

HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS COMPREHENSIVE DEER MANAGEMENT PLAN

BACKGROUND AND VALUE OF DEER

The white-tailed deer (*Odocoileus virginianus*) is a large, graceful and attractive part of the vertebrate fauna of eastern North America. As a species, the whitetail is appreciated and valued for its beauty, its food value, and for being symbolic of that which is wild and natural in our increasingly tame and synthetic surroundings. People place many values, both positive and negative, on deer. Whether or not we find deer desirable is an opinion based on many factors and experiences. People enjoy photographing, watching, hunting, studying, and simply knowing that deer exist. Some people suffer economic losses because of deer, while others may derive significant income from their presence.

Over the past several decades, the landscape of Howard County has undergone significant change. Extensive suburban development in this once rural landscape has brought about dramatic ecological changes that have affected many species, especially the white-tailed deer. While quite rare in the early 1900's, the whitetail's population has recently reached densities never before seen in many areas. This remarkable recovery is due to effective conservation efforts, the elimination of natural predators and an extremely adaptable animal that is able to take advantage of the habitat changes brought about by urban sprawl and the reduction in agricultural land use. There has also been a reduction in the land area open to hunting, and societal changes have led to fewer hunters going afield. The combination of these factors has resulted in a surge of deer populations around the region.

Development practices utilized over the past several decades have fragmented our forests and farms creating ideal habitat for deer. Deer prefer the edges of forests where they can access both wooded cover and open fields for foraging. Suburban development has greatly multiplied this forest edge, creating what has been described as "a deer factory". Improvements in fertilization and crop varieties on the remaining farms provide an abundance of nutritious food, further enhancing the reproductive capacity of the herds.

Today, the large population of white-tailed deer in Howard County increases the risk of serious vehicular collisions, damages agricultural crops and ruins residential and commercial landscaping. Deer are implicated in the spread of Lyme Disease, and can serve as a vector for other diseases which may affect people, livestock or other wildlife species. Deer are having a negative impact on remaining forests and other natural areas, greatly reducing populations of many plants and destroying habitat for a variety of other animals. This environmental damage constitutes a serious long-term problem that goes unnoticed by the casual observer. Forests in which too many tree seedlings are being consumed by deer lose the capacity to regenerate, and become devoid of key habitat elements which in turn may impact other species. Regarding management decisions on County-owned lands, these natural resources concerns are of the highest priority, since their resolution is inextricably tied to the resolution or elimination of other deer impacts.

THE APPROACH

The type and severity of deer-human conflicts within Howard County varies considerably depending upon many factors, and no single management approach can be expected to prove effective in all situations. As will be seen in this plan, Howard County has chosen to take a comprehensive approach as recommended in the Howard County Deer Task Force Report (July 1999). Using adaptive management, the County will implement a variety of techniques to reduce or prevent damage and maintain the population of white-tailed deer at a level that is ecologically sound and socially acceptable to most citizens. The key to the success of this plan is flexibility in approach and cooperation between various federal, state and County agencies and the citizens of the County. The key players in these agencies will be required to work together to collect data and develop viable approaches to solving these complex management problems.

This management plan is divided into four parts. Part I addresses the collection, centralization and accurate use of information on white-tailed deer, their habits and their impacts on people, landscapes and ecosystems in Howard County. This is the foundation upon which management decisions will be based. Part II is the implementation of a comprehensive public awareness and education program about deer biology, deer-human conflicts and the things people can do to minimize those conflicts. Part III presents various adaptive management alternatives that are available to prevent or reduce deer-human conflict. Part IV describes the current status of the plan's implementation and the program for the current fiscal year. This last section will be updated annually and will introduce any modifications or additions to the plan that may develop.

This plan was developed to represent the interests of all citizens and not just the visions of any special group - including the County government. It outlines a composite of contributions from citizens, business interests, resource professionals and recreationists. At times, the desires and visions of one specific group may be in complete contradiction to those of another group. When such a situation occurs, the plan may not represent a compromise between two opposing views, because such a position may not be possible. Rather, the plan reflects the broadest consensus possible based on information found in the Deer Management Task Force Report and similar works produced by other jurisdictions throughout the range of the white-tailed deer. As stated previously, natural resources protection shall have priority in guiding management decisions on County property.

GOALS

Howard County realizes that a healthy deer population is a valuable component of a balanced ecosystem. The County will seek to:

- C Maintain a stable, balanced deer population within acceptable limits of biological and cultural carrying capacities (1).
- C Positively impact public health and safety as related to deer overabundance.
- C Take measures to reduce the number of deer/auto collisions on County roadways.
- C Develop an educational program to provide citizens with information about deer biology, currently available methods to minimize deer/human conflicts on private property, and ongoing public management activities.
- C Promote the intrinsic value of deer as a natural resource and provide opportunities for people to enjoy and appreciate this beautiful and important animal.

FOOTNOTE: (1) - **Biological Carrying Capacity is defined here as the population level at which an organism begins to impact its physical and biological environment beyond the environment's ability to repair itself. Cultural Carrying Capacity, similarly, is the population level of an organism at which local human populations register more negative responses to the organism's presence than positive responses.**

STRATEGIES

- C Make deer management decisions based upon well-founded best management practices (BMPs) which will:
 - 1) contribute to proper ecological functioning of natural systems
 - 2) maintain populations within the cultural carrying capacity.(see footnote 1 above)
- C Provide a collection of educational material in each branch of the Howard County Public Library, Recreation and Parks Headquarters, and the Cooperative Extension offices.
- C Form a cooperative of relevant agencies (Traffic Engineering/Bureau of Highways, Animal Control, H.C.P.D. Maryland State Highway Administration and DNR) to monitor deer-vehicle collisions and take appropriate measures to reduce them where incidence is highest.
- C Establish and implement policies and procedures for the efficient, humane and safe removal of surplus deer in specific areas when necessary. These policies must address the variety of land uses and diversity of societal and ecological conditions that exist around the County.
- C Every attempt must be made to address deer management issues in as safe and humane a manner as possible.

PRINCIPAL AGENCY ROLES

Deer overabundance and deer management are complex, multi-disciplinary issues. The actions called for to address these issues engage the responsibilities of a number of agencies. These agencies each have an interest in the management of deer and contribute to that management materially in significant ways. The US Department of Agriculture Wildlife Services Program maintains a Nuisance Wildlife Management Team with responsibilities throughout the state. The Maryland Department of Natural Resources (DNR) is charged with the statewide management of all wildlife. The State Highways Administration collects information regarding accidents and

road-killed deer on state highways. Cooperative Extension program areas related to deer include agriculture, natural resources and home horticulture.

Within the County, the Department of Public Works Highways Division and the Animal Control Division of the Police Department are concerned with deer-vehicle collisions on County roads. The Public Information Office is responsible for news, press releases and the production of educational materials. The Department of Recreation and Parks maintains Parks and Open Space throughout the County, and is responsible for wildlife management and natural resources decisions on the local level. The County Deer Management Task Force recommended that “a single point of contact for citizen concerns” be established within the County government. The Department of Recreation and Parks has established a Deer Project Manager position as that point of contact. This manager will not only serve as the main point of public contact on deer related issues, but will assist in the collection of data, production of educational materials, development of management strategies and serve as liaison between the various public agencies, stakeholder groups and the communities of Howard County.

The Howard County Deer Management Task Force also recommended the formation of a “Work Group’ to implement a comprehensive deer management program for Howard County.” This Work Group will consist of representatives from the various state and local agencies which are directly involved with deer management, either as property managers or management consultants to property owners. Maryland Department of Natural Resources, Wildlife and Heritage Division, Howard County Departments of Health, Police and Recreation and Parks, Cooperative Extension, The Natural Resources Conservation Service, and The Washington Suburban Sanitary Commission shall each be represented, and various organizations, experts or citizen groups may be asked to participate from time to time to offer their perspectives and information pertaining to specific topics. This Work Group should meet quarterly, and prepare an annual update of the status of the plan.

INFORMATION COLLECTION AND STORAGE

Sufficient accurate information does not exist on the specific biology and ecology of deer in Howard County. In order to properly evaluate deer impact and make sound management decisions, pertinent information must be available and a mechanism must be in place to collect data in the future. Identifying the relevant information and making it available to the public and to those specifically involved in management decisions is of vital importance to the goals of this plan. Accurate information should be collected regarding deer-vehicle collisions, agricultural, commercial and residential landscape damage, deer-related diseases, and environmental impacts. It must then be accessible to those who need it and stored in a manner which facilitates analysis and dissemination.

Geographical Information Systems (GIS) are extremely useful for recording, processing and presenting this information. The databases and retrieval options available with GIS make detailed analyzing and mapping of deer populations and their impacts possible.

DEER-AUTO COLLISIONS: There are three agencies that receive reports of road-killed deer, the Division of Animal Control of the County Police, Maryland DNR and the State Department of Transportation Bureau of Highways. These data have been collected by the Department of Recreation and Parks since 1998 and compiled into a database that is connected to GIS.

Action 1. Develop a computer log to simplify the analysis of deer-vehicle collisions using GIS technology.

Action 2. Collect and study deer-vehicle accidents reports as investigated by the Howard County and Maryland State Police. This would yield useful information concerning the nature of these accidents and possibly lead to actions to reduce their number and severity.

Action 3. Monitor the effectiveness of the Strieter reflectors installed along Montgomery Road, and plan further installations if warranted.

Action 4. Investigate other preventive measures that may be taken to reduce the risk of deer-vehicle collisions

AGRICULTURAL, COMMERCIAL NURSERY AND RESIDENTIAL PLANT DAMAGE:

Currently, there is no central collection and storage of these data. According to information gathered by the Deer Management Task Force, deer browse damage amounts to hundreds of thousands of dollars in lost revenues annually. This information, plus information on browse-resistant plants, repellents and other methods of reducing crop damage, should be kept and made available for analysis and public use. The Cooperative Extension would be a logical repository for this information, and is the agency most farmers and homeowners turn to for assistance in these matters. The USDA Animal-Plant Health Inspection Service (APHIS) is another source of information and assistance for crop and landscape damage, and should be consulted regularly.

Action 5. In collaboration with APHIS, Cooperative Extension and DNR, collect and maintain records regarding depredations by deer. Report important information periodically so that activities of other agencies can be coordinated.

IMPACT ON NATURAL RESOURCES AND NATURAL AREAS: More documentation is needed on the effects that deer over-abundance is having on natural plant and animal communities in the County. Deer population densities, changes in plant and animal populations, and possible impacts on threatened or endangered species should be monitored. These data are essential for sound deer management decisions on a Countywide basis. The Department of Recreation and Parks, DNR and citizen volunteers from interested organizations should carry out these efforts.

Action 6. Establish protocols and procedures for monitoring deer populations and their impact on the environment. Stay abreast of new technologies and procedures for estimating deer populations. Keep up to date records of populations of plants and wildlife most susceptible to negative impacts from over-abundant deer. Monitor levels of browse damage as it impacts biodiversity and forest structure. Perform periodic surveys of deer health - as indicative of herd health and carrying capacity - by studying internal and external parasites, fat levels and reproductive system health.

PUBLIC INFORMATION AND EDUCATION

The Task Force Report makes clear that public information is an important part of the management of deer-human conflicts in the County. A lack of understanding of deer biology and ecology appears to be compounded by ignorance, misinformation and misconception regarding the available management options. The following actions are intended to better inform and educate the public and to address commonly expressed concerns related to deer.

Action 7. Develop an informational brochure on white-tailed deer in Howard County including information on deer biology, ecology, deer-human conflicts and the management options that may reduce or end those conflicts. This brochure should provide a list of agencies and organizations involved in the issue, and how they may be contacted. It should be distributed throughout the County, in libraries, schools, and government office buildings, and to the Columbia Association and other homeowner's associations. Make it a page of the County's website.

Action 8. Publicize the Nuisance Animal Information Line, a toll-free number (1-877-463-6497) operated by APHIS and DNR, which provides information to homeowners, businesses and farmers on preventing animal damage on their properties.

Action 9. Offer educational programs through Cooperative Extension, the Department of Recreation and Parks, Columbia Association, homeowner's associations and interested organizations such as garden clubs. These programs would include information similar to the brochure, and would also serve as a forum for exchange of new ideas and opinions.

Action 10. Develop and maintain, through the Public Information Office, a media plan to provide timely and relevant information on deer, suited to the needs of the season. These press releases and broadcast segments would be distributed to local newspapers, television and radio outlets, and through the government access cable channel (Cable 15).

- Action 11.** Develop and produce an exhibit display on deer issues and the management plan. This display could be rotated around the library system, public schools and other public buildings, and other locations if requested.
- Action 12.** Hold informational meetings for Government officials so that they will know the scope of the management plan and the proper directions in which to steer public inquiries they may receive.
- Action 13.** Produce and distribute an annual update on deer management activities and information for all interested parties. Note all significant accomplishments and milestones reached during the preceding year.
- Action 14.** Develop a deer management website, with appropriate links, to disseminate information through the increasingly popular medium of the Internet.
- Action 15.** Implement a Deer Management Info-line Number that people can call to learn the latest management activities and policies, and to learn about other resources and information regarding deer and deer-related issues. The recorded message on such a phone line could be updated as necessary, and comments and inquiries from callers could also be recorded.

MANAGEMENT OPTIONS FOR DEER-PEOPLE IMPACTS

Just as there is a variety of ways in which deer impact their surroundings, there is a variety of ways in which these impacts may be addressed. Some alternatives may be more effective in some situations, while other ones may be impossible in certain circumstances. Often, a combination of several management techniques may be necessary. Ten management alternatives were presented in the Task Force Report. This part of the plan will present an overview of these alternatives with their drawbacks and assets. An additional technique - habitat management - will also be presented.

Management options fall into two broad categories. First, population control options are those that actually impact the number of deer in a given area. These methods may be lethal or non-lethal, and have varying degrees of effectiveness and differing time frames within which desired results may be expected. Various ecological, legal and societal factors determine which options may be feasible in any given situation. All population control methods require some amount of long-term maintenance, since deer will continue to reproduce.

Secondly, there are management options do not involve population control. Some of these are means of managing deer behavior or preventing access to certain places by deer. These options are intended to reduce the level of conflict between deer and people without reducing herd size or productivity. The rest of these management practices do more to modify human behavior and perception of the impact of deer.

THE ROLE OF RECREATION AND PARKS IN DEER MANAGEMENT:

The Howard County Department of Recreation and Parks will monitor deer impacts on County Parkland and, in cooperation with the Deer Management Work Group, evaluate, choose and apply appropriate management alternatives from the range of alternatives presented in this plan.

The Department, through its stewardship of over 8,000 acres of parks and dedicated open space land, is a major provider of deer habitat in the County. Responses to the Task Force survey indicate that many deer-human conflicts occur adjacent to parkland. No effort to reduce these conflicts can succeed without addressing the deer populations within parks and open space.

An important issue concerning deer and parkland is the concern over deer impacts on native plant and animal communities. Dense deer populations may negatively impact forest regeneration, natural succession and biological diversity, as well as threatened or endangered species by selective feeding which removes some plants from an ecological community while fostering the spread of other, perhaps undesirable species. Regardless of other concerns, various park agencies have found it necessary to implement deer management programs which include population regulation when it is determined that natural resources are being negatively impacted by deer overabundance. While research continues into other management alternatives, population reduction is likely to remain the only viable means of preventing or eliminating ecological damage caused by overabundant deer.

Under Title 19, Section 19.209 (h) of the Howard County Code, hunting and trapping of all wildlife on parkland is prohibited except for scientific or management purposes with written permission of the Director, and in compliance with all local, state and federal laws. The Department of Recreation and Parks views population management as a resource management tool to be used as necessary to achieve desired goals. It is committed to achieving those goals as safely, humanely and efficiently as possible. Whenever the Department proposes to reduce the population of deer in a specific park property, that proposal will include a format for participation by the surrounding community in the final development and implementation of the reduction strategy.

THE ROLE OF PRIVATE LANDOWNERS IN DEER MANAGEMENT:

The vast majority of deer habitat in Howard County is found on privately held land. The variety of agricultural, forested and residential properties provides an abundance of the diverse "edge" habitat which deer prefer. It also provides for a diversity of management options. All wildlife is considered a part of the public domain, and DNR Wildlife and Heritage Division promulgates legislation and policy for its management statewide. Within the parameters of prevailing law, private landowners are responsible for developing their own deer management strategies. Wildlife and Heritage Division personnel are able to assist landowners in developing and implementing such plans. Educational materials and programs are also available through Cooperative Extension. Once established, the proposed Howard County deer web site and information phone line will also offer useful information to help in the decision-making process. The USDA

Wildlife Services Program is also available to advise and inform homeowners, farmers, tree farmers and others with information on current resources for deer management.

POPULATION CONTROL: NON-LETHAL

CONTRACEPTION

There are four distinct forms of contraceptives: surgical sterilization, oral hormones, implantation of encapsulated hormones, and immunocontraception. Immunocontraception holds the greatest promise of usefulness in deer management, and will be discussed at greater length than the other methods. All of these methods have proven effective in controlling reproduction in captive deer, but none have been approved for use on free-ranging, wild deer. Contraception may prevent further population growth, but it is not a method of population reduction per se. Due to the long life expectancy of un-hunted adult deer, it may take many years before mortality by other means causes a noticeable reduction in a local population that is being treated with contraceptives. Until such a time, browse damage and other negative impacts from overabundant deer would require other means of management.

Surgical sterilization would be a logistical impossibility for large, free-ranging herds, and involves stress and risk of injury to both the deer and its handlers during capture and surgery.

Oral hormonal contraceptives are not useful in free-ranging wild populations because of the logistical difficulty in administration of proper dosages and the risk of introducing abnormal levels of hormones into the food chain.

Hormonal implants, while easier to administer, would still carry the same ecological risk as oral contraceptives. Both hormonal methods also may have behavioral, social and long-term health effects, which have not been determined at this time. Further research may lead to improvements in hormonal contraceptive technology, but use on large, free-ranging herds is likely to remain impossible.

Immunocontraception is a technique in which a naturally occurring protein is introduced into the bloodstream of female deer. This foreign protein stimulates an immune response that renders the doe essentially immune to her own mature egg cells (ova). Thus, whenever an immunized doe ovulates, her immune system immediately attacks the ova, preventing fertilization and pregnancy. Current research shows promise that this technology can effectively control reproduction in captive or insular (island) herds. The method requires certain identification of individual females in order to administer necessary follow up and booster shots. Research is also being done which may eliminate the need for booster shots. This one dose immunocontraceptive would reduce the costs and logistics of administering such a program, but would still require identification of immunized individuals and injection by properly trained personnel under strict safety controls. If immunocontraceptive systems can be perfected and approved for free ranging

deer, the technique may become an important part of an integrated program for controlling population growth. To date, researchers do not believe that immunocontraceptive programs will ever be feasible for free-ranging wild deer. Since fertility control does not reduce population size, some form of herd reduction may first be necessary for the timely resolution of deer overabundance problems by this method.

Action 16: The County should avail itself of all opportunities to support research on deer contraceptive technologies by negotiating agreements with bona fide scientific organizations and scientists to carry out valid investigations on County properties. Educational programs and information packets developed by the County should include up-to-date information regarding the status of contraceptives for deer population management. As contraceptive options are approved, the County should evaluate them for inclusion in the comprehensive deer management plan.

TRAP AND RELOCATE

Trapping deer in an area that is overpopulated and relocating them elsewhere would directly reduce deer-human conflicts in the locale from which they are removed. However, the potential would exist to create the same conflicts at the release site. Numerous capture methods exist, but there are few if any potential release areas that are experiencing low deer populations. While public support for this method may be high in the target community, it would require DNR approval, and finding a release site may prove impossible. Costs for trap and release programs are quite high, sometimes as much as \$900 per deer, and may be prohibitively expensive.

Trapping, tranquilizing and transporting deer presents serious risks for both the deer and those handling them. Technicians are placed at risk of injury from hooved and antlered captives, and may be exposed to accidental doses of tranquilizers. The animals are under extreme stress throughout the procedure, and mortality can be as high as 15 to 25 percent because of capture-induced stress. When released into areas with existing deer herds, mortality rates as high as 85 percent have been documented within twelve months of release.

POPULATION CONTROL: LETHAL

In subsequent parts of this plan, management options that do not affect deer populations are presented. Public Education and the use of repellents, fencing and other such management tools are important components of any plan to reduce deer-human conflicts. However, they do little to solve the problem of deer overabundance, and may actually exacerbate the problem. If deer populations continue to increase, it is likely that deer-related conflicts will also increase. Deer habitat will continue to be degraded by overpopulation until the deer herd itself is eventually impacted. A program of population management can reduce deer-human conflicts and must be considered as a tool in the long-term management of the County's deer herd.

Lethal removal is only one management option. It may not be necessary, cost effective, socially acceptable or politically expedient in all situations. The assumption of this plan is that, where determined to be appropriate, lethal removal programs may be carried out following one of a variety of procedures. Whenever it is decided to use lethal removal, it is further assumed that efficiency, human safety, and the humane treatment of all wildlife are high priority considerations in the implementation of the program. Additionally, it is assumed that all useable deer meat will be processed for food, either by program participants or through donation to charitable organizations such as Farmers and Hunters Feeding the Hungry.

As stated earlier, all population control programs require long-term maintenance. Only complete eradication, which is not recommended nor supported by any known segment of the citizenry, requires no such follow up maintenance. The lowest long-range costs - in money, effort and number of deer impacted - are realized when the population control is initiated aggressively. Computer models of various lethal removal plans demonstrate that, over a 20 year span, the fewest deer need be killed while reaching and maintaining a population goal when the most deer are removed in the initial year of management. Traditionally, regulated hunting has been the preferred approach for lethal management of deer populations. However, the increasing number of sites that cannot be safely opened for hunting requires that other methods of lethal control be developed which are more suited to the suburban landscape.

Criteria for Implementing Lethal Population Controls In County Parks:

Ideally, a set population density, based on scientific research and principles, may appear to be the desired goal of any herd reduction program. Deer density, however, is difficult and expensive to estimate over large areas of diverse habitat such as are found in Howard County. Furthermore, the cultural carrying capacity and actual impact of the deer is likely to vary from one community to another. Assuming that the goals of such a program are to reduce deer-human conflicts, protect natural areas from negative impacts and protect the overall health of the deer herd, then the criteria should be based on the number of complaints and collisions reported, or the extent and severity of browse damage to landscapes, crops or natural areas. Quantitative data can be very difficult to obtain for these criteria, and establishing thresholds from them is also challenging - at what point can it be said that too many accidents have occurred, or too many seedlings have been consumed? Recognizing the inherent subjectivity in this process, the following guidelines serve to identify and prioritize areas where, at any given point in time, population management or reduction may be necessary.

- 1) Data on deer-vehicle collisions, crop depredation, habitat destruction, and landscape damage near a given park will determine where deer conflicts are most severe.
- 2) The types and severity of damage prevalent in an area will be used to prioritize sites for possible reduction programs - Human health and safety, ecological integrity and agricultural losses need more attention than damage to vegetable gardens or landscaping. Observable ecological or agricultural damage indicates a greater likelihood for a need to

remove deer while other management options, such as reflectors or scare devices, may be successful in sufficiently reducing other impacts.

3) Those sites that are of highest priority will, if logistically suitable, be chosen for herd reduction programs. Sites will vary from year to year based upon the determined need. Annually, the Deer Project Manager will assess available data and propose deer management strategies where appropriate.

4) As stated earlier, any specific population reduction proposal will include a format for the participation of the surrounding communities in the development and implementation of the reduction strategy.

REINTRODUCTION OF PREDATORS

Although occasionally suggested as the most natural means of controlling deer populations, reintroduction of large predators is a logistical impossibility. Lack of suitable habitat and the general aversion such predators have for dense human populations make success with this type of program unlikely. Relocation stress and trauma also pose a significant risk to the predators, some species of which are already threatened or extinct in the mid-Atlantic region. Introducing large predators into congested suburban areas would certainly be unacceptable to a portion of the human population. Those raising livestock in the less densely populated areas would also have legitimate concerns about how such reintroductions would affect their interests and livelihood.

REGULATED HUNTING

There are a number of possible methods for employing public hunting (not sharpshooters) as a means of controlling populations of white-tailed deer through lethal removal. Surveys by the Maryland DNR and the Howard County Deer Management Task Force have shown that the majority of citizens acknowledge that sport hunting, properly carried out, is a safe and acceptable form of deer management.

The Howard County Code (Sec. 8.401) stipulates that no firearms may be discharged on properties of less than ten acres in area within the metropolitan district, nor within 100 yards of the right-of-way of any public road. The State law prohibiting firing of any firearm or bow and arrow within 150 yards of occupied structures (without the owner's permission) adds another level of restriction. Thus, hunting must be limited to the rural district and those metropolitan area lands greater than ten acres.

General Public Hunting:

In this option, a property is simply opened to public access during all or part of the deer-hunting season, allowing use by any licensed hunter according to prevailing state regulations. This option has the lowest overall operating costs, and requires the least oversight and preparation. Posting and maintenance of safety zones, boundaries, and informational signs would be the greatest capital expenses, and would decrease over time. Enforcement patrols would likely be the major operating expense and would be reoccurring. Under this option, the hunters would

not be pre-qualified, so there would be little assurance of safety beyond the state licensing requirement of completion of a hunter safety education course. There would also be very little assurance of efficiency of harvest or humane treatment of wildlife. While this option may be most cost-effective, the lack of assurances makes it unacceptable for use on County-owned land. Additionally, this is the most difficult type of hunt to monitor, yielding minimal amounts of accurate biological data on harvest, population size, buck-doe ratio, doe-fawn ratio et cetera. While this option may appear indiscriminate and unsafe, it must be pointed out that thousands of acres of State land are open to the general public every year with very few accidents. Many thousands of hunters in Maryland use public land without accident, vandalism or offense of any sort.

Managed Public Hunting:

For the purposes of this document, managed public hunting means restricting hunting access and/or method. Access restriction may be accomplished by limiting hunting to special dates and seasons, controlling the numbers of hunters and/or by allowing only specially qualified hunters to participate. Method restrictions may be on weapon type, hunter mobility, or through prohibition or mandating of certain techniques or equipment. The scope of potential restrictions is too broad to enumerate here, but, as examples, hunters could be required to hunt from elevated stands, or use shotguns only, etc. The Middle Patuxent Environmental Area (MPEA) hunts of 1998 and 1999 were managed hunts which incorporated both access and method restrictions. Posting, boundary maintenance and enforcement costs would be the same as for general hunting, however, such hunts are inherently more costly than general hunting due to the greater amounts of planning, organizing and supervising they require. A distinct benefit of a managed hunt is the increased amount of biological data that would be generated, allowing more careful and precise management of the deer herd and other living resources on the site. Most importantly, the assurance of a safe, efficient and humane harvest is much greater.

Having already stated that the scope of management possibilities is too broad to consider, there is value in looking at some of the major options that are possible.

Archery hunting has the longest regular season, is very safe, and is most adaptable to use in smaller, suburban properties. The kill rate per unit of effort is lower than firearms hunting, due to the limited range - 30 to 40 yards maximum - of the equipment. There is a negative public perception that archers wound and do not recover an inordinately high percentage of animals, but technical advances have dramatically increased the accuracy and lethality of modern archery equipment. A major study of bow hunting injuries to deer at Camp Ripley, Minnesota proved that archers wound very few deer that are not subsequently recovered. The Maryland DNR Police have kept records of hunting accidents and injuries since the mid 1970's and have never recorded a case of a personal injury from someone being shot by a bow-hunter. Some states require an archer to pass a bow-hunter's course to receive an archery license. Maryland is not one of these states, so that a separate qualification or safety education program requirement may be needed to assure the public of a safe and humane bow hunt. This would add to the costs of administering such a hunt.

Firearms hunting, such as has been done at the MPEA, has proven to be safe, effective and

socially acceptable, although not without objection, in Howard County. The costs per deer removed have been roughly equivalent to published costs for sharpshooters and similar managed hunts in other jurisdictions. As the program becomes better established and standardized, cost per deer removed should decrease.

In any form of managed hunt, success in every sense is largely dependent on the quality of the individual hunters participating. The hunter qualification process developed for the MPEA hunt, with the assistance of the Howard County Hunter Safety Instructors and members of the Middle Patuxent Valley Association, has worked very well for selecting safety-minded, responsible hunters. Marksmanship qualification has also helped to assure that the hunt was efficient, humane and safe. The additional costs and time necessary for the qualification process are well justified by the assurances gained. Many of the hunters volunteered their time in support of the hunt program, providing many hours of labor in the field and office. Further improvement of the MPEA hunt model should streamline its administration, making it possible for the Department to hold similar hunts on other properties.

Privately Managed Hunting:

Representing perhaps the most restrictive form of hunter access, privately managed hunts are contractual arrangements with incorporated hunter group(s) to manage their own hunting programs on County properties. The County could specify all the same types of restrictions it places on managed hunts, but the administration and implementation of the hunt would be performed solely by the group. Organized groups of this sort already exist, and are successfully managing deer hunting programs on private property in many parts of the country where deer overabundance is a problem. There are groups of this type operating with private landowners in Howard County, as well as with community associations in other Maryland jurisdictions. Being incorporated as non-profit organizations, these groups are able to obtain liability insurance to cover their hunting activities. Often, these groups will contribute substantially to the overall management of the hunted land beyond removing deer. Cleaning up litter, maintaining boundaries, trails or other amenities, and making habitat improvements are typically done by these hunter/volunteers. The benefit to the membership is that they hold exclusive hunting privileges on the designated property. This type of program would have all the assurances of efficiency, safety and humane practices as a managed public hunt, but the County's share of administrative and operational costs would be greatly reduced. It is unknown at present how many such groups currently are available to enter such arrangements. Availability of lands suitable for this type of hunting may also be a limiting factor. There may also be a negative response from those members of the hunting public who are not allowed access to properties that are closed to them by such exclusive agreements.

Hunting on Private Property

Most of the deer habitat in Howard County is on private property, and hunting solely on public land will not suffice to manage the deer herd County-wide. Many who own lands of sufficient size currently have hunting programs in place. The amount of deer hunting occurring on these properties may not be sufficient to reduce deer damage to acceptable levels. Some property

owners, not having personal experience with hunting or firearms, may not know how they can be assured of safe and humane practices if they were to allow hunting. Hunter groups like those mentioned in the preceding section are currently operating in the County. The Maryland Farm Bureau, The Maryland Sportsmen's Association, DNR and others have been working on programs to improve hunter-landowner relationships and increase access to private property by hunters. The Howard County Hunter Safety Instructor's Association has suggested the development of a "Master Hunter" training program. Those who successfully complete such a program will have demonstrated proficiency and knowledge of the skills and qualities necessary to assure landowners of their ability to hunt safely, humanely, effectively and ethically. A list of these certified "Master Hunters" would be available for landowners to contact.

Action 17: Based on population estimates, browse damage and other observations, conduct managed hunts on County lands on an as-needed basis. Such hunts should be managed with the goal of reducing the herd to an appropriate level as quickly and efficiently as possible while maintaining the highest possible standards of safety, ethics and humane treatment.

Action 18: In cooperation with DNR, Farm Bureau, Hunter Safety Instructors, sportsmen's groups and other relevant parties, work to increase hunter accessibility to private property while encouraging high standards for hunter conduct and significant consequences for those found guilty of hunting related infractions.

Action 19: Include up-to-date information in all educational materials and programs so that hunters, landowners and the broader public know what options and alternatives are available for use in the County.

SHARPSHOOTERS

The use of sharpshooters can be an effective means of controlling deer populations and has been implemented successfully in several locations around the nation. In November 1996, sharpshooters removed twelve does from a U. S. Navy facility in northern Calvert County, Maryland. In 1998-99, Montgomery County utilized MNCPPC police sharpshooters to remove deer from Brookside Botanical Garden. Sharpshooters have not been used in Howard County.

Employing qualified sharpshooters, especially in suburban communities, on corporate campuses, or on government properties may address safety concerns and other liability and public relations concerns that exist. Use of non-traditional techniques such as sharpshooters to reduce deer densities has increased significantly in the last decade.

The costs associated with sharpshooter operations are typically high. To be effective, qualified shooters with proper equipment typically shoot over baited sites that have been chosen for safety and attractiveness to deer. Processing of carcasses and donation of meat to charitable

organizations is prearranged in order to carry out the herd reduction expeditiously. Besides the sharpshooter, costs would be incurred for site preparation, bait and for processing the carcasses. Recent sharpshooter operations in other jurisdictions have incurred costs from \$91 to \$300 per deer removed.

MANAGEMENT WITHOUT POPULATION CONTROL

FENCING

Fencing, or any physical barrier, can be very effective in excluding deer from places where they are not desired. For small home gardens, specimen trees and shrubs, and local colonies of rare or threatened plants, fencing can be the simplest and most effective means of protection. However, there are certain drawbacks to this method of damage control. Cost of installation and routine maintenance, especially for larger properties, can be prohibitively high. Aesthetic value and impacts on other wildlife species may prohibit the use of fencing in specific situations.

With the suitability of any given type of fence being dependent on the specific application, it is beyond the scope of this Plan to list all the types and their pros and cons. See the University of Maryland Cooperative Extension Bulletin # 354, *Controlling Deer Damage in Maryland*, for a treatment of different types of fence and their designs. Generally, large area fences must be at least eight feet high, and the durability and height of the fencing must increase as the density of deer increases and the availability of food decreases. Whitetails have been observed squeezing under or jumping over 12 foot high fences when sufficiently motivated! Electric fences are inexpensive and very effective, but cannot or should not be used in many situations, especially in populous eastern Howard County. They also require great amounts of time for maintenance.

At the time of this writing (winter, 1999-2000), rough estimates for the cost of fencing three Howard County Parks (3) that are known to have high deer populations ranged from \$600,000 for slanted smooth wire fencing materials (does not include site preparation and installation) to \$1,800,000 (exclusive of site preparation) for chain link fencing. After installation, any fence would require periodic inspections and maintenance, especially in forested areas where falling trees and limbs can collapse sections of the fence and render it ineffective. In addition to these expenses, such large-scale fencing would be unattractive, even offensive, to many residents, and would hinder the free movement of other wildlife, such as foxes, raccoons, box turtles and skunks. This could have unpredictable impacts on these and other species as migratory routes, escape corridors and needed food supplies are made inaccessible.

Zoning regulations and community covenants may prohibit or restrict the installation of fences. Homeowners should inquire with their homeowner's association and the Office of Planning and Zoning before installing any large, expensive fences on their property.

FOOTNOTE (2): David W. Force Park - \$379,800 for chain link, The Middle Patuxent Environmental Area - \$1,101,200, and Rockburn Branch Park - \$316,800.

HEADLIGHT REFLECTORS AND HIGHWAY SAFETY

Headlight reflectors, manufactured and marketed by several companies, are intended to be a psychological or behavioral barrier preventing deer and other wildlife from crossing roadways at night while vehicular traffic is present. The reflectors direct a portion of the light from a vehicle's headlights to supposedly create a visual effect which startles deer, causing them to flee or stop instead of crossing the road. While little scientific data exists, many public highway departments in the United States and Europe have reported significant reductions in animal-vehicle collisions where the devices have been installed. Several reports indicate that, like many psychological barriers, reflectors may become less effective over time. It should be noted that these reflectors can only be effective at night or other low light conditions. Though most deer-vehicle collisions occur in early morning or at dusk, reflectors should not be expected to eliminate such accidents altogether. At this writing, the County has installed headlight reflectors along a one mile stretch of Montgomery Road in Elkridge, where the highest incidence of deer-vehicle collisions have been reported to Howard County Animal Control.

Another technique for improving highway safety is the construction of tunnels under the roadways to facilitate the safe passage of deer (as well as other animals). While such structures are cost prohibitive as stand-alone projects, they should be considered on new road construction and road improvement projects in the future. Typically, new bridge construction projects are excellent locations for wildlife passages as the rivers and streams are natural corridors for wildlife. Changes in design and construction necessary for encouraging use by wildlife would add little or nothing to the overall costs of a highway project.

Action 20: Monitor, for at least three years (through 2003), the effectiveness of the existing Montgomery Road reflectors by comparing annual road-kill reports from before and after their installation. If found to be effective, develop specific plans to install reflectors along other County roads with high numbers of deer-vehicle collisions and urge the Maryland Highway Administration to install reflectors on state roads where warranted.

Action 21: Require that wildlife crossings be considered in all major road construction and improvement projects. Incorporate design features which promote safe wildlife crossing where appropriate and feasible in all such projects

HABITAT MODIFICATION

Theoretically, deer damage can be controlled by removing the food and cover plants upon which they depend. Deer are opportunistic feeders, feeding on what is available after preferred foods have been consumed. Female deer, generally, are also strongly imprinted to their home ranges, and will tend to stay within an area (generally less than two square miles) until forced to leave. Almost every plant accessible to deer must be removed, in order for habitat modification to effectively manage deer on a large scale. This is clearly impractical and inadvisable. Habitat modification is a very useful tool for smaller scale applications, such as residential and

commercial landscaping and some agricultural uses. By planting varieties that are proven to be less attractive to deer, damage to small trees, shrubbery, flowers and vegetables may be reduced. Some plantings can function as physical barriers to prevent access to or direct deer away from certain locations. The Maryland Cooperative Extension publishes a list of woody ornamentals ranked by likelihood of being damaged by deer. As long as other food sources are available, homeowners, landscape designers and contractors can reduce deer damage by utilizing the list when planning a landscape.

Action 22: Currently, Cooperative Extension produces a list of woody ornamentals rated by their susceptibility to deer damage. Produce a similar list of herbaceous ornamentals. Make this information available to the public through a variety of media.

NO SPECIFIC ACTION

Choosing to take no action in response to the rising population of deer is also a management option. To understand the ramifications of such a decision, it is necessary to consider how the current conditions came to be. In the pre-colonial period, the vast majority of eastern North America was covered with mature forests, which offered limited food and cover for white-tailed deer. Deer populations were highest near forest edges along waterways, beaver meadows, blow-downs and forest fire re-growth areas. Predators, primarily wolves, mountain lions, black bears and man, regularly pursued and killed deer of all ages and either sex. These ecological factors tended to maintain herds with relatively equal numbers of males and females. Diseased individuals were removed readily by predators, maintaining herd health. While reproductive rates per doe were high when nutritious browse was plentiful, the buck:doe ratio, low population density and predation kept numbers from climbing to the levels currently being observed.

With the advent of agriculture and clearing of the forests, the amount of suitable habitat dropped during the 17th, 18th and 19th centuries. The speed with which the landscape was changed, and unregulated hunting, led to extremely low deer populations by the early 20th century. The modern conservation movement began at that time, elevating the status of white-tailed deer to a trophy game animal and restricting hunting pressure. With this new status, the hunting of antlered bucks was encouraged, while the killing of does was discouraged in a conscious effort to raise population levels. As stated earlier in this plan, the decline of agriculture and the spread of suburban landscapes provided excellent habitat without any of the traditional predatory controls except regulated hunting. In many areas today, deer herds have many more does than bucks. Being polygamous, one buck is capable of mating with many does, resulting in a herd with a tremendous capacity to multiply - capable of doubling in two years.

With such rapid growth, deer herds can quickly exceed the carrying capacity (see footnote #1 above) of their surroundings. As that degradation continues, serious changes such as soil compaction, erosion of stream banks and the loss of species and/or age classes of species - tree seedlings, for example, can have long term effects on ecosystems. Various species of wildlife are

also impacted by deer-induced modification of the environment. These changes result in what ecologists term an altered stable state, meaning that full ecological recovery can take decades, or may be impossible due to species reduction and depletion of the seed bank.

As the deer herd depletes its preferred food resources, it is forced to feed on less palatable or less nutritious species. Higher herd densities increase the transmission of parasites and diseases and the incidence of congenital defects. Reproduction rates drop off as malnutrition spreads, causing spontaneous abortions and stillbirths. In the absence of other population controls - hunting and predation - disease and starvation will eventually cause a dramatic crash in population. With severely degraded habitat, herd recovery will also be extremely slow. The Task Force survey found that the majority of residents found "No Action" to be an unacceptable management option.

REPELLENTS AND SCARE DEVICES

Repellents are chemicals that deter deer from feeding on treated plants or areas. Mechanical devices made to scare deer away can also be considered repellents. There are numerous formulations and devices available, along with countless homemade remedies. Repellants can be effective on small private properties for the protection of general landscapes or specimen plants, and can be beneficial for the protection of newly planted material. However, large-scale applications for agricultural and natural area protection are often financially or logistically impractical. Most repellants are depleted by weather and time, thus re-applications are needed to maintain effectiveness. Deer may become habituated to repellents also, so that employing several varieties may be necessary over time. They are most effective when untreated browse is relatively abundant - as other food sources dwindle, deer will eat treated plants. It must also be borne in mind that any management method that stops deer from browsing in a given area is actually displacing that browse activity to other nearby sites, which may mean no actual reduction in damage.

One type of scare device is the presence of dogs. Using the underground electronic restraint device, dogs can be housed inexpensively on orchards, truck farms or large back yards at times and seasons when deer are likely to cause browse damage. Deer apparently learn the area to which the dogs are confined by the electronic fence system, and will generally avoid that area after having been chased and barked at several times. These invisible fences are not failsafe, though. Dogs, especially when chasing something, can and do escape from the containment area of these systems. Barking dogs can bother neighbors, so these systems may create new problems, especially in densely populated areas. Dogs which are housed outside without sufficient socialization with people may become aggressive, and may be a risk to people who may enter a property with this type of restraint system. Concerns have been raised regarding the welfare of dogs only being kept for such utilitarian purposes. Humane living conditions and proper treatment of the dogs should be considered in the operating costs for such a system. Other scare devices employ a motion detector connected to a noise making device, a water jet or

some other mechanism that startles the deer. Any such devices generally lose effectiveness over time as animals become accustomed to them. Some scare devices would be inappropriate in residential areas, especially since deer are often active during the times of day when people are most sensitive to being disturbed. Flashing lights and loud sounds may keep deer away, but would not be popular with members of the household or close neighbors.

Since 1996, numerous types of chemical repellents have been used with some success by Howard County Natural Resource Division (NRD) staff on new reforestation plantings. One of the most successful repellent types is synthetic predator urine. This material is sprayed on the plants and the odor of a predator discourages the deer for venturing too close. Garlic scented clip-on sticks may also be effective for repelling deer. Obviously, these types of material would not be suitable for use on landscape plantings in close proximity to a house. They are usually effective for several months before re-application is need.

Tablets made of a patented material called "Bitrex" have also been used by NRD staff. This is a systemic repellent that is usually added to the potting soil by the nursery. The bitter tasting repellent is then absorbed and incorporated into the plant's tissues. Additional tablets can be placed in the hole when planting. This repellent has longer lasting effects since it is absorbed by the plant and is not affected by weather.

Action 23: Continue to gather data on effective repellents and scare devices, and make that data available to the public in appropriate educational materials and programs.

Action 24: Continue using a variety of repellents to protect reforestation plantings, and begin use on park landscape beds where necessary.

SUPPLEMENTAL FEEDING

Providing supplemental food to reduce damage to natural or ornamental vegetation should not be considered viable as a long-term management option. Supplemental feeding may prevent starvation during severe weather conditions or where natural browse has been depleted, but it concentrates deer at feeding station(s). This may promote the spread of infectious diseases and parasites, increase stress and among individuals, and will increase the level of browse damage to vegetation surrounding the feeding area. The reproductive rate of such artificially sustained deer herds also remains high, causing the herd to continue to grow beyond the carrying capacity of the available habitat.

Another important consideration is that fed deer can become increasingly tame and more tolerant of human presence. This increases the likelihood of deer-human conflicts such as property damage, vehicle collisions, disease transmission and personal injury. Deaths, injuries and harassment of deer by domestic dogs can also increase as herds concentrate at feeding sites.

STATUS OF THE PLAN

While the year 2,000 is the inaugural year of the Comprehensive Deer Management Plan, there are already several efforts underway to respond to the need to manage deer in Howard County. The following summary of current activity demonstrates the County's response to the need to manage deer according to the actions specified in this plan.

The Department of Recreation and Parks has been receiving and compiling deer-vehicle collision information from the Animal Control Division and the State Highways Administration dating back to 1990.

Using GIS, the Department has mapped the locations of collisions and used the information to guide Strieter Reflector placement (actions 1, 2 & 3). To date, the County has installed Strieter reflectors along Montgomery Road (action 20).

Two managed deer hunts have been held in the Middle Patuxent Environmental Area (action 17).

These hunts, in January/February of 1998 and October/November 1999, removed a total of 184 deer from this 1,000 acre site.

The Department of Recreation and Parks has also spoken with researchers about using County property for research into a Deer Tick pesticide technology and an immunocontraceptive study (action 16), although neither research project chose Howard County as a site for their projects.

The Maryland Department of Transportation has contacted the County for cooperation in a possible wildlife underpass project. Preliminary discussions have already taken place on adding wildlife crossing features to the bridge/road improvement project at Bethany Lane where it crosses the Little Patuxent River north of Rt. 40 (action 4).

A brochure entitled "Living with White-tailed Deer in Howard County" has been produced by the Department of Recreation and Parks and should be in general distribution soon (actions 7 & 8).

A deer management handbook has been produced and placed in every branch of the Howard County Public Library. This handbook is accompanied by a video tape entitled "Whitetails at the Crossroads." The Cooperative Extension also maintains a library with publications of interest to those who want to know more about managing deer (action 9 in part).

The Howard County Master Gardeners, a group of volunteer educators sponsored by Cooperative Extension, has an educational program available for home gardeners and farmers that includes information on deer overabundance and various management options (action 9).

Several different population estimating methodologies have been or will soon be used on County properties in order to obtain better population density estimates. In 1998 and 1999, the Department of Recreation and Parks contracted to have deer population surveys using helicopter mounted Forward Looking Infrared (FLIR) videotaping equipment (action 6). Several park properties and their immediate surroundings were surveyed. The results of these surveys show deer densities in the areas flown to be almost universally above the levels at which deer have a negative environmental impact. These surveys are performed in late winter, when infrared sensitivity is best. Consequently, they do not show the additions to the population from the spring fawning season. The company with whom the County contracted for this work permanently ceased FLIR operations during 1999.

While endeavoring to develop a new contract for future surveys, we have been unable to obtain FLIR data for the year 2000. Two new methods of population estimation are being tried for the first time this year. Using infrared-triggered cameras to photograph deer over the course of several weeks promises to yield much useful data on deer populations structure. Ratios of bucks to does, and mature to immature deer can be determined by this method, developed by biologists at Stephen F. Austin University in Texas. Wildlife students at the University of Maryland will also be experimenting with night vision goggles to estimate deer herd size in the Middle Patuxent Environmental Area (action 6). Some effort to census the deer population by using spotlight counts has also been carried out in the vicinity of the MPEA. Extensive residential development and the presence of abundant shrubbery along the roads in this area limit the usefulness of this technique.

A search of the Internet and other resources is currently under way to develop a more comprehensive list of ornamental plants which are resistant to deer browsing (action 22). Personnel from the Natural Resources Division of the Department of Recreation and Parks are preparing an extensive test of several repellent materials to be used on reforestation plantings during the 2000 planting season (actions 23 & 24). The findings of this research will be made available to the public.

A number of deer exclosures have been built in Columbia Open Space and the MPEA. These are being monitored to determine the impact of deer on local wild plants (action 6).

The Department of Recreation and Parks has committed to staying current on all aspects of deer management and overabundance. Scientific journals and papers, affiliation with professional associations, professional contacts including Federal, State and local wildlife specialists, seminars and symposiums and the Internet, and other sources of information, will be consulted regularly to ensure that the County stays abreast of the latest management issues, techniques and opinions. Department personnel have been doing vegetative studies and investigating new population estimating techniques. A study of deer parasites that should yield valuable information on herd health and carrying capacity will also be undertaken in the near future (Summer 2000).

ACKNOWLEDGMENTS: The Montgomery County Deer Management Task Force has

pioneered the way for the local management of White-tailed deer in Maryland. The work of all other local jurisdictions will rely heavily on their work. The Maryland DNR has been extremely helpful in the preparation of this plan, especially Doug Hotton, Paul Peditto, Ken D'Loughy and Marilyn Mause.

Suggested Readings in Deer Biology and Management:

Howard County Deer Task Force (1999). *Findings and Recommendations*. This document is included as an addendum to this plan.

Maryland-National Capitol Park and Planning Commission et al. (1995). *Comprehensive Management Plan for White-tailed Deer in Montgomery County, Maryland*.

Illinois Department of Conservation Division of Wildlife Resources (1991). *Reduction of Local Deer Herd at Rock Cut State Park, Winnebago County*.

New Hampshire Fish & Game Department. 1996 (Rev.) *An Evaluation of Deer Management Options*. Connecticut Department of Environmental Protection, Wildlife Bureau, *Publication No. DR-11*.

Lowell K. Halls (ed.) 1984. *White-tailed Deer Ecology and Management*. *A Wildlife Management Institute Book*. Stackpole Books, Harrisburg, PA..

Robert J. Warren (ed.) 1997. *Deer Overabundance*. *A Special Issue of the Wildlife Society Bulletin*, Vol.25, No. 2. The Wildlife Society, Bethesda, MD.

William J. McShea, H. Brian Underwood and John H. Rappole (ed.s) 1997. *The Science of Overabundance*. The Smithsonian Institution Press. Washington, DC

Howard County Department of Recreation and Parks (compilers) 1999. *Deer Management Reference Manual*. Various publications and publishers - available in all County Public Libraries.

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