FROM DEER PROBLEM TO PEOPLE SOLUTION: A CASE STUDY FROM MONTGOMERY COUNTY, MARYLAND

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ABSTRACT: Montgomery County, Maryland, a 495 square-mile area adjacent to Washington, D.C., is a rapidly developing, highly educated suburban community with one of the highest per capita incomes in the nation. There is increasing concern for the growth and impact of white-tailed deer (Odocoileus virginianus) populations by agricultural interests, resource professionals and residential landowners. The Montgomery County Council assembled a task force of stakeholders to examine relevant information and propose deer management options. The task force report provided detailed information on the county deer situation, 11 management alternatives, and 9 final recommendations. The county parks administrator appointed a staff member to develop a comprehensive management plan to implement the task force recommendations. Public meetings were held to elicit the views of county residents on the comprehensive management plan using a nominal group process. Implementation of recommendations that included direct herd reduction methods met with favorable response except from animal rights activists. Managed hunts are planned for fall of 1996 while education and improved information-collection efforts continue. The success of the process can be attributed to some key factors including: (1) support of the county government by resolution that provided human, fiscal resources and political resolve; (2) support for a solution by agriculturalists, residential owners and natural resource professionals; (3) an effective task force process with a diversity of stakeholders; (4) an effective education and information program to counter dissemination of inaccurate information; and (5) a structured public meeting process utilizing small-group discussions that allowed for the registration of values, opinions, and attitudes of all stakeholders.

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White-tailed deer populations have increased throughout much of the Northeast (Flyger et al. 1983) and damage caused by deer browsing is being reported by agricultural producers, homeowners, foresters, park managers and wildlife biologists. Health and safety concerns regarding deer have become prevalent due to the increased incidence of Lyme disease and deer-car collisions. Balancing the detrimental and beneficial effects of larger deer populations is a challenge that is becoming more frequent and complex, especially in developing urban and suburban areas.

Deer populations have increased due to the lack of natural predators, the ability to adapt to humans, good food sources provided by farm crops and suburban landscapes, and lack of hunting pressure. The management of rural deer populations using traditional hunting regulations has sometimes been unsuccessful because of posting of land and ownership patterns. However, wildlife managers can still effectively reduce deer populations using traditional techniques as part of an integrated deer management program, which also includes fencing, repellents and vegetation management. Traditional population management techniques include increasing the number of doe permits and crop damage permits, as well as expanded seasons and higher harvest levels overall.

Increasing deer problems in urban areas pose considerable challenges to wildlife managers, largely due to the human dimension. Many suburban residents are unlikely to support traditional approaches to deer population control, given their protective view of wildlife and their lack of participation in sport hunting (Decker and Gavin 1987). However, there are indications that as deer populations continue to increase in the Northeast, and concerns over Lyme disease and deer-car

collisions have escalated, public acceptance of hunting may be increasing (Applegate 1995). The use of controlled hunts can be efficient and cost-effective for reducing deer numbers, and many successful programs can be found in Maryland at locations such as the Smithsonian Property, Susquehanna State Park, Fort Frederick State Park, the Fair Hill NRMA, (D'Loughy 1992; Maryland Wildlife Division 1992) and elsewhere in the Northeast (Parkhurst and O'Conner 1992). However, acceptability of the program requires that proposed herd-reduction objectives be clearly defined, people are adequately notified in advance of operational and logistic plans, and the cooperation of all parties involved is attained (Parkhurst and O'Conner 1992).

Attempts to reduce deer herds foster vocal and often emotional public discontent from animal rights organizations (Hill 1991), and other citizens with diverse values, beliefs, and attitudes toward deer. Resource managers have learned that lengthy and costly delays can be avoided, and agency credibility enhanced, by involving the public in the decision-making process (Stout et al. 1993). The use of open public meetings to address deer management issues in suburban areas has been largely counterproductive due to well-organized and well-financed opposition groups that commonly disrupt such meetings. The use of a citizen task force approach offers stakeholders who hold differing viewpoints an opportunity to present their concerns and become participants in a structured process (Stout, et al. 1992; Curtis et al. 1993; Hall 1992). By carefully selecting individuals who represented various stakeholder groups, much potential antagonism was avoided and consensus was reached on management options.

This paper provides a case study of a developing county adjacent to Washington, D.C. and the developing process of creating a management policy for a rapidly increasing deer herd.

STUDY AREA

Montgomery County, Maryland is a 495-square mile area adjacent to Washington, D.C. (Fig. 1) that has become a highly urbanized jurisdiction in the past 50 years. The county was once considered a bedroom community for Washington, D.C., but now is a hub for high technology and light industries. The human population has increased from 164,000 in 1950 to 780,000 in 1994. Development has drastically altered the landscape. In 1960, 49,000 acres in the county were classified as developed land, which included residential and commercial housing, industry, local government facilities, park and recreation facilities and rights-of-way for transportation and utilities. Developed land increased by 216% to 155,000 acres by 1991.

The majority of Montgomery County lies in Maryland's piedmont physiographic region, an area of gently rolling hills, dominated by oak (Quercus spp.) and hickory (Carya spp.) forests. Approximately 20% of the county's surface area is covered by forest.

Montgomery County's system of extensive stream-valley parks provides excellent habitat for white-tailed deer as well as natural transportation corridors for the ever-expanding human population. County-owned parkland totals 27,763 acres. There are an additional 22,000 acres of federal and state parkland as well as municipal areas (Fig. 2). Total park acreage accounts for 16% of the surface area.

Aggressive farmland preservation programs have enabled Montgomery County to maintain almost 100,000 acres in agriculture. This amounts to about 30% of the surface area in the county. Most of the agricultural land is located in a perimeter around the urban growth area (Fig. 3). Corn, soybeans, wheat and hay are the predominate field crops providing a readily available food source for the growing deer population. Ornamental horticulture, with annual sales in excess of $125 million, is Montgomery County's fastest growing agricultural industry.

The county population is affluent, well-educated, and politically active. The median household income is > $57,000 per year, one of the highest in the nation. Over 75% of the County's population has some level of college education, with 30% holding advanced degrees. The county contains the corporate homes for several national animal rights groups including the Fund for Animals and the Humane Society. Overall, Montgomery County presents a challenging environment for forming consensus on management of white-tailed deer.

BACKGROUND

Available data document an increase in the number of white-tailed deer in the county during the last decade, and coincide with more frequent reports of conflicts between people and deer as both the human population and land development areas expanded. There has been an increase in farmers and horticulturalists complaints of deer damage to crops, reported deer vehicle accidents (Table 1), reports of depredations on residential properties, in parks and natural areas, and public health concerns about Lyme disease. Reports of deer sightings were relatively few as little as 15 years ago. Farmers, in general, were quite pleased to see the deer numbers expanding. However, as reports of damage became increasingly frequent, the farmers tolerance for deer rapidly declined.

The number of deer taken during the annual hunting season has risen from about 300 in 1983 to > 1,700 in 1993 (Fig. 4.)

A comprehensive survey of 669 agricultural producers (farm owners and nursery operators) was undertaken in 1993 by the county Agricultural Advisory Board to document deer damage. Of the 470 respondents, 281 or 60% reported deer damage. The farmers reported losses of corn, soybeans, alfalfa, vegetables, small fruit, fruit trees, shrubs, ornamental trees and flowering plants. Agricultural producers reported economic impacts totaling $856,000 for 1993. Of the agricultural producers reporting economic losses, 47 (27%) reported losses of $5,000 or more, 64 (37%)reported losses between of $1,000 and $5,000 and 62 (36%) experienced losses of less than $1,000. Approximately two-thirds of the respondents reported damage from deer to be on the increase.

Another major concern was the incidence of automobile accidents involving deer in Montgomery County. The committee recognized that perhaps as few as one-third of the deer vehicle accidents were actually reported. This is a conservative percentage since studies in New York found only 17-25% of deer-vehicle accidents were reported (Decker et al. 1990). The number of reported incidents has risen significantly over the last 3 years. The number of estimated accidents involving deer was 782 for 1992; 861 for 1993; and 1,343 for 1994. This was many times higher than the state average.

Deer have also become a problem in residential areas. The current system for reporting deer damage on residential property is inadequate in that there is no clear place for homeowners to report damage. The Montgomery County Council, Montgomery County Animal Control, USDA's Animal and Plant Health Inspection Service (APHIS) and the Cooperative Extension Service were some of the agencies reporting the highest numbers of complaints from homeowners. USDA-APHIS received 123 complaints for 1992 and 131 complaints through the first nine months of 1993.

The impacts to natural vegetation and parkland have been qualitatively assessed, however, quantitative data are lacking. Of 24 local parks surveyed for qualitative changes in vegetation in 1992, 18 had excessive impact by deer and 6 had moderate impact (Bargis and Wiegand 1993). The deer impacts observed in 11 county parks had increased from moderate to excessive from 1991 to 1992. Browselines are evident in many forested areas of the parks, suggesting that resident deer populations may have exceeded the biological carrying capacity of those areas. More detailed quantitative surveys of vegetation are needed and will be completed to help document these effects.

Hunting is recognized as the most efficient and economical means of controlling deer populations (Ellingwood and Caturano 1988). However, several factors work to limit the effectiveness of hunting in Montgomery County. It is illegal to discharge a firearm in the urbanized area (approximately two-thirds of the county; Fig. 3.) Bow hunting is legal in the urban area and the number of deer harvested annually by bow has risen significantly in the past decade. Unfortunately, the annual deer harvests are not nearly high enough to even stabilize the population numbers. Compounding the problem are thousands of acres of stream-bottom parkland not available for hunting, plus large areas of private land that is not hunted. Much of Montgomery County's farmland is owned by non-farmers. This land is typically leased to active farmers for cropping purposes. However, a significant percentage of this land is not hunted because landowners are reluctant to grant permission for hunting. These large non-hunted areas provide refuge and habitat for white-tailed deer.

Animal rights protests over sport hunting have been a problem for many years in the county. The national headquarters for the Fund for Animals was located in the county until recently. National offices for the Humane Society, and People for the Ethical Treatment of Animals (PETA), are located nearby in Washington, D.C. Annual confrontations between hunters and animal activists have taken place each year at the McKee Beshers Wildlife Management Area in western Montgomery County (Hill 1991). In fall of 1990, about 300 people from both sides of the animal rights issue gathered at the start of bow hunting season. Ten animal rights activists were arrested for violating the state's hunter harassment law. One member of the Fund for Animals went to jail for 15 days rather than pay the $110 fine. In such a climate of conflicting values, any solution to the county-wide deer issue would have to consider all viewpoints.

THE TASK FORCE PROCESS

The major impetus for the creation of a deer task force in Montgomery County resulted from increasing complaints of deer-human conflicts. These conflicts included; deer-vehicle accidents, depredation on residential, agricultural and public land, and human health concerns about Lyme disease. The legislation to sanction the task force was introduced by a Montgomery County Council member whose legislative district includes the majority of farmland in the County. This Council member received numerous complaints from the Montgomery County Agricultural Advisory Committee (an advisory board of agricultural producers to county government), and local park officials concerned about depredation on parklands. The task force was created by the Montgomery County Council to examine the available information and to develop a plan of action for the management of deer on public and private land. The plan included possible actions, and their likely cost and effectiveness during the short and long term (Montgomery County Council 1994).

The task force consisted of 18 members interviewed and appointed by the County Council. Six members were from the following government entities: Maryland National Capital Park and Planning Commission, Department of Parks Montgomery County (M-NCPPC), Maryland Department of Natural Resources-Wildlife Division (MD - DNR), Montgomery County Department of Animal Control, Montgomery County Agricultural Advisory Committee, Montgomery County Range Approval Committee, U. S. Department of the Interior-National Biological Survey. Three individuals represented the following non-government organizations: The Isaak Walton League of America, the Montgomery County Archery Association, and the Fund for Animals (animal rights organization). There were 4 citizen representatives appointed to the task force and 5 ex-officio members representing: the Department of Natural Resource Police, M-NCPPC Park Police, Montgomery County Police, the Washington Suburban Sanitary Commission and the National Institute of Standards and Technology (NIST).

The task force began its work on September 22, 1993 and after 20-25 meetings of the main task

force, plus subcommittee meetings, the group submitted its report in April 1994.

The size of the committee (18 members) and the diversity of interests caused considerable consternation as to whether the task force would be able to reach consensus. However, the task force did manage to reach consensus on a number of recommendations despite the diversity of perspectives. Members representing agriculture, for example, favored reduction of the herd to decrease crop damage. Hunters favored the establishment of more hunting areas in a county where hunting lands are scarce, but weren't necessarily in favor of significantly reducing deer herd size. Park and Natural Resource representatives were concerned with browselines, endangered plant species and other wildlife habitat. The animal rights activist favored the modification of human behavior and humane treatment of the deer. Overall there were many periods of conflict and points of contention; however, these disagreements were almost always solved through civilized dialog and education of all participants through selected printed materials.

Some members of the task force were concerned that a minority report might be submitted by the animal rights representative. Most members of the task force decided if this were to occur, they would write their own minority report to counteract or contradict the animal rights report. Fortunately, neither of these occurred as the group was able to submit a consensus report.

Eleven management alternatives were considered as both an existing and potential means of managing deer impacts:

1) Maintain Status Quo - This alternative would result in no changes in current management practices. The deer population would remain stable or increase, and deer-human conflicts will likely increase.

2) Modify Legal Harvest - This would likely lower deer density, the extent and rate depending upon the regulation of bag limits, season lengths, sex restrictions and how many areas were actually opened for hunting. The cost of this alternative would be minor or negligible because the process is already in place.

3) Agricultural Damage Permits - This could reduce deer depredation on agricultural lands. The long term effects on deer density are unknown, depending on the extent of the issuance and the use of these permits.

4) Direct Reduction - Direct reduction would serve to reduce numbers of deer in specific locations using managed hunts or sharpshooters. This may be an extremely costly alternative depending on many variables and how it is conducted, especially if sharpshooters are needed. However, it may be the most effective in specific problem areas.

5) Repellents - Repellents have limited effectiveness and are generally used in small areas, and can be costly. This alternative has no affect on numbers.

6) Fencing - Fencing can be effective for protecting small areas, particularly for high-value crops. Fencing is often costly to erect and maintenance is required. Properly constructed fences will exclude deer but will not decrease deer density.

7) Contraception - Contraception may achieve some results in limited areas, particularly where the deer herd is confined. This is very costly in terms of material and manpower. Contraception is still in the research and experimental stages and requires federal and state approval.

8) Habitat Alterations - This alternative would attempt to alter deer behavior, and would likely be useful in limited areas. This could also potentially impact wildlife other than deer.

9) Trapping - Trapping may reduce deer densities. The cost of this management alternative is very high and requires state approval. A scarcity of release sites for deer would limit its practicality.

10) Supplemental Feeding - This alternative can actually serve to increase the number of deer locally. It may also tend to concentrate deer, possibly creating disease or parasite problems.

11) Restore Predators - This alternative would require federal and state approval. It is difficult and extremely unlikely to be implemented given the urbanized nature of Montgomery County.

TASK FORCE RECOMMENDATIONS

Some of the management alternatives were not practical for several reasons. Ultimately, the task force forwarded 9 recommendations to the Montgomery County Council. These recommendations are described below:

1) Cooperative Planning Process - The legal responsibility for resident wildlife, including white-tailed deer, is vested with the State of Maryland through public law. The Montgomery County Council should request, through memorandum of understanding, the cooperation of state and county agencies and departments. The partnerships' responsibility would be initially to examine specific problems and to recommend management responses.

2) Comprehensive Management Plan - A comprehensive management plan should address the affects of white-tailed deer on the county's human and natural environment. The plan should also establish the necessary database and information for decision-making. This plan would be developed and maintained by designated public employees, including county park officials and Maryland DNR Wildlife personnel.

The comprehensive management plan should include a definition of deer management goals, accurate information on deer and their impacts, and an understanding of deer-human conflicts.

3) Public Information/Education - The county should develop an informational brochure describing topics such as deer-vehicle accidents, damage to agricultural crops, impacts on parks and natural areas, Lyme's disease, and damage to ornamental shrubs and gardens.

4) Deer-Vehicle Accidents - The County Council should request that county agencies develop a more workable and centralized method of reporting and recording deer-vehicle accidents. The current system fails to capture the information needed.

5) Monitoring Vegetation in County Parks - The County Council should request the appropriate agencies initiate a regular program of monitoring the affects of deer on native plants in county parks. This information will enable park staff to determine whether deer are in fact exerting an undesirable affect on natural vegetation of each park.

6) Geographic Information Systems (GIS) - The factors that relate to deer presence, abundance, and mobility throughout the county are currently unknown. The County Council should support the implementation of GIS technology to more accurately track the deer population and its movements.

7) Deer Biology and Ecology - The Council should request that local and state agencies initiate a deer study in Montgomery County to gather more specific data concerning deer impacts to native plant and animal communities, deer demography, and ecology.

8) Deer Damage Reporting - The County Council should request that the appropriate agencies develop a unified and comprehensive plan to more accurately report deer damage.

9) Wildlife Corridors - The County Council should request appropriate agencies to consider wildlife travel corridors during the transportation planning process, especially for those projects intersecting major stream valleys. Past failures to carefully consider the needs of wildlife at stream-valley

crossings have no doubt contributed to the large number of deer-vehicle accidents on county highways.

IMPLEMENTING MANAGEMENT ALTERNATIVES

In May 1995 the Maryland-National Capital Park and Planning Commission, Department of Parks, Montgomery County, Natural Resource Division (known as the "M-NCPPC") took the nine recommendations from the task force report and developed a Comprehensive Management Plan for Montgomery County ("the Plan") that was designed to be open-ended and adaptable (Montgomery County Council 1994). The goal was to reduce deer-human conflicts by maintaining a deer population that is compatible with human priorities and land uses. As part of a cooperative planning process, the Montgomery County Deer Management Group (DMG) was established through a memorandum of understanding. The group is made up of representatives from the Maryland Wildlife Division, M-NCPPC and the National Biological Service. This core group will work with other agencies to accomplish the actions in the Plan. Public participation and citizen involvement was built into the decision-making process through existing meetings and a number of planned public meetings to solicit input.

Three main goals were outlined in the Plan: (1) obtaining accurate information on deer and their impacts, (2) improving public information and education, and (3) implementation of deer management alternatives.

To better obtain accurate information on deer and their impacts, agencies developed a centralized method of reporting deer-vehicle accidents to the Maryland Wildlife Division. An accurate record-keeping system for depredation on agricultural lands and residential properties was developed by coordinating efforts between the Maryland Wildlife Division, USDA-APHIS and the Montgomery County Cooperative Extension Service. A monitoring program has been developed to quantitatively and qualitatively assess impact on natural areas and relative changes in deer population density and habitat use in selected areas. At the present time this consists of erection of 10 deer exclosures in the county, and data collection on vegetation. Funds have been approved to study the ecology of deer in Montgomery County Parks. As more extensive studies are undertaken, this information can be mapped in a geographic information system (GIS) which would allow better analysis of deer-human conflicts. Equipment has been purchased for this purpose and staff are being trained.

Improving public information and education to address commonly expressed concerns is a priority. An informational brochure on white-tailed deer in Montgomery County has been widely distributed and includes information on deer biology, ecology, deer-human conflicts, damage, and prevention. Sources of assistance are provided and should help centralize reporting. A portable bulletin board is being developed that can be used at many events. The Maryland Cooperative Extension Service has publications on managing deer damage and other related topics, and has provided educational programs for park naturalists, agricultural producers, homeowners and others. Recommendations for reference materials on deer and deer problem have been made to the county library. A comprehensive media plan has been developed with county staff and DNR communications specialists. An annual newsletter on deer and multimedia presentation for media groups are in the development stage.

The Plan presents the 11 management alternatives discussed in the task force report in a matrix with estimated costs, benefits and consequences. Implementing population management would likely cause the most conflict. It is acknowledged that deer numbers could be managed at county and state parklands. Three options were determined to be the most practical and effective: (1) modify legal harvest; (2) increase

depredation permits; and (3) carry out direct reduction through use of managed hunts or sharpshooters. Specific criteria were included for implementing direct reduction options (i.e., hunter requirements, selection, site selection, etc.).

Two 3.5-hour public meetings occurred on October 24 and 25, 1995, with the objective to solicit citizen participation and public involvement in the comprehensive management plan. The meetings were structured to provide time to view displays, followed by a few presentations that discussed the various task force recommendations and meeting format. The participants were then divided into small groups of about 10 persons with a trained facilitator and recorder from the county parks department in each group. Training of the facilitators was provided by the Maryland Wildlife Division.

The meeting format itself was developed by the Maryland Wildlife Division to generate constructive public input on wildlife issues (R. Helinski, Maryl. Wildl. Div., pers. commun.) and is based on accepted citizen participation and public involvement methods (Wiedman 1983). The meetings were well-attended with a combined total of 222 people participating in the small group sessions.

A list of comments and concerns were generated in each small group focusing on two questions: (1) What is your opinion of the deer management options being considered in Montgomery County?, and (2) Which deer management options are most acceptable? Preliminary analysis of the comments ranked the acceptance of various management alternatives. Modifying the legal harvest received the highest acceptance (24%), direct reduction through managed hunts was ranked second (21%) acceptance, and use of contraception was ranked third (17%). While many animal rights persons did attend and participate, the meetings were orderly.

DISCUSSION

Montgomery County, Maryland, provides an example of an area with a citizenry that is highly educated, very affluent, and only recently affected by damage from an escalating deer population. Public agencies are attempting to move from an information stage represented by the task force, to a comprehensive action plan that can be open to public comments through a structured meeting process. The goal is long-term population management for deer (Fig. 5.)

The task force process utilized existing information on public attitudes toward suburban deer herds (Curtis and Richmond 1992; Curtis and Stout 1993; Decker and Gavin 1987; Decker and Stedman 1992; Parkhurst and O'Conner 1992) to offer a forum for stakeholders to express their opinions and concerns. Perhaps more importantly, sanctioning the task force through a county resolution assured access to considerable fiscal and human resources, and political resolve to deal with the problem. The recommendations offered by the task force were based on deliberative and thorough analysis of data including deer-vehicle collisions, deer harvest, and damage to natural areas, agricultural crops and residential landscapes. Given the education level of the citizenry, documented information to validate the problem was essential.

The public input process was essential to make local citizenry understand that their values, opinions and attitudes were heard and that government was not forcing a plan upon them. The overall purpose was to resolve a county problem (deer damage) caused by a state-owned resource (deer). The small-group meetings helped stakeholders with different viewpoints be heard, and all participants understood the amazing complexity of the issue. However, it is unlikely people's strongly held opinions were changed.

The citizenry of Montgomery County has apparently accepted population management alternatives for deer. Information and education efforts focused on safety concerns related to the

increasing deer population (i.e. deer-vehicle collisions and Lyme disease), and may have compelled citizens to accept a deer population decrease (Decker and Gavin 1987; Decker and Stedman 1992). The extensive county park network provides excellent corridors for deer to penetrate the urban area, even within the Washington, D.C. beltway. Many expensive homes backup to these park properties, and ornamentals were severely damaged. The sentiment expressed by most citizens was that the county must do something about managing "their" deer, even if this included a population reduction.

Harvesting deer during managed hunts in the firearms-exclusion zone would be with bow hunting alone. Research in other areas indicates bowhunting alone will not cause significant reductions in deer-damage complaints in suburban landscapes (Curtis and Richmond 1992). This approach may have to be reconsidered if reduction levels are not met by this type of harvest. Due to the timing of the public meeting process, managed hunts on state and county properties and the community meetings that accompany the hunts, cannot be organized until the Fall 1996 hunting season.

It is unclear if animal activists will support managed hunts or the use of sharpshooters. Efforts are in place to scientifically document deer impacts, which will help to minimize the effect of legal challenges. Hopefully, the public input process has helped all parties to better understand the values, opinions and attitudes of various stakeholders.

CONCLUSION

The future of the Montgomery County management plan for resolving deer conflicts is dependant on the successful implementation of managed hunts in the fall of 1996 on state and county properties identified as problem areas. Conflicts are also possible on private lands. Community meetings will be held to involve and inform the local residents of the strict criteria used to implement this type of program. This process has worked well in other managed hunts in Maryland.

The success of the process up until this time can be attributed to some key factors: (1) the support by resolution of the county government that provided human, fiscal resources, and political resolve; (2) widespread support from agriculture, residential landowners, and natural resource professionals; (3) an effective task force process representative of all major stakeholders; (4) an effective education and information program that has countered dissemination of inaccurate information; and (5) a structured public meeting process utilizing small group input that allowed for the input of values, opinions, and attitudes from all stakeholders.

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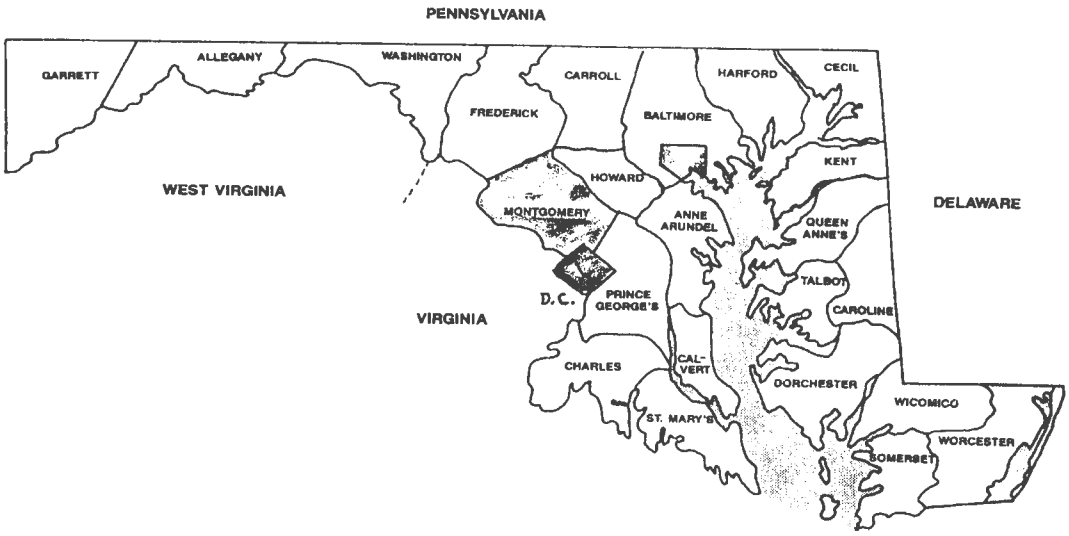

Fig. 1 -
Location of Montgomery County, Maryland, with reference to Washington, D.C.

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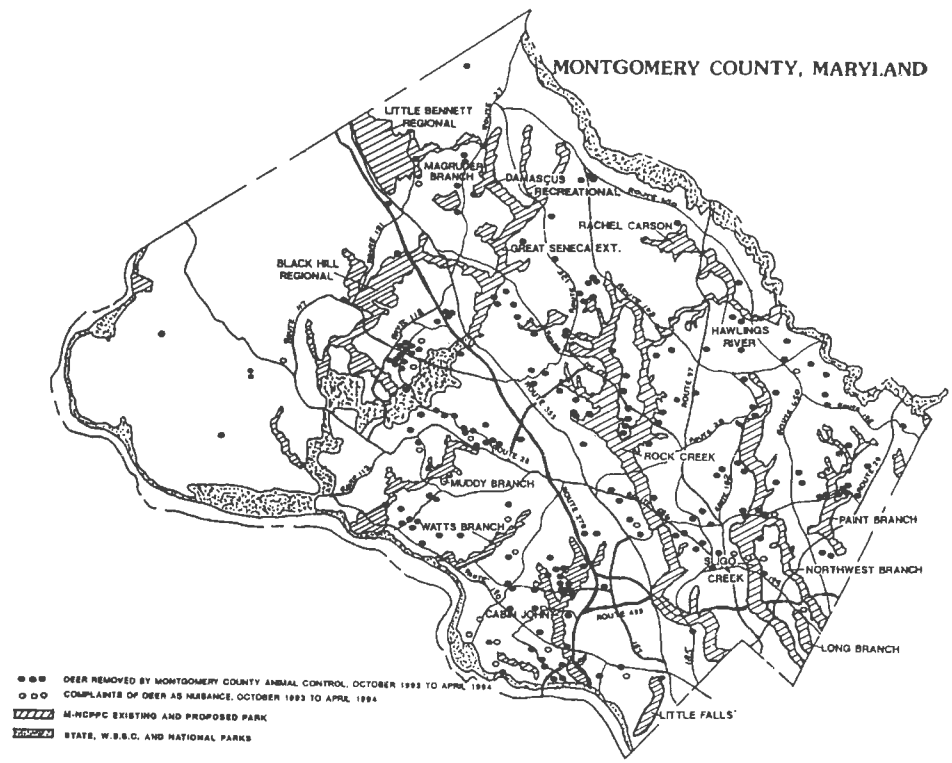

Fig. 2 - Location of streambottom county and state parks that act as natural travel corridors for deer into the developed areas of Montgomery County, MD.

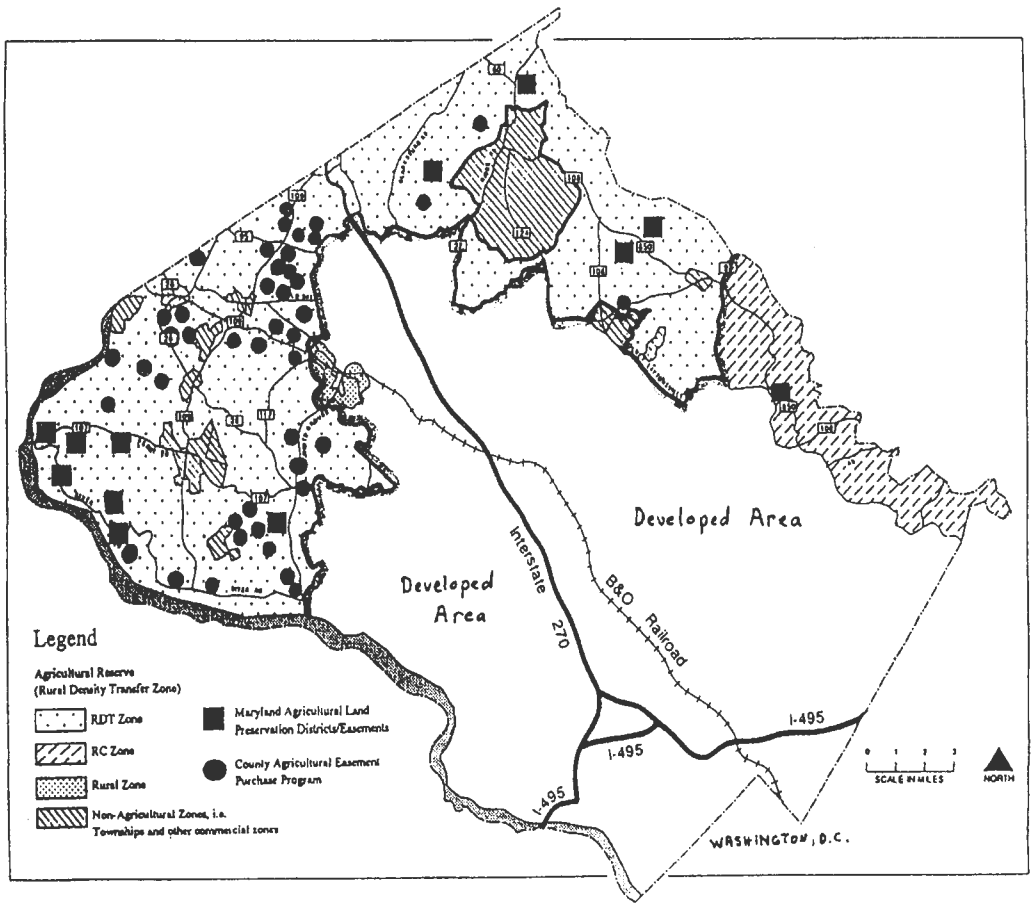

Fig. 3 - Map of Montgomery County, MD, showing developed area surrounded by rural surrounds protected by agricultural preservation. It is illegal to discharge firearms in most of the developed area of the county.

Table 1. Number of deer-vehicle collisions in Montgomery County, MD from 1992 to 1994.

Year	No. of Collisions
1992	782
1993	861
1994	1343

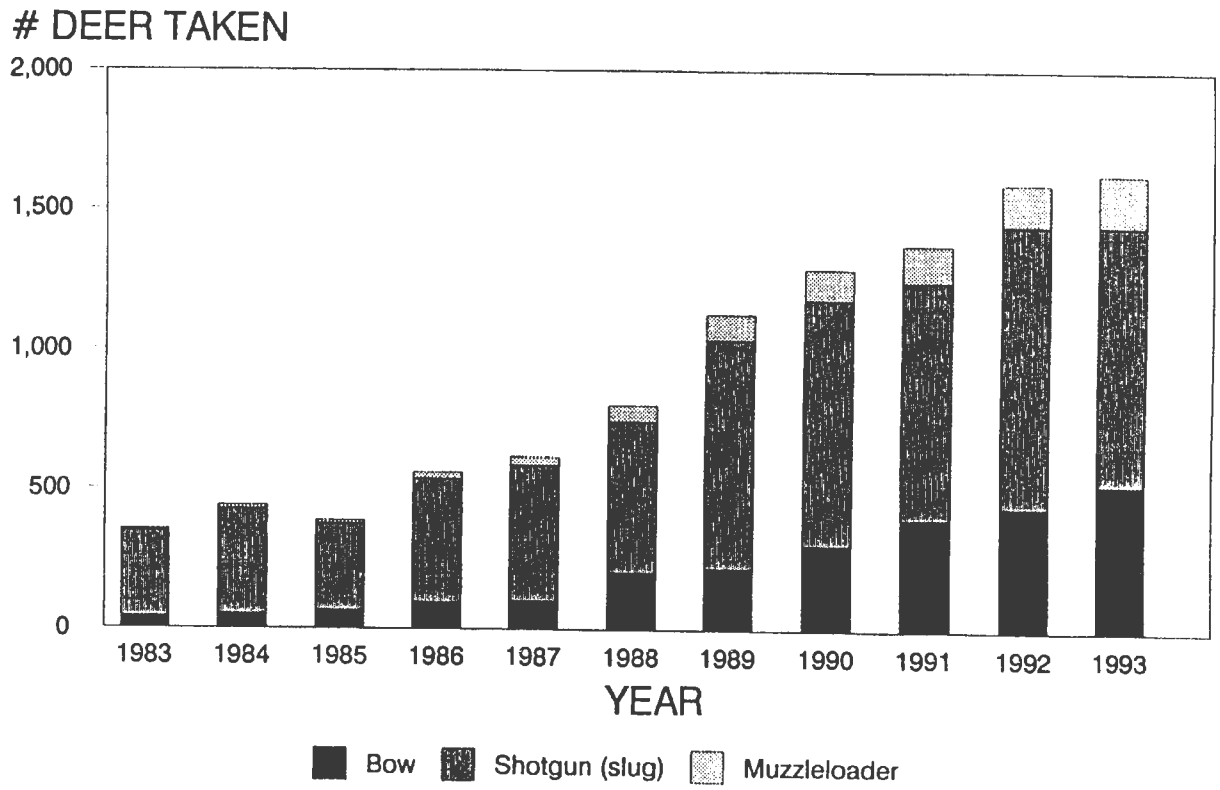

Fig. 4 - Deer harvest by bow, shotgun and muzzleloader for Montgomery County, MD, from 1983 through 1993.

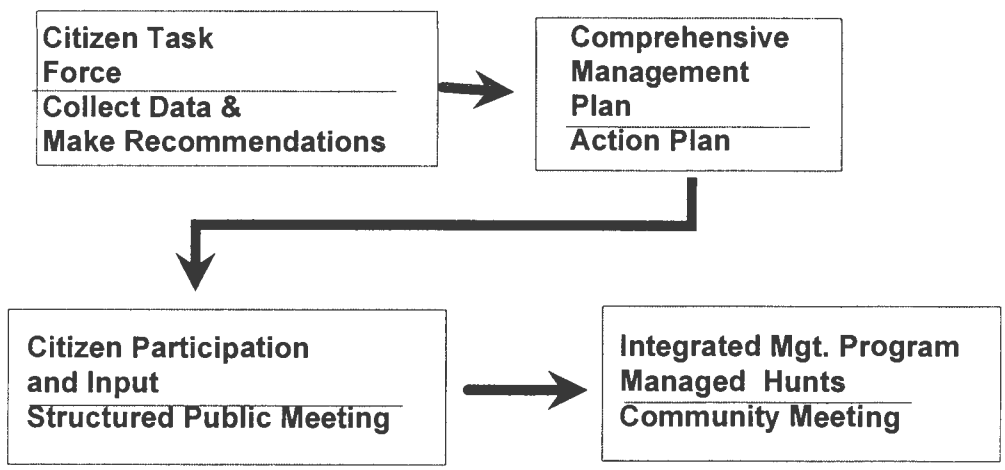

Fig. 5 - Process used to resolve deer issue in Montgomery County, MD.