinances of the City of Wheeling:

1. Hunting is by permit only. Hunters must register with the City and obtain a permit, the rules and regulations of the hunt.
2. The hunt is for deer only.
3. Only legal bows and arrows may be used.
4. Hunters must possess a valid West Virginia Hunting License and must have completed the National Bowhunter Education course to be eligible to hunt.
5. Hunting is not allowed on Sundays.
6. Hunting is allowed only with written permission from the property owner in their possession while hunting on private property or on city property.
7. No hunting is allowed within three hundred (300) feet of a dwelling, school, park, recreational or shopping areas.
8. The bag limit is as determined by the West Virginia Hunting Regulations; and special regulations for urban hunts established by the West Virginia Department of Natural Resources. provided, a hunter may not kill an antlered buck until he has first killed an antlerless deer within the city limits and legally checked the deer at an official game checking station. He may then hunt an antlered buck with his second permit or license if one is available.
9. All deer killed must be legally checked at an official game checking station and reported to the city.
10. All West Virginia hunting rules and regulations apply to the hunt.
11. The City may charge an administrative fee for permits to recover costs of the program.

Provided, that the prohibition against the shooting of arrows in Codified Ordinances §545.12 Throwing or Shooting Missiles does not apply to persons lawfully engaged in the limited bow hunt as long as any such person is in compliance with all other applicable regulations and laws.

Section 2. Prior to the adoption of this ordinance, the Clerk shall cause notice of the proposed adoption of this proposed ordinance to be published as a Class I-0 Legal Advertisement.

Section 3. This ordinance shall be effective from and after the date of its adoption.

PASSED BY THE COUNCIL OF THE CITY OF WHEELING, W. VA. AT A REGULAR MEETING HELD ON THE 17th DAY OF September 2002

MAYOR

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To Fred Richter	From
Co.	Co.
Dept.	Phone #
Fax # 233-4626	Fax #

99-09-191

CODE # 91.18

ORDINANCE

AN ORDINANCE AMENDING AND MODIFYING AN ORDINANCE ENTITLED: "AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES"

WHEREAS, many West Virginia cities are experiencing problems in the form of deer vehicle collisions and damage to ornamental shrubs and gardens due to increasing deer populations. Recognizing that the only practical and acceptable way to reduce the deer herds in city limits is through removal by hunting, the West Virginia Division of Natural Resources enacted regulations to allow cities the opportunity to have an early deer archery season along with a bonus bag limit. This special deer season will in no way supersede local regulations or community prohibitions on hunting; and

WHEREAS, by Resolution adopted the 3rd day of July, 1995, the Council of the Village of Bethlehem requested, through its special appointed committee, for the West Virginia Division of Natural Resources to provide advice and assistance in controlling the overpopulation of deer in the Village of Bethlehem and such advice and assistance has been provided in the form of urban deer archery special regulations for a limited bow hunt within designated hunting zones within the Village limits.

NOW, THEREFORE, BE IT ORDAINED BY THE COMMON COUNCIL OF THE VILLAGE OF BETHLEHEM AS FOLLOWS:

The Ordinance previously adopted by the common council of the Village of Bethlehem on

the 5th day of September, 1995, entitled, "AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES", is hereby amended and modified in title to be entitled "AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE VILLAGE OF BETHLEHEM AND THE WEST VIRGINIA DIVISION OF NATURAL RESOURCES", and is hereby amended and modified to provide as hereinafter set forth.

ARTICLE I

SECTION 1. A limited bow hunt within the Village of Bethlehem is hereby authorized in accordance with the statutes, legislative rules and regulations of the State of West Virginia, and the Ordinances and the following regulations of the Village of Bethlehem:

1. Hunters must register with the Village and obtain a permit.
2. The hunt is for deer only.
3. Only legal bows and arrows may be used.
4. Hunters must complete a West Virginia Hunter Safety course and a National Bowhunter Education course to be eligible to hunt.
5. Hunting is not allowed on Saturdays, unless specified and express permission is granted by the property owner.
6. Hunters must have written permission from the property/land owner while

weapon which will expel a projectile by action of an explosion, or "deadly weapon", which means an instrument which is designed to be used to produce serious bodily injury or death, or is readily adaptable to such use, within the corporate limits of the municipality of the Village of Bethlehem, West Virginia.

(B) This Section does not apply when firearms or deadly weapons are used in self-defense, in the discharge of official duty, or when otherwise lawfully authorized."

SECTION 5. This Ordinance shall take effect upon adoption.

ADOPTED this 21st day of November, 1994.

Donald C. Sinclair, Mayor

ATTEST:

Donald A. Junkins, Recorder

FIRST READING: NOVEMBER 7, 1994

SECOND READING: NOVEMBER 21, 1994

94-04-39

91.03
91.05
91.06

ORDINANCE

AN ORDINANCE REPEALING SECTION 91.03, SECTION 91.05 AND SECTION 91.06 OF CHAPTER 91 ENTITLED "HUNTING; FIREARMS" OF THE BETHLEHEM CODE, AND ADOPTING A NEW SECTION 91.03 ENTITLED "HUNTING PROHIBITED", A NEW SECTION 91.05 ENTITLED "NEGLIGENT SHOOTING", AND A NEW SECTION 91.06 ENTITLED "DISCHARGING FIREARMS OR WEAPONS" OF CHAPTER 91 OF THE BETHLEHEM CODE

BE IT ORDAINED BY THE COMMON COUNCIL OF THE VILLAGE OF BETHLEHEM AS FOLLOWS:

ARTICLE I

SECTION 1. Section 91.03 entitled "Hunting Permits", Section 91.05 entitled "Negligent Shooting", and Section 91.06 entitled "Discharging Firearms in Public Places" of Chapter 91 entitled "Hunting; Firearms" of the Bethlehem Code, recorded as Ordinances enacted on the 4th day of November, 1957, be, and the same are hereby repealed, provided, however, that such repeal shall not have any effect on any existing litigation, if any, involving said Sections of the Bethlehem Code, and shall not operate as an abatement of any action or proceeding, criminal or otherwise, pending pursuant to said Sections or by virtue of the said Sections hereby repealed.

SECTION 2. A new Section 91.03 of Chapter 91 of the Bethlehem Code is hereby established to read and provide as follows:

"Section 91.03 - Hunting Prohibited.

It shall be unlawful for any person to engage in hunting or pursuing animals, birds, fowl, or reptiles with any weapon including, but not limited to, a gun, revolver, rifle, shotgun, pistol, bow and arrow, switchblade, automatic weapon, or

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by use of any other "deadly weapon", which means an instrument which is designed to be used to produce serious bodily injury or death, or is readily adaptable to such use; or by the use of any "firearm", which means any weapon which will expel a projectile by action of an explosion; at any time within the corporate limits of the municipality of the Village of Bethlehem, West Virginia."

SECTION 3. A new Section 91.05 of Chapter 91 of the Bethlehem Code is hereby established to read and provide as follows:

"Section 91.05 - Negligent Shooting.

It shall be unlawful for any person to carelessly or negligently shoot, wound or kill any human being or any livestock, animal, bird, fowl, or reptile, or to destroy or injure any other person's chattels or property within the corporate limits of the municipality of the Village of Bethlehem, West Virginia."

SECTION 4. A new Section 91.06 of Chapter 91 of the Bethlehem Code is hereby established to read an provide as follows:

"Section 91.06 - Discharging Firearms or Weapons.

(A) It shall be unlawful for any person to shoot or discharge any gun, rifle, pistol, revolver, shotgun, automatic weapon, or other "firearm", which means any

hunting on private property.

7. No hunting is allowed within one hundred (100) feet of a dwelling.

8. The bag limit is as determined by the West Virginia Division of Natural Resources Hunting Rules and Regulations.

9. All deer killed must be legally checked at an official game checking station.

10. All West Virginia hunting rules and regulations apply to the hunt.

SECTION 2. The prohibitions, as are contained in other existing Village Ordinances, against the shooting of arrows and/or the throwing or shooting of missiles or projectiles, do not apply to persons lawfully engaged in the limited bow hunt, provided such person is in compliance with all other applicable regulations and laws for the limited bow hunt.

SECTION 3 (a). A special urban deer archery season may be implemented within the incorporated Village limits. The special urban deer archery season, if established, will open fourteen (14) days prior to the opening of the statewide deer archery season and close on the last day of December.

SECTION 3 (b). During this special urban deer archery season, two (2) deer may be taken which will not apply to the regular archery deer season bag limit as provided in Section 3.5. of the West Virginia Division of Natural Resources Rules and Regulations. All of the West Virginia Division of Natural Resources Rules and Regulations governing hunting apply to the special urban deer archery season hunt.

SECTION 4. Immediately after the adoption of this Ordinance, the Village Recorder shall cause notice of the adoption of this Ordinance to be posted and published in accordance with

the provisions of the West Virginia Code, if any.

SECTION 5. Penalty clause: The West Virginia State Code penalty provisions that govern Bowhunting are adopted by the Village and shall apply to bowhunting pursuant to this Ordinance.

SECTION 6. This Ordinance shall take effect upon adoption.

ADOPTED this 20th day of September, 1999.

Arthur L. McKenzie, Mayor

ATTEST:

Donald A. Junkins, Village Recorder

FIRST READING: September 7, 1999

SECOND READING: September 20, 1999

City of Mexico Urban Deer Bow Hunting Rules and Regulations

Sec. 10-181. Possession of dangerous weapons prohibited; exceptions.

(a) No person in this city shall have in his possession, except within his own domicile, or carry or use a revolver, pistol, shotgun or rifle of any description which may be used for the explosion of cartridges, or any air gun, "B-B" gun, gas-operated gun, spring gun or any instrument, toy or weapon known as a "pea shooter," "slingshot" or "beanie," or any bow made for the purpose of throwing or projecting missiles of any kind by any means whatsoever, whether such instrument is called by any name set forth above or by any other name.

(b) The prohibitions of subsection (a) above shall not apply to:

(1). Licensed shooting galleries or in private grounds or premises under circumstances when such instrument can be fired, discharged or operated in such a manner as not to endanger persons or property, and in such manner as to prevent the projectile from traversing any grounds or space outside the limits of such gallery, grounds or residence.

(2). Archery hunting of deer on a privately owned tract of land three (3) acres or larger where the property is in single ownership with no more than one dwelling unit per one (1) acre on the tract, with provisions for controlled hunting on public lands, subject to the following conditions:

1. Hunters must have all required State permits and abide by all State hunting regulations and seasons.

2. Hunters must register at City Hall and carry written permission from the property owner. A hunter must display that written permission at the request of a law enforcement officer.

3. Hunters must be at least 21 years of age

4. Hunters must be elevated a minimum of ten feet from the ground when discharging a bow in the act of hunting.

5. It shall be unlawful to discharge a bow and arrow within one hundred eighty (180) feet of a dwelling house, a building or structure used for the assembly of people, a street, a highway, park, or property line.

5. No bow and arrow shall be discharged in the direction of any human, roadway, structure, or domestic animal within reasonable range of the weapon at an angle which might allow the projectile to strike at, or dangerously near, these objects.

6. No field dressing will be allowed within one hundred (100) feet of any property line.

7. Each hunter who successfully harvests a deer will report the hunter's name, the sex of the animal, and the location where harvested to the city managers office.

8. Only a conventional bow and arrow combination that requires completely manual operation without any means to cock the weapon and leave it in a stable state until it is released or fired via a trigger mechanism is authorized for use under this subsection

(Code 1969, § 44-1)

Frequently asked Questions

1. Can I combine my land with a neighbor to make up three acres?

Answer: Only with special permission from the City managers office.

2. What do I do if I injure a deer and cannot find it after a substantial effort?

Answer: Please report the problem to animal control at 473- 5800

3. What if I don't want to eat the deer I harvest?

Answer: The Share the Harvest Program is active in our local area and benefits the Help Center. For more information talk to your meat locker or processor

4. When field dressing does city code required me too remove the gut pile?

Answer: City code does not require it. Check with the owner of the property you are hunting on and remember you must have their written permission to return

5. Is public property like the parks open for hunting?

Answer: No, other than the Missouri Department of Conservation's William S. Lowe area on the south edge of town only private property is available for hunting.

6. Can I hunt from a ground blind?

Answer: No due to the nature of hunting in an urban environment for safety reasons City code requires that you hunt from an elevated stand.

2/2

Wheeling

Ordinance No. 12525 Introduced September 3, 2002

AN ORDINANCE AMENDING AND REENACTING THE ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE CITY OF WHEELING IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES REGULATIONS.

WHEREAS, by Ordinance No. 10793, adopted the 1st day of August 1995, the Council of the City of Wheeling adopted special regulations for a limited bow hunt within the city limits.

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF WHEELING:

Section 1. A limited bow hunt within the city is hereby authorized in accordance with the following special regulations, the statutes and regulations of the State of West Virginia, and the Codified Ordinances of the City of Wheeling:

1. Hunting is by permit only. Hunters must register with the City and obtain a permit, the rules and regulations of the hunt.
2. The hunt is for deer only.
3. Only legal bows and arrows may be used.
4. Hunters must possess a valid West Virginia Hunting License and must have completed the National Bowhunter Education course to be eligible to hunt.
5. Hunting is not allowed on Sundays.
6. Hunting is allowed only with written permission from the property owner in their possession while hunting on private property or on city property.
7. No hunting is allowed within three hundred (300) feet of a dwelling, school, park, recreational or shopping areas.
8. The bag limit is as determined by the West Virginia Hunting Regulations; and special regulations for urban hunts established by the West Virginia Department of Natural Resources. provided, a hunter may not kill an antlered buck until he has first killed an antlerless deer within the city limits and legally checked the deer at an official game checking station. He may then hunt an antlered buck with his second permit or license if one is available.
9. All deer killed must be legally checked at an official game checking station and reported to the city.
10. All West Virginia hunting rules and regulations apply to the hunt.
11. The City may charge an administrative fee for permits to recover costs of the program.

Provided, that the prohibition against the shooting of arrows in Codified Ordinances §545.12 Throwing or Shooting Missiles does not apply to persons lawfully engaged in the limited bow hunt as long as any such person is in compliance with all other applicable regulations and laws.

Section 2. Prior to the adoption of this ordinance, the Clerk shall cause notice of the proposed adoption of this proposed ordinance to be published as a Class I-0 Legal Advertisement.

Section 3. This ordinance shall be effective from and after the date of its adoption.

PASSED BY THE COUNCIL OF THE CITY OF WHEELING, W. VA. AT A REGULAR MEETING HELD ON THE 17th DAY OF September 2002

MAYOR

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To Fred Richter	From
Co.	Co.
Dept.	Phone #
Fax # 233-4626	Fax #

99-09-191

CODE # 91.18

ORDINANCE

AN ORDINANCE AMENDING AND MODIFYING AN ORDINANCE ENTITLED: "AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES"

WHEREAS, many West Virginia cities are experiencing problems in the form of deer vehicle collisions and damage to ornamental shrubs and gardens due to increasing deer populations. Recognizing that the only practical and acceptable way to reduce the deer herds in city limits is through removal by hunting, the West Virginia Division of Natural Resources enacted regulations to allow cities the opportunity to have an early deer archery season along with a bonus bag limit. This special deer season will in no way supersede local regulations or community prohibitions on hunting; and

WHEREAS, by Resolution adopted the 3rd day of July, 1995, the Council of the Village of Bethlehem requested, through its special appointed committee, for the West Virginia Division of Natural Resources to provide advice and assistance in controlling the overpopulation of deer in the Village of Bethlehem and such advice and assistance has been provided in the form of urban deer archery special regulations for a limited bow hunt within designated hunting zones within the Village limits.

NOW, THEREFORE, BE IT ORDAINED BY THE COMMON COUNCIL OF THE VILLAGE OF BETHLEHEM AS FOLLOWS:

The Ordinance previously adopted by the common council of the Village of Bethlehem on

the 5th day of September, 1995, entitled, "AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES", is hereby amended and modified in title to be entitled "AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE VILLAGE OF BETHLEHEM AND THE WEST VIRGINIA DIVISION OF NATURAL RESOURCES", and is hereby amended and modified to provide as hereinafter set forth.

ARTICLE I

SECTION 1. A limited bow hunt within the Village of Bethlehem is hereby authorized in accordance with the statutes, legislative rules and regulations of the State of West Virginia, and the Ordinances and the following regulations of the Village of Bethlehem:

1. Hunters must register with the Village and obtain a permit.
2. The hunt is for deer only.
3. Only legal bows and arrows may be used.
4. Hunters must complete a West Virginia Hunter Safety course and a National Bowhunter Education course to be eligible to hunt.
5. Hunting is not allowed on Saturdays, unless specified and express permission is granted by the property owner.
6. Hunters must have written permission from the property/land owner while

weapon which will expel a projectile by action of an explosion, or "deadly weapon", which means an instrument which is designed to be used to produce serious bodily injury or death, or is readily adaptable to such use, within the corporate limits of the municipality of the Village of Bethlehem, West Virginia.

(B) This Section does not apply when firearms or deadly weapons are used in self-defense, in the discharge of official duty, or when otherwise lawfully authorized."

SECTION 5. This Ordinance shall take effect upon adoption.

ADOPTED this 21st day of November, 1994.

Donald C. Sinclair, Mayor

ATTEST:

Donald A. Junkins, Recorder

FIRST READING: NOVEMBER 7, 1994

SECOND READING: NOVEMBER 21, 1994

94-04-39

91.03
91.05
91.06

ORDINANCE

AN ORDINANCE REPEALING SECTION 91.03, SECTION 91.05 AND SECTION 91.06 OF CHAPTER 91 ENTITLED "HUNTING; FIREARMS" OF THE BETHLEHEM CODE, AND ADOPTING A NEW SECTION 91.03 ENTITLED "HUNTING PROHIBITED", A NEW SECTION 91.05 ENTITLED "NEGLIGENT SHOOTING", AND A NEW SECTION 91.06 ENTITLED "DISCHARGING FIREARMS OR WEAPONS" OF CHAPTER 91 OF THE BETHLEHEM CODE

BE IT ORDAINED BY THE COMMON COUNCIL OF THE VILLAGE OF BETHLEHEM AS FOLLOWS:

ARTICLE I

SECTION 1. Section 91.03 entitled **"Hunting Permits"**, Section 91.05 entitled **"Negligent Shooting"**, and Section 91.06 entitled **"Discharging Firearms in Public Places"** of Chapter 91 entitled **"Hunting; Firearms"** of the Bethlehem Code, recorded as Ordinances enacted on the 4th day of November, 1957, be, and the same are hereby repealed, provided, however, that such repeal shall not have any effect on any existing litigation, if any, involving said Sections of the Bethlehem Code, and shall not operate as an abatement of any action or proceeding, criminal or otherwise, pending pursuant to said Sections or by virtue of the said Sections hereby repealed.

SECTION 2. A new Section 91.03 of Chapter 91 of the Bethlehem Code is hereby established to read and provide as follows:

"Section 91.03 - Hunting Prohibited.

It shall be unlawful for any person to engage in hunting or pursuing animals, birds, fowl, or reptiles with any weapon including, but not limited to, a gun, revolver, rifle, shotgun, pistol, bow and arrow, switchblade, automatic weapon, or

by use of any other "deadly weapon", which means an instrument which is designed to be used to produce serious bodily injury or death, or is readily adaptable to such use; or by the use of any "firearm", which means any weapon which will expel a projectile by action of an explosion; at any time within the corporate limits of the municipality of the Village of Bethlehem, West Virginia."

SECTION 3. A new Section 91.05 of Chapter 91 of the Bethlehem Code is hereby established to read and provide as follows:

"Section 91.05 - Negligent Shooting.

It shall be unlawful for any person to carelessly or negligently shoot, wound or kill any human being or any livestock, animal, bird, fowl, or reptile, or to destroy or injure any other person's chattels or property within the corporate limits of the municipality of the Village of Bethlehem, West Virginia."

SECTION 4. A new Section 91.06 of Chapter 91 of the Bethlehem Code is hereby established to read an provide as follows:

"Section 91.06 - Discharging Firearms or Weapons.

(A) It shall be unlawful for any person to shoot or discharge any gun, rifle, pistol, revolver, shotgun, automatic weapon, or other "firearm", which means any

hunting on private property.

7. No hunting is allowed within one hundred (100) feet of a dwelling.

8. The bag limit is as determined by the West Virginia Division of Natural Resources Hunting Rules and Regulations.

9. All deer killed must be legally checked at an official game checking station.

10. All West Virginia hunting rules and regulations apply to the hunt.

SECTION 2. The prohibitions, as are contained in other existing Village Ordinances, against the shooting of arrows and/or the throwing or shooting of missiles or projectiles, do not apply to persons lawfully engaged in the limited bow hunt, provided such person is in compliance with all other applicable regulations and laws for the limited bow hunt.

SECTION 3 (a). A special urban deer archery season may be implemented within the incorporated Village limits. The special urban deer archery season, if established, will open fourteen (14) days prior to the opening of the statewide deer archery season and close on the last day of December.

SECTION 3 (b). During this special urban deer archery season, two (2) deer may be taken which will not apply to the regular archery deer season bag limit as provided in Section 3.5. of the West Virginia Division of Natural Resources Rules and Regulations. All of the West Virginia Division of Natural Resources Rules and Regulations governing hunting apply to the special urban deer archery season hunt.

SECTION 4. Immediately after the adoption of this Ordinance, the Village Recorder shall cause notice of the adoption of this Ordinance to be posted and published in accordance with

99-09-191
CODE # 91.18

the provisions of the West Virginia Code, if any.

SECTION 5. Penalty clause: The West Virginia State Code penalty provisions that govern Bowhunting are adopted by the Village and shall apply to bowhunting pursuant to this Ordinance.

SECTION 6. This Ordinance shall take effect upon adoption.

ADOPTED this 20th day of September, 1999.

Arthur L. McKenzie, Mayor

ATTEST:

Donald A. Junkins, Village Recorder

FIRST READING: September 7, 1999

SECOND READING: September 20, 1999

95-05-107

91.18

ORDINANCE

AN ORDINANCE AUTHORIZING A LIMITED BOW HUNT WITHIN DESIGNATED HUNTING ZONES IN THE VILLAGE OF BETHLEHEM, OHIO COUNTY, WEST VIRGINIA, IN ACCORDANCE WITH WEST VIRGINIA DIVISION OF NATURAL RESOURCES REGULATIONS.

WHEREAS, by Resolution adopted the 3rd day of July, 1995 the Council of the Village of Bethlehem requested, through its special appointed committee, the West Virginia Division of Natural Resources to provide advice and assistance in controlling the overpopulation of deer in the Village of Bethlehem and such advice and assistance has been provided in the form of special regulation for a limited bow hunt within designated hunting zones within the Village limits.

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE VILLAGE OF BETHLEHEM:

Section 1. A limited bow hunt within designated hunting zones in the Village is hereby authorized in accordance with the following special regulations, the statutes and regulations of the State of West Virginia, and the Ordinances of the Village of Bethlehem:

1. Hunting is by permit only. Hunters must register with the Village and obtain a permit, the rules and regulations of the hunt, and a map of the hunt zone.

2. The hunt is for deer only.

3. Only legal bows and coded arrows may be used.

4. Only residents of Ohio and Marshall counties, and the Village of Bethlehem may participate in the hunt.

5. Hunters must complete a West Virginia Hunter Safety course and a National Bowhunter Education course to be eligible to hunt.

6. Hunting is not allowed on Saturdays, unless specified and express permission is granted by the property / land owner.

7. Hunting is allowed only within the designated hunt zones in the Village limits. These include certain Village owned tracts of land and private property. Hunters must have written permission from the property owner while hunting on private property.

8. No hunting is allowed within five hundred (500) feet of a dwelling.

9. The bag limit is as determined by the West Virginia Hunting Regulations;

provided, a hunter may not kill an antlered buck until he has first killed an antlerless deer in Bethlehem and checked it at an official game checking station. He may then hunt an antlered buck with his second permit or license if one is available.

10. All deer killed must be legally checked at an official game checking station and reported to the Village.

11. All West Virginia hunting rules and regulation apply to the hunt.

12. The village may charge a $5.00 administrative fee for the first year for permits to recover costs of the program.

13. Hunting must be from tree stands only.

14. All arrows, missiles, or projectiles used while hunting must be permanently tagged by a representative of the village of Bethlehem.

15. All hunters must be appropriately insured with a Homeowner's or Renter's or Hunter's Insurance Policy.

Provided, that the prohibition against the shooting of arrows is in existing ordinances, throwing or shooting missiles does not apply to persons lawfully engaged in the limited bow hunt as any such person is in compliance with all other applicable regulations and laws.

Section 2. Immediately after the adoption of this ordinance, the Village Recorder shall cause notice of the proposed adoption of this proposed ordinance to be posted and published in accordance with the provisions of West Virginia code.

Section 3. Penalty clause; West Virginia State Codes that govern Bowhunting will apply.

Section 4. This ordinance shall take effect upon adoption.

Donald C. Sinclair, Mayor

ATTEST:
Adopted this 5th day of September, 1995

By Donald A. Junkins
Donald A. Junkins, Village Recorder

First Reading: August 21, 1995 Second Reading: September 05, 1995

VILLAGE OF BETHLEHEM
P.O. BOX 6339
ONE COMMUNITY PARK ROAD
BETHLEHEM, WV 26003-0800
PHONE # 304-233-9527
FAX # 304-231-2187

FAX TRANSMITTAL FORM

DATE: 1-11-10

FAX #: 304 233-4626

NO. OF PAGES INCLUDING THIS ONE: 10

TO: Fred Richter

FROM: Joni

COMMENTS:

IF YOU HAVE ANY QUESTIONS OR HAVE ANY DIFFICULTY IN RECEIVING THIS TRANSMISSION, YOU MAY CONTACT THE SENDER AT 304-233-9527.

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS PRIVILEGED AND CONFIDENTIAL INFORMATION INTENDED FOR THE USE OF THE INDIVIDUAL OR ENTITY NAMED ABOVE. IF THE READER OF THIS MESSAGE IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT THE DISSEMINATION, DISTRIBUTION, OR COPYING OF THIS COMMUNICATION IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLEASE NOTIFY US IMMEDIATELY BY TELEPHONE, AND RETURN THE ORIGINAL MESSAGE TO US AT THE ABOVE ADDRESS VIA THE U.S. POSTAL SERVICE. THANK YOU!

City of Mexico Urban Deer Bow Hunting Rules and Regulations

Sec. 10-181. Possession of dangerous weapons prohibited; exceptions.

(a) No person in this city shall have in his possession, except within his own domicile, or carry or use a revolver, pistol, shotgun or rifle of any description which may be used for the explosion of cartridges, or any air gun, "B-B" gun, gas-operated gun, spring gun or any instrument, toy or weapon known as a "pea shooter," "slingshot" or "beanie," or any bow made for the purpose of throwing or projecting missiles of any kind by any means whatsoever, whether such instrument is called by any name set forth above or by any other name.

(b) The prohibitions of subsection (a) above shall not apply to:

(1). Licensed shooting galleries or in private grounds or premises under circumstances when such instrument can be fired, discharged or operated in such a manner as not to endanger persons or property, and in such manner as to prevent the projectile from traversing any grounds or space outside the limits of such gallery, grounds or residence.

(2). Archery hunting of deer on a privately owned tract of land three (3) acres or larger where the property is in single ownership with no more than one dwelling unit per one (1) acre on the tract, with provisions for controlled hunting on public lands, subject to the following conditions:

1. Hunters must have all required State permits and abide by all State hunting regulations and seasons.

2. Hunters must register at City Hall and carry written permission from the property owner. A hunter must display that written permission at the request of a law enforcement officer.

3. Hunters must be at least 21 years of age

4. Hunters must be elevated a minimum of ten feet from the ground when discharging a bow in the act of hunting.

5. It shall be unlawful to discharge a bow and arrow within one hundred eighty (180) feet of a dwelling house, a building or structure used for the assembly of people, a street, a highway, park, or property line.

5. No bow and arrow shall be discharged in the direction of any human, roadway, structure, or domestic animal within reasonable range of the weapon at an angle which might allow the projectile to strike at, or dangerously near, these objects.

6. No field dressing will be allowed within one hundred (100) feet of any property line.

7. Each hunter who successfully harvests a deer will report the hunter's name, the sex of the animal, and the location where harvested to the city managers office.

8. Only a conventional bow and arrow combination that requires completely manual operation without any means to cock the weapon and leave it in a stable state until it is released or fired via a trigger mechanism is authorized for use under this subsection

(Code 1969, § 44-1)

Frequently asked Questions

1. Can I combine my land with a neighbor to make up three acres?

Answer: Only with special permission from the City managers office.

2. What do I do if I injure a deer and cannot find it after a substantial effort?

Answer: Please report the problem to animal control at 473- 5800

3. What if I don't want to eat the deer I harvest?

Answer: The Share the Harvest Program is active in our local area and benefits the Help Center. For more information talk to your meat locker or processor

4. When field dressing does city code required me too remove the gut pile?

Answer: City code does not require it. Check with the owner of the property you are hunting on and remember you must have their written permission to return

5. Is public property like the parks open for hunting?

Answer: No, other than the Missouri Department of Conservation's William S. Lowe area on the south edge of town only private property is available for hunting.

6. Can I hunt from a ground blind?

Answer: No due to the nature of hunting in an urban environment for safety reasons City code requires that you hunt from an elevated stand.

General Rules (Proposed Draft) for Morgantown Control Bowhunt and the Bowhunters
April 20, 2010
What must a hunter do to hunt in City Limits?
1. Fill out a 4-page application and get it approved.
2. Take a 10-hr urban bowhunter education course.
3. Pass a shooting proficiency test.
4. Attend pre-season announced meeting.

5. Obey specified rules.
A. Park only in appropriate/normal parking areas. No special parking privileges are granted unless otherwise specifically provided to you based on your designated hunting location.
B. Treat everyone you meet with courtesy and respect.
C. Do not litter.
D. Your Morgantown Urban Control Deer Hunt (MUCDH) Serial Number, assigned to you by the Committee, MUST be on all arrows used while hunting. i.e. A123 #1, A123 #2, A123 #3....
E. Obey all West Virginia game laws.
F. Hunters will be assigned certain areas by the MUCDH. Do not move to other areas not assigned to you. Hunting in any other areas is prohibited.

Each participant is required to:
G. Use a flashlight when entering your stand in the morning and leaving in the evening.
H. Use a full-body safety harness from the time you leave the ground until you return to the ground.
I. Do not walk around carrying visible bows. For the purposes of this hunt bows must be in either a bow sling or case when being carried to and from your hunting location.
J. Only hunt from tree stands. Walk straight to and from your stand. No hunting from the ground is allowed.
K. In pursuance of our deer management goals, doe harvest is preferred for both urban hunt tags. All hunters *must* harvest an *antlerless* deer as their *first* urban hunt tag. When using your individual WV Archery Tags (Normal Archery Stamp and any additional RB stamps, follow all West Virginia Game Laws.) Remember two deer may be harvested during this urban hunt and do not count towards your normal WV tag limits.
L. You will be responsible for providing your own tree or climbing stand. The City of Morgantown and West Virginia University DO NOT assume any risk or liability for injuries sustained during the hunt, while putting up tree stands, or while in tree stands. HUNT AT YOUR OWN RISK!
M. Hunting must be from elevated stands only (12' or higher).
N. All stands will be located at least 50 yards from any pedestrian trails, sidewalks or roads. Most spots are already marked.
O. Shots must be limited to 25 yards.
(We highly encourage substantially broadside shots from less than 20 yards).
P. Remember you are invited to hunt on the property. Respect it.
Q. All permits and authorization papers must be on your person at all times while hunting.
R. Baiting in the area you plan to hunt is permitted. Please do so in moderation and as needed to assist in safe harvesting of deer.

S. Under no situations will entrails be left at the hunting location. A carcass is to be removed in its entirety or have entrails placed in plastic bags and then properly discarded. Please provide your own bags for this purpose. There will be a place designated where you can gut your deer or where you can place the entrails of deer already gutted. We'll announce a designated location for these to be placed.

T. If a wounded deer leaves the boundary of the designated hunting area do not pursue the deer without landowner permission. Contact the Morgantown Police Department at 304-xxx-xxxx and identify yourself as a member of the Morgantown Urban Deer Hunt needing assistance retrieving a wounded deer outside the hunting boundary and provide your location/meeting place and your cell phone number. An officer will be dispatched to meet you and assist in gaining permission and recovery.

If a property owner does not grant you permission to enter their property, you may have them call Morgantown Authority XXXX to have the deer removed from the property.

U. All successful hunters *must* check their deer in at (not decided yet) or at Backwoods Taxidermy. Check-out forms MUST be completed for all deer killed on the Morgantown Urban Deer Hunt areas to permit accurate reporting of the harvest.

V. Backwoods Taxidermy located on US Route 119 approximately 8 miles south of Morgantown is also the location to submit your deer for donation to the Morgantown Urban Deer Hunt – Hunters Helping the Hungry Effort) Deer donated under this program will be processed and donated to local food banks free of charge to the hunter.

W. You will be assigned to a specific area. We'll assign those when possible to areas you desire. That may not always be possible. Regardless you are only authorized to hunt in your designated area(s) during all legal archery seasons which consists of: A. Early Anterless Archery Season dates xx Sept to xx Sept 2010 B. Special Urban Archery Season xx Oct – 31 Dec 2010. C. Archery Season xx Oct – 31 Dec 2010. Once the hunt starts, there may be opportunities to move. We'll work with you on those.

Greystone On the Cheat

URBAN ARCHERY DEER HUNT APPLICATION

Dear Bowhunter,

Thank you for your interest in participating in the first DNR approved urban archery hunt in our community. The purpose of our controlled archery hunt is to responsibly manage whitetail deer through bowhunting.

Bow hunting in suburban areas can be difficult and sensitive. Our urban hunt will be modeled after similar, highly effective deer management programs throughout the country where safety, ethical hunting, and professionalism are the chief objectives.

All hunters must abide by a strict set of rules and regulations formulated with the special needs of our property owners in mind. Because of these restrictions, this urban hunt is not for everyone. If you decide to complete the application, please keep in mind that we are looking for responsible individuals who are "team players" and care more about the resource than personal goals. We want to give our community a positive impression of bowhunting and bowhunters.

If your application is approved, we will set up a date and time for you to take a proficiency test. This will involve hitting a 12 inch circle with four or five arrows at 20 yards. If passed, this will be followed by an interview and then we will also meet with you to further explain our goals and objectives. We will provide a Greystone hunting permit to 25-30 approved hunters. A waiting list will also be used as space becomes available, or as other hunters fill their limits. Please keep in mind that we make no promises as to hunting opportunities or hunter success.

Thank you for your interest in assisting our community in this very important endeavor.

Sincerely,

Greystone-on-the-Cheat Board of Directors

URBAN ARCHERY DEER HUNT APPLICATION (Page 1)

INSTRUCTIONS: This application is designed for us to get to know you. Please answer all questions fully and honestly. If you need more room to complete your answers, or you feel some clarification is necessary, continue on the back of the application.

Name: _____ Age: _____ Date: _____

Address: _____

Phone # Home _____ Work _____ Cell _____

Date of Birth: _____

Vehicle ID: Year: _____ Make: _____ Model: _____

Color: _____ License#: _____

Current State Hunting License#: _____

Have you ever been arrested or received a summons for any game law violation?

No _____ Yes _____ (If yes, explain fully)

List all hunting organizations of which you are a current member. Also list offices you hold or have held in these organization(s).

Name of organization(s)	Member since	Office

Please list those states you have bowhunted:

URBAN ARCHERY DEER HUNT

ETHICS PLEDGE

1. Safety is my number one concern.
2. I know and will obey all hunting rules and regulations.
3. I understand that any willful violation of a game law will result in reporting to the local wildlife conservation officer.
4. I will respect the safety of the residents, pets, and other animals within the community.
5. I will make every effort to be as inconspicuous and effective while hunting in this community as possible.
6. I will respect the private property I have been granted permission to hunt on.
7. I will not enter onto a property owner's property without first obtaining their permission and **ONLY** for purposes of collecting a wounded or dead deer.

Name _____ Date _____

When returning this application, please enclose a photocopy of the following:

- Valid and current WV State Hunting License
- State Driver's License
- Vehicle Registration

Please return this application and a copy of the above listed documents no later than September 15, 2009 to:

Greystone on the Cheat POA
PO BOX 18040
Morgantown, WV 26507

UBRAN HUNT IN GREYSTONE BEGINS OCTOBER 3, 2009 and runs through December 31, 2009

II. GENERAL RULES FOR URBAN ARCHERY HUNT

A. Park only in designated parking areas.
B. All hunters will receive a special vehicle permit to enter Greystone and must display this permit on the dash of their vehicle at all times.
C. Treat everyone you meet with courtesy and respect.
D. Do NOT litter.
E. Under NO situations will entrails be left on any landowner's property. A carcass is to be removed in its entirety or have entrails placed in plastic bags and then properly discarded. (please provide your own bags for this purpose and we will tell you exactly where these are to be placed)
F. **If a wounded or dead deer shall enter and rest on private homeowner property, permission from the homeowner will be necessary to enter said property to retrieve deer. (Please contact Michelle Duda at 906-9830 to get permission).**
G. If property owner does not grant you permission to enter their property, you may have them call Michelle Duda at 906-9830 or Steve Taylor at 685-2233 to have the deer removed from the property.
H. **All hunters must check in and out at the Greystone maintenance building on Sunset Beach Road before and after hunting.**
I. All deer must be checked-out. A check-out form MUST be completed for all deer killed.
J. Obey all West Virginia Game Laws.
K. The Game Management areas will consist of only those areas designated by the Greystone Board of Directors. Hunting in any other areas is prohibited.
L. Each member is required to:
   1. Use a flashlight when entering your stand in the morning and leaving in the evening.
   2. Use a full-body safety harness while you are in your treestand.
   3. Only broad heads are permitted.
M. In pursuance of our deer management goals, a hunter must harvest **at least one doe** before harvesting a buck.
N. **Two deer may be harvested during this urban hunt and not count towards your normal WV tag limits.**
O. **The Urban Archery season runs two weeks prior to the regular archery season and begins October 3, 2009 and will continue through the regular archery season, December 31, 2009.**
P. Your name and sequential numbers MUST be on all arrows used while hunting. i.e. J. Doe #1, J. Doe #2, J. Doe #3....
Q. Do not walk around the community carrying visible bows. There will be no hunting done except from tree stands. Walk straight to and from your stand.
R. Hunters will be assigned certain areas and specific times to hunt. Do not move to other areas not assigned to you.
S. **You will be responsible for providing your own tree or climbing stand. Greystone DOES NOT assume any risk or liability for injuries sustained during the hunt, while putting up tree stands, or while in tree stands. HUNT AT YOUR OWN RISK!**
T. **Hunting must be from elevated stands only.**
U. **Shots must be limited to 25 yards.**
V. **We highly encourage substantially broadside shots from less than 20 yards.**
W. Remember you are **invited** to hunt on our private property. Respect it.
X. Only portable stands, and in some situations, climbing stands, may be used.
Y. Stalking or still-hunting deer is prohibited.
Z. All permits and authorization papers must be on your person at all times while hunting.
AA. Do not kill or attempt to kill any albino deer or deer with albino tendencies.
BB. **No alcohol beverages permitted on premises at any time. Any one who has consumed alcohol prior to hunting will be asked to leave the property!**

I have read, agree to, and will follow all rules stated above. I understand that if I violate any of these rules or any other state hunting regulations, I will be removed from Greystone's property and violations will be reported to the state.

Signature_____ Date_____

GREYSTONE URBAN HUNT CHECK OUT FORM

Hunter Name: _____

Date of Hunt: _____

Time of kill: _____

Location/tree stand where kill was made: _____

Sex of Deer: M F

Age/type of Deer (fawn, doe, buck):

This is the (circle one): 1st deer I have harvested 2nd deer I have harvested

I understand if I have now harvested two deer I can no longer participate in this urban hunt this year.

Hunter's Signature _____

- I acknowledge that I do not have any physical limitations, medical ailments, physical or mental disabilities that would limit or prevent me from participating in this event, and if necessary will obtain a medical examination and clearance.

- I acknowledge that this Accident Waiver and Release of Liability will be used by event holders and organizers, and that it will govern my actions and responsibilities in said event.

- I understand that I would not be permitted to participate in this event unless I signed this Accident Waiver and Release of Liability.

- I execute this Accident Waiver and Release of Liability and understand that it shall be binding upon me, my executors, administrators, heirs, next of kin, successors, personal representatives and assigns.

- I hereby agree to Waive, Release and Discharge from any and all liability for my death, disability, personal injury, property damage, property theft or actions of any kind which may hereafter accrue to me including my traveling to and from this event and in any way arising out of or related to my participation in said event, THE FOLLOWING ENTITIES OR PERSONS: GREYSTONE ON THE CHEAT, and any affiliated organizations and any involved municipalities, their directors, officers, employees, volunteers, representatives or agents, the event holders, organizers, directors, volunteers, and property owners.

- I further agree to Indemnify and Hold Harmless the entities or persons mentioned in the preceding paragraph from any and all liabilities or claims made as a result of participation in this event, whether caused by the sole or partial negligence of me or releasee(s) or otherwise.

- I hereby consent to receive medical treatment, which may be deemed advisable in the event of injury, accident and/or illness during my participation in this event.

- This Accident Waiver and Release of Liability shall be construed broadly to provide a release and waiver to the maximum extent permissible under applicable law.

- If any paragraph or part of this Accident Waiver and Release of Liability is found void or unenforceable, the remainder shall not be affected thereby.

- I further agree to abide by all the rules, regulations and instructions as set forth by the Releasee and organizer of this event. I specifically acknowledge receipt, review and understanding of the "General Rules for Urban Archery Hunt" provided by Greystone on the Cheat and agree to abide by all such rules, as well as all of the rules and regulations set forth by the State of West Virginia generally governing hunting and archery hunting.

- This waiver and release agreement will be construed in accordance with and governed by the laws of the state of West Virginia.

- I understand that I would not be permitted to participate in this event unless I signed this Accident Waiver and Release of Liability.

- This Accident Waiver and Release of Liability release contains the entire agreement between the parties to this release and the terms of this release are contractual and not a mere recital.

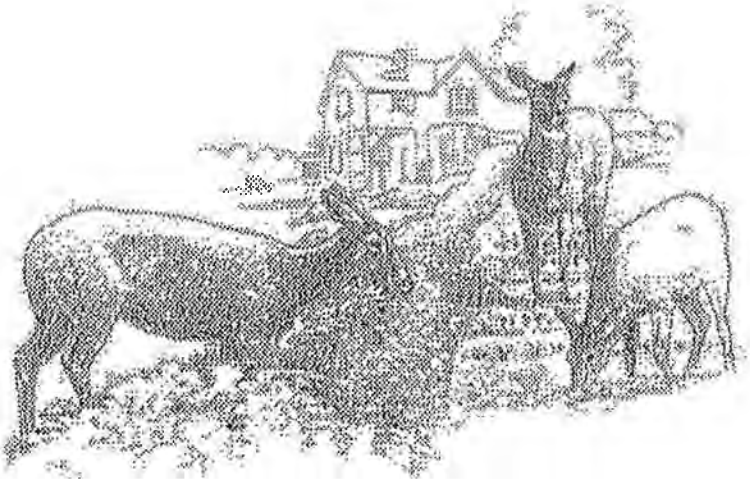
- I hereby certify that I have read this entire document consisting of three (3) pages and that I understand all its contents. _____ (Initials)

Participant's Signature: _____

Date: _____

GUIDE TO URBAN BOWHUNTING

THE GUIDE FOR ADDRESSING URBAN DEER PROBLEMS WITH THE USE OF RESPONSIBLE BOWHUNTING



Written by Fred Richter and Tim Reed

Illustrated by Wayne Trimm

For

THE NATIONAL BOWHUNTER EDUCATION FOUNDATION
267-B, E. 29TH ST., #503
LOVELAND, CO 80538

The Purpose of This Guide

✓ Provide information for local officials and concerned citizens so they can make informed decisions.

✓ Provide a step-by-step guide for concerned people to use when working with communities that have deer problems.

✓ Give information that concerned residents can use to accurately and rationally address deer problems and community attitudes toward deer management.

✓ Assist the community in opening new areas to hunting.

✓ Encourage enrollment in the International Bowhunter Education Program. This course produces better-prepared bowhunters, while sending a strong, positive message to nonhunters. The public often looks more favorably on bowhunters who have completed the course.

Although the **Guide to Urban Bowhunting** *pertains primarily to deer, this information might also be used to implement urban bowhunting for other deer-like species such as antelope, moose, elk and other problem wildlife.*

To order additional copies of this guide, contact:

National Bowhunter Education Foundation
267-B, E. 29th St., Box 503
Loveland, CO 80538
970/635-1994
e-mail: nbef@frii.com

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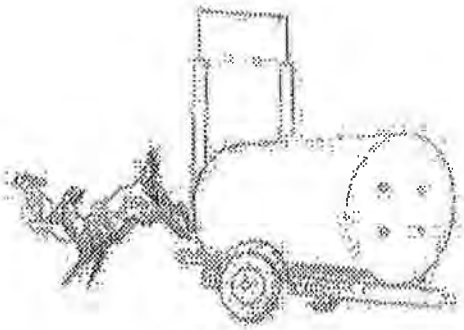
Weigh the Options: What is the Most Logical Solution?



1. Trapping and relocating
2. Birth control
3. Fencing
4. Supplemental feeding
5. Using plants that deer avoid
6. Repellents
7. Using sharpshooters
8. Being objective
9. Do nothing
10. Hunting as the answer
11. Firearms hunting
12. The bowhunting option
13. Other considerations

Understanding the options will be a concerned residents make the right choices.

Trapping and Relocating

✓ Trapping is labor-intensive, requiring a large number of man-hours for preparation, maintenance and monitoring of the traps.

✓ Trapping is prohibitively expensive.

✓ Once deer are captured, communities must decide where the deer can be taken. Most areas have deer of their own to contend with, and do not need more.

✓ Survival rates of relocated deer are frequently low. As an example, trapping and transfer rates in California, New Mexico and Florida resulted in high animal deaths, sometimes even months after release.

✓ Trapping of deer is illegal in some states because it often leads to high deer deaths and is considered inhumane.

✓ Trapping of free-roaming deer is a difficult task.

✓ The practice of trapping the deer and shooting them draws a lot of negative public sentiment.

Birth Control

✓ Like trapping, birth-control options are expensive. The cost of the drugs, and the expense of many man-hours to administer the drugs are not practical when considering the large number of deer that must be treated before birth control can be effective.

✓ Birth-control drugs are difficult to administer to free-roaming deer. Even if baiting and/or remote delivery (dart guns) methods are used, treating an adequate portion of the herd is nearly impossible.

✓ If the drugs are administered by the deer eating treated bait, ingestion by non-target animals is a concern.

✓ Little research has been done on the effects that birth-control steroids might have on humans or animals in the food chain. The question of what happens if a human or other animal consumes the meat of a drug-treated deer must first be answered.

✓ Research has shown that deer avoid treated bait after a period of time.

✓ Birth control might work on small insular

deer populations (i.e., 80 acres or less) under regulated conditions, but it is not practical — and possibly illegal — on free-roaming deer on large tracts of land.

✓ Birth-control implants have a limited life expectancy. The costs and stress to animals continue to rise with capture and recapture efforts needed to treat deer.

Fencing

✓ Fencing is expensive and often lessens a property's attractiveness.

✓ Electric fences are effective but raise concerns where contact with humans and pets are likely.

✓ Fences high enough to prevent deer from jumping them are not practical in most residential areas.

✓ Fences, particularly electric fences, require regular maintenance.

✓ It is next to impossible to fence the entire neighborhood well enough to keep out deer. If only one neighbor puts up a fence, other people in the area will see even more deer concentrated on their property.

Supplemental Feeding

✓ Work in Michigan and Colorado indicates it costs between $37 and $53 per deer per month to run a winter feeding program. Multiply that by the number of deer to be fed, and it's easy to see that feeding, like all the other options, is cost-prohibitive.

✓ In fact, feeding actually encourages the deer herd's growth, thereby possibly exceeding the land's carrying capacity, which damages the habitat and health of the herd.

✓ Feeding increases the chances that disease will be transmitted between deer as they gather in large numbers at feeding sites.

✓ Feeding concentrates deer and makes them more vulnerable to predation by dogs and coyotes. It also makes shrubs and other valuable plants near the feeding site vulnerable to deer.

✓ Feeding requires many hours of work. The question arises: Just who will do it, and who will pay for it?

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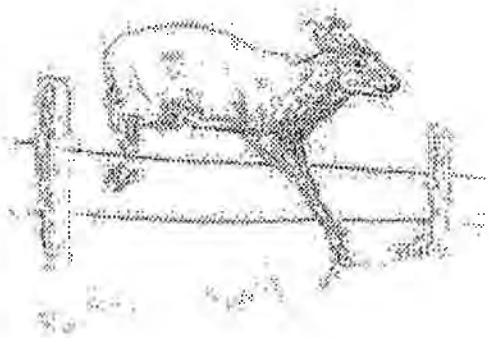

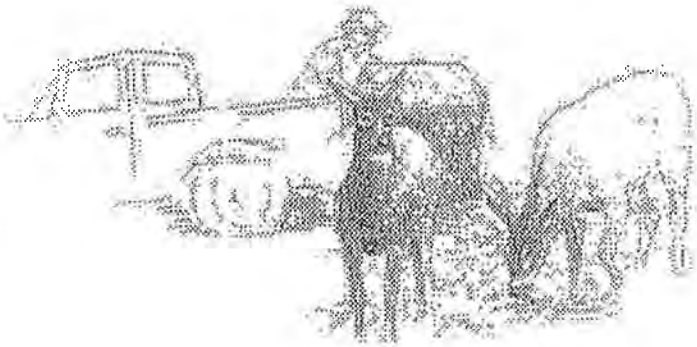

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✓ Deer do not eat all plants, and some of these unpalatable plants are zestiness. However, this option means landowners would need to replace their existing plants with ones deer don't find appealing. This can be expensive for individual property owners.

✓ Unfortunately, deer like to eat most garden plants. Therefore, landowners wouldn't be able to find planting alternatives for their vegetable gardens, fruit trees and flower beds.

✓ Being limited to plant only vegetation that deer will not eat eliminates the freedom to landscape by choice.

Repellents

✓ Repellents are only effective in controlled "spot" applications and are not a wildscale solution.

✓ Repellents can be expensive and are labor-intensive to apply.

✓ To be effective, repellents require frequent applications as new growth on treated plants outgrows the protection.

✓ Repellent performance varies. Some might work well in one area and poorly in another.

✓ Smell and sight of repellents can reduce quality of life for residents.

✓ Repellents are not as effective in winter because of snow, or in areas with frequent rain.

✓ Some repellents damage plants because of heavy bonding agents used to produce them.

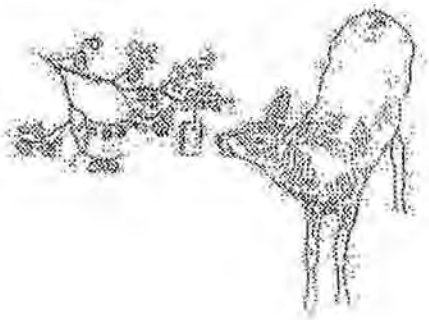
✓ Studies show that repellents modify deer behavior. They might perform well under moderate pressure from deer, but might be ignored when alternative deer foods are scarce.

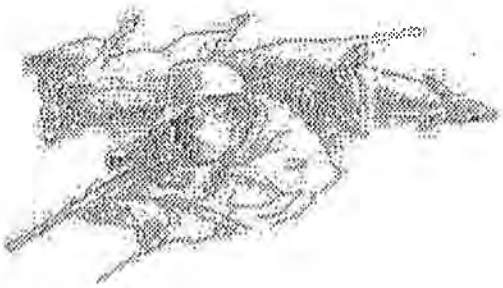
Using Sharpshooters

✓ Typically, sharpshooters are hired to patrol a designated area and, as discreetly as possible, shoot deer with a firearm. The cost of this service can be high.

✓ A sharpshooter program in Wisconsin cost $74 per deer removed, and a similar program in Ohio found that sharpshooting was a less efficient method of deer removal than controlled hunting.

✓ Using sharpshooters can be exceedingly controversial in situations where regulated





hunting could be conducted. That's because it denies citizens access to a renewable public resource and recreational opportunities.

✓ Some sharpshooters use night scopes and silencers on their firearms, which can give the impression that something akin to a military operation is occurring. Therefore, some neighborhoods might reject it.

✓ The sound from shots being fired are typically considered disruptive and invasive to residents.

✓ Sharpshooting can raise safety concerns because high-powered rifles are used, and they have long-range capacity.

✓ Sharpshooting provides a workable solution only in specific instances.

Being Objective

With the options outlined above, any one of them might work under specific situations, after costs, staffing and other variables are considered. Specifically ...

✓ Trapping and relocating might be performed by professionals in some cases.

✓ Fencing is being used in many places on a limited basis, particularly around gardens and ornamental plantings.

✓ Supplemental feedings, when used with other reduction programs, can help keep deer from consuming valuable plants in winter.

✓ Repellents are the most common deer-control measure used in conjunction with other deer-control programs.

✓ Sharpshooters have been used in some instances as a control technique to get a community to accept the idea of deer management. This plan is then followed by hunting proposals within a couple of years.

Do Nothing

✓ Uncontrolled deer herds soon outgrow the land's capacity to provide them with food (see chart, Page 5). As the habitat degrades, the deer become susceptible to disease, parasites, starvation and, ultimately, death for unhealthy individuals and other species.

✓ Overgrazing also destroys the habitat by killing trees, brush and plants.

✓ Doing nothing can lead to increased suffering in the herd in problem areas.

✓ Doing nothing might be an option if a community's deer population is growing, and if the residents need time to evaluate realistic deer management solutions. However, lengthy procrastination can worsen the problem.

Hunting as the Answer

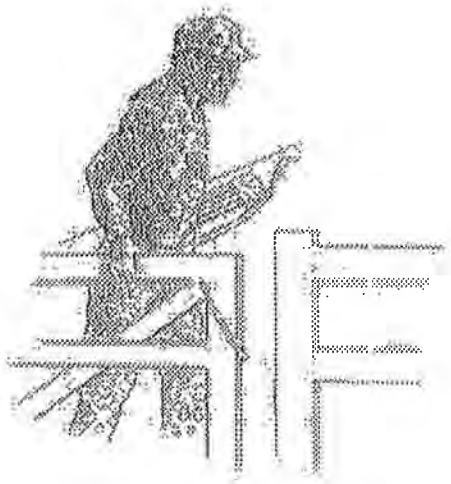
Regulated hunting has been proven to be a sound, responsible method for managing deer populations. It is safe, ethical and humane. It provides deer population control for the least cost, because recreational hunters do the "work" of removing deer. In some places, the money spent by hunters for licenses and permits provides an added bonus by benefiting wildlife and habitat. Other options have been found impractical, prohibitively expensive, widely unacceptable, and limited in application.

Firearms Hunting

Closely regulated firearms hunting effectively controls deer populations. However, in some heavily populated urban areas, safe firearms hunting is limited because the bullet, slug or projectile has the potential to travel long distances.

Another concern to some residents is the noise of discharging firearms. For those reasons, firearms hunting is not as practical in some urban settings as bowhunting.

Firearms hunting still has a place in some urban areas. Some communities have had excellent results with strictly regulated slug-shotgun and muzzleloader hunting, along with bowhunting. The geography and other unique characteristics of each area will determine if firearms hunting is a safe option. The decision to allow firearms hunting must be made by



tions, and why more methods except hunting are not really viable. You also might want to contact references in this guide for more information. Your state's fish and wildlife agencies are also excellent sources of information.

4. Don't allow anti-hunters to sidetrack your efforts. Present the information as found in this booklet, and concentrate on winning the votes of those who do not hunt. They're the community's majority.

5. Stay calm and professional when discussing the issue. Presenting the facts and respecting other viewpoints will make you a winner. If you want to polish your skills so that you can negotiate and present your views more effectively, contact the Wildlife Legislative Fund of America, 801 Kingsmill Parkway, Columbus, OH 43229. Ask the WLFA how you can enroll in one of its proven Protect What's Right workshops.

6. Use the media to get the word out. Most reporters want to hear about the issues and the possible solutions. You're offering a workable solution. A phone call to the local newspaper, and radio and television stations is usually all it takes to get attention.

7. Talk with local law-enforcement officials, and listen to what they say. Ask what can be done to make their jobs easier and gain their support.

8. Meet with the mayor, city manager, councilmen and other area officials to learn what must be done to allow hunting. Be flexible. Give something to get something, and be considerate. Again: Stick with the facts.

9. If the community elects to try urban hunting, many meetings with local officials will likely follow. Ordinances and other details will most likely be introduced, and customized as the community requires.

10. Urban hunts tend to be more successful when the state's fish and wildlife agency is involved. Contact the agency early. Some state agencies even have a special urban bowhunting season, and give bonus tags that allow hunters to take extra deer.

11. Discuss the environmental impacts and economic issues caused by overpopulated deer herds. Arguing with anti-hunters over the perceived morality of bowhunting is useless.

12. Stress the need for bowhunter education. Most hunters and nonhunters alike feel more positive when they know bowhunters have taken the course before hunting. Don't hesitate to recommend mandating the IBEP course for those wanting to bowhunt the urban area.

13. Meet again with community officials and property owners after the first hunt to discuss the success of the program, and to determine if modifications to the program might be needed.

Other Ideas

The following is a sample of regulations some urban areas have implemented for urban hunts. Each urban area is unique and reserves the right to customize rules to fit its circumstances. The opinions of hunters and nonhunters should be considered equally. Doing so makes the urban hunt a positive solution to a real problem, and ensures strong public support. The points referenced below are not necessarily endorsed or supported by the NBEF. These are only listed to stimulate thought, creativity and open discussion.

1. The International Bowhunter Education

Greystone On the Cheat

URBAN ARCHERY DEER HUNT APPLICATION

Dear Bowhunter,

Thank you for your interest in participating in the first DNR approved urban archery hunt in our community. The purpose of our controlled archery hunt is to responsibly manage whitetail deer through bowhunting.

Bow hunting in suburban areas can be difficult and sensitive. Our urban hunt will be modeled after similar, highly effective deer management programs throughout the country where safety, ethical hunting, and professionalism are the chief objectives.

All hunters must abide by a strict set of rules and regulations formulated with the special needs of our property owners in mind. Because of these restrictions, this urban hunt is not for everyone. If you decide to complete the application, please keep in mind that we are looking for responsible individuals who are "team players" and care more about the resource than personal goals. We want to give our community a positive impression of bowhunting and bowhunters.

If your application is approved, we will set up a date and time for you to take a proficiency test. This will involve hitting a 12 inch circle with four or five arrows at 20 yards. If passed, this will be followed by an interview and then we will also meet with you to further explain our goals and objectives. We will provide a Greystone hunting permit to 25-30 approved hunters. A waiting list will also be used as space becomes available, or as other hunters fill their limits. Please keep in mind that we make no promises as to hunting opportunities or hunter success.

Thank you for your interest in assisting our community in this very important endeavor.

Sincerely,

Greystone-on-the-Cheat Board of Directors

Greystone On the Cheat

URBAN ARCHERY DEER HUNT APPLICATION (Page 1)

INSTRUCTIONS: This application is designed for us to get to know you. Please answer all questions fully and honestly. If you need more room to complete your answers, or you feel some clarification is necessary, continue on the back of the application.

Name: _____ Age: _____ Date: _____

Address: _____

Phone # Home _____ Work _____ Cell _____

Date of Birth: _____

Vehicle ID: Year: _____ Make: _____ Model: _____

Color: _____ License#: _____

Current State Hunting License#: _____

Have you ever been arrested or received a summons for any game law violation?

No _____ Yes _____ (If yes, explain fully)

List all hunting organizations of which you are a current member. Also list offices you hold or have held in these organization(s).

Name of organization(s)	Member since	Office

Please list those states you have bowhunted:

URBAN ARCHERY DEER HUNT

ETHICS PLEDGE

1. Safety is my number one concern.
2. I know and will obey all hunting rules and regulations.
3. I understand that any willful violation of a game law will result in reporting to the local wildlife conservation officer.
4. I will respect the safety of the residents, pets, and other animals within the community.
5. I will make every effort to be as inconspicuous and effective while hunting in this community as possible.
6. I will respect the private property I have been granted permission to hunt on.
7. I will not enter onto a property owner's property without first obtaining their permission and **ONLY** for purposes of collecting a wounded or dead deer.

Name _____ Date _____

When returning this application, please enclose a photocopy of the following:

- Valid and current WV State Hunting License
- State Driver's License
- Vehicle Registration

Please return this application and a copy of the above listed documents no later than September 15, 2009 to:

Greystone on the Cheat POA
PO BOX 18040
Morgantown, WV 26507

UBRAN HUNT IN GREYSTONE BEGINS OCTOBER 3, 2009 and runs through December 31, 2009

II. GENERAL RULES FOR URBAN ARCHERY HUNT

A. Park only in designated parking areas.
B. All hunters will receive a special vehicle permit to enter Greystone and must display this permit on the dash of their vehicle at all times.
C. Treat everyone you meet with courtesy and respect.
D. Do NOT litter.
E. Under NO situations will entrails be left on any landowner's property. A carcass is to be removed in its entirety or have entrails placed in plastic bags and then properly discarded. (please provide your own bags for this purpose and we will tell you exactly where these are to be placed)
F. **If a wounded or dead deer shall enter and rest on private homeowner property, permission from the homeowner will be necessary to enter said property to retrieve deer. (Please contact Michelle Duda at 906-9830 to get permission).**
G. If property owner does not grant you permission to enter their property, you may have them call Michelle Duda at 906-9830 or Steve Taylor at 685-2233 to have the deer removed from the property.
H. **All hunters must check in and out at the Greystone maintenance building on Sunset Beach Road before and after hunting.**
I. All deer must be checked-out. A check-out form MUST be completed for all deer killed.
J. Obey all West Virginia Game Laws.
K. The Game Management areas will consist of only those areas designated by the Greystone Board of Directors. Hunting in any other areas is prohibited.
L. Each member is required to:
   1. Use a flashlight when entering your stand in the morning and leaving in the evening.
   2. Use a full-body safety harness while you are in your treestand.
   3. Only broad heads are permitted.
M. In pursuance of our deer management goals, a hunter must harvest **at least one doe** before harvesting a buck.
N. **Two deer may be harvested during this urban hunt and not count towards your normal WV tag limits.**
O. **The Urban Archery season runs two weeks prior to the regular archery season and begins October 3, 2009 and will continue through the regular archery season, December 31, 2009.**
P. Your name and sequential numbers MUST be on all arrows used while hunting. i.e. J. Doe #1, J. Doe #2, J. Doe #3....
Q. Do not walk around the community carrying visible bows. There will be no hunting done except from tree stands. Walk straight to and from your stand.
R. Hunters will be assigned certain areas and specific times to hunt. Do not move to other areas not assigned to you.
S. **You will be responsible for providing your own tree or climbing stand. Greystone DOES NOT assume any risk or liability for injuries sustained during the hunt, while putting up tree stands, or while in tree stands. HUNT AT YOUR OWN RISK!**
T. **Hunting must be from elevated stands only.**
U. **Shots must be limited to 25 yards.**
V. **We highly encourage substantially broadside shots from less than 20 yards.**
W. Remember you are invited to hunt on our private property. Respect it.
X. Only portable stands, and in some situations, climbing stands, may be used.
Y. Stalking or still-hunting deer is prohibited.
Z. All permits and authorization papers must be on your person at all times while hunting.
AA. Do not kill or attempt to kill any albino deer or deer with albino tendencies.
BB. **No alcohol beverages permitted on premises at any time. Any one who has consumed alcohol prior to hunting will be asked to leave the property!**

I have read, agree to, and will follow all rules stated above. I understand that if I violate any of these rules or any other state hunting regulations, I will be removed from Greystone's property and violations will be reported to the state.

Signature_____ Date_____

GREYSTONE URBAN HUNT CHECK OUT FORM

Hunter Name: _____

Date of Hunt: _____

Time of kill: _____

Location/tree stand where kill was made: _____

Sex of Deer: M F

Age/type of Deer (fawn, doe, buck):

This is the (circle one): 1st deer I have harvested 2nd deer I have harvested

I understand if I have now harvested two deer I can no longer participate in this urban hunt this year.

Hunter's Signature _____

- I acknowledge that I do not have any physical limitations, medical ailments, physical or mental disabilities that would limit or prevent me from participating in this event, and if necessary will obtain a medical examination and clearance.

- I acknowledge that this Accident Waiver and Release of Liability will be used by event holders and organizers, and that it will govern my actions and responsibilities in said event.

- I understand that I would not be permitted to participate in this event unless I signed this Accident Waiver and Release of Liability.

- I execute this Accident Waiver and Release of Liability and understand that it shall be binding upon me, my executors, administrators, heirs, next of kin, successors, personal representatives and assigns.

- I hereby agree to Waive, Release and Discharge from any and all liability for my death, disability, personal injury, property damage, property theft or actions of any kind which may hereafter accrue to me including my traveling to and from this event and in any way arising out of or related to my participation in said event, THE FOLLOWING ENTITIES OR PERSONS: GREYSTONE ON THE CHEAT, and any affiliated organizations and any involved municipalities, their directors, officers, employees, volunteers, representatives or agents, the event holders, organizers, directors, volunteers, and property owners.

- I further agree to Indemnify and Hold Harmless the entities or persons mentioned in the preceding paragraph from any and all liabilities or claims made as a result of participation in this event, whether caused by the sole or partial negligence of me or releasee(s) or otherwise.

- I hereby consent to receive medical treatment, which may be deemed advisable in the event of injury, accident and/or illness during my participation in this event.

- This Accident Waiver and Release of Liability shall be construed broadly to provide a release and waiver to the maximum extent permissible under applicable law.

- If any paragraph or part of this Accident Waiver and Release of Liability is found void or unenforceable, the remainder shall not be affected thereby.

- I further agree to abide by all the rules, regulations and instructions as set forth by the Releasee and organizer of this event. I specifically acknowledge receipt, review and understanding of the "General Rules for Urban Archery Hunt" provided by Greystone on the Cheat and agree to abide by all such rules, as well as all of the rules and regulations set forth by the State of West Virginia generally governing hunting and archery hunting.

- This waiver and release agreement will be construed in accordance with and governed by the laws of the state of West Virginia.

- I understand that I would not be permitted to participate in this event unless I signed this Accident Waiver and Release of Liability.

- This Accident Waiver and Release of Liability release contains the entire agreement between the parties to this release and the terms of this release are contractual and not a mere recital.

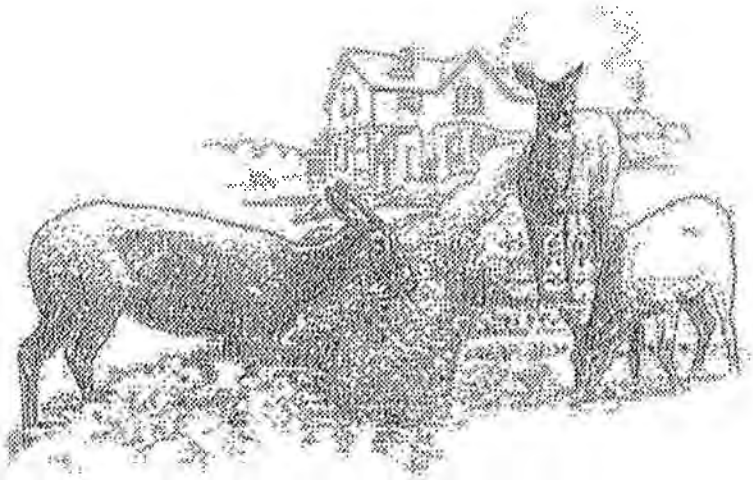
- I hereby certify that I have read this entire document consisting of three (3) pages and that I understand all its contents. _____ (Initials)

Participant's Signature: _____

Date: _____

GUIDE TO URBAN BOWHUNTING

THE GUIDE FOR ADDRESSING URBAN DEER PROBLEMS WITH THE USE OF RESPONSIBLE BOWHUNTING



Written by Fred Richter and Tim Reed

Illustrated by Wayne Trimm

For:

THE NATIONAL BOWHUNTER EDUCATION FOUNDATION
267-B, E. 29TH ST., #503
LOVELAND, CO 80538

THE PURPOSE OF THIS GUIDE

✓ Provide information for local officials and concerned citizens so they can make informed decisions.

✓ Provide a step-by-step guide for concerned people to use when working with communities that have deer problems.

✓ Give information that concerned residents can use to accurately and rationally address deer problems and community attitudes toward deer management.

✓ Assist the community in opening new areas to hunting.

✓ Encourage enrollment in the International Bowhunter Education Program. This course produces better prepared bowhunters, while sending a strong, positive message to nonhunters. The public often looks more favorably on bowhunters who have completed the course.

Although the **Guide to Urban Bowhunting** *pertains primarily to deer, this information might also be used to implement urban bowhunting for other deer-like species such as antelope, moose, elk and other problem wildlife.*

To order additional copies of this guide, contact:

National Bowhunter
Education Foundation
267-B, E. 29th St., Box 503
Loveland, CO 80538
970/635-1994
e-mail: nbef@frii.com

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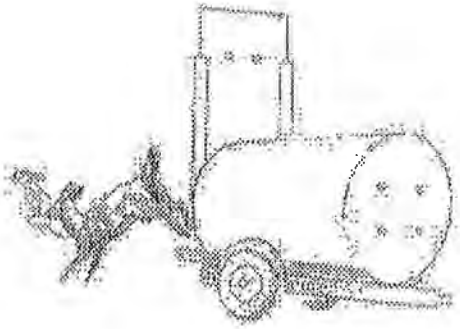
Weigh the Options: What is the Most Logical Solution?



1. Trapping and relocating
2. Birth control
3. Fencing
4. Supplemental feeding
5. Using plants that deer avoid
6. Repellents
7. Using sharpshooters
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12. The bowhunting option
13. Other considerations

Understanding the options will help concerned residents make the right choices.

Trapping and Relocating

✓ Trapping is labor-intensive, requiring a large number of man-hours for preparation, maintenance and monitoring of the traps.

✓ Trapping is prohibitively expensive.

✓ Once deer are captured, communities must decide where the deer can be taken. Most areas have deer of their own to contend with, and do not need more.

✓ Survival rates of relocated deer are frequently low. As an example, trapping and transfer rates in California, New Mexico and Florida resulted in high animal deaths, sometimes even months after release.

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✓ Fencing is expensive and often diminishes a property's attractiveness.

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✓ Fences high enough to prevent deer from jumping them are not practical in a old residential areas.

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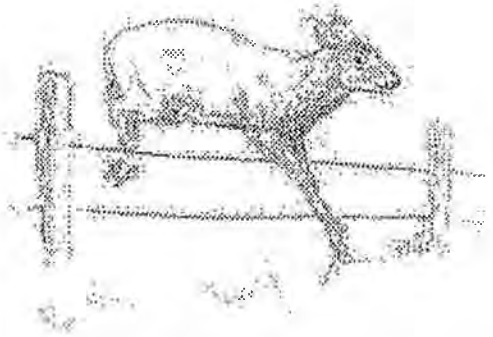

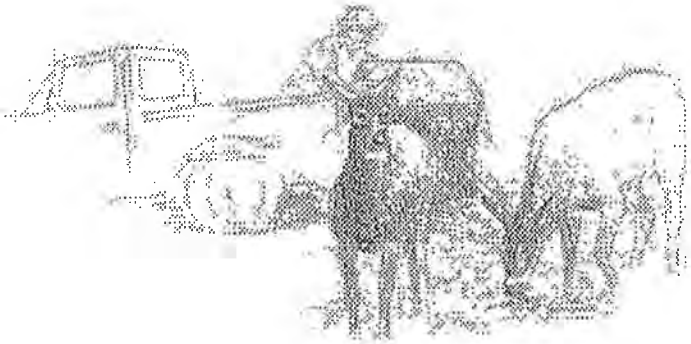

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✓ Unfortunately, deer like to eat most garden plants. Therefore, landowners wouldn't be able to find planting alternatives for their vegetable gardens, fruit trees and flower beds.

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✓ To be effective, repellents require frequent applications as new growth on treated plants outgrows the protection.

✓ Repellent performance varies. Some might work well in one area and poorly in another.

✓ Smell and sight of repellents can reduce quality of life for residents.

✓ Repellents are not as effective in winter because of snow, or in areas with frequent rain.

✓ Some repellents damage plants because of heavy bonding agents used to produce them.

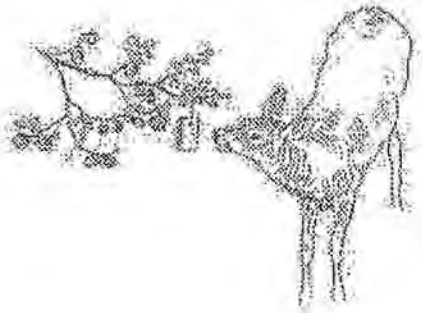
✓ Studies show that repellents modify deer behavior. They might perform well under moderate pressure from deer, but might be ignored when alternative deer foods are scarce.

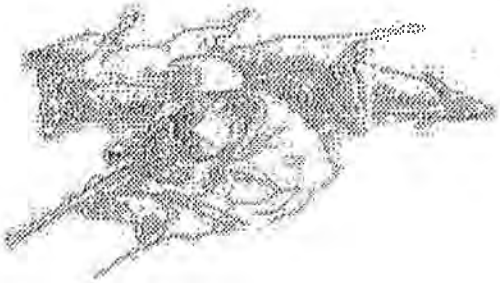
Using Sharpshooters

✓ Typically, sharpshooters are hired to patrol a designated area and, as discreetly as possible, shoot deer with a firearm. The cost of this service can be high.

✓ A sharpshooter program in Wisconsin cost $74 per deer removed, and a similar program in Ohio found that sharpshooting was a less efficient method of deer removal than controlled hunting.

✓ Using sharpshooters can be exceedingly controversial in situations where regulated





hunting could be conducted. That's because it denies citizens access to a renewable public resource and recreational opportunities.

✓ Some sharpshooters use night scopes and silencers on their firearms, which can give the impression that something akin to a military operation is occurring. Therefore, some neighborhoods might reject it.

✓ The sound from shots being fired are typically considered disruptive and invasive to residents.

✓ Sharpshooting can raise safety concerns because high-powered rifles are used, and they have long-range capacity.

✓ Sharpshooting provides a workable solution only in specific instances.

Being Objective

With the options outlined above, any one of them might work under specific situations, after costs, staffing and other variables are considered. Specifically ...

✓ Trapping and relocating might be performed by professionals in some cases.

✓ Fencing is being used in many places on a limited basis, particularly around gardens and ornamental plantings.

✓ Supplemental feedings, when used with other reduction programs, can help keep deer from consuming valuable plants in winter.

✓ Repellents are the most common deer-control measure used in conjunction with other deer-control programs.

✓ Sharpshooters have been used in some instances as a control technique to get a community to accept the idea of deer management. This plan is then followed by hunting proposals within a couple of years.

Do Nothing

✓ Uncontrolled deer herds soon outgrow the land's capacity to provide them with food (see chart, Page 5). As the habitat degrades, the deer become susceptible to disease, parasites, starvation and, ultimately, death for unhealthy individuals and other species.

✓ Overgrazing also destroys the habitat by killing trees, brush and plants.

✓ Doing nothing can lead to increased suffering in the herd in problem areas.

✓ Doing nothing might be an option if a community's deer population is growing, and if the residents need time to evaluate realistic deer management solutions. However, lengthy procrastination can worsen the problem.

Hunting as the Answer

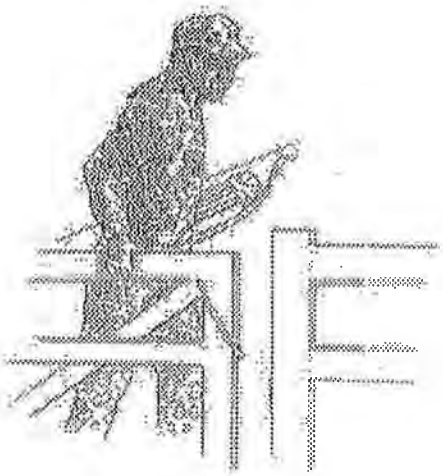
Regulated hunting has been proven to be a sound, responsible method for managing deer populations. It is safe, ethical and humane. It provides deer population control for the least cost, because recreational hunters do the "work" of removing deer. In some places, the money spent by hunters for licenses and permits provides an added bonus by benefiting wildlife and habitat. Other options have been found impractical, prohibitively expensive, widely unacceptable, and limited in application.

Firearms Hunting

Closely regulated firearms hunting effectively controls deer populations. However, in some heavily populated urban areas, safe firearms hunting is limited because the bullet, slug or projectile has the potential to travel long distances.

Another concern to some residents is the noise of discharging firearms. For those reasons, firearms hunting is not as practical in some urban settings as bowhunting.

Firearms hunting still has a place in some urban areas. Some communities have had excellent results with strictly regulated slug-shotgun and muzzleloader hunting, along with bowhunting. The geography and other unique characteristics of each area will determine if firearms hunting is a safe option. The decision to allow firearms hunting must be made by



tions, and why most methods except hunting are not really viable. You also might want to contact references in this guide for more information. Your state's fish and wildlife agencies are also excellent sources of information.

4. Don't allow anti-hunters to sidetrack your efforts. Present the information as found in this booklet, and concentrate on winning the votes of those who do not hunt. They're the community's majority.

5. Stay calm and professional when discussing the issue. Presenting the facts and respecting other viewpoints will make you a winner. If you want to polish your skills so that you can negotiate and present your views more effectively, contact the Wildlife Legislative Fund of America, 801 Kingsmill Parkway, Columbus, OH 43229. Ask the WLFA how you can enroll in one of its proven Protect What's Right workshops.

6. Use the media to get the word out. Most reporters want to hear about the issues and the possible solutions. You're offering a workable solution. A phone call to the local newspaper, and radio and television stations is usually all it takes to get attention.

7. Talk with local law enforcement officials, and listen to what they say. Ask what can be done to make their jobs easier and gain their support.

8. Meet with the mayor, city manager, councilmen and other area officials to learn what must be done to allow hunting. Be flexible. Give something to get something, and be considerate. Again: Stick with the facts.

9. If the community elects to try urban hunting, many meetings with local officials will likely follow. Ordinances and other details will most likely be introduced, and customized as the community requires.

10. Urban hunts tend to be more successful when the state's fish and wildlife agency is involved. Contact the agency early. Some state agencies even have a special urban bowhunting season, and give bonus tags that allow hunters to take extra deer.

11. Discuss the environmental impacts and economic issues caused by overpopulated deer herds. Arguing with anti-hunters over the perceived morality of bowhunting is useless.

12. Stress the need for bowhunter education. Most hunters and nonhunters alike feel more positive when they know bowhunters have taken the course before hunting. Don't hesitate to recommend mandating the IBEP course for those wanting to bowhunt the urban area.

13. Meet again with community officials and property owners after the first hunt to discuss the success of the program, and to determine if modifications to the program might be needed.

Other Ideas

The following is a sample of regulations some urban areas have implemented for urban hunts. Each urban area is unique and reserves the right to customize rules to fit its circumstances. The opinions of hunters and nonhunters should be considered equally. Doing so makes the urban hunt a positive solution to a real problem, and ensures strong public support. The points referenced below are not necessarily endorsed or supported by the NBEF. These are only listed to stimulate thought, creativity and open discussion.

1. The International Bowhunter Education

Greystone On the Cheat

URBAN ARCHERY DEER HUNT APPLICATION

Dear Bowhunter,

Thank you for your interest in participating in the first DNR approved urban archery hunt in our community. The purpose of our controlled archery hunt is to responsibly manage whitetail deer through bowhunting.

Bow hunting in suburban areas can be difficult and sensitive. Our urban hunt will be modeled after similar, highly effective deer management programs throughout the country where safety, ethical hunting, and professionalism are the chief objectives.

All hunters must abide by a strict set of rules and regulations formulated with the special needs of our property owners in mind. Because of these restrictions, this urban hunt is not for everyone. If you decide to complete the application, please keep in mind that we are looking for responsible individuals who are "team players" and care more about the resource than personal goals. We want to give our community a positive impression of bowhunting and bowhunters.

If your application is approved, we will set up a date and time for you to take a proficiency test. This will involve hitting a 12 inch circle with four or five arrows at 20 yards. If passed, this will be followed by an interview and then we will also meet with you to further explain our goals and objectives. We will provide a Greystone hunting permit to 25-30 approved hunters. A waiting list will also be used as space becomes available, or as other hunters fill their limits. Please keep in mind that we make no promises as to hunting opportunities or hunter success.

Thank you for your interest in assisting our community in this very important endeavor.

Sincerely,

Greystone-on-the-Cheat Board of Directors

URBAN ARCHERY DEER HUNT APPLICATION (Page 1)

INSTRUCTIONS: This application is designed for us to get to know you. Please answer all questions fully and honestly. If you need more room to complete your answers, or you feel some clarification is necessary, continue on the back of the application.

Name: _____ Age: _____ Date: _____

Address: _____

Phone # Home _____ Work _____ Cell _____

Date of Birth: _____

Vehicle ID: Year: _____ Make: _____ Model: _____

Color: _____ License#: _____

Current State Hunting License#: _____

Have you ever been arrested or received a summons for any game law violation?

No _____ Yes _____ (If yes, explain fully)

List all hunting organizations of which you are a current member. Also list offices you hold or have held in these organization(s).

Name of organization(s)	Member since	Office

Please list those states you have bowhunted:

URBAN ARCHERY DEER HUNT

ETHICS PLEDGE

1. Safety is my number one concern.
2. I know and will obey all hunting rules and regulations.
3. I understand that any willful violation of a game law will result in reporting to the local wildlife conservation officer.
4. I will respect the safety of the residents, pets, and other animals within the community.
5. I will make every effort to be as inconspicuous and effective while hunting in this community as possible.
6. I will respect the private property I have been granted permission to hunt on.
7. I will not enter onto a property owner's property without first obtaining their permission and **ONLY** for purposes of collecting a wounded or dead deer.

Name _____ Date _____

When returning this application, please enclose a photocopy of the following:

- Valid and current WV State Hunting License
- State Driver's License
- Vehicle Registration

Please return this application and a copy of the above listed documents no later than September 15, 2009 to:

Greystone on the Cheat POA
PO BOX 18040
Morgantown, WV 26507

UBRAN HUNT IN GREYSTONE BEGINS OCTOBER 3, 2009 and runs through December 31, 2009

II. GENERAL RULES FOR URBAN ARCHERY HUNT

A. Park only in designated parking areas.
B. All hunters will receive a special vehicle permit to enter Greystone and must display this permit on the dash of their vehicle at all times.
C. Treat everyone you meet with courtesy and respect.
D. Do NOT litter.
E. Under NO situations will entrails be left on any landowner's property. A carcass is to be removed in its entirety or have entrails placed in plastic bags and then properly discarded. (please provide your own bags for this purpose and we will tell you exactly where these are to be placed)
F. **If a wounded or dead deer shall enter and rest on private homeowner property, permission from the homeowner will be necessary to enter said property to retrieve deer. (Please contact Michelle Duda at 906-9830 to get permission).**
G. If property owner does not grant you permission to enter their property, you may have them call Michelle Duda at 906-9830 or Steve Taylor at 685-2233 to have the deer removed from the property.
H. **All hunters must check in and out at the Greystone maintenance building on Sunset Beach Road before and after hunting.**
I. All deer must be checked-out. A check-out form **MUST** be completed for all deer killed.
J. Obey all West Virginia Game Laws.
K. The Game Management areas will consist of only those areas designated by the Greystone Board of Directors. Hunting in any other areas is prohibited.
L. Each member is required to:
   1. Use a flashlight when entering your stand in the morning and leaving in the evening.
   2. Use a full-body safety harness while you are in your treestand.
   3. Only broad heads are permitted.
M. In pursuance of our deer management goals, a hunter must harvest **at least one doe** before harvesting a buck.
N. **Two deer may be harvested during this urban hunt and not count towards your normal WV tag limits.**
O. **The Urban Archery season runs two weeks prior to the regular archery season and begins October 3, 2009 and will continue through the regular archery season, December 31, 2009.**
P. Your name and sequential numbers **MUST** be on all arrows used while hunting. i.e. J. Doe #1, J. Doe #2, J. Doe #3....
Q. Do not walk around the community carrying visible bows. There will be no hunting done except from tree stands. Walk straight to and from your stand.
R. Hunters will be assigned certain areas and specific times to hunt. Do not move to other areas not assigned to you.
S. **You will be responsible for providing your own tree or climbing stand. Greystone DOES NOT assume any risk or liability for injuries sustained during the hunt, while putting up tree stands, or while in tree stands. HUNT AT YOUR OWN RISK!**
T. **Hunting must be from elevated stands only.**
U. **Shots must be limited to 25 yards.**
V. **We highly encourage substantially broadside shots from less than 20 yards.**
W. Remember you are invited to hunt on our private property. Respect it.
X. Only portable stands, and in some situations, climbing stands, may be used.
Y. Stalking or still-hunting deer is prohibited.
Z. All permits and authorization papers must be on your person at all times while hunting.
AA. Do not kill or attempt to kill any albino deer or deer with albino tendencies.
BB. **No alcohol beverages permitted on premises at any time. Any one who has consumed alcohol prior to hunting will be asked to leave the property!**

I have read, agree to, and will follow all rules stated above. I understand that if I violate any of these rules or any other state hunting regulations, I will be removed from Greystone's property and violations will be reported to the state.

Signature_____ Date_____

Greystone
On the Cheat

GREYSTONE URBAN HUNT CHECK OUT FORM

Hunter Name: _____

Date of Hunt: _____

Time of kill: _____

Location/tree stand where kill was made: _____

Sex of Deer: M F

Age/type of Deer (fawn, doe, buck):

This is the (circle one): 1st deer I have harvested 2nd deer I have harvested

I understand if I have now harvested two deer I can no longer participate in this urban hunt this year.

Hunter's Signature _____

- I acknowledge that I do not have any physical limitations, medical ailments, physical or mental disabilities that would limit or prevent me from participating in this event, and if necessary will obtain a medical examination and clearance.

- I acknowledge that this Accident Waiver and Release of Liability will be used by event holders and organizers, and that it will govern my actions and responsibilities in said event.

- I understand that I would not be permitted to participate in this event unless I signed this Accident Waiver and Release of Liability.

- I execute this Accident Waiver and Release of Liability and understand that it shall be binding upon me, my executors, administrators, heirs, next of kin, successors, personal representatives and assigns.

- I hereby agree to Waive, Release and Discharge from any and all liability for my death, disability, personal injury, property damage, property theft or actions of any kind which may hereafter accrue to me including my traveling to and from this event and in any way arising out of or related to my participation in said event, THE FOLLOWING ENTITIES OR PERSONS: GREYSTONE ON THE CHEAT, and any affiliated organizations and any involved municipalities, their directors, officers, employees, volunteers, representatives or agents, the event holders, organizers, directors, volunteers, and property owners.

- I further agree to Indemnify and Hold Harmless the entities or persons mentioned in the preceding paragraph from any and all liabilities or claims made as a result of participation in this event, whether caused by the sole or partial negligence of me or releasee(s) or otherwise.

- I hereby consent to receive medical treatment, which may be deemed advisable in the event of injury, accident and/or illness during my participation in this event.

- This Accident Waiver and Release of Liability shall be construed broadly to provide a release and waiver to the maximum extent permissible under applicable law.

- If any paragraph or part of this Accident Waiver and Release of Liability is found void or unenforceable, the remainder shall not be affected thereby.

- I further agree to abide by all the rules, regulations and instructions as set forth by the Releasee and organizer of this event. I specifically acknowledge receipt, review and understanding of the "General Rules for Urban Archery Hunt" provided by Greystone on the Cheat and agree to abide by all such rules, as well as all of the rules and regulations set forth by the State of West Virginia generally governing hunting and archery hunting.

- This waiver and release agreement will be construed in accordance with and governed by the laws of the state of West Virginia.

- I understand that I would not be permitted to participate in this event unless I signed this Accident Waiver and Release of Liability.

- This Accident Waiver and Release of Liability release contains the entire agreement between the parties to this release and the terms of this release are contractual and not a mere recital.

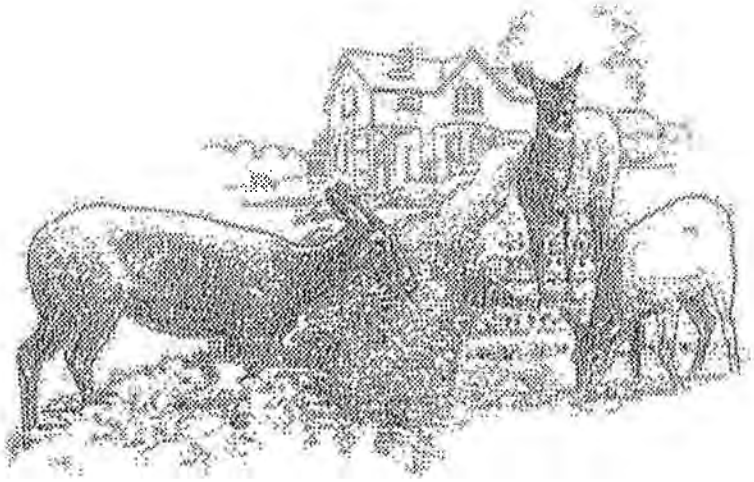
- I hereby certify that I have read this entire document consisting of three (3) pages and that I understand all its contents. _____ (Initials)

Participant's Signature: _____

Date: _____

GUIDE TO URBAN BOWHUNTING

THE GUIDE FOR ADDRESSING URBAN DEER PROBLEMS WITH THE USE OF RESPONSIBLE BOWHUNTING



Written by Fred Richter and Tim Reed

Illustrated by Wayne Trimm

For:

THE NATIONAL BOWHUNTER EDUCATION FOUNDATION
267-B, E. 29TH ST., #503
LOVELAND, CO 80538

THE PURPOSE OF THIS GUIDE

✓ Provide information for local officials and concerned citizens so they can make informed decisions.

✓ Provide a step-by-step guide for concerned people to use when working with communities that have deer problems.

✓ Give information that concerned residents can use to accurately and rationally address deer problems and community attitudes toward deer management.

✓ Assist the community in opening new areas to hunting.

✓ Encourage enrollment in the International Bowhunter Education Program. This course produces better-prepared bowhunters, while sending a strong, positive message to nonhunters. The public often looks more favorably on bowhunters who have completed the course.

Although the **Guide to Urban Bowhunting** *pertains primarily to deer, this information might also be used to implement urban bowhunting for other deer-like species such as antelope, moose, elk and other problem wildlife.*

To order additional copies of this guide, contact:

National Bowhunter
Education Foundation
267-B, E. 29th St., Box 503
Loveland, CO 80538
970/635-1994
e-mail: nbef@frii.com

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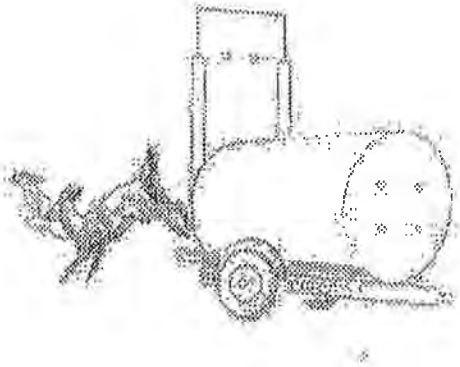
Weigh the Options: What is the Most Logical Solution?



1. Trapping and relocating
2. Birth control
3. Fencing
4. Supplemental feeding
5. Using plants that deer avoid
6. Repellents
7. Using sharpshooters
8. Being objective
9. Do nothing
10. Hunting as the answer
11. Firearms hunting
12. The bowhunting option
13. Other considerations

Understanding the options will be a concerned residents make the right choices.

Trapping and Relocating

✓ Trapping is labor-intensive, requiring a large number of man-hours for preparation, maintenance and monitoring of the traps.

✓ Trapping is prohibitively expensive.

✓ Once deer are captured, communities must decide where the deer can be taken. Most areas have deer of their own to contend with, and do not need more.

✓ Survival rates of relocated deer are frequently low. As an example, trapping and transfer rates in California, New Mexico and Florida resulted in high animal deaths, sometimes even months after release.

✓ Trapping of deer is illegal in so-to states because it often leads to high deer deaths and is considered inhumane.

✓ Trapping of free-roaming deer is a difficult task.

✓ The practice of trapping the deer and shooting them draws a lot of negative public sentiment.

Birth Control

✓ Like trapping, birth-control options are expensive. The cost of the drugs, and the expense of many man-hours to administer the drugs are not practical when considering the large number of deer that must be treated before birth control can be effective.

✓ Birth-control drugs are difficult to administer to free-roaming deer. Even if baiting and/or remote delivery (dart guns) methods are used, treating an adequate portion of the herd is nearly impossible.

✓ If the drugs are administered by the deer eating treated bait, ingestion by non-target animals is a concern.

✓ Little research has been done on the effects that birth-control steroids might have on humans or animals in the food chain. The question of what happens if a human or other animal consumes the meat of a drug-treated deer must first be answered.

✓ Research has shown that deer avoid treated bait after a period of time.

✓ Birth control might work on small insular

deer populations (i.e., 50 acres or less) under regulated conditions, but it is not practical — and possibly illegal — on free-roaming deer on large tracts of land.

✓ Birth-control implants have a limited life expectancy. The costs and stress to animals continue to rise with capture and recapture efforts needed to treat deer.

Fencing

✓ Fencing is expensive and often diminishes a property's attractiveness.

✓ Electric fences are effective but raise concerns where contact with humans and pets are likely.

✓ Fences high enough to prevent deer from jumping them are not practical in most residential areas.

✓ Fences, particularly electric fences, require regular maintenance.

✓ It is next to impossible to fence the entire neighborhood well enough to keep out deer. If only one neighbor puts up a fence, other people in the area will see even more deer concentrated on their property.

Supplemental Feeding

✓ Work in Michigan and Colorado indicates it costs between $37 and $53 per deer per month to run a winter feeding program. Multiply that by the number of deer to be fed, and it's easy to see that feeding, like all the other options, is cost-prohibitive.

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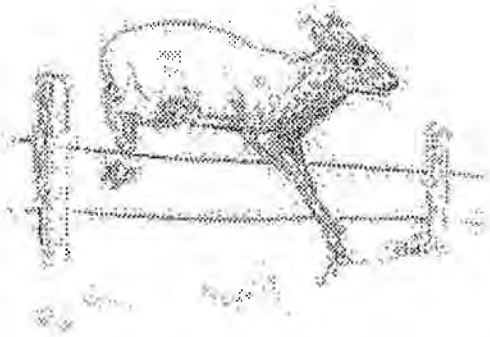
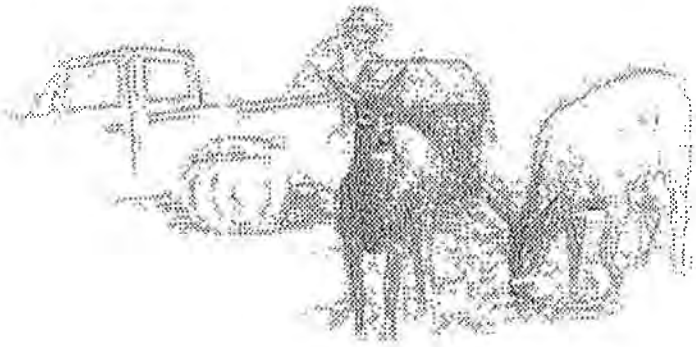
✓ In fact, feeding actually encourages the deer herd's growth, thereby possibly exceeding the land's carrying capacity, which damages the habitat and health of the herd.

✓ Feeding increases the chances that disease will be transmitted between deer as they gather in large numbers at feeding sites.

✓ Feeding concentrates deer and makes them more vulnerable to predation by dogs and coyotes. It also makes shrubs and other valuable plants near the feeding site vulnerable to deer.

✓ Feeding requires many hours of work. The question arises: Just who will do it, and who will pay for it?





Using Plants that Deer Avoid

✓ Deer do not eat all plants, and some of these unpalatable plants are aesthetic. However, this option means landowners would need to replace their existing plants with ones deer don't find appealing. This can be expensive for individual property owners.

✓ Unfortunately, deer like to eat most garden plants. Therefore, landowners wouldn't be able to find planting alternatives for their vegetable gardens, fruit trees and flower beds.

✓ Being limited to plant only vegetation that deer will not eat eliminates the freedom to landscape by choice.

Repellents

✓ Repellents are only effective in controlled "spot" applications and are not a widescale solution.

✓ Repellents can be expensive and are labor-intensive to apply.

✓ To be effective, repellents require frequent applications as new growth on treated plants outgrows the protection.

✓ Repellent performance varies. Some might work well in one area and poorly in another.

✓ Smell and sight of repellents can reduce quality of life for residents.

✓ Repellents are not as effective in winter because of snow, or in areas with frequent rain.

✓ Some repellents damage plants because of heavy bonding agents used to produce them.

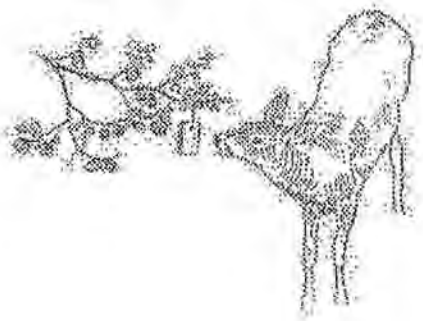
✓ Studies show that repellents modify deer behavior. They might perform well under moderate pressure from deer, but might be ignored when alternative deer foods are scarce.

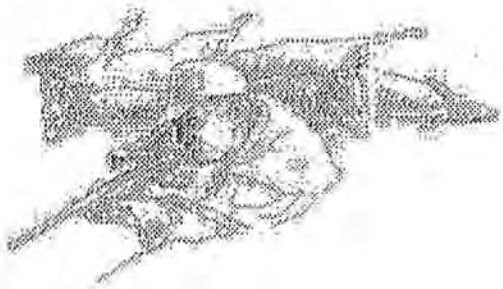
Using Sharpshooters

✓ Typically, sharpshooters are hired to patrol a designated area and, as discreetly as possible, shoot deer with a firearm. The cost of this service can be high.

✓ A sharpshooter program in Wisconsin cost $74 per deer removed, and a similar program in Ohio found that sharpshooting was a less efficient method of deer removal than controlled hunting.

✓ Using sharpshooters can be exceedingly controversial in situations where regulated





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✓ Some sharpshooters use night scopes and silencers on their firearms, which can give the impression that something akin to a military operation is occurring. Therefore, some neighborhoods might reject it.

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✓ Doing nothing might be an option if a community's deer population is growing, and if the residents need time to evaluate realistic deer-management solutions. However, lengthy procrastination can worsen the problem.

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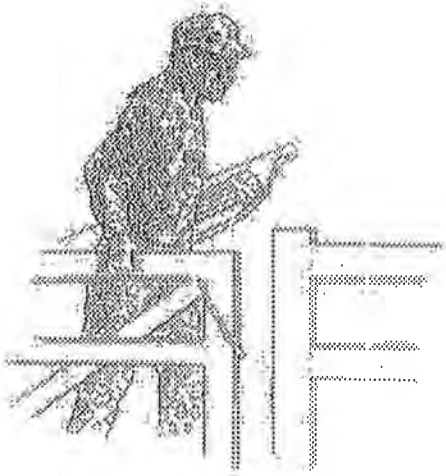
Another concern to some residents is the noise of discharging firearms. For those reasons, firearms hunting is not as practical in some urban settings as bowhunting.

Firearms hunting still has a place in some urban areas. Some communities have had excellent results with strictly regulated slug-shotgun and muzzleloader hunting, along with bowhunting. The geography and other unique characteristics of each area will determine if firearms hunting is a safe option. The decision to allow firearms hunting must be made by



tions, and why most methods except hunting are not really viable. You also might want to contact references in this guide for more information. Your state's fish and wildlife agencies are also excellent sources of information.

4. Don't allow anti-hunters to sidetrack your efforts. Present the information as found in this booklet, and concentrate on winning the votes of those who do not hunt. They're the community's majority.

5. Stay calm and professional when discussing the issue. Presenting the facts and respecting other viewpoints will make you a winner. If you want to polish your skills so that you can negotiate and present your views more effectively, contact the Wildlife Legislative Fund of America, 801 Kingsmill Parkway, Columbus, OH 43229. Ask the WLFA how you can enroll in one of its proven Protect What's Right workshops.

6. Use the media to get the word out. Most reporters want to hear about the issues and the possible solutions. You're offering a workable solution. A phone call to the local newspaper, and radio and television stations is usually all it takes to get attention.

7. Talk with local law-enforcement officials, and listen to what they say. Ask what can be done to make their jobs easier and gain their support.

8. Meet with the mayor, city manager, councilmen and other area officials to learn what must be done to allow hunting. Be flexible. Give something to get something, and be considerate. Again: Stick with the facts.

9. If the community elects to try urban hunting, many meetings with local officials will likely follow. Ordinances and other details will most likely be introduced, and customized as the community requires.

10. Urban hunts tend to be more successful when the state's fish and wildlife agency is involved. Contact the agency early. Some state agencies even have a special urban bowhunting season, and give bonus tags that allow hunters to take extra deer.

11. Discuss the environmental impacts and economic issues caused by overpopulated deer herds. Arguing with anti-hunters over the perceived morality of bowhunting is useless.

12. Stress the need for bowhunter education. Most hunters and nonhunters alike feel more positive when they know bowhunters have taken the course before hunting. Don't hesitate to recommend mandating the IBEP course for those wanting to bowhunt the urban area.

13. Meet again with community officials and property owners after the first hunt to discuss the success of the program, and to determine if modifications to the program might be needed.

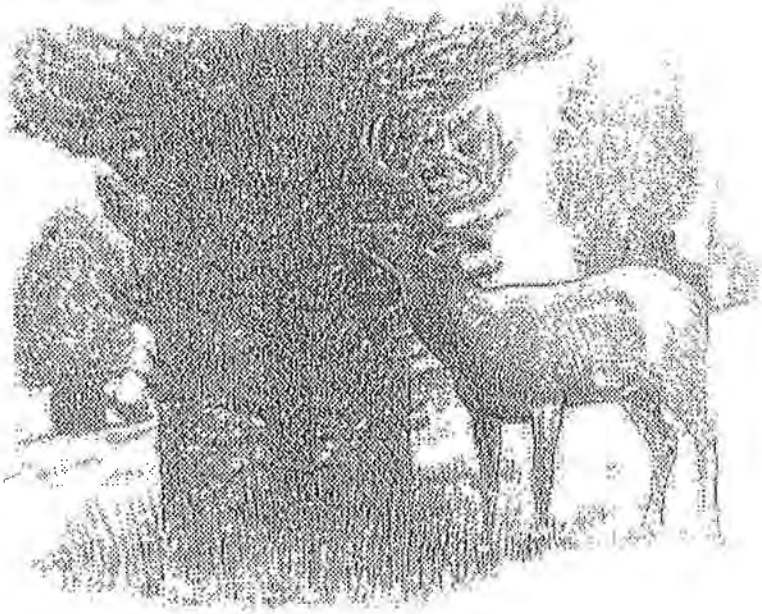
Other Ideas

The following is a sample of regulations some urban areas have implemented for urban hunts. Each urban area is unique and reserves the right to customize rules to fit its circumstances. The opinions of hunters and nonhunters should be considered equally. Doing so makes the urban hunt a positive solution to a real problem, and ensures strong public support. The points referenced below are not necessarily endorsed or supported by the NBEF. These are only listed to stimulate thought, creativity and open discussion.

1. The International Bowhunter Education

best way to control the herd. However, because it's sometimes difficult to attract hunters if only does can be killed, a mixed bag is sometimes allowed. This means hunters must first take a doe before taking a buck.

14. One borough near Pittsburgh requires hunters to travel to and from the hunting areas dressed in regular clothes. Once they have arrived at their hunting spot, they can change into their camouflage clothes. The town's leaders believe hunters attract less attention when they aren't dressed in hunting garb while in public view.



15. Programs that donate venison to the hungry are excellent for public relations. Hunters Helping the Hungry programs are endorsed by many state fish and wildlife agencies.

16. Orientation meetings for registered hunters are a good idea. These meetings give everyone a chance to have input while learning special regulations and considerations. These are good forums for distributing information on the specific hunt, as well as hunting in general. This will better prepare hunters to answer questions they might hear from the public or media.

(See the booklet "Bowhunting, An Examination of the Facts," distributed by the NBEF. Also, contact the National Shooting Sports Foundation, or the Wildlife Legislative Fund of America).

17. Several cities require bowhunters to sign their arrows, and present the arrows to a designated official when registering to hunt.

18. It's common for urban hunters to be required to display a special city/urban hunting permit on their outer hunting garments while hunting. This allows law-enforcement officers and others to tell at a glance that a hunter is qualified and registered.

19. Before receiving permission to hunt, archers must often prove to the landowner or city officials that they have liability insurance.

20. Strict no-littering rules should be in place. Trash left in the woods by bowhunters creates a negative impression.

21. The program might designate which types of tree stands are allowed. Stands that don't cut deeply into tree bark are favored. The NBEF strongly discourages the use of permanent tree stands built of wood. Not only are these stands unsightly, they can be dangerous. Wood deteriorates with age, and nails can pull through the wood as the tree grows and moves. (See NBEF "Tree Stand Guide.")

22. When too many people want to bowhunt an area, some communities hold a competitive shoot-off. The best shooters qualify to hunt. Other communities have random drawings or divide the group to hunt on alternating days.