

Raising white-tailed deer and other ungulates
behind fences: A review of Big Game Shooting
Areas and wildlife breeders in Missouri.

1 May 2000

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EXECUTIVE SUMMARY

Raising native or exotic cervids (deer-like mammals in the family Cervidae) in captivity is a popular and expanding activity throughout North America. Captive cervid operations can be placed into two categories. Small penned operations (SPO's), of which there are more than 200 in Missouri, grow and sell cervids for breeding stock and for shooting in high-fenced facilities. SPO's generally import and export cervids, often across state and even federal borders. SPO's raising white-tailed deer must meet MDC regulated confinement standards (500 square feet for first animal and 125 square feet for each additional animal) as outlined under Class I Wildlife Breeder permits. Other native cervids must be confined in facilities according to requirements for similar-sized animals.

Big game shooting areas (BGSA) are high-fenced operations where wild white-tailed deer have been removed and captive-raised cervids have been introduced. BGSA's, of which there currently are 15 in Missouri that range in size from 410 to 3,000 acres, must obtain an MDC-regulated permit specifying minimum size (320 acres), and requirements for removal of wild deer and record keeping. BGSA's do not have to follow statewide deer hunting regulations so they generally have extended seasons, unlimited bag limits, and no restrictions on method of take. BGSA's often import animals to enhance genetics or provide trophy animals for shooters.

In addition to SPO's and BGSA's, there are high-fenced enclosures in which wild whitetails are not removed; statewide deer hunting regulations must be followed on these areas. These enclosures are generally intended to eliminate the loss of large-antlered bucks to neighboring hunters.

Although captive cervid operations provide alternative incomes for some landowners, there are potentially serious wildlife resource management problems associated with SPO's and BGSA's. Disease implications for native wildlife and domestic livestock associated with the importation and exportation of captive cervids is a primary concern. Although there are a number of diseases and parasites that could be introduced by importing captive cervids, chronic wasting disease (CWD) is most significant. CWD is a transmissible spongiform encephalopathy, a fatal neurologic disease of elk, mule deer and white-tailed deer. CWD is currently known to be present in the wild in Colorado and Wyoming. The increasing trade of captive cervids has resulted in its appearance in captive elk in Nebraska, South Dakota, Montana, Oklahoma and Saskatchewan.

Control of CWD is problematic because there is no live animal test for the disease, it is resistant to heat, cold, disinfectants, and host immune systems and it has a long incubation period in the host. No link between CWD and human disease has been discovered but the lack of knowledge about the disease and its transmission is cause for concern. The hysteria that occurred as a result of "mad cow" disease in Europe in the 1990's, a disease similar to CWD but in cattle, and a possible link to human disease (variant of Creutzfeldt-Jakob disease) should be a warning. If CWD escaped into the wild from captive cervid operations, and there was a perceived or real link between CWD and human disease, current deer hunting and management systems could be drastically affected. Harvests, especially of antlerless deer, could decline because hunters may be afraid to eat deer meat; alternative means of controlling deer populations would be necessary. It

is imperative that we prevent CWD from becoming established in Missouri. Only by prohibiting importation of captive-raised cervids into Missouri can we minimize the possibility of introducing CWD and other important diseases of concern.

Another resource concern involves activities on BGSA's. Increasing disposable income but decreasing time for recreation have stimulated interest in shooting operations at BGSA's. Quick success is almost ensured; trophy-sized animals can be taken with little effort expended by the shooter. How these "hunts" are perceived by the nonhunting public should be a concern to MDC because as the regulatory authority over BGSA's, public perceptions are that we condone, even promote, this type of activity. The media has publicized "canned hunts" in their worst form in other states. It is probable that the nonhunting public does not distinguish between traditional hunting and shooting at BGSA's; public animosity toward traditional hunting may result.

Although ethics can be a personal issue, a line has been drawn beyond which many hunting and fishing activities are considered unacceptable and are prohibited. The long-term best interest of public resources in Missouri should be of utmost consideration in establishing regulations. Maintaining traditional deer hunting opportunities should be an important concern not only because it is a valued source of recreation but because it is an essential population management tool. The divisiveness surrounding taking of cervids on BGSA's threatens the future of traditional hunting and our ability to manage the whitetail resource.

Besides disease and ethical concerns, BGSA's and high fences enclosing wild deer affect daily and seasonal movements of wild deer, increase vulnerability to predation and other mortality factors, and impact deer hunting opportunities and harvest on surrounding properties. High-fenced wild populations thus represent a "taking" of a public resource.

In a society where resource management activities are increasingly scrutinized and where perceptions are reality, it is imperative that MDC monitor and regulate activities that could jeopardize future hunting and management opportunities. The best way to resolve problems with public attitudes toward BGSA's is for MDC to prohibit any new BGSA's. Existing BGSA's have invested considerable capital; grandfathering them until the current owner gives up the operation would be appropriate. Requiring grandfathered BGSA's to follow statewide method of take regulations would also reduce public criticism of these operations. Similarly, to prevent taking of a public resource, additional high fence enclosures of wild deer should be prohibited.

Risks of introducing disease into wild white-tailed deer has increased as the trade in captive cervids has expanded in Missouri. These risks could be minimized by prohibiting importation (not exportation) of cervids into Missouri.

The purpose of this paper is to review the biological and social issues of Big Game Shooting Areas (BGSA's), high fences, and small deer pens as they pertain to management of wildlife, especially white-tailed deer (free-ranging, wild) in Missouri. A brief review of laws pertaining to fences is also included. Specific recommendations pertaining to BGSA's and SPO's are presented on page 18 of this document.

INTRODUCTION

Recently, interest in raising white-tailed deer and other native and exotic cervids (deer-like mammals in the family Cervidae) species as a source of income has increased in Missouri and other states. This form of alternative agriculture, termed captive cervid agriculture provides a source of income for landowners and property/animal managers. Captive cervid agriculture can range from small penned operations (SPO's) in which cervids are raised and sold for specialty markets to large high fenced big game shooting areas (BGSA's). Generally SPO's grow and sell breeding stock, an industry based on the demand for "shooter bucks", "breeder bucks" and does. Demand for deer and elk with well developed antlers is high. The demand for "breeder does" is also high but may wane over time as the market becomes saturated. Other alternative agricultural enterprises have come and gone in Missouri (e.g. pot bellied pigs, emus, ostriches). As is typical with pyramid type enterprises demand is high at first but as markets fail to develop or become saturated, prices sag. Because antlerless deer are not usually sold for hunts and are long lived they can become overabundant. A secondary outlet for the captive elk industry is the sale of velvet antlers. The market is currently somewhat depressed due to economic set backs in Asia where the bulk of velvet antlers are exported. However, the American market is growing. In Missouri, owners of BGSA's sell the opportunity for others to kill cervids in these fenced settings. Typically success rates are high and the opportunity to kill large antlered and oftentimes record class animals are much greater inside these fenced operations.

Captive cervid agriculture carries with it a number of implications that may affect wildlife residing within and outside of enclosures. The construction of high fences and importation of deer associated with BGSA's and SPO's may impact seasonal movements, distribution, disease frequency and spread, and population size of wild, free-ranging deer. Large high fence operations may affect movement patterns of other wildlife species that are unable to climb, go around, or through fences. High deer densities and feeding operations may change habitat components inside fenced areas and make them less attractive to other native wildlife. Currently about 40 states and provinces permit deer farming and/or hunts inside fenced enclosures. However, the potential impacts listed above along with concerns about privatization of wildlife and public perceptions of shooting operations behind fences has led several states and some provinces to ban or consider banning high fenced cervid operations. Potential negative impacts of BGSA's and SPO's in Missouri include:

- 1.) The introduction and dissemination of diseases and parasites from penned ungulates/exotics to native wildlife, domestic livestock, and humans.
- 2.) Competition between escaped "penned wildlife"/ungulates with native species for space and forage and the potential for established populations of non-native wildlife.
- 3.) Privatization, commercialization and taking of wildlife, trafficking in dead wildlife and wildlife parts and the administrative and economic burden of regulating these activities.
- 4.) Recreational shooting and activities performed in pens that are not legal outside of pens (e.g. hunting over bait, extended hunting season, hunting with aid of motorized vehicles,

canned hunts) may adversely affect public perception of hunting and its role in wildlife management and conservation and Missouri traditions.

- 5.) Humane issues related to the confinement and unnaturally high densities of penned “wild animals” in these penned settings.

Wildlife breeders, recreational property owners, farmers and silviculturalists, industrial landowners, and people desiring privacy (or security) in general are all landowner groups that have an interest in fencing their property. The Missouri Department of Conservation (MDC) does not have authority to regulate the construction of fences; it does have authority to regulate practices that are construed as “taking” or impacting the conservation of wildlife (Wildlife Code of Missouri, Chapter 4, 3CSR10-4.105.) The Conservation Department also has the authority to regulate captive white-tailed deer enclosures (Wildlife Code of Missouri, Chapter 9, 3CSR10-9.560). In this paper we review biological and social issues related to captive cervid agriculture in Missouri and discuss possible needs for additional regulation to minimize threats to wild white-tailed deer populations and their management.

STATUS OF BIG GAME SHOOTING AREAS AND DEER PENS IN MISSOURI

Classified as big game shooting areas (BGSA’s) in Missouri, commercial high fence operations have been steadily growing in number in Missouri and in the U.S. As of March 2000 MDC had issued 15 commercial permits for BGSA’s in the state (Figure 1). Missouri has liberal regulations pertaining to importation and commercialization of cervids compared to many other Midwestern or Southeastern states (Appendix A). BGSA’s in Missouri range from 410 to 3000 acres (Appendix B). Biologists from Texas estimate that the number of BGSA’s in Missouri is similar to that in Texas in the 1960’s (Butch Young, TX Department of Wildlife and Parks, personal communication.). As of 1994 Texas had over 4 million acres under high fence (See survey results, Appendix B) and an estimated free-ranging feral population of exotic cervids numbering over 74,000 animals (Lanka 1992). Colorado recently documented 5 populations of exotic wildlife occurring in the wild that resulted from escapes from fenced operations. Michigan, with regulations similar to Missouri’s, has experienced tremendous growth in commercialized hunting. From 1994 to 1998 Michigan’s captive wildlife permits for elk increased by 400% and for white-tailed deer increased by 50%. Michigan currently has nearly 21,000 whitetails and 2,600 elk behind high fences for commercial use. Given the liberal

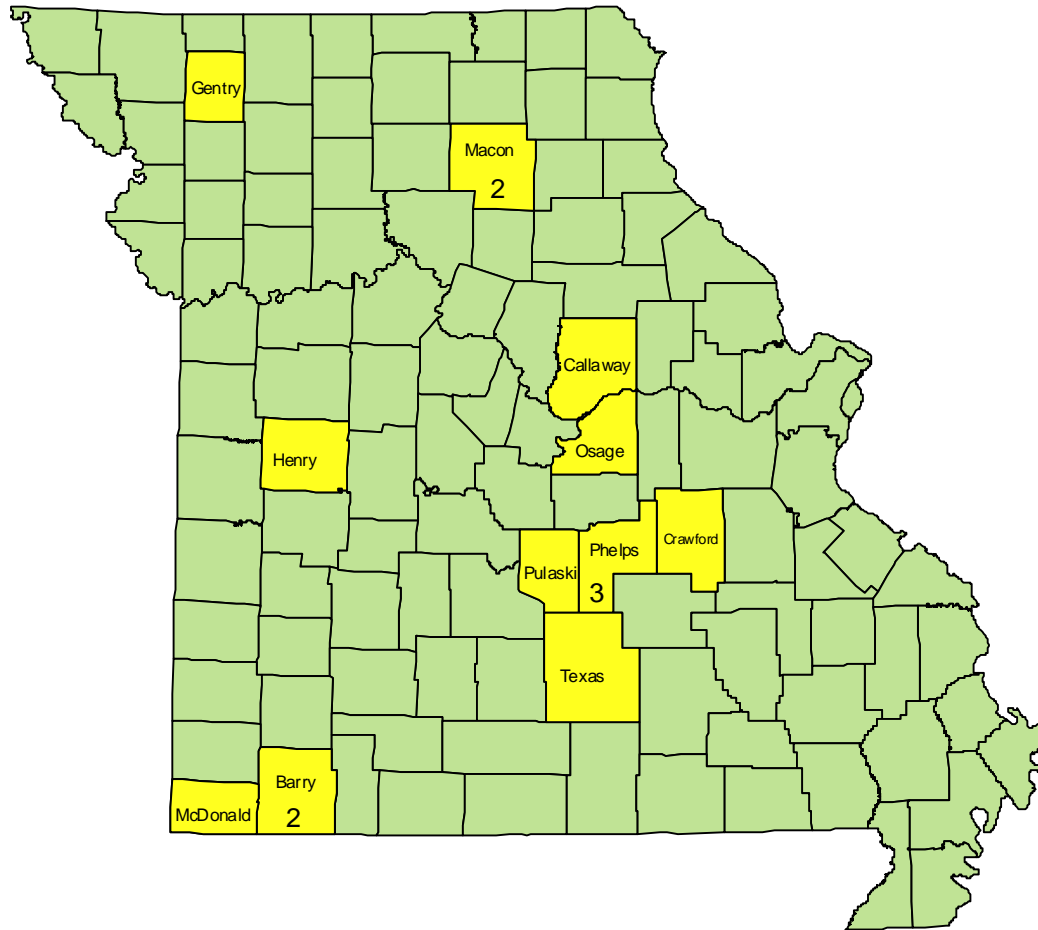


Figure 1. Number and Location of Big Game Shooting Areas in Missouri during 1999.

regulations in Missouri and current nationwide boom in the commercial hunting industry, it seems likely that construction of additional high-fenced hunting operations will continue.

White-tailed deer are the most common large animal held under Wildlife Breeder permits and are found throughout the state (Figure 2). Small penned operations, where individuals raise whitetails or other ungulates under Class I Wildlife Breeder permits, numbered over 200 in Missouri in 1999 (Appendix C). SPO's must meet confinement standards depending on the species (3CSR10-9.220); for whitetails, the pens must enclose at least 500 square feet for the first animal and 125 square feet for each additional animal. Fence height is a minimum of 8 feet. Deer held in pens under Wildlife Breeder permits can be used for exhibition, propagation, can be sold, used, given away, transported or shipped. Other wildlife native to Missouri (elk, mule deer) must be confined in facilities according to requirements for similar-sized animals.

BIOLOGICAL ISSUES

The effect of fences on the ecology of white-tailed deer occurs at different levels. Factors that influence individual animal movements and population level dynamics are of greatest concern to wildlife managers.

Restricted movements

Deer populations can be impacted by a variety of ecological conditions. Among these are loss of habitat, disruption of normal movements, increased mortality from disease, or combinations of these factors. Direct loss of habitat by exclusion can occur at both small and large scales. The actual loss would be related to the number, size, and location of man-made barriers relative to deer movements.

Numerous studies demonstrate that a well-maintained fence of sufficient height is an effective barrier to deer movement and allows for efficient management of penned deer. The George Reserve in southern Michigan originally had a 7.5-foot (2.3 m) fence completed in 1927 (McCullough 1979). The fence was later raised to 11.5 feet (3.5 m) to comply with the state's Game Breeders License and to effectively stop ingress and egress of deer (McCullough 1979). The Cusino enclosure in northern Michigan had 8.0 feet (2.44 m) of woven wire plus 4 strands of smooth wire to create a 10-foot (3.0 m) deer-proof fence for research purposes (Arnold and Verme 1963). Only 3 deer were reported to have escaped the enclosure over a ten-year period. Current Missouri requirements for captive deer in enclosures held under Wildlife Breeder Permits are an 8-foot (2.44 m) fence and a minimum area of 500 square feet (roughly 1/87th of 1 acre) with 125 square feet for each additional animal. Conventional deer control fences have been vertical 8- to 10- foot (2.4 to 3.0 m) woven wire type (McAninch et al. 1983). Some fences have included a 2- to 3-foot (0.6 to 0.9 m) overhang of barbed or smooth wire at the top (McAninch et al. 1983). Eight-foot (2.44 m) fences have been installed along high-speed highways to reduce

woven wire fences are considered to be “deer-proof” (Palmer et al. 1985).

Feldhammer et al. (1986) found a 106-inch (2.7 m) high fence reduced the number of deer groups on interstate right-of-ways compared to a fence 2.2 m (86-inch) in height, but it was not effective in reducing the number of road-kills. Falk et al. (1978) reported a modified 2.26-meter (88-inch) fence along highways was an effective barrier to deer when in good repair. The 2.26 m fence was not totally deer proof, even when the underside was made deer proof by eliminating all gaps between the ground and fence. Bellis and Graves (1971) showed significant numbers of deer jumped an intact, fully repaired 2.2 m (86-inch) fence. Topography, habitat type, and food availability have been reported as possible influences on the relative effectiveness of fences in influencing deer movements (Feldhammer et al. 1986; Falk et al. 1978; Bellis and Graves 1971; Puglisi et al. 1974; Carbaugh et al. 1975).

Falk et al. (1978) found deer crossed under fences through gaps less than 23 cm (9 inches) in height. Deer have been shown to be able to squeeze through gates or under fences with as little as 10-15 cm (4-6 inches) of space, and these spaces have been identified as weak spots which require particular attention (Transport Canada, undated).

Palmer et al. (1985) reported a vertical 5-wire electrified fence 1.47 m (58 inches) in height was an effective deer control fence. Hygnstrom and Craven (1988) found single strand electric fences are effective at reducing deer damage in crop fields. Porter (1983) used a single strand of electrified wire 0.9 m (36 inches) above the ground and baited with peanut butter to minimize deer depredation on apple seedlings by behaviorally conditioning animals. In certain situations, “max flex,” an electrified 6-strand high tensile wire fencing of 1.5 m (60 inches) in height can be effective in protecting orchards and small crop fields, when constructed and maintained correctly, according to the manufacturer.

Researchers have also documented fence heights and construction features that allow free movement of deer. Anderson and Denton (1980) stated that a standard 1.1 m (42-inch) fence on level ground could generally be negotiated by adult deer with little apparent difficulty. Andrew et al. (1997) described fences built of steel pipe or rebar which allowed protection of natural watering sources from feral equines while allowing access to mule deer and bighorn sheep.

Most studies have focused on fencing strategies designed to prohibit significant ingress or egress of deer from habitats of interest. Little research has been directed towards the relationship of fence height on individual white-tailed deer movements and survival. High fences can block traditional travel corridors and force deer into situations where vulnerability is high, such as highways or railroad beds (Reed et al. 1974); increased deer mortality and conflicts with humans may result. Fences installed in Botswana and Namibia, Africa, to prevent the spread of cattle lung disease have been linked to increased mortality of free-ranging wildlife herds (Davies 1997). Holzenbein and Marchinton (1992:150) observed two occasions when dogs killed a deer “when a fence hindered the deer’s escape.” Six of 10 predator kills were found close to a fence in their study. The United States Federal Courts have established precedence, under the Unlawful Enclosures Act (USC Annotated Title 43, Public Lands, Chapter 25 s 1061), for fences not to

impede animal movements to critical winter range on public lands. Neilsen et al. (1997) noted fencing with openings impacted the movement of yearling bucks during the first year of a study of an 800 acre enclosure. The emigration rate of yearling bucks from the partially-opened enclosure was lower than the emigration rate of bucks in unfenced conditions (Neilsen et al. 1997).

Disease

The issue of disease in penned deer operations carries with it more serious consequences. Modern-day deer farming usually involves the importation/shipping of farmed deer on a regular basis. Deer are introduced to resident herds in an attempt to increase genetic vigor or instill certain desirable physical characteristics such as large antlers or body size. Often “trophy” class animals are imported and released into high fenced areas prior to a scheduled “hunt.” Time periods from release to harvest can range from a few minutes to several weeks. The importation/translocation of deer from long distances can introduce diseases and parasites. Rhyan et al. (1995) documented the introduction of TB into native, free ranging wildlife in Montana via captive elk. Temple and Cook (1999) describe the introduction of CWD into white-tailed deer in South Dakota via captive elk. Others have documented translocation of parasites (Lankester and Fong 1986, Glover et al. 1990). The introduction and consequent dissemination of diseases to domestic livestock, native wildlife populations, and to humans is perhaps the most serious issue concerning deer farming and high fence operations. Often diseases are difficult to diagnose, results are not always accurate, and the scientific community may not have complete knowledge of the disease, and therefore may not install adequate regulatory controls.

That diseases and parasites can be translocated with exotic or game farm animals has been demonstrated on numerous occasions (Ferris et al. 1961, Thornton et al. 1973, Davidson et al. 1985, Lankester and Fong 1986, , Glover et al. 1990, Rhyan et al. 1995, Temple and Cook 1999, Thompson and Willer 1999). Despite regulations to control interstate movement of diseased livestock there are not always comparable tests and procedures for game farm wildlife (Lanka et al. 1992), or the tests are not always accurate. Samuel (1987) suggested that quarantine testing may not be adequate for detecting parasites. Quarantine requirements may also miss diseased animals that are not showing clinical symptoms of diseases and enforcement of proper quarantine procedures is difficult (Gajadhar et al. 1994). In some cases animals may not demonstrate clinical signs of a disease but can be carriers of low level infections (Joe Gaydos, Southeast Cooperative Wildlife Disease Study, personal communication) that can spread among other animals. For some of the most serious diseases it is difficult to prove they do not exist in a given deer herd. Often only the healthiest-appearing deer are moved and therefore tested. It is entirely possible a deer herd could harbor infective animals that go undetected unless all animals are tested. The only way to reduce uncertainty of disease presence would be to test all deer periodically and to test all animals removed by hunting or slaughter.

A basic principle of animal disease ecology is that disease manifestation may not occur until animals are stressed through artificial crowding, severe environmental conditions, or other diseases. Mackintosh and Henderson (1984) suggested that yersiniosis in red deer is predicated by stress. In some cases disease or parasites do not impair a host species (or even host subspecies) because they have evolved with and adapted to the pathogen. However, when

diseases or parasites are introduced to new areas and new species the impacts can be devastating. Examples include meningeal worm in moose and caribou, nasal bot and warble flies in red deer in New Zealand (Massey 1987) and different strains of epizootic hemorrhagic disease (EHD) in white-tailed deer in Missouri. Circumstantial information suggests imported northern white-tailed deer may be more susceptible to EHD than resident Missouri whitetails. (Vic Nettles, Southeast Wildlife Disease Study, personnel communication). The movement of some wildlife diseases and parasites from captive ungulates to wild free-ranging deer can occur even though fences remain intact (Rhyan et al. 1995, Temple and Cook 1999). Diseases and parasites can be transferred through 1.) insects, slugs or snails that move in and out fenced enclosures, 2.) nose to nose contact, through fences, between penned and free ranging animals or, 3.) movement of other animals (e.g. coyotes, raccoons, opossums) in and out of fenced areas.

There are a number of diseases and parasites that could cause problems with native deer and/or the livestock industry in Missouri. The likelihood of these diseases becoming established in Missouri is greatly enhanced when deer and other cervids are imported. Although there are regulations designed to control the spread of such diseases many of the animals involved in the current bovine tuberculosis (TB) outbreak in North America passed tests and were certified disease free (Lanka et al. 1992). In addition to TB, chronic wasting disease (CWD), bovine brucellosis, anaplasmosis, Johne's disease, and malignant catarrhal fever are also linked to exotic and captive cervid animal propagation and have the potential to impact native wildlife. The recent discovery (1993) of deer adenovirus in California (Woods et al. 1996) is another example of a new disease that could impact Missouri wild deer via the inadvertent translocation of captive deer. Also, a new form of malignant catarrhal fever was recently diagnosed in captive white-tailed deer (Li et al. 2000) suggesting there are likely other undiscovered diseases. Because it may be difficult to detect low level diseases in wild populations (Beringer et al. 2000), in and outside of fences, these diseases can be spread through translocation. Detection may occur only when diseases infect new hosts or a stress-induced epizootic occurs.

The following discussion of disease issues in captive cervids will be limited to two diseases. Impacts from these diseases have the greatest potential for economic loss resulting from infection of domestic livestock or humans and loss of recreational opportunities for hunters because wild white-tailed deer populations could be greatly reduced or their meat deemed unfit for human consumption.

Bovine tuberculosis (TB) is a serious disease infecting domestic livestock, wild animals, and people. TB is caused by a slow growing bacterium that is persistent under varying environmental conditions. Because not all infected animals test positive for the disease there is potential for TB to go undetected in wild or feral populations. TB has existed in significant proportions in captive deer in New Zealand, Canada, Australia, Great Britain, and the United States (Vaughan et al. 1994, Beatson 1985, Livingstone 1991, O'Neil 1990). The disease has spread from captive deer to domestic animals in Alberta, New Brunswick, Ontario, Saskatchewan, Colorado, Florida, Michigan, Montana, Nebraska, New Jersey, New York, Oklahoma, Pennsylvania, South Dakota, Washington, and Wisconsin (Lanka et al. 1992, Vaughan et al. 1994). The disease has been documented in feral or wild animal populations in Michigan, Australia, and Great Britain, (Lanka et al. 1992, Coon et al. 1999). Wild swine infected with bovine TB have been documented in the

United States and other countries (Davidson and Nettles 1988). To date only one human has been infected with TB associated with captive cervids (Essey et al. 1991). There is no treatment or vaccine for TB in wildlife. The spread of TB from captive ungulates to domestic livestock or wild deer could result in tremendous economic loss to the cattle industry and revenue generated through hunting. If TB becomes established in free-ranging white-tailed deer or other cervids it may be impossible to eradicate (Essey 1991) and may act as a reservoir continually reinfecting domestic animals and other wildlife. New York spent over \$650,000.00 to eliminate TB and reacquire a TB-free status; Virginia estimated costs would exceed \$8 million if TB-free status were compromised. Michigan is spending an estimated \$16 million dollars annually to contain the spread of TB between free ranging deer and cattle (Michigan Department of Natural Resources 1999). Missouri has one of the largest cow/calf operations in the United States and losing TB-free status would be very costly.

Recently, TB in Michigan has demonstrated that whitetails are capable of spreading the disease to other deer and wildlife species. The disease is prevalent in the northeastern lower peninsula where deer feeding and baiting is popular and there is a large number of penned deer operations. While the origin of the disease is unknown, TB in Michigan has been documented in cattle, white-tailed deer, black bears, coyotes, red fox, bobcats, and raccoons. It is not known whether these “spill over” species will be able to act as a reservoir to maintain TB in wild populations. However this has happened in New Zealand where brush tailed opossums maintain the TB organism and in Great Britain where badgers maintain the organism (Woodford 1993).

Chronic Wasting Disease (CWD) is a fatal neurologic disease of elk, mule, and white-tailed deer. Both CWD and Bovine Spongiform Encephalopathy (BSE) belong to a family of disease syndromes called transmissible spongiform encephalopathies that cause deterioration of the brain. Similar diseases infect cattle (“mad cow”, BSE), sheep (scrapie), mink (transmissible encephalopathy), and humans (Creutzfeldt - Jakob disease). The causative agent for each of these diseases is a prion, or proteinaceous infectious particles. Prions seem to be able to transform normal protein into a mutant form that prevents the protein from performing its normal function. This ultimately kills the cell. The loss of nerve cells creates small holes in the brain thus the spongiform description. No link between CWD and disease in humans has been reported, however the lack of knowledge about the disease is cause for concern.

The primitive nature of prions makes them extremely resistant to heat, cold, disinfectants and the host's immune system. The disease is thought to be 100% fatal and there is no antemortem test. CWD is difficult to eradicate from penned settings. An infected herd of deer and elk in Colorado were killed and buried. Soil inside all of the pens was turned over, all structures and pastures were sprayed with a disinfectant repeatedly. A year later the pens were restocked with wild elk and two of these animals contracted CWD within the next five years. CWD was reported in wild deer that may have had contact with infected captive animals. CWD has been documented in wild deer and elk in Colorado and Wyoming and captive elk in Colorado, Nebraska, South Dakota, Montana, Oklahoma and Saskatchewan. Recently Canada banned importation of deer or elk from the U.S. because of concerns about CWD. Currently CWD occurs in 5-6% of wild deer and 2-3% of wild elk in northeast Colorado and south-central Wyoming. Incidence in wild cervids from other areas has not been reported. The long incubation period and lack of an antemortem test

make CWD monitoring difficult. If a real or perceived link between CWD and human disease occurred and became established in wild deer in Missouri, it could change the way we manage deer forever.

In a worst case scenario interest in deer and deer hunting could diminish. Some hunters would continue to pursue and harvest deer for sport or for antlers only - much to the dismay of the nonhunting public. Doe harvest would decrease dramatically as hunters would be concerned about getting the disease from eating deer. Managing deer with hunting would no longer be adequate and landowners would have to be given permission to kill deer year-round. Given the apathy with which many farmers approach out-of-season kill permits in Missouri, this approach probably wouldn't control deer populations. Other more intense measures would be required. Permit sales would at best diminish and at worst be virtually nonexistent. MDC would be forced to control deer operationally on public lands and perhaps on private ground. Revenue generated from permit sales would sink while costs to manage deer would rise. Land values in some areas could decrease because some hunters would no longer have a need for recreational rural property. Hunting pressure would increase for other species. Persons and businesses that cater to deer hunters would suffer financial set-backs. Clearly whitetails would no longer be the featured species it now is in Missouri. Similar implications exist for the cattle industry in Missouri if CWD was transferable to cattle.

Prohibiting high fences will not eliminate diseases and parasites in white-tailed deer in Missouri. However, the conditions under which white-tailed deer and other ungulates are "farmed" in high fenced situations, i.e. high density of ungulates per acre of habitat, feeding operations resulting in close animal contact, and the continual translocation and importation of animals for hunting and breeding greatly increase the probability of disease and parasite introduction. The movement of these "farmed ungulates" is largely through uncontrolled and unorganized marketing channels (Vaughan et al. 1994). Although all imported deer are required to have a certificate of veterinary inspection from the United States Department of Agriculture, a majority of imported deer in at least two counties of Missouri are never tested (Larry Evans, Missouri Department of Conservation, personal communication). Oftentimes "shooter bucks" are brought directly to Missouri from other states and released one or two days before a particular scheduled hunt (anonymous, personal communication). Diagnostic tests for certain diseases in deer and other ungulates are not always reliable and have, in the past, failed. The impacts of a serious disease becoming entrenched in wild free ranging deer would be very serious and costly to both our resident deer herd and traditional livestock operations.

The importation of some furbearer species (coyotes, foxes, raccoons, skunks) is prohibited because of potential disease introduction and transmission in Missouri. The disease concern is primarily with raccoon rabies and a tapeworm parasite that infects foxes and coyotes. The implications are that an imported strain of rabies could devastate the state's furbearer population and infect domestic animals and possibly humans. This is a scenario with concerns similar to those we have with the importation of deer; except that it could be argued that the ramifications of some of the cervid diseases are even more far-reaching than those of rabies and distemper.

SOCIAL ISSUES

Note: This section contains portions of a Fencing Issue Paper authored by Pete Squibb and William Moritz for the Michigan Department of Natural Resources. Used with permission.

There are situations where fences that exclude deer and other wildlife are in the best interest of the public. One situation utilizes high fences to protect public health, safety, and security. Another uses high fences to protect agricultural, horticultural, or silvicultural crops.

Most fences constructed for the purpose of protecting the health, safety, or security of humans are located in urban and suburban environments. Highway corridors, airports, warehouse complexes, test tracks, housing complexes, antenna fields, schools, government complexes, urban and suburban parks and recreation sites, and certain water sites are examples of areas which may mandate the use of perimeter fencing to provide protection or security. Size of these enclosures is extremely variable. They can range in size from a few hundred square feet, for a power substation, to hundreds of acres needed to enclose and protect industrial sites, test tracks, and airports. Size of enclosures for crop protection depends upon the value of the crop(s) protected. Most enclosures used for crop protection are relatively small due to high costs of installation (Caslick and Decker 1979) and are located in rural settings.

Social effects of high fences related to wildlife are relatively easy to describe but hard to quantify. Growers of high value crops sometimes will use expensive measures such as high fences to reduce crop damage by excluding deer (Fritzell 1998). Impacts on neighboring properties are difficult to measure. Attempts to hold deer on personal property to protect bucks and does include high fences, supplemental feeding, and habitat management. Many people feel that intensive deer management on small properties will necessitate high fences to minimize loss of prized animals to hunters on surrounding lands. Obviously, the potential for landowner conflict is greatest when intensive deer management occurs adjacent to high value crops, but conflicts can occur whenever land management goals are different on adjacent properties (e.g. agriculture and recreational lands side by side).

Conflicts center on the public ownership of wild animals that live on or cross private lands, and the private citizen's "right" to control his/her property (Kroll, undated). Wildlife management is a partnership between the state and private landowners. As partners, each party has responsibilities to ensure wildlife populations are at satisfactory levels for the landowner and for the general public. The state has a legal obligation to ensure viable populations of animals. It also seeks to provide diverse recreational opportunities for citizens of the state, regardless of whether those citizens own land or not. However, this does not mean that the state should maintain populations at levels that cause undue hardship to landowners or force landowners to allow access to public resources found on their private property.

The landowner has the right to manage his/her property for a variety of intended purposes. The landowner can manage habitat as long as actions do not threaten the existence of a wildlife species. A lot of what landowners do is detrimental; a landowner can manage any way he/she

sees fit even if it results in no wildlife on their property. Landowner environmental impacts are regulated primarily through the federal and state environmental protection laws, while restrictions on harvest are controlled through license issuance, season lengths and daily (or seasonal) bag limits, all of which are controlled by the state. The landowner affects harvests of animals through control of hunting access.

The relationship grows cloudier as the tools of public wildlife management, e.g. habitat management and population control through license issue, are voluntary for the private land manager. The individual landowner has an opportunity to modify management for species that are problematic or desirable, as long as the management practice is legal. As an example, some landowners are using self-imposed restrictions on the type of antlered bucks that can be harvested. These restrictions are greater than those of state law and represent a desire to produce older bucks with larger antlers. Other landowners may decide not to harvest any antlerless deer on their property, even though antlerless licenses are available to stabilize or reduce deer numbers within a deer management unit.

Thus, the partnership between public wildlife management and the private landowner is flexible with restrictions on what actions are taken by each partner. The state must allow landowners considerable freedom to do what they want on their personal property as long as the actions do not threaten population viability and public ownership of individual animals. When a person places a fence that limits free movement of wildlife, a publicly owned resource, that landowner has essentially taken those animals from the rest of the citizens of the state. Although it could be argued that a large enough fenced area would incorporate a whitetail's entire home range, the fence also limits dispersal and migratory movements of future offspring. Radio telemetry studies in Missouri indicated that 77% of male fawns and 25% of female fawns moved from natal home ranges averaging more than 8 miles before establishing their permanent home range (Hansen et. al. 1997). Also, given the typically high densities of deer inside of enclosures, it is likely that rates of dispersal from these areas would be higher than we observed in free-ranging wild deer.

The legality of removing live deer from the wild varies by state. Current Missouri law requires landowners applying for a BGSA's permit to remove wild deer from properties that are being fenced. Conservation agents inspect fence integrity, height, space, and decide whether the landowner made a satisfactory attempt to drive all wild deer from fenced areas prior to introduction of imported animals. Given the difficulty of removing all deer from a large parcel of land and the fact that MDC does not take steps (e.g., an aerial survey over snow) to confirm absence of deer, landowners likely "take" deer from the public. Administration of BGSA's, periodic inspections by field personnel, investigations of illegal activities and other calls require considerable investment of MDC resources. Missouri landowners currently can erect high fences on their properties without being considered BGSA's, provided they follow statewide harvest regulations.

In Michigan, deer can be taken from public domain under conditions established by the Natural Resources and Environmental Protection Act, 1994 PA 451. In Wisconsin, pending legislation would require all new enclosures to be cleared of all native wild animals (Tom Solin, Wisconsin Department of Natural Resources, personal communication *in* Mortitz 1999). Minnesota does

not recognize pens that enclose deer as a method of takings (David Schad, Minnesota Department of Natural Resources, personal communication *in* Moritz 1999). In Texas, free-ranging deer enclosed by fences are still considered community property and thus fall under statewide hunting regulations (Jerry Cooke, Texas Parks and Wildlife, personal communication *in* Moritz 1999).

Interest in hunting inside of enclosures has increased. “Baby boomers” with limited time and much disposable income are seeking these hunts because they nearly ensure success, offer the opportunity to take a Safari Club International record book animal (currently Boone and Crocket and Pope and Young record organizations do not recognize animals killed in enclosures) and don’t require a trip to the mountains or a week of preparation. This style of hunting is also attractive to persons with disabilities, or new and inexperienced “hunters.”

MDC is charged with management and biological issues but we must also be aware of public perceptions towards activities we regulate. Because we regulate BGSA’s in Missouri, the public may believe we condone these activities, and may not distinguish enclosure shoots from the more traditional hunting for food and recreation. Whether the nonhunting public can or tries to distinguish “canned hunts” from a large enclosure hunt from hunting free ranging wildlife is not known. Peyton (1998) suggests the public may not be able to differentiate among various forms of hunting. News media have targeted the practices used at some fenced shooting operations for controversial news stories. Most notably the television program “Guns of Autumn” aired as an anti-hunting show and used footage taken inside fenced shooting operations in Texas. Recently Dateline, another television news magazine, featured shoots inside of enclosures (<http://www.msnbc.com/news/382123.asp>) as part of a story reflecting the lack of ethics associated with shooting game in fenced enclosures. This style of “hunting” has raised public awareness and concern over recreational hunting and has given hunters a negative image. Public perceptions of hunting ethics and fair chase have been the impetus for ballot initiatives in Michigan and Colorado. Ballot initiatives to control or regulate shooting inside of high fences could adversely affect the future of hunting wild free-ranging wildlife.

Should agencies legislate ethics as they relate to hunting? Certainly, much of ethical hunting depends on an individual’s perception of what is ethical and what constitutes fair chase. Although some hunters may shoot a turkey off a roost or a deer over bait, others consider such activities unethical. However, there are some activities that the general public will not accept or tolerate. MDC allocates our wildlife resources and opportunities through seasons and restrictions on methods of taking game. MDC also legislates ethics when certain behaviors mar the image of hunters or cause conflict among user groups. Examples of ethics legislation include a 10 shot limit when hunting geese in certain zones, shotgun plugs, laws prohibiting hunting over bait or using some electronics to aid in the harvest of game species. These rules may not affect wild animal populations from a biological perspective but impact hunter behavior and ethics. Where do we draw the line? We cannot force our beliefs and ideas on the public. It seems the hunting and nonhunting public expects us to establish some rules.

We know how the public feels about certain issues. For example, we know that 85% approve of hunting for meat and that 80% disapprove of trophy hunting (Kellert 1979). Hunting captive cervids is about killing a trophy without having to take the time and effort required to accomplish

this same feat in a wild unfenced setting. People that pay to shoot animals in these enclosures do not usually have an interest in killing antlerless animals. Captive female whitetails in Missouri enclosures quickly become overabundant and must be trapped and moved, killed and donated, or killed and buried (personal obs.) to prevent overpopulation. This past summer a BGSA in Missouri killed over 50 female white-tailed deer and buried their carcasses in a ditch on the property (Personal observation, 1999). Certainly these activities would not be legal for public resources and would likely be viewed as wanton waste by the public.

Closely related to the fair chase issue is how animals are treated in these enclosures - animal welfare. Many wild cervids especially white-tailed deer are susceptible to stress from handling (Beringer et al. 1996) and translocation (Beringer, unpublished data). Whitetails exhibit high levels of cortisol when being captured and handled (Denicola 1997) High animal densities per acre often associated with captive cervid operations may also contribute to high stress levels. Animals may be stressed from social interactions because they are at or above carrying capacity for the habitat (McCullough 1979). The high EHD mortality observed in deer pens in Missouri suggests that perhaps stress played a role in the recent epizootic of hemorrhagic disease we experienced in Missouri.

RECOMMENDATIONS

The effect of fences on the ecology of white-tailed deer occurs at different scales and levels. Numerous studies demonstrate that a well-maintained fence of sufficient height is an effective barrier to deer movement and allows for efficient management of penned deer. Researchers have also documented fence heights and construction features that allow free movement of deer.

There are two general situations where fences specifically designed to restrict deer and other wildlife movements may be in the best interest of the public. The first situation utilizes high fences to protect public health, safety, and security. The second use of high fences is to protect agricultural, horticultural, or silvicultural crops. These fences, by nature of construction, are designed to exclude deer or other wildlife.

High fences can affect deer populations by reducing habitat availability, increasing mortality, disrupting normal movements, or combinations of these factors. Direct loss of habitat by exclusion can occur at both small and large scales. The importation and translocation of cervids associated with BGSA's pose a serious disease concern. The introduction and dissemination of diseases to domestic livestock, native wildlife populations and humans could create a tremendous economic burden and could limit our ability to manage free-ranging white-tailed deer. Some diseases and parasites can be transmitted from captive animals by nose to nose contact through

fences, on snails, slugs and insect vectors, and from movement of animals not limited by an eight-foot fence. Importation of raccoons, foxes, coyotes, and skunks is prohibited in Missouri due to disease and parasite concerns similar in scope and magnitude to cervid diseases. **Wildlife Division recommends a Missouri state ban on the importation of white-tailed and mule deer. Exportation would still be legal and subject to rules and constraints established by USDA.**

Current confinement standards for white-tailed deer held under Wildlife Breeder or Big Game Shooting area permits have no biological basis. Deer can be held at densities that may contribute to high stress levels and raise animal welfare issues. **Wildlife Division recommends a review of pen standards used in other states and zoo facilities. Also, we suggest research be conducted to determine appropriate spacing and density requirements, based on stress and physiological testing, for deer held under wildlife breeder permits or confined on BGSA's for existing operations that would be exempt from the ban.**

[Potential conflict centers on the public ownership of wild animals that exist on private lands. The state must observe the private citizens right to control his/her property *as long as the actions do not threaten the existence of a wild species or do not privatize wild animals.* The current fence regulation in Missouri allows landowners to erect high fences that limit free movement of whitetails and other wildlife. This action essentially takes wildlife from the public because some species are no longer able to move onto adjoining properties and dispersal movements are prevented. **Wildlife Division recommends a ban be placed on hunting white-tailed and mule deer inside of high fences that prohibit free movement of deer of the state of Missouri.]***

Hunting inside enclosures does not represent fair chase in the eyes of much of the hunting and nonhunting public. Activities such as hunting over bait, pursuing animals with and shooting from vehicles, year-round hunting, spotlighting deer, and using electronics are legal methods of pursuit inside but not outside of BGSA's. The distinction that these activities can be done only in BGSA's may not be clear to the public. Media have increased public awareness and concern about fair chase and hunter ethics. Ballot initiatives intended to regulate hunting in pens may impact hunting of free-ranging wildlife. High fences have animal welfare implications as animals are kept at densities above social and biological carrying capacities that are maintained only through supplemental feeding. **Wildlife Division recommends a ban on any new BGSA's in the state of Missouri based on disease concerns and the negative image BGSA's portray to the public about fair chase. Further we recommend that hunting methods used inside existing BGSA's be consistent with those listed in the Wildlife Code of Missouri (3CSR10-7.410). We recommend existing BGSA's be allowed to continue operations under current permit holder names but that these permits cannot be transferred after January 1, 2025.**

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APPENDIX A. RESULTS OF DEER ENCLOSURE SURVEY FROM MIDWESTERN AND SOUTHEASTERN STATES

Question 1. Are private individuals allowed to build deer enclosures in your state?

Question 2. Are the deer in these enclosures considered “public” wildlife or private property?

State	Allowed	Public or private property
Alabama	Yes	Public
Arkansas	Yes	Public/Private ¹
Delaware	No	
Georgia	Yes	Public
Illinois	Yes	Public/Private ¹
Indiana	Yes	Private
Louisiana	Yes	Public
Maine	No	
Maryland	No	
Massachusetts	No	
Michigan	Yes	Private ²
Mississippi	Yes	Public
Missouri	Yes	Public/Private ²
Nebraska	Yes	Public
New Hampshire	No (2 “grandfathered”)	Private ³
New Jersey	No	
North Carolina	Yes	Public
North Dakota	Yes	Public/Private
Ohio	Yes	Private
Oklahoma	Yes	Public/Private ⁷
Rhode Island	No	
Tennessee	Yes	Public ⁴
Texas	Yes ⁵	Public
Vermont	No ⁸	
Virginia	Yes	Public
West Virginia	Yes	Public ⁶
Wisconsin	Yes	Public/Private

¹Public, if they are native deer not bought and stocked in the enclosure. If purchased they are considered private property.

²If existing deer, (wild deer) are not removed they are considered public. If they attempt to force deer out prior to

completion of the fence and once completed they reintroduce deer originating from captive stock, then they are considered private property.

³There were not many deer in NH at the time. Deer were imported, area is 25000+ acres and was set up in 1890. The other area is 100 acres and all native deer were driven out before the fenced was closed. They then bought and imported deer. The 100 acre area's permit to import white-tailed deer expires 10/99.

⁴Native deer trapped in a newly erected enclosure are still considered "public" property. Non-native deer (exotics) may be released into the enclosure but native deer may not be released into the enclosure.

⁵There is also a scientific breeding permit for holding privately owned deer in captivity and the new deer management permit to allow capture of wild deer on high fenced ranches, breeding, and return to the wild (2 were issued in 1998).

⁶They are considered private property in shooting preserves but meat cannot be sold only hunting privileges.

⁷Commercial hunting area license allows owner to purchase and import deer (must be marked).

⁸Deer farming (red deer and fallow deer) allowed and regulated by Department of Agriculture.

Question 3. Are there any special regulations pertaining to these deer enclosures?

Question 4. If so, who has the regulatory authority?

Note regulations pertaining to supplemental feeding, fencing, area, disease testing, and importation of deer are listed as comments.

State	Special regulations	Authority
Alabama	No	
Arkansas	No	
Georgia	Yes ¹	DNR Wildlife Research Division
Illinois	Yes ¹⁰	IL DNR
Indiana	Yes	DNR
Louisiana	No (except for importation) ²	
Michigan	Yes	DNR/Dept. Of Ag
Mississippi	Yes ³	MS Dept. Wildlife, Fish, and Parks
Missouri	Yes ⁴	MO Dept. of Conservation
Nebraska	Yes	NGPC/Dept. Of Ag
New Hampshire	Yes ⁵	NH Fish and Game
North Carolina	No ⁶	
North Dakota	Yes	Dept. of Ag/Bd of Animal Health
Ohio	Yes	Div. Wildlife
Oklahoma	No	
Tennessee	No ⁷	
Texas	No ⁸	
Virginia	No	
West Virginia	No ⁹	
Wisconsin	Yes	DNR/DATCP

¹**Supplemental feeding:** no hunting over bait. Can feed but not hunt over it (within 300 yards) **Area:** 300 acre minimum.

²**Importation** not allowed except by authority of LAWF department secretary.

³**Importation** is not allowed.

⁴**Fencing:** 8 foot, **Area:** 320 acre minimum, **Disease testing:** Dept. of Agriculture regulations before they can be brought in from out-of-state, and **Importation:** imported deer must be captive raised and cannot be released into the wild.

⁵**Fencing:** 8 foot, **Area:** 50 acre minimum and 500 acre maximum (25,000 acre area grandfathered). Also 2,000 square feet per animal minimum (this translates into a maximum deer density of 22 deer per acre), and **Disease testing:** goal is accredited herds, currently test only dead animals.

⁶Special regulations for exotics, not for white-tailed deer. Exotics may not be hunted.

⁷Agriculture has regulatory authority over non-native deer in enclosures.

⁸**Disease testing:** must meet USDA and state health agency requirements if transported from outside the state and **Importation:** transportation permit from TPWD required for any deer brought into state.

⁹Special regulations for licensed shooting preserves (DNR is regulatory authority).

¹⁰Special regulation require that all deer be removed prior to stocking private deer, **Fencing:** 9 foot.

Question 5. Is hunting allowed in these enclosures?

Question 6. If so, are the hunting regulations the same as unfenced areas?

Question 7. Are fenced areas allowed to participate in special deer management programs?

Question 8. Would fenced areas be allowed to get an out-of-season kill permit for deer damage?

State	Hunting	Same	Participate	Kill Permit
Alabama	Yes	Yes	Yes	Yes
Arkansas	Yes	Yes	Yes	Yes
Georgia	Yes	Yes	N/A	No
Illinois	Yes	Yes/No	N/A	Yes ²
Indiana	Yes	Yes	No ²	Yes ²
Louisiana	Yes	Yes	Yes	No
Michigan	Yes ²	No	N/A	No
Mississippi	Yes	Yes	Yes	Yes
Missouri	Yes	Yes/No ¹	N/A	Yes/No ²
Nebraska	Yes	Yes/No	N/A	N/A
New Hampshire	Yes	No ³	N/A	No
North Carolina	Yes	Yes	Yes	Unknown
North Dakota	No	No	No	N/A
Ohio	Yes	No	N/A	No
Oklahoma	Yes	No ⁴	Yes	No
Tennessee	Yes	Yes	N/A	Yes
Texas	Yes	Yes	Yes	Yes
Virginia	Yes	Yes	Yes	Unknown
West Virginia	Yes	Yes	N/A	Yes
Wisconsin	Yes	No ³	No	N/A

¹public herds yes and private herds no.

²not required, these deer are considered private property.

³no hunting regulations apply, they set their own seasons and bag limits.

⁴commercial hunting area license areas can hunt out-of-season (must have documentation regarding purchase and be marked so as not to be mistaken for native deer).

Question 9. Is supplemental feeding allowed?

Question 10. If so, what percent of these areas are conducting a supplemental feeding program?

Question 11. Is commercial hunting allowed in these enclosures? Note: average price is note in comments.

State	Feeding	Percent	Commercial
Alabama	Yes	>=80	Yes ¹
Arkansas	Yes	Estimate most	Yes ²
Georgia	Yes	Unknown	Yes ³
Illinois	Yes	Unknown	Yes
Indiana	Yes	All	Yes
Louisiana	Yes	Unknown	Yes ²
Michigan	Yes	All	N/A
Mississippi	Yes	>=75	Yes ²
Missouri	Yes	Most	Yes ⁴
Nebraska	Yes	Unknown	Yes
New Hampshire	Yes	100	Yes ⁵
North Carolina	Yes	All probably are	Unknown
North Dakota	Yes	Most	No (commercial shoots)
Ohio	Yes	Unknown	Yes
Oklahoma	Yes	Unknown	Yes ⁶
Tennessee	Yes	33	Yes
Texas	Yes	>75	Yes ⁷
Virginia	Yes	100	Yes ⁸
West Virginia	Yes	100	Yes ⁹
Wisconsin	Yes	Most	Yes

¹total number of enclosures operating commercial business is unknown. Cost of a trophy buck is up to \$5000.

²unknown

³unknown and \$2500 for a 3-day hunt.

⁴trophy buck \$5500-\$7000 (lodging, etc. included).

⁵one is members and guests, the other price is based on size of deer taken (8 points \$2200, 12 points \$6500, etc.).

⁶if the owner possesses a commercial hunting area license. Also animals taken out-of-season must have documentation regarding purchase and be marked so as not to be mistaken for native deer.

⁷no data, varies greatly, trophy buck averages \$1000-\$5000 depending on management intensity, antlerless deer \$200-\$500.

⁸only one (1) enclosure operates a commercial operation, \$2500 for three (3) days (includes food and lodging), B&C <=160 \$3500 and B&C >160 \$4500.

⁹is thought all current enclosures are for private use of the owner and friends. Can charge access/trespass fee but cannot charge a separate fee for individual animal like shooting preserve.

Question 12. Has your state ever legally evaluated whether or not commercial hunting fees constitute "selling" wildlife?

Question 13. Are enclosures allowed to import deer from out-of-state? Note: importation regulations are listed as comments.

State	Evaluated	Import
Alabama	No	No
Arkansas	No	Yes ¹
Georgia	No	No
Illinois	No ²	Yes
Indiana	No	Yes
Louisiana	Yes ²	No ³
Michigan	No	Yes
Mississippi	No	Yes ⁴
Missouri	No ⁵	Yes
Nebraska	No	Yes
New Hampshire	No	No ¹¹
North Carolina	No	Yes ⁶
North Dakota	No	Yes
Ohio	No	Yes
Oklahoma	No	Yes ⁷
Tennessee	No	No ⁸
Texas	No	Yes ⁹
Virginia	No	No
West Virginia	No	No ¹⁰
Wisconsin	Yes	Yes ⁹

¹Arkansas Game and Fish Commission requires a bill of sale. Arkansas livestock and poultry requires a health certificate when animal comes across state line into Arkansas.

²Legal staff states that they are not selling wildlife. They are selling the hunting opportunity, similar to a landowner leasing hunting rights.

³Individuals desiring to import deer would have to apply and qualify for a deer farming license.

⁴Permit required from MDWFP but permits have never been issued.

⁵These deer are captive born and considered private property.

⁶Must acquire legally a propagation permit (whitetails and exotics). Animals may not be hunted, including offspring. NCDA permit also required.

⁷Must have import permit, health certificate, and proper documentation (e.g., purchase from licensed breeder). Animals must be marked.

⁸Non-native deer can be imported.

⁹Must be purchased from a legal source (pursuant to other state's laws) and adhere to any federal or state health requirements.

¹⁰Shooting preserves are allowed to import non-native cervids which are considered private property. Cervids must be from a USDA Tb accredited herd and have a negative cervical Tb and brucellosis test no more than 30 days prior to entry.

¹¹Small enclosure permit to import expires 10/99.

Question 14. Number of enclosures, smallest, largest, and average size. NOTE: area in acres.

State	Number	Smallest	Largest	Average
Alabama	50+	7	3200	867
Arkansas	Unknown	Unknown	Unknown	Unknown
Georgia	Unknown	150 ¹	2000	Unknown
Illinois	4	200	1200	600
Indiana	1	120-150 ^{pets}	1200	Unknown
Louisiana	3 ²	500	2000	Unknown
Michigan	700	<1	6,000	<40
Mississippi	2	327	650	N/A
Missouri	15 ^{all private}	373	2000	Aprox. 700
Nebraska	150	1	3500	Unknown
New Hampshire	2	100	25,000	N/A
North Carolina	4-5	200	900	Unknown
North Dakota	Unknown	Unknown	Unknown	Unknown
Ohio	286	Unknown	Unknown	Unknown
Oklahoma	Unknown	Unknown	Unknown	Unknown
Tennessee	3	600	900	766
Texas	Unknown ³	Unknown	Unknown	Unknown
Virginia	2	800	800	N/A
West Virginia	1 ⁴	400		
Wisconsin	544	389 - <10 ac	10 - >500 ac	154 - 10-500 ac

¹grandfathered, acreage minimum is now 300 acres.

²Are not licensed. Most are licensed deer farms (alternative livestock) regulated by Agriculture. Hunting is allowed on deer farms ≥ 300 acres (n=15).

³There were over 4 million acres under high fence in 1994. At the 1997 Texas legislative session, the legislature passed a bill recognizing the right of landowners to build high fence. They also confirmed that white-tailed deer behind high fence are property of the state.

⁴In addition, are two (2) big game shooting preserves.

Question 15. Are private individuals allowed to keep white-tailed deer in “back yard” pens?

Question 16. If so, are these regulated?

Question 17. If regulated, by who?

Question 18. Who owns these deer?

Question 19. Is hunting allowed in these pens?

Question 20. Estimated number of these backyard enclosures? NOTE: area in acres.

State	Allowed	Regulated	Who	Owens	Hunting	Number
Alabama	Yes	Yes	ADCNR ¹	Private	No	Unknown
Arkansas	Yes	Yes	AGFC ²	³	Yes	Unknown ⁴
Delaware	No					
Georgia	No					
Illinois	Yes	Yes	IL DNR	Private	Yes ⁶	Unknown
Indiana	Yes ¹²	Yes	DNR	Private	Yes	100
Louisiana	Yes	Yes	LAWF/LAAF ⁵	Private ⁶	Depends ⁷	⁸
Maine	No ¹⁶					
Maryland	Yes ⁹	Yes	DNR	Private	No	20-25
Massachusetts	No ¹⁰	Yes	Fish & Wildlife	Private	No	3
Michigan	Yes ¹²	Yes	DNR	N/A	Yes	Unknown
Mississippi	Yes	Yes	MDWF&P	Public	Unknown	Unknown
Missouri	Yes	Yes	Dept. Cons.	Public/Private	Yes/No ¹¹	100+
Nebraska	Yes ¹²	Yes	NGPC/Ag	Public/Private	Yes	Handful
New Hampshire	No ¹⁰					
New Jersey	Yes ¹²	Yes	NJDFGW ¹³	Private	No	~20
North Carolina	Yes	Yes	NCWRC/NCDA	Private	No	30
North Dakota	Yes ¹²	Yes	Ag/Bd An Health	Private	Yes	Unknown
Ohio	Yes	Yes	Div. Wildlife	Private	Yes ¹²	Unknown
Oklahoma	Yes ¹⁴	Yes	Dept. Wildlife	Private	Yes	Unknown
Rhode Island	No	Yes	Div. F & W		No	2 or 3 ¹⁵
Tennessee	No					
Texas	No ¹⁶					
Vermont	No ¹⁶					
Virginia	No ¹⁶					
West Virginia	Yes	Yes	WVDNR ¹⁷	Private	No ¹⁸	10
Wisconsin	Yes	Yes	DNR/Dept Ag	Private/Public	Yes ^{>10 ac}	544

¹Alabama Department of Conservation and Natural Resources.

²Arkansas Game and Fish Commission

³Pet requirements, can keep up to 6 deer only if captured by hand from the wild. The individual can keep them, cannot sell or barter. Owner can kill one of these deer in season only.

⁴Many.

⁵LAWF game breeders program (backyard pets). LA Agriculture and Forestry all kinds (livestock program/deer farmers for commercial purposes).

⁶These are domestic deer that are purchased by/from farmers so the licensed individual purchasing them own them.

⁷Depends on their license type.

⁸Game breeders = 107 and white-tailed deer farmers = approx. 15.

⁹Only grandfathered, no new ones.

¹⁰Several were grandfathered when regulations were enacted several years ago. Were allowed to keep existing animals, but cannot acquire new animals or allow existing animals to reproduce.

¹¹Must be at least 320 acres to hunt. Are private big game shooting preserves. Also 100+ un hunted private captive herds.

¹²By permit only.

¹³NJ Division of Fish, Game, and Wildlife.

¹⁴Can't keep wild deer. Deer must be acquired from a breeder and individuals must possess either a noncommercial or commercial wildlife breeders permit.

¹⁵Not licensed. There is permit process but it is not intended for backyard pens.

¹⁶Except licensed wildlife rehabilitators.

¹⁷Law Enforcement section.

¹⁸Hunting is allowed in shooting preserves and shooting preserves may have both a shooting preserve license and a farm game license to raise deer.

