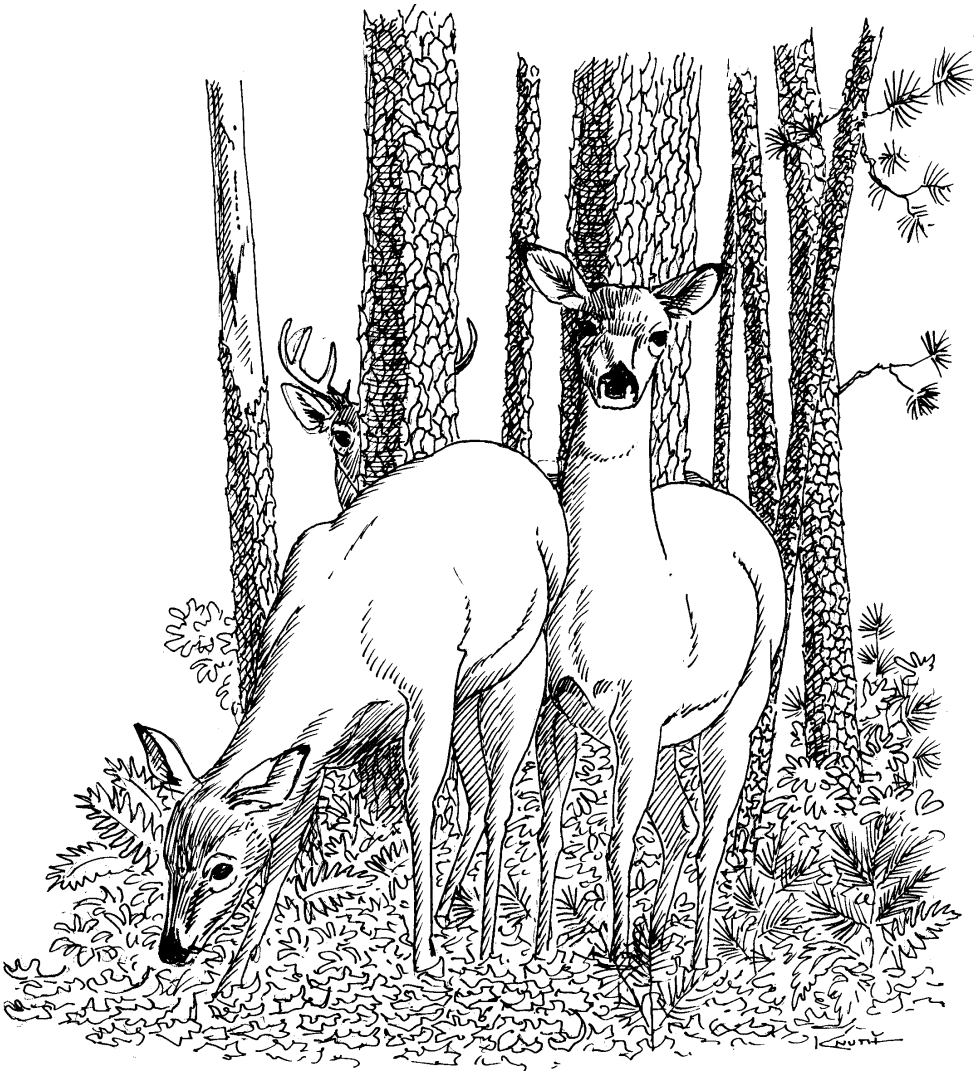
Virginia Deer Management Plan 2015-2024



Cover art by Spike Knuth

October 2015

Virginia Department of Game and Inland Fisheries

About the Authors

The Virginia Deer Management Plan was written by deer program staff with the Virginia Department of Game & Inland Fisheries (VDGIF) in collaboration with the Stakeholder Advisory Committee (SAC). The SAC represented a diverse cross section of Virginia citizens with an interest in deer management issues. A description of the processes used to develop this plan is described in the Introduction. SAC members are listed in Appendix 1.

Acknowledgements

Appreciation is extended to Virginia citizens for their review and input, to the Department of Fish and Wildlife Conservation in the College of Natural Resources and Environment at Virginia Tech for survey assistance, to other wildlife professionals for their quality reviews and contributions, and to the VDGIF administration and Board of Directors for support through all aspects of developing the Deer Management Plan.

This program received financial assistance from the U.S. Fish & Wildlife Service through the Wildlife and Sport Fish Restoration Program, Project WE99R.

Citation

VDGIF. 2015. Virginia deer management plan, 2015-2024. Virginia Department of Game and Inland Fisheries, Richmond, Virginia, USA.

This publication is available at http://www.dgif.virginia.gov.

EXECUTIVE SUMMARY

White-tailed deer (*Odocoileus virginianus*) garner more interest than any other wildlife species in Virginia. Many Virginians relish the chance to hunt, watch, or photograph this graceful mammal. The economic impact of deer hunting in Virginia is over $500 million annually. However, deer also inflict millions of dollars in damage to crops, trees, and gardens and are a safety risk on our highways. As large herbivores (plant-eaters), deer also have a profound impact on natural ecosystems.

Active deer management is necessary to maintain deer populations at optimum levels to meet the needs of citizens of the Commonwealth. An optimum deer population balances positive demands (e.g., hunting, viewing) with negative demands (e.g., agricultural damage, vehicle collisions, ecosystem impacts). The Virginia Deer Management Plan identifies areas where deer populations should be managed to increase, decrease, or remain the same.

The first Virginia Deer Management Plan, completed in 1999, has been revised twice, during 2005-2006 and 2014-2015, through the involvement of stakeholders and managers of deer. Biological principles continue to play a major role in the success of deer management programs, but meaningful stakeholder involvement is also necessary. Because VDGIF's mission is "to serve the needs of the Commonwealth," the processes used to develop and revise the deer plan incorporated public values (e.g., economic, sociological, and political) and biological considerations.

The Virginia Deer Management Plan is intended to embody the interests of all Virginians. Deer stakeholders focused on making value choices about deer management, while wildlife professionals focused on the technical aspects. A 15-member Stakeholder Advisory Committee (SAC) represented a cross section of stakeholders: hunters, agricultural producers, homeowners, forest landowners, animal and ecological health interests, vehicle drivers, and local, state, and federal agencies. The SAC was responsible for identifying the goals that should drive deer management. VDGIF staff with technical expertise in deer management designed objectives and strategies based on values identified by the SAC. Additional public values were considered via stakeholder surveys and advertisement of the draft plan for broad public review. Deer managers and researchers external to VDGIF provided a technical review of the draft plan. The plan was presented to, and endorsed by, the VDGIF Board of Directors on October 15, 2015.

The revised Virginia Deer Management Plan will guide deer management across the Commonwealth through 2024. This plan describes the history of white-tailed deer management, current status (supply and demand) of the deer resource and management programs, and the future of the deer management program in Virginia. The plan identifies a framework of what needs to be done, how it should be done, and when it should be done. Guided by the VDGIF mission, the Virginia Deer Management Plan includes four goals which specify the general directions for deer populations, deer-related recreation, deer-related damage, and deer habitat. Specific objectives help guide the attainment of each goal. Potential strategies then clarify how each objective could be achieved, but without delving into the operational details. By clarifying goals and directions of deer management, this plan will assist the VDGIF Board of Directors, VDGIF administrators and staff, and the public in addressing deer issues.

Following are the mission, goals, and brief summaries of objectives for deer management in Virginia over the next 10 years. Full objectives and strategies are presented toward the end of this document.

Mission for Deer Management: ***Sustainably manage white-tailed deer as a wild, free-roaming public resource to serve the needs and interests of all citizens of the Commonwealth. Manage deer populations, deer habitat, deer-related recreation, and deer damage using approaches that are innovative, flexible, proactive, transparent, technically sound, scientifically sound, ethical, ecologically responsible, and more natural than artificial.***

Population Goal: ***Manage local deer populations to balance the varied needs and reasonable expectations of a diverse human community (cultural carrying capacity), the requirements of a biologically diverse ecosystem, and the anticipated future social/ecosystem demands. Hunting is the preferred population management method, where appropriate and feasible.***

Objectives, with associated strategies, direct VDGIF to:

- Meet deer population objectives within 5 years;
- Monitor deer population status by management unit (county/city);
- Update deer population objectives (as frequently as 2 years);
- Use hunting as the primary deer population management tool;
- Manage limiting factors to attaining deer population objectives;
- Develop/continue site-specific deer management programs (e.g., DMAP, urban archery);
- Increase stakeholder support for deer population management through education and engagement.

Recreation Goal: ***Provide and promote quality deer-related recreational opportunities for all citizens that are safe, diverse, accessible, and consistent with deer population and damage goals. Preserve the heritage and tradition of observing and hunting deer for both management and recreational benefits. Ensure that deer-related recreation methods are sportsmanlike and ethical and that those methods are consistent with and respect the rights of private property owners and other citizens.***

Objectives, with associated strategies, direct VDGIF to:

- Maintain current deer viewing opportunities;
- Reduce deer hunting accidents;
- Maintain current deer hunter participation by weapon type;
- Manage deer hunter satisfaction at levels above "adequate";
- Ensure that deer hunting methods are fair and sportsmanlike;
- Ensure that deer-related recreation respects rights of private property owners and other citizens;
- Increase stakeholder support for deer-related recreation through education and engagement.

Damage Goal: ***Manage deer damage (e.g., agricultural, residential, ecosystem, vehicular, forestry, animal health, human health and safety, other impacts) at local and regional scales consistent with deer population objectives. Promote shared public/agency responsibility for managing deer damage. Hunting is the preferred damage management method when lethal approaches are necessary, where appropriate and feasible.***

Objectives, with associated strategies, direct VDGIF to:

- Quantify deer damage and tolerance for deer damage;
- Reduce agricultural deer damage;
- Reduce residential deer damage;
- Reduce deer-vehicle collisions;
- Reduce ecological impacts from deer;
- Minimize deer-related diseases that impact humans or domestic animals;
- Develop policies and protocols for using alternatives when deer hunting is not feasible or acceptable;
- Increase stakeholder support for managing deer damage through education and engagement.

Habitat Goal: ***Manage deer habitat compatible with deer population, recreation, and damage goals while working within the constraints of diverse land ownerships and ecosystems.***

Objectives, with associated strategies, direct VDGIF to:

- Update/evaluate deer habitat status;
- Identify where deer habitat is limiting factor;
- Promote deer habitat management needed to achieve population, recreation, and damage goals;
- Increase stakeholder support for deer habitat management through education and engagement.

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INTRODUCTION

Public attention to white-tailed deer arguably is greater than the interest exhibited for any other species of wildlife in Virginia. In addition to being Virginia's most popular game species, white-tailed deer are prized by the public as part of the Commonwealth's natural heritage. However, deer may cause serious property damage and human safety concerns. Divergent citizen interests associated with white-tailed deer provide unique management challenges for the Virginia Department of Game and Inland Fisheries (VDGIF).

The VDGIF, under the direction of a Governor-appointed Board of Directors, is charged specifically by the General Assembly with the management of the state's wildlife resources. The Board and VDGIF are given many legal mandates throughout the Code of Virginia. The agency's primary functions include management of the wildlife resources (§29.1-103), public education (§29.1-109), law enforcement (§29.1-109), and regulatory powers (§29.1-501).

The Virginia Department of Game and Inland Fisheries' mission is:

- To manage Virginia's wildlife and inland fish to maintain optimum populations of all species to serve the needs of the Commonwealth;
- To provide opportunity for all to enjoy wildlife, inland fish, boating and related outdoor recreation and to work diligently to safeguard the rights of the people to hunt, fish and harvest game as provided for in the Constitution of Virginia;
- To promote safety for persons and property in connection with boating, hunting and fishing;
- To provide educational outreach programs and materials that foster an awareness of and appreciation for Virginia's fish and wildlife resources, their habitats, and hunting, fishing, and boating opportunities.

What the Virginia Deer Management Plan Is

The Virginia Deer Management Plan describes the history of the deer management program, its current status (supply and demand), and the future direction or emphases it likely will take. The plan establishes a framework through 2024 of what needs to be done, how it should be done, and when it should be done. By clarifying management goals and objectives of the VDGIF relating to deer, this plan will help Board members, VDGIF administrators, VDGIF staff, and the public to effectively address deer issues. As the basis for guiding white-tailed deer management activities and projects, the plan also informs the General Assembly and the public of what the VDGIF intends to accomplish. This is a strategic plan (e.g., proposing hunting as the preferred method to control deer populations) and not an operational plan (e.g., establishing specific number of days for hunting antlerless deer).

How the Plan was Developed

The first deer management plan was developed between 1996 and 1998, and hereafter will be referred to as the 1999 Deer Plan. This plan was developed to represent the interests of all citizens, not just select groups (including the VDGIF). It evolved as a composite of contributions from citizens, business interests, resource professionals, and people seeking recreational opportunities in the Commonwealth. The 1999 Deer Plan represented VDGIF's first attempt to thoroughly incorporate the public's interests into all phases of its management planning process.

The plan was first revised during 2005-2006. Like the original planning process, the revision incorporated value choices made by diverse stakeholders with technical guidance from wildlife professionals.

Key accomplishments of the revision were updating technical chapters (data, programs, etc.) and engaging a Stakeholder Advisory Committee (SAC) to significantly update goals, objectives, and strategies of the plan. To broaden input, public comments were received on the draft plan revision via the internet and in writing. The VDGIF Board of Directors endorsed the 2006-2015 Deer Plan on March 27, 2007.

The plan was once again revised during 2014-2015 using a very similar process to the one used during 2005-2006. The 15-member SAC (Appendix 1) met four times during July, September, and December 2014 and August 2015. A key improvement during this process was the incorporation of data from a citizen survey conducted by Virginia Tech regarding citizen experiences with, and opinions about, deer. To broaden public and professional input, VDGIF staff presented draft population objectives during the biennial hunting regulations review process, circulated draft technical chapters among professionals with technical expertise, and received public comments about the draft plan revision via the internet and in writing (Appendix 2). The plan was presented to, and endorsed by, the VDGIF Board of Directors on October 15, 2015.

Format

The 2015-2024 Virginia Deer Management Plan includes updated sections on deer program history, deer program status (supply and demand), supporting documents, accomplishments of the 2006-2015 Deer Plan, and deer program goals. Within the context of the VDGIF mission statement, deer management goals were drafted to address four key issue areas: deer populations, deer-related recreation, deer damage, and deer habitat. Specific objectives have been established for each of these goals to help guide their attainment, whereas preferred strategies clarify how each objective should be achieved.

Interim Changes to the Objectives and Strategies of the Plan

The revised Virginia Deer Management Plan is designed to provide guidance and priorities to help manage Virginia's deer population through 2024. This plan is intended to be a dynamic and flexible tool which remains responsive to changing social, environmental, technical, and administrative conditions. Thus, to keep the plan relevant and responsive, specific objectives and strategies may be added, deleted, or amended by VDGIF as new circumstances demand. Recognizing the adaptive significance of corrective changes in management approaches, the SAC endorsed this flexibility in updating objectives and strategies between scheduled revisions. VDGIF staff will submit any interim updates to the SAC for review before implementing changes. *Updated objectives will be provided as addenda to the Plan on the agency website*.

Acknowledgements

For a plan representing the interests and values of Virginians, success depended on the meaningful involvement of stakeholders from throughout the Commonwealth. The commitment and enthusiasm provided by the Stakeholder Advisory Committee (Appendix 1) not only made a substantial difference in the quality of the final plan, but enriched the process throughout. Numerous citizens answered surveys and reviewed and commented on the draft plan (Appendix 2).

We would like to acknowledge the contributions of various professionals in the development of this plan. Appreciation is extended for the work of VDGIF technical staff for summarizing, presenting, and/or reviewing a great deal of life history and management information. The citizen survey and model developed by Drs. Jim Parkhurst and Amy Carrozzino-Lyon of Virginia Tech strengthened this plan and our process for updating deer population objectives in the future. We also appreciate the valuable professional advice and reviews provided by George Timko (Maryland DNR) and Dr. Mark Ford (USGS Coop. Unit, Virginia Tech).

DEER PROGRAM HISTORY

Introduction

White-tailed deer in Virginia have a remarkable and interesting history, and historical changes in deer distribution, abundance, and management practices are representative of those in many southeastern states. Deer herds at the time of European settlement around 1600 were plentiful and widespread. However, over-exploitation during the next 300 years resulted in near extirpation of deer by 1900.

When the first European settlers arrived in North America in 1607 at Jamestown Island, Virginia, they described an abundant animal, which would become known commonly as the Virginia white-tailed deer. Early records indicate that white-tailed deer were present statewide, but highest population densities probably occurred in the coastal Tidewater physiographic region (Figure 1).

The exact number of deer that inhabited the Commonwealth of Virginia at the time of European settlement is unknown. However, one of America's foremost naturalists, Ernest Thompson Seton, estimated the deer herd in the eastern United States to be 10-20 deer per square mile at the time of European settlement. Seton's estimate, when applied to the land area of Virginia, equates to a pre-colonial population of 400,000-800,000 deer in 1607 (Figure 2).

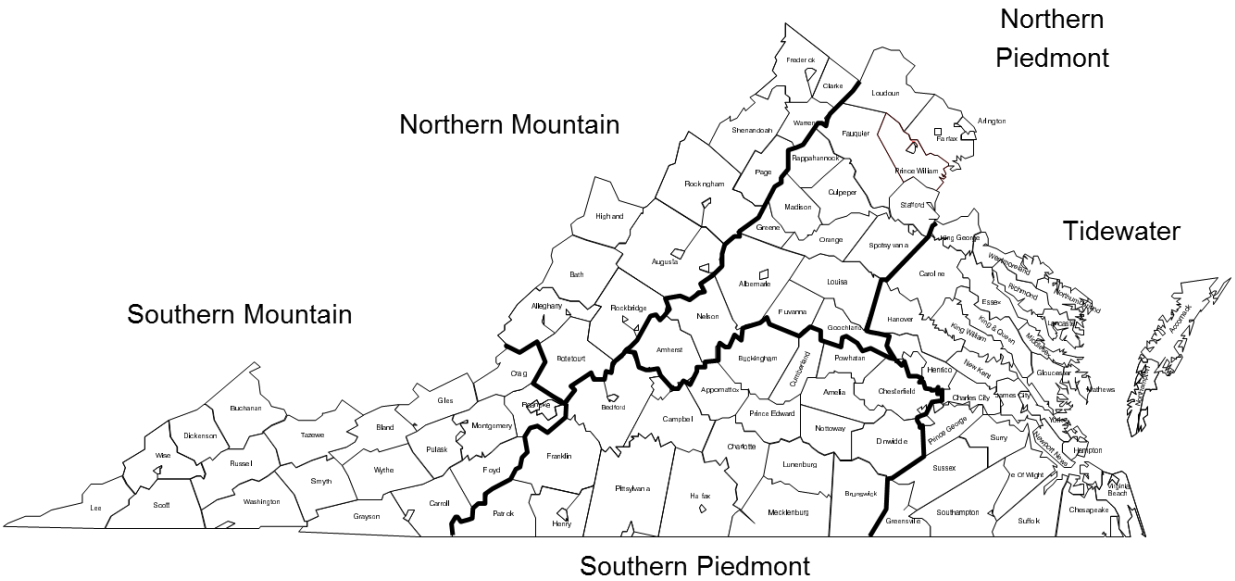

Figure 1. Virginia regions used in this plan.

Historical Changes in Distribution and Abundance

Deer Population Decline, 1600-1900.----Following European settlement, Virginia's deer population began to decline. Factors cited as reasonable causes for this decline are habitat loss due to deforestation and agriculture, over-harvest, and lack of effective law enforcement. Extensive over-harvest may have been the most damaging factor. Although some clearing and conversion of forests to agriculture should have benefited Virginia's colonial deer herd, improvements in habitat apparently were negated by continued over-harvest.

To rectify the decline in deer numbers, Virginia was one of the first colonies to establish a closed season on hunting deer (from February 1 through July 31), beginning in 1699. By 1738, separate seasons had been established for bucks as well as for does and fawns.

The over-harvest of Virginia's deer resource was characterized by several distinct stages. During early European settlement, venison and deer hides were essential staples of everyday colonial life. Despite the potential harm likely to be inflicted on deer populations, nearly every law enacted by colonists to protect deer in Virginia exempted settlers living on the contemporary western frontier. As further evidence of the pioneers' dependence on deer as a source of food and clothing, it was not until 1849 that the deer season was closed completely in counties west of the Blue Ridge Mountains.

Commercial trade in deer hides, which peaked around 1700, added to subsistence hunting. Between 1698 and 1715, approximately 14,000 hides were exported annually from Virginia to Europe.

The boom in market hunting followed the rise and fall of commercial trade in deer hides. One market hunter in northwestern Virginia was reported to have killed over 2,700 deer prior to 1860 at an average price of 10 cents per pound. Market hunting effectively ceased with the passage of the federal Lacey Act in 1900, which outlawed the buying and selling of wildlife taken illegally and enhanced federal government control over the interstate transport of wildlife.

Similar to most southeastern states, Virginia's deer herd reached its lowest point during the early 1900s. By that time, the deer herd in nearly all of Virginia's Mountain and Piedmont regions had been extirpated. In an article that appeared in the *Game and Fish Conservationist*, the precursor to today's *Virginia Wildlife*, the 1931 statewide deer population was estimated to be approximately 25,000 animals (Figure 2).

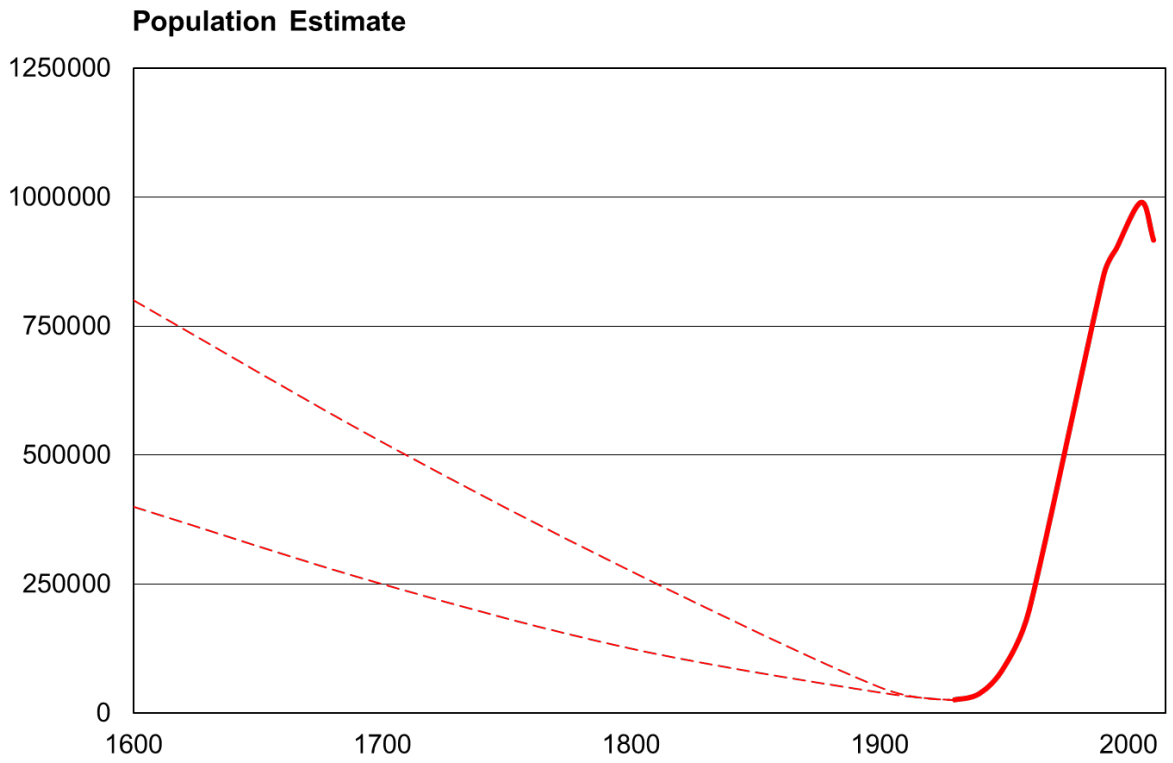

Figure 2. Hypothetical population curve for Virginia's deer herd, 1600-present.

Deer Population Restoration.----Exactly when deer numbers began to increase significantly in Virginia is unknown. It is unlikely that the North American deer population increased significantly until the 1930s. The principal factors that contributed to the increase in deer populations in Virginia over the past 60-70 years were reforestation, farm abandonment, protective game laws, effective law enforcement, and restocking. The three latter factors have been the responsibility of the VDGIF.

After its formation in 1916, the Virginia Game Commission devoted considerable time and effort to deer management. Initial efforts to protect remaining deer herds included establishing shorter hunting seasons and imposing a season bag limit. The annual deer harvest during the 1920s averaged about 620 deer for the 33 counties still open to deer hunting. In 1924, the General Assembly restricted hunting to a 45-day buck-only season between November 15th and December 31st with a 1-deer per day, 2-deer per season bag limit.

In 1926, the Game Commission initiated a deer restoration program. Early records of this restoration effort are incomplete, but it is known that from 1926-1952, 1,870 deer from out-of-state were imported for release in Virginia. Historical records indicate that Virginia imported deer from more states (11) than any other state in the Southeast (Figure 3). The average cost for out-of-state deer was $50/deer, but costs ranged from $25-$125/deer. The last deer imported for release in Virginia was in 1952. After 1952, restoration efforts focused on capturing and relocating deer within the state.

The number of deer released in Virginia peaked at 375 deer in 1940 (Figure 4). After a 4-year lull during World War II, restocking activities resumed at a moderate level for 10 years and averaged about 40 animals annually. From 1958 - 1966, restoration efforts were suspended but resumed again in 1967. Nearly all the deer stocked after 1967 came from the Radford Army Ammunition Plant(s) in Montgomery and Pulaski Counties. Restoration efforts conducted during the 1980s and 1990s (involving about 450 deer) were directed primarily at 2 far southwestern counties, Buchanan and Dickenson. Most restocking in Virginia occurred west of the Blue Ridge Mountains (Figure 5). In total, 4,264 deer were imported or translocated within the state.

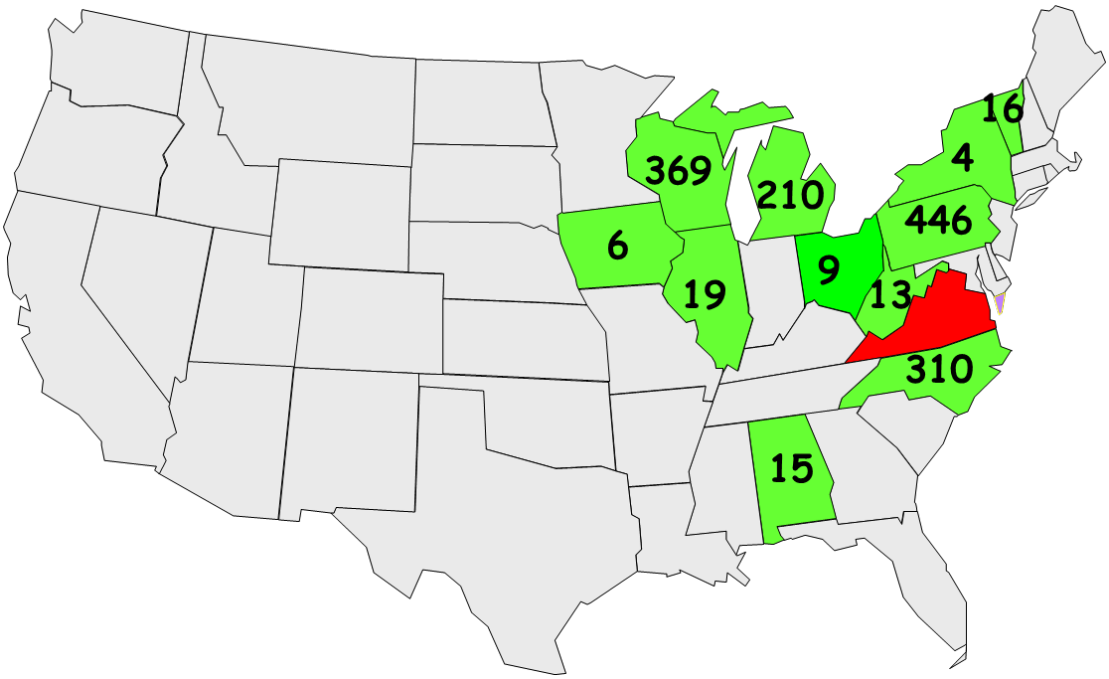

Figure 3. Source states, and number imported from each, for deer stocked in Virginia, 1926-1952.

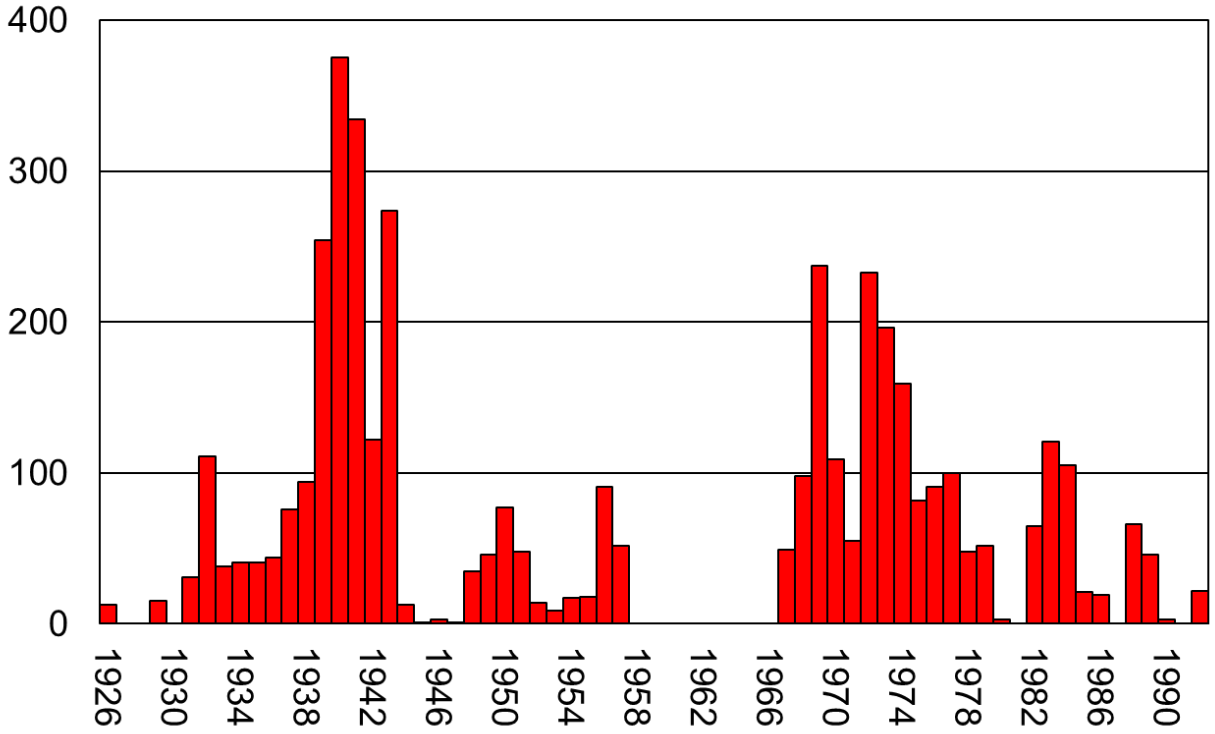

Figure 4. Number of deer stocked in Virginia, 1926-1992. In total, 4,264 deer were imported or translocated within the state.

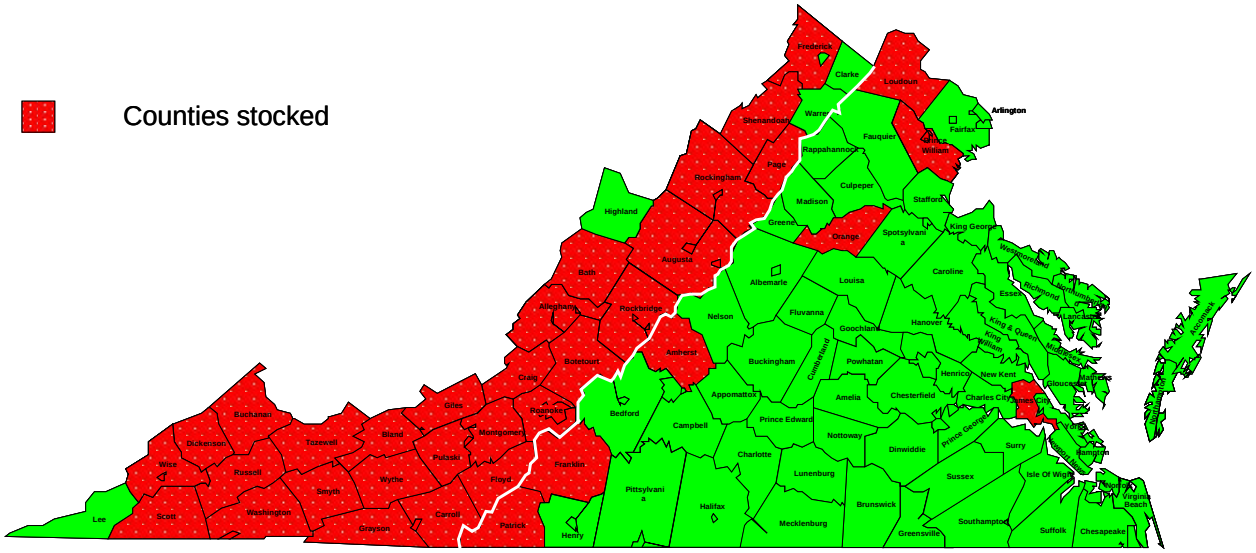

Figure 5. Areas stocked with deer, 1926-1992.

Deer Distribution Maps

1938.----In one of the first maps of deer distribution in Virginia (Figure 6), three distinct areas were described: areas with native deer herds, areas where deer were absent, and 22 locations of isolated deer populations attributed to restocking. At a time when native deer were considered extirpated from nearly all of western Virginia, Bath and Highland counties still possessed a population estimated at 500-2,500 deer. By far the largest contiguous area with native deer populations extended from the coastal Tidewater region into the central Piedmont. Over half of the state, consisting of most of the mountains and the northern and southwestern Piedmont, was described as devoid of deer.

Later changes in Virginia's deer distribution and abundance are best depicted in a series of maps produced by the Southeastern Cooperative Wildlife Disease Study (SCWDS) at the University of Georgia. These maps, prepared for multiple states from data compiled by state game and fish biologists, represent conditions in Virginia in 1950, 1970, 1980, and 1988.

1950.----The 1950 SCWDS map of Virginia designated locations of deer when intensive restoration began, but it gave no indication of relative abundance (Figure 7). By 1950, Virginia had been conducting restoration efforts for nearly 25 years and had released approximately 2,000 animals. By the early 1950s, Virginia's estimated, statewide deer population had expanded to 150,000 animals.

Similar to the 1938 map, the 1950 SCWDS map indicated that deer occupied a majority of the coastal Tidewater and central Piedmont regions, yet much of the southwestern and northern Piedmont remained unoccupied. Most of the south-central Piedmont lacked deer, with only isolated populations scattered throughout the area. West of the Blue Ridge Mountains, native and restocked deer herds in the northern mountains had repopulated approximately 75% of the available range. Deer herds in the southern mountains were depicted as isolated populations with vast areas of unoccupied range.

In 1952, the Virginia Game Commission initiated a statewide program to collect data on deer populations to help set appropriate seasons and bag limits, and in 1953, the first full-time deer biologist was employed to direct this program.

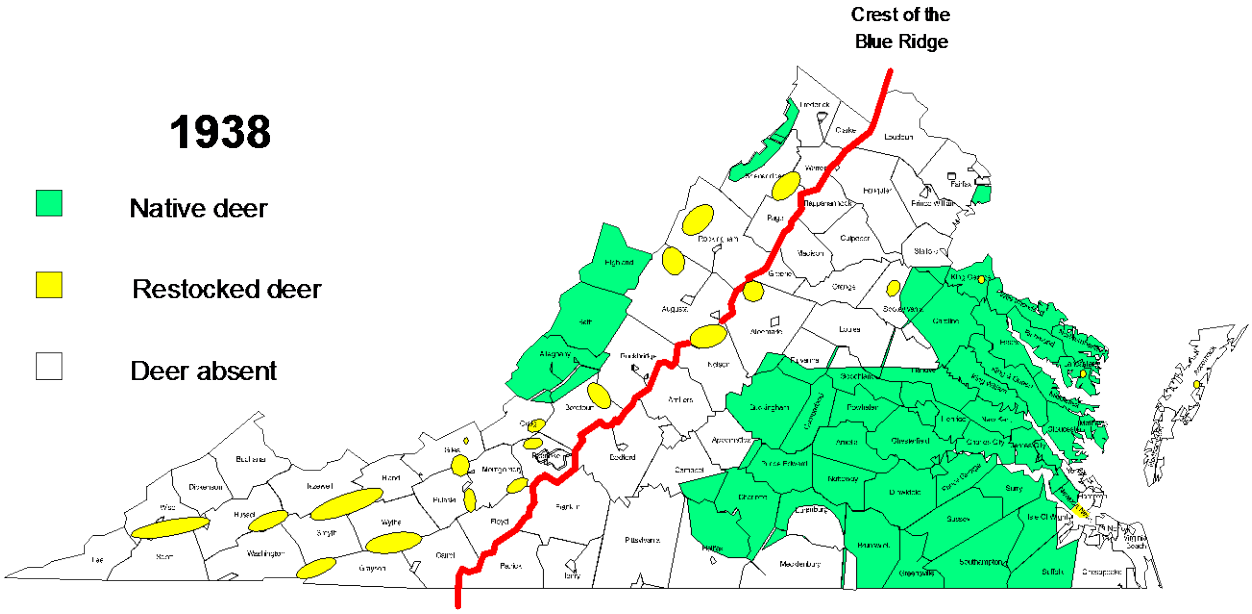

Figure 6. Virginia deer distribution in 1938 (estimated 50,000 deer; adapted from Patton 1938).

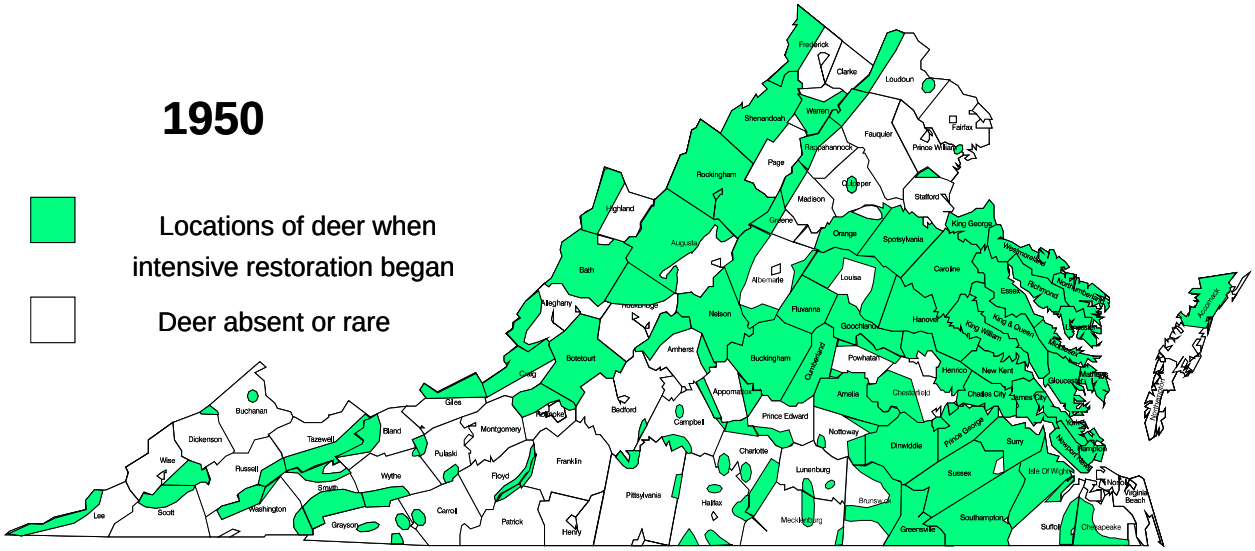

Figure 7. Virginia deer distribution in 1950 (estimated 150,000 deer; see text).

1970.----The 1970 SCWDS map indicate a significant expansion in the distribution of deer (Figure 8). The Piedmont, which lacked deer in 1950, was repopulated by 1970. Deer now occupied virtually all-available range east of the Blue Ridge Mountains and in the northern mountains.

In addition to significantly expanding its range, Virginia's deer population also continued to grow. By 1970, Virginia's statewide deer population was estimated to be approximately 215,000 animals. Beginning with the 1970 SCWDS map, relative indices of deer population abundance were provided for the first time and included the following: populations exceeding the environmental capacity, populations equal to the environmental capacity, populations below the environmental capacity, and areas where deer were rare or absent.

Environmental capacity - a term only used for the 1970 and 1980 SCWDS maps - represented optimum population levels where habitat is not limiting and physical condition and reproduction are relatively good. Environmental capacity would be much below *biological carrying capacity* - the maximum number of deer the habitat could support on a sustained basis. At biological carrying capacity, physical condition and reproduction will decline due to the lack of food and other resources.

Unpublished data from the same period indicate that areas below the environmental capacity typically had deer densities of less than 5 deer per square mile. Areas described as equal to the environmental capacity ranged from 5-25 deer per square mile, and areas exceeding environmental capacity exceeded 25 deer per square mile.

1980.----Significant increases in the abundance of deer in Virginia occurred between 1970 and 1980 (Figure 9). By 1980, a majority of the Tidewater, Piedmont, and Northern Mountains were described as fully occupied at environmental capacity. Populations in the Southern Mountains had expanded slightly but were still described as below environmental capacity, with many areas where deer were rare or absent. The 1980 statewide deer population was estimated at 422,000 animals.

1988.---- In contrast to the earlier maps, this map introduced specific density estimates on a county basis (Figure 10). Population estimates used for the 1988 map were based on the county's antlered buck harvest per square mile of forested area using data from 1986 or 1987 (whichever was highest). Estimated antlered buck harvests by county were calculated from check station data using the equation: estimated

antlered males = total male harvest - (total female harvest * 0.3). The deer densities for the 1988 map were assumed to be 10 times the estimated antlered buck kill per square mile of forest range. Based on this model, the 1987 statewide deer population was estimated to be approximately 575,000 animals.

Since the early 1990s, deer population status in Virginia has been monitored using an annual index of the antlered buck kill per square mile of estimated deer habitat. This technique does not provide a total number of deer or absolute deer density (i.e., number of deer per square mile) within a management area. However, this index does provide a reliable method to compare relative deer densities among management units and regions of the state and also allows the Department to monitor deer population trends within management units over time. Also, since the mid-1990s, deer population status has been monitored separately on private and public lands for counties in western Virginia.

1995.----Data shown in the 1995 maps (Figures 11 and 12) represent the relative deer population status for private and public lands by management unit in fall 1995 and were included in the Department's first deer management plan (VDGIF 1999). The index is the number of antlered deer killed per square mile of habitat. As was noted in the first plan, deer population estimates based on computer reconstruction models indicated that the statewide deer herd had been fairly stable around that time at a prehunt population of approximately 950,000-1,000,000 deer.

2004.----Data shown in the 2004 maps (Figure 13 and 14) represent the relative deer population status for private and public lands by management unit in fall 2004 and were included in the Department's second deer management plan (VDGIF 2007). As was noted in the second plan, prehunt computer population reconstruction estimates had been relatively stable over the previous decade, fluctuating between 850,000 and 1,050,000 deer (mean = 945,000).

2015.----Current deer distribution and abundance is described in the Deer Program Supply and Demand section of this plan.

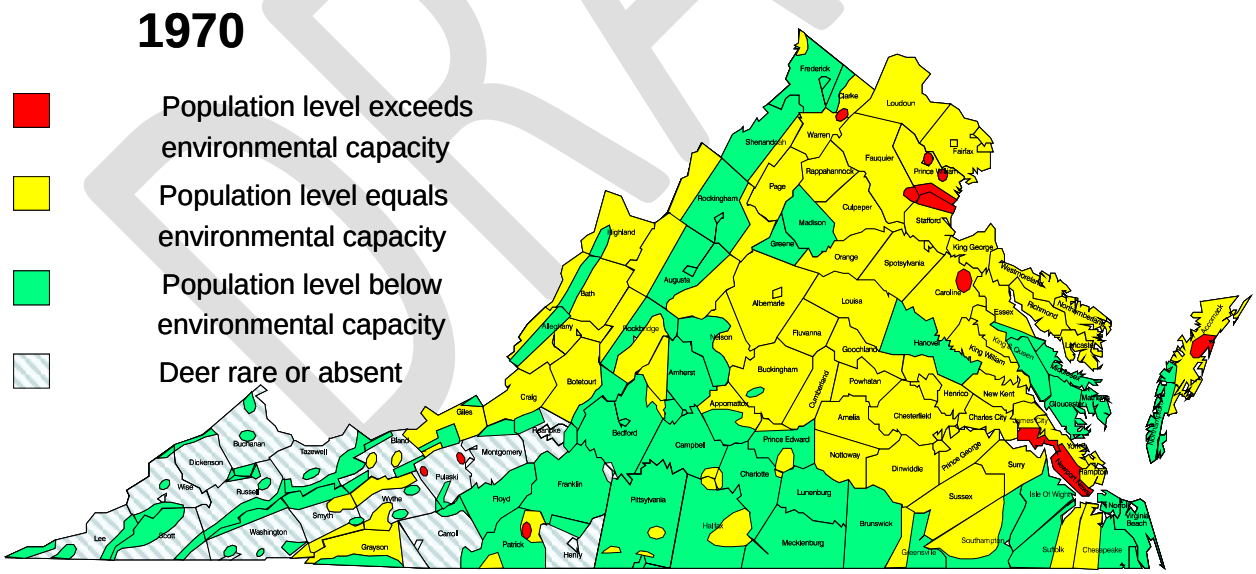

Figure 8. Virginia deer distribution and relative abundance in 1970 (estimated 215,000 deer; see text).

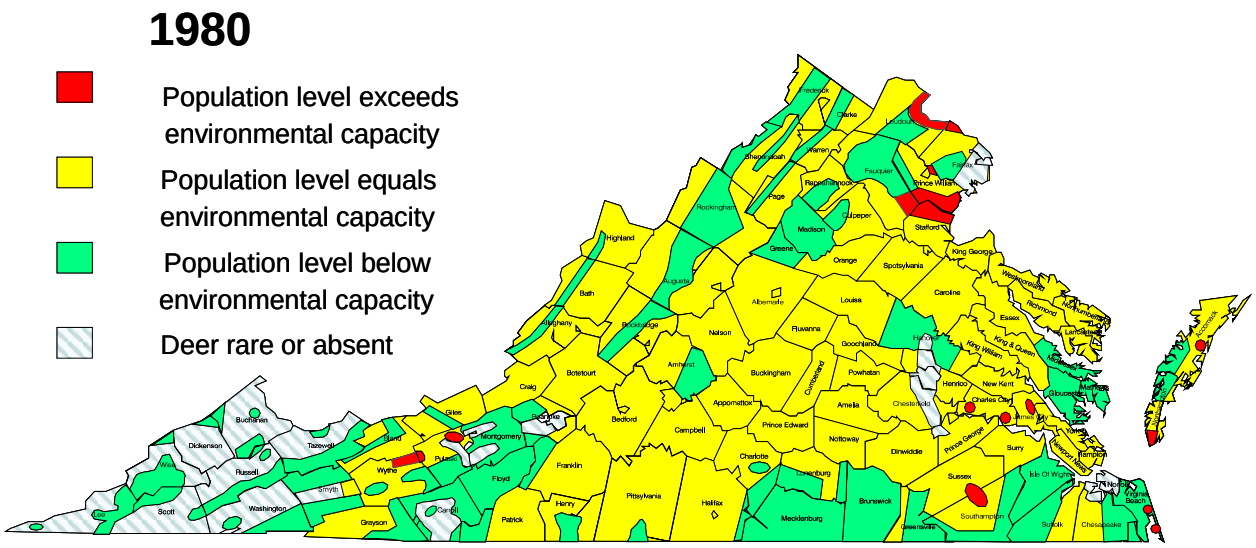

Figure 9. Virginia deer distribution and relative abundance in 1980 (estimated 425,000 deer; see text).

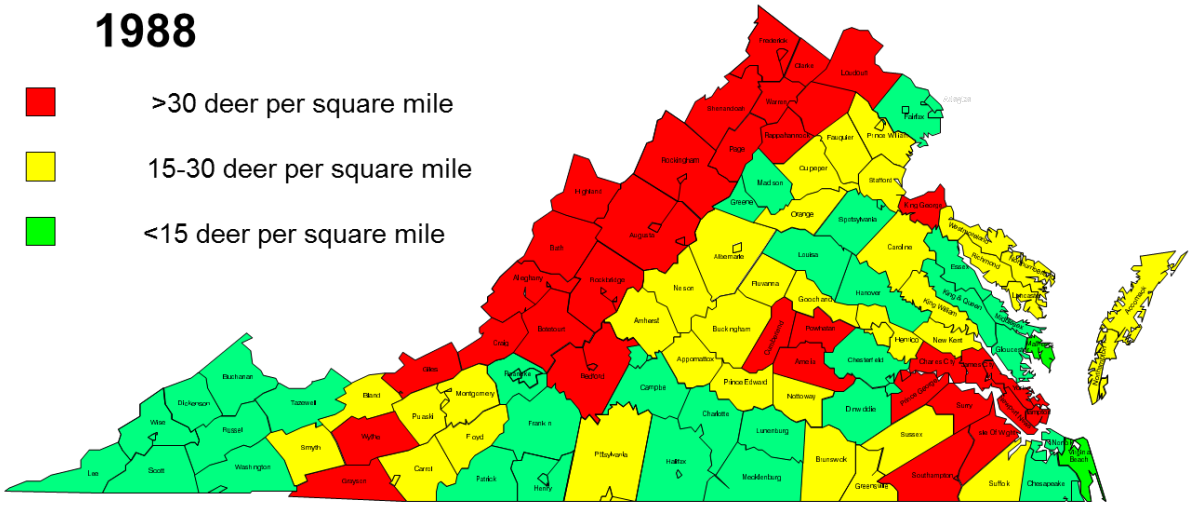

Figure 10. Virginia deer density estimates by county in 1988 (estimated 575,000 deer; see text).

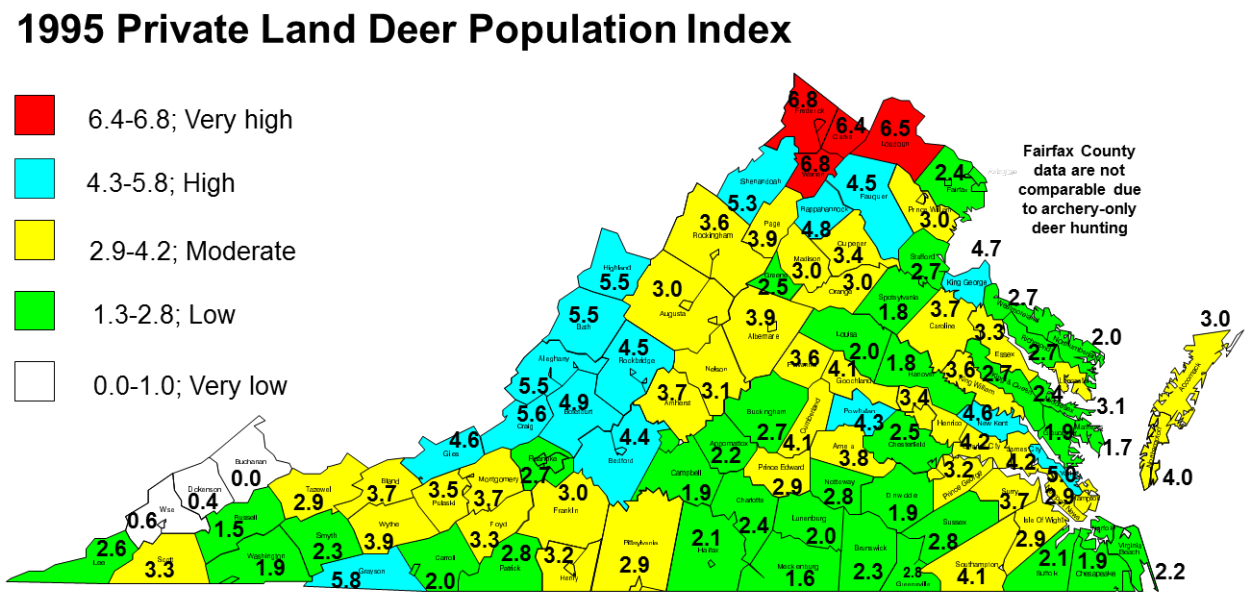

Figure 11. Relative deer population abundance by county on private lands in Virginia in 1995. NOTE: *The index (antlered deer killed per square mile of habitat) is not a density estimate, but indicates relative differences among management units. Cluster labels (e.g., very high, high, etc.) are subjective. Estimated prehunt deer population of approximately 950,000-1,000,000 animals (*see text*).*

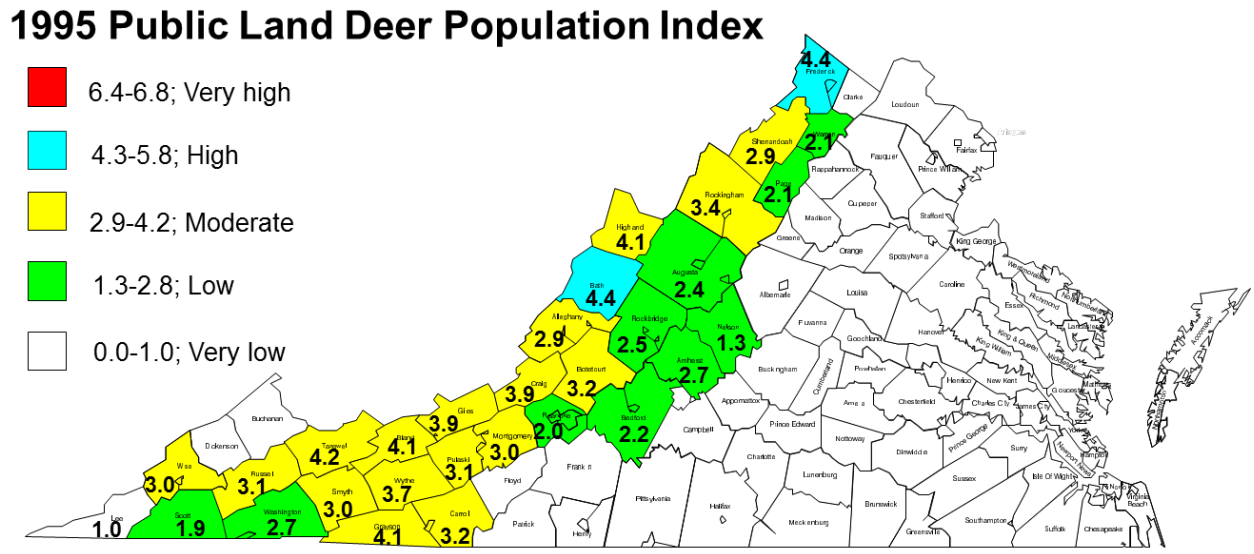

Figure 12. Relative deer population abundance by county on public lands in Virginia in 1995. NOTE: *See Figure 11 caption for more information about the index.*

2004 Private Land Deer Population Index

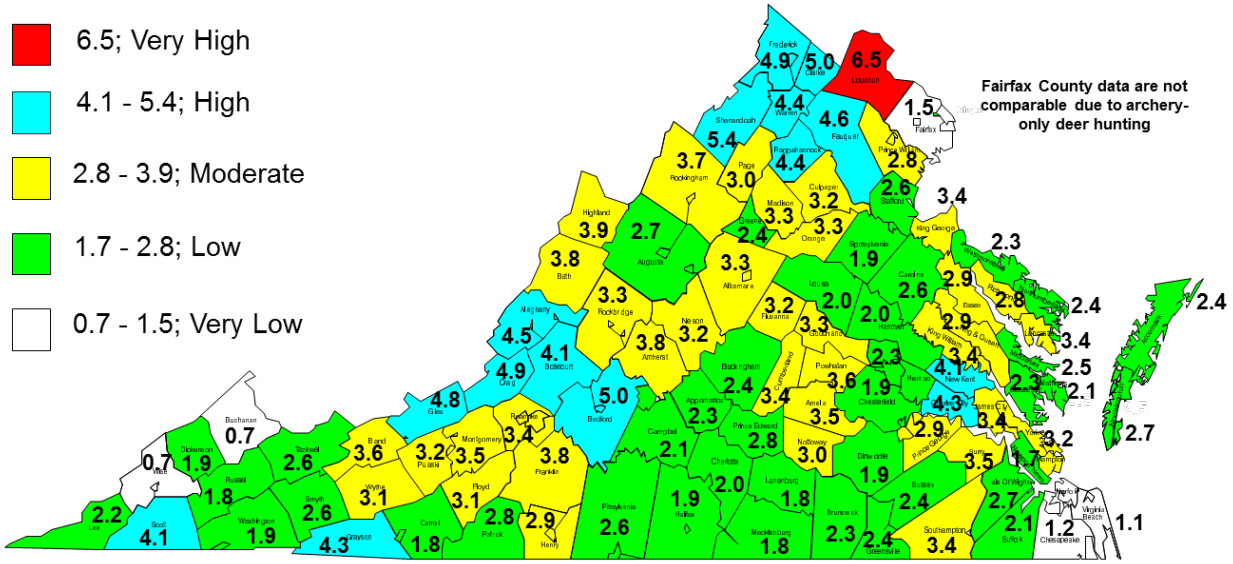

Figure 13. Relative deer population abundance by county on private lands in Virginia in 2004. NOTE: *See Figure 11 for more information about the index. Estimated deer population of 1,039,000 deer* (see text).

2004 Public Land Deer Population Index

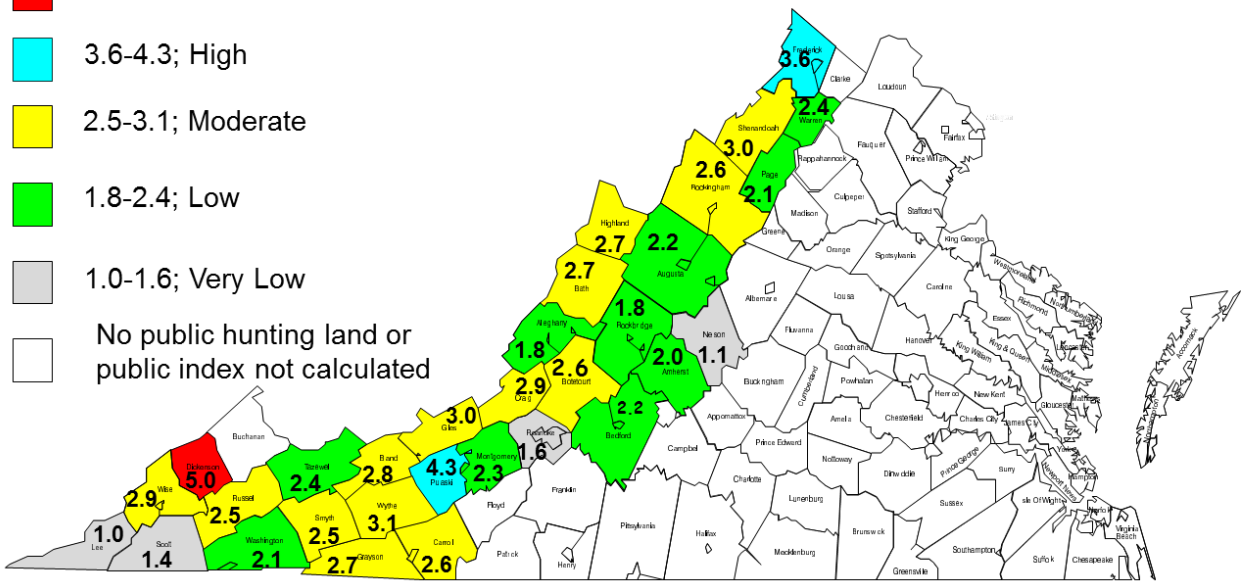

Figure 14. Relative deer population abundance by county on public lands in Virginia in 2004. NOTE: *See Figure 11 for more information about the index.*

Deer Management Program

Big Game Checking System.----The cornerstone of Virginia's deer management program is the big game check station system, which includes physical check stations and an automated reporting system. This system allows VDGIF to effectively monitor annual deer hunting harvests on a county basis. For the purposes of this plan and unless otherwise qualified (e.g., subsistence hunting, market hunting), *hunting* refers to the legal pursuit and/or taking of wild animals under fair chase conditions for recreational and/or management purposes. In contrast to many states that estimate their annual deer harvest(s), Virginia's deer harvest figures represent a known minimum count. The check station system provides harvest figures that the public understands and has confidence in. Beginning in 1947, each successful deer hunter was required by law to check every deer they killed at a check station to receive an official game tag. Information regarding the animal's sex, date of kill, type of weapon, and county of kill was recorded.

Check stations are operated by local volunteers who serve without compensation. During the 2014 deer season, approximately 600 big game check stations were distributed throughout the Commonwealth. The check station system is administered as a joint effort between the Bureau of Wildlife Resources and Law Enforcement Division. Law Enforcement selects and supervises the check stations while the Bureau of Wildlife Resources provides equipment and materials and tabulates the annual harvest data. Results of the annual deer kill are available about one month after the close of the season.

Beginning in fall 2004, VDGIF initiated an automated telephone deer checking system (1-866-GOT-GAME) for hunter convenience. A successful hunter could check his or her animal at a check station or by calling it in on the telephone checking system. Approximately 44% of the deer harvest that year was checked using the new telephone checking system. In fall 2007, an Internet checking option was added, and by fall 2014, approximately 79% of the reported deer kill was checked electronically via telephone or Internet.

Deer Harvest Regulations.---- At the state level, deer harvest regulations are evaluated and amended every other year. Depending on management goals and the current status of the deer herd, regulation amendments may involve adjustments to season lengths, bag limits, and/or the number of antlerless deer hunting days within a county during the general firearms season. Generally, the density and health of Virginia's deer herd has been managed by controlling the number of antlerless (i.e., either-sex) deer hunting days within individual counties.

The biennial process to change hunting regulations typically stretches over one year and represents a major investment of VDGIF staff time and effort. Public and staff begin submitting issues during one year, and the VDGIF Board holds a series of public meetings the following year. The public has an extended period to review and comment on regulation amendments before the Board acts to propose and finalize amendments. New regulations typically become effective on July 1 of the year of adoption.

As noted earlier, Virginia established a closed season on deer hunting in 1699, and the next two centuries witnessed a continual restriction of deer hunting seasons as the deer population declined. By the 1920's, the annual kill averaged only 619 deer in the 33 counties that still had an open deer season. For the next 70 years (1920s – early 1990s), Virginia's deer management program was designed to allow deer herds to increase by maintaining a low to moderate percentage of female (or antlerless) deer in the total deer kill. This strategy worked very well as deer populations expanded and increased in Virginia.

Virginia was one of the first southeastern states to recognize the need to harvest antlerless deer in order to control population growth and size. During the 1946-1947 season, the first either-sex deer hunting days (i.e., days when both antlered and antlerless deer could be killed) were held east of the Blue Ridge Mountains in Caroline and King and Queen Counties as well as portions of Southampton and Sussex Counties. West of the Blue Ridge Mountains, the first either-sex deer hunting days were held in Augusta County in 1951. From 1951 to 1967, many different combinations of either-sex deer hunting season approaches were evaluated. Heavy harvests of antlerless deer in some counties during one year were followed by a marked reduction in the number of antlered deer harvested in that county the following year, suggesting that the level of antlerless deer harvest could control deer populations. In 1967, the VDGIF Game Division adopted a sustained yield management strategy where management objectives were accomplished by incrementally

increasing or decreasing the number of either-sex deer hunting days at the end of the general firearms deer season. Years of experience using this approach revealed that when the percentage of female deer in the total deer kill did not exceed ~30%, the total deer kill in succeeding years generally either increased or remained stable.

In the late 1980s and early 1990s, Virginia's deer management goal changed from growing herds to controlling them. To effect this change in management direction, the total statewide deer kill and the percent females in the deer kill were increased dramatically through rapid liberalization of deer seasons, bag limits, and the number of either-sex deer hunting days. Consequently, between 1988 and 1992, the total deer kill increased 75% from 115,000 to 200,000 and percent females in the deer kill was increased from 33% to 40%.

Over the past two decades, deer seasons, bag limits, and either-sex deer hunting opportunities have continually been liberalized. Today, the percent females in the deer kill is typically just under 50% statewide and consistently exceeds 50% in many management units. Current deer seasons and bag limits across much of Virginia are some of the longest and most liberal deer seasons in the United States. Liberalized hunting regulations enacted over the past two decades appear to have stabilized or reduced deer herds in most areas.

Appendix 3 contains a list of some major historical changes made in deer seasons and regulations.

Deer Management: Two Traditions.----Deer management in Virginia is characterized by two distinct zones of tradition and regulation, east of the Blue Ridge Mountains and west of the Blue Ridge Mountains. Historically, bag limits and either-sex deer hunting opportunities west of the Blue Ridge Mountains have been more conservative than those in eastern Virginia. Deer hunting east of the Blue Ridge Mountains is rooted strongly in a tradition of private land hunting clubs, where use of hounds and a 7-week general firearms season prevails. Conversely, west of the Blue Ridge Mountains, hunting deer with dogs is prohibited by state law, hunt clubs are less common, nearly 2 million acres of public lands are available for hunting, and the general firearms season in most areas is 15 days long. Prior to 1964, the west of the Blue Ridge Mountains general firearms season was 6 days long. Eight southwestern Piedmont counties (or portions thereof) which lie east of the Blue Ridge Mountains have traditionally been incorporated into the "western" framework. Currently, only three of these counties (Amherst, Bedford, and Nelson) continue to follow the "western" deer seasons. The five remaining counties have moved toward more liberal deer hunting regulations. Finally, in the extreme southeastern corner of the state, 3 cities (Chesapeake; Suffolk, east of the Dismal Swamp line; and Virginia Beach) have an October 1 through November 30 firearms deer season traditional to that area

Deer Management Assistance Program (DMAP).----DMAP was implemented by the VDGIF in 1988. DMAP is a site-specific deer management program that increases a landowner's or hunt club's management options by allowing a more liberal harvest of antlerless deer than offered under general hunting regulations. The primary goal of DMAP is to allow landowners and hunt clubs to work together on a local level to manage deer herds. Landowners/hunt clubs have the option to increase, decrease, or stabilize deer populations on their property enrolled in DMAP. These objectives are accomplished by harvest strategies that control the number of antlerless deer taken, primarily through the issuance of DMAP tags. DMAP tags can be used only to harvest antlerless deer (does and male fawns) and are not valid for antlered bucks. Secondary objectives are to increase VDGIF's biological database and to improve communication between deer hunters, landowners, and VDGIF. During the 2014 hunting season, 25,849 DMAP tags were issued to 805 cooperators on approximately 1.4 million acres, resulting in the harvest of 14,681 deer. These 805 DMAP cooperators represented more than 17,700 members and guests. Today the Department's biological database for deer has more than 15,840 datasets and more than 526,000 records.

Damage Control Assistance Program (DCAP).----Similar to DMAP, DCAP started in 1988 and also is a site-specific deer damage management program designed to increase a landowner's management options by allowing a more liberal harvest of antlerless deer than offered under general hunting regulations. The primary objective of DCAP is to provide site-specific assistance to control crop depredation or other property damage by deer. A landowner who demonstrates damage from deer can kill deer under a valid kill permit at the time of damage (see below) and/or use the valid kill permit to defer removing deer until the hunting season using DCAP tags. DCAP tags can be used only to harvest antlerless deer (does and male fawns). Secondary objectives are to maximize hunter participation in the control effort and to shift the deer kill from closed-season kill permits to the deer hunting season. During the 2014 hunting season, 10,444 DCAP tags were issued to 901 cooperators on 327,000 acres, resulting in the harvest of 2,062 deer. DCAP is not available in

cities and counties east of the Blue Ridge where hunters may harvest antlerless deer every day during the general firearms deer season.

Kill Permits.----As provided by Virginia State Statute §29.1-529 (*Killing of deer, elk, or bear damaging fruit trees, crops, livestock or personal property or creating a hazard to aircraft)*, the VDGIF is authorized to permit owners or lessees of land to kill deer where deer cause commercial or personal property damage. Under the kill permit system, a landowner/lessee who sustains deer damage must report the damage to the local conservation police officer (CPO) for investigation. If, upon investigation, the CPO (or designee of the Director) determines that deer are responsible for the reported damage, he/she may authorize in writing that the owner/lessee, or other person(s) designated by the CPO, be allowed to kill deer when they are found upon the property where the damage occurred. In calendar year 2014, 2,308 deer kill permits were issued to landowners and 11,361 deer were reported killed.

Deer Population Reduction Program (DPOP).----DPOP is a site-specific urban deer management tool that allows managers of public properties with unique deer management needs (e.g., parks, airports) to use recreational deer hunters to kill extra antlerless deer outside of traditional established seasons or with weapons generally reserved for other seasons (e.g., rifles during muzzleloading season). DPOP was also used in the past to authorize sharpshooting of deer, generally conducted with tactical weapons at night for maximum efficiency. During a review of site-specific deer programs during 2012, staff decided to authorize sharpshooting on public land or in cities under kill permits and to restrict DPOP hunting to public land. During 2013-2014, DPOP permits were issued to 14 cooperators. These cooperators were issued 5,855 antlerless deer tags and reported a deer kill of 1,231 animals.

Urban archery season.----An urban archery season was initiated in 2002 to help reduce deer-human conflicts in urban areas while providing additional hunting recreation. Only antlerless deer may be taken during this season. This special season provides 4 additional weeks of hunting prior to the opening of the statewide archery season in October, and it provides 3 additional months of hunting after general firearms season ends in January. Urban counties with more than 300 persons per square mile and all cities and towns in Virginia are eligible to participate in this urban archery program. In order to participate, a locality must submit its intent to do so to VDGIF by April 1 and advise VDGIF of any applicable weapons ordinances or other restrictions.

Participation has grown from 11 localities during 2002-03 to 45 during 2015-16 (Appendix 4). The statewide urban archery harvest was 873 during 2014-15. During 2013, VDGIF conducted a survey of local governments participating in the urban archery season and interviewed selected respondents. Most responding officials were satisfied with the season and considered it effective in their localities; however, access, landowner reluctance to allow hunting, and local weapons restrictions were considered impediments to the program in some cases.

Deer Disease Surveillance.---- For decades, VDGIF has monitored for hemorrhagic disease (HD) in the summer and fall months. HD, a viral disease (*Orbovirus*) transmitted by biting midges (*Culicoides*), affects the white-tailed deer population every year in Virginia. The last significant outbreak occurred in fall 2014. Typically, deer in the Coastal Plain are hardest hit, deer in the central area of the state are less severely affected, and reports are rarely received from the mountainous regions of Virginia. However, in 2007 and 2012, numerous reports of HD were received from western counties.

Chronic wasting disease (CWD) surveillance began in Virginia in 2002 when the disease was first diagnosed east of the Mississippi River. CWD is an infectious, progressive, and fatal brain and nervous system disease found in North American deer, elk, and moose. The disease agent is a protein called a prion which can be spread directly between infected deer or through contamination of the environment. Virginia and other eastern states initiated CWD planning efforts and established regulations to detect and minimize the spread of this always fatal disease. Since 2002, VDGIF has instituted a number of management actions to prevent the introduction of CWD into Virginia. These actions include restricting movement of captive deer (2002); revising CWD surveillance and response plans to address risk factors in adjacent states (2005); restricting import of hunter-killed deer from areas with CWD (2005) or from enclosures intended to confine deer or elk (2013); and, prohibiting possession or use of deer scents/lures that contain natural deer urine or other bodily

fluids used for the purposes of taking, attempting to take, attracting, or scouting wildlife (2015).

To assess whether CWD was present in Virginia's wild deer population, VDGIF has maintained a surveillance program since 2002. The CWD surveillance program monitors the wild deer population using three different approaches: (a) random sampling of hunter-killed or road-killed deer, (b) targeted sampling of deer exhibiting disease symptoms, and (c) testing of all captive deer mortalities. In September 2005, CWD was discovered in a free-ranging white-tailed deer in Hampshire County, West Virginia less than 10 miles from Frederick County, Virginia. Following this discovery, VDGIF's surveillance efforts have focused on western Frederick and northwestern Shenandoah counties. In 2009, Virginia's first CWD-positive deer was harvested in western Frederick County within one mile of the West Virginia border. Since then, 7 more CWD-positive deer have been killed in this same area of western Frederick County. In 2013, a hunter killed a positive deer in southern Frederick County approximately 10 miles southeast of the original positive deer. A positive road-killed deer was found in northeastern Shenandoah County near the Frederick County line in 2014. From 2002-2014, over 7,800 Virginia deer were tested for CWD, 10 of which were positive. As of February 2015, 183 CWD-positive deer have been diagnosed in Hampshire and Hardy Counties, West Virginia, several of which have been close to the Virginia state line.

Since becoming a CWD-positive state in 2009, VDGIF has implemented a number of management actions to slow the spread of CWD. A disease Containment Area (CA) was established in Frederick and Shenandoah counties and expanded to Clark and Warren counties in 2015. Feeding of deer was prohibited year-round both in and near the CA. With a few exceptions, the movement of deer carcasses and carcass parts out of the CA was prohibited. Restrictions were placed on the disposal of deer offal from the CA. Rehabilitation of deer in the CA was prohibited, and deer seasons and bag limits on private lands were liberalized in an attempt to reduce the deer population. These actions are in keeping with responses to a Department survey conducted following the discovery of CWD in Frederick County where respondents supported 5 of 7 potential strategies to control CWD in affected areas, including mandatory disease testing of hunter-killed deer, deer feeding prohibitions, deer carcass movement restrictions, restrictions on deer rehabilitation, and reduction of deer populations using hunters. Respondents did not support the use of sharpshooting to reduce localized deer populations (42% opposed, 36% supported, 22% were neutral), but the strongest opposition was for doing nothing to control CWD (79 % opposed vs. 8% supported).

Captive Deer.---- Deer held in captivity are regulated by VDGIF to achieve the following goals:

(1) Protect the wild white-tailed deer resource.
(2) Manage white-tailed deer as a public resource.
(3) Protect health and safety of humans and domestic animals.
(4) Provide educational and recreational viewing opportunities for citizens, advance scientific knowledge (research), conserve globally rare species, and serve other legitimate purposes for the benefit of society or the environment.

Captive deer have been strictly regulated in Virginia since at least 1994, when a moratorium was placed on fallow deer farming permits (the last permitted facility closed in 2012). Since November 2002, a DGIF permit has been required to possess any member of the deer family (*Cervidae*) in Virginia (§4 VAC 15-30-40). As of June 2015, 16 permitted facilities—primarily those that exhibit deer to the public—held approximately 600 deer in captivity in Virginia. Permit conditions established in 2002 prohibit the importation or movement of any deer species into or within Virginia. Facilities are also required to individually mark all captive deer, keep detailed records, and report deaths and escapes immediately. CWD testing of all captive adult deer mortalities is mandatory. Since 2008, DGIF has allowed limited movements of nonnative captive cervids between compliant, permitted exhibitors on a case-by-case basis.

Private citizens in Virginia are not allowed to keep deer as pets or as part of a private menagerie, and a protocol to address unpermitted captive deer was developed in 2009 and updated in 2012. To educate citizens about the legal, biological, and management issues associated with keeping deer as pets, VDGIF developed a brochure and maintains a webpage entitled, *Keeping Deer Wild in Virginia*.

Deer Hunting Enclosures.----In 2001, the Virginia General Assembly passed §29.1-525.1 to prohibit (a) the erection of a fence with intent to confine deer, and (b) hunting within a fenced area that prevents or impedes the free egress of deer. Exceptions were made to avoid impacts upon areas fenced to ensure human safety (e.g., military installations), permitted captive deer facilities, and 5 existing deer hunting enclosures in

existence or under construction at the time the law was passed. The 5 enclosures were required to register with VDGIF and operate under management practices approved by VDGIF. Currently, 4 registered deer hunting enclosures remain in Virginia. In 2006, VDGIF enacted a regulation describing the attributes of an enclosed or fenced area deemed to prevent or impede the free egress of deer in response to landowner questions regarding this issue (4VAC15-90-291).

Deer Research--- The deer program's primary involvement in research pertains to projects directly related to the Deer Management Plan. Currently, two research studies are being conducted.

The 2006-2015 plan directed VDGIF to improve methods to determine cultural carrying capacity (CCC) for deer. During 2011-2014, VDGIF worked with Virginia Tech to construct and evaluate a predictive model to estimate CCC by management unit. The results of this study were available in 2014 and assisted development of deer population objectives in this plan.

The previous and revised plans have directed VDGIF to develop practical, efficient assessments of deer impacts to ecosystems at the management unit scale to inform establishment of population objectives. During 2012-2016, Virginia Tech has been conducting a research project to model deer herbivory in western Virginia – the region where desired deer population levels conflict most with biological carrying capacity – according to inherent landscape features (e.g., land ownership, topography).

Surveys.----In addition to the specific deer management programs listed above, two VDGIF surveys have a significant impact on Virginia's deer management program: the statewide hunter survey and the bowhunter survey. Virginia's first statewide hunter survey was conducted in 1968 and has since been conducted on either a five-year, annual, or biennial basis. In addition to providing deer kill data like the big game checking system, the hunter survey also provides a mechanism to examine hunter preferences and opinions (i.e., preference for different deer management options). By asking a standard battery of questions over time, deer management staff monitor Virginia deer hunters' opinion on population abundance (high, moderate, or low), perception of any recent change in deer numbers (increasing, stable, or decreasing), and appropriate deer population management objectives (increase, decrease, or stabilize). The bowhunter survey, initiated in 1997, is a diary of wildlife observations by cooperating bowhunters. This survey provides valuable deer observation data for each region of the state, including deer seen per unit time, adult sex ratio estimates, and fawn recruitment estimates. During fall 2013, useable responses were received from 358 archery hunters participating in 4,303 hunts (18,496 total hunting hours).

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DEER PROGRAM SUPPLY AND DEMAND

Introduction

Deer management in Virginia integrates *cultural carrying capacity* (CCC) - the number of deer that can coexist compatibly with humans - and potential ecological impacts of deer. The CCC for deer in a given area is typically well below the *biological carrying capacity* (BCC), the maximum number of deer that a habitat can sustain. BCC is a function of both the quality and quantity of the habitat.

Under optimum conditions, deer populations can double in size annually. Lacking an external regulating factor (e.g., predators, hunting), deer populations can expand to a point (BCC) where they will surpass the ability of the habitat to provide sufficient food resources. As deer populations approach BCC, herd health and condition will decline dramatically. The quality of deer habitat will also be diminished, thereby lowering future BCC for deer and other wildlife dependent on low-growing vegetation. Deer herbivory can also potentially alter future forest composition and structure.

Although frequently described as overpopulated, most of Virginia's deer herds are managed through hunting at moderate to low population densities, in fair to good physical condition, and below BCC. However, deer herds are still above CCC in a number of areas in the Commonwealth.

Supply

Deer Habitat

Like other animals, white-tailed deer have specific habitat requirements, which include food, water, cover, and space. Of these, food is the most critical in Virginia because the average adult white-tailed deer requires 4-6 pounds of food daily per 100 pounds of body weight.

Habitat quality for deer is correlated significantly with soil fertility, more fertile soils provide a wider variety of better quality vegetation for deer to eat. In addition to soil fertility, habitat type, successional stage, and arrangement of habitat types (i.e., interspersion) can affect deer habitat quality. In general, habitat management practices that improve soil fertility, increase the number of habitat types, revert mature habitats to earlier successional stages, or increase the interspersion of habitat types will increase carrying capacity for deer.

Typically, there is a direct inverse relationship between deer density and the health of animals within a herd. As deer population density increases, overall herd health and reproductive rates decline. Conversely, as deer population density decreases, health improves and reproductive rates rise.

Ecoregions----There are six ecoregions (Middle Atlantic Coastal Plain, Southern Appalachian Piedmont, Blue Ridge Mountains, Northern Ridge and Valley, and Northern Cumberland Mountains, and Southern Cumberland Mountains) representing 2 major landscapes (Atlantic Coastal Plain and Appalachian Highlands) in Virginia (Figure 15). These different landscapes create a diversity of habitat types.

Examples of mountain forest habitats include mixed mesophytic, northern hardwoods, Appalachian oak, and oak/hickory/pine. Soils of the narrow ridges and steep slopes typical of the Appalachian Plateau and Ridge and Valley provinces typically are shallow and low in fertility whereas soils found in the valleys are derived from shale and limestone and are relatively fertile. Soils of the Blue Ridge formed primarily from metamorphic and igneous rocks and, as a result, tend to be deeper and have better fertility than Ridge and Valley and Appalachian Plateau soils. Habitats in the Piedmont are characterized by Cecil sandy loam soils with a red clay subsoil. These soils generally are acidic, low in organic matter, phosphorus, and nitrogen, and commonly support oak/hickory forests. In the Coastal Plain, habitats are diverse (they grade from coastal marshes to pine/oak-pine/hardwood forests to bottomland hardwoods) and soils typically are sandy and low in fertility. The most productive forest type for deer in the Coastal Plain is bottomland hardwoods.

Land Area and Deer Habitat Types---- Since 2004, deer harvest and habitat data have been maintained by Federal Information Processing Standards (FIPS) codes management units corresponding to 95 counties and 39 cities. The 95 county units range from 26 to 971 square miles in size and average 399 square miles. The cities of Chesapeake, Suffolk, and Virginia Beach are treated like counties for deer management.

There are approximately 39,600 square miles of land area in Virginia. All land types except barren (0%) and developed (10%) are considered deer habitat; developed land is excluded because of limited hunting opportunities, which would confound the population density index (see Figure 16 and Appendix 5). By habitat type, this 35,643 square miles of deer habitat is 65% forest, 3% shrub/scrub, 2% grassland, 19% hay/pasture, 5% crops, and 6% wetlands. Data used to classify and tabulate land cover or habitat types in this plan came from U.S. Geological Survey's National Land Cover Dataset (NLCD), which uses 2006 satellite imagery.

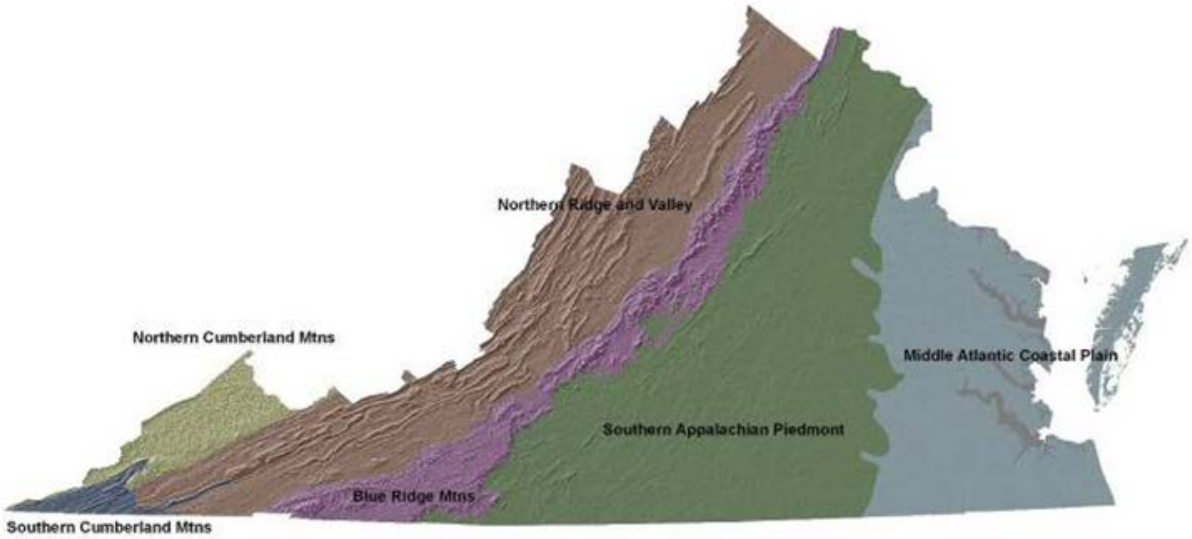

Figure 15. Virginia's ecoregions.

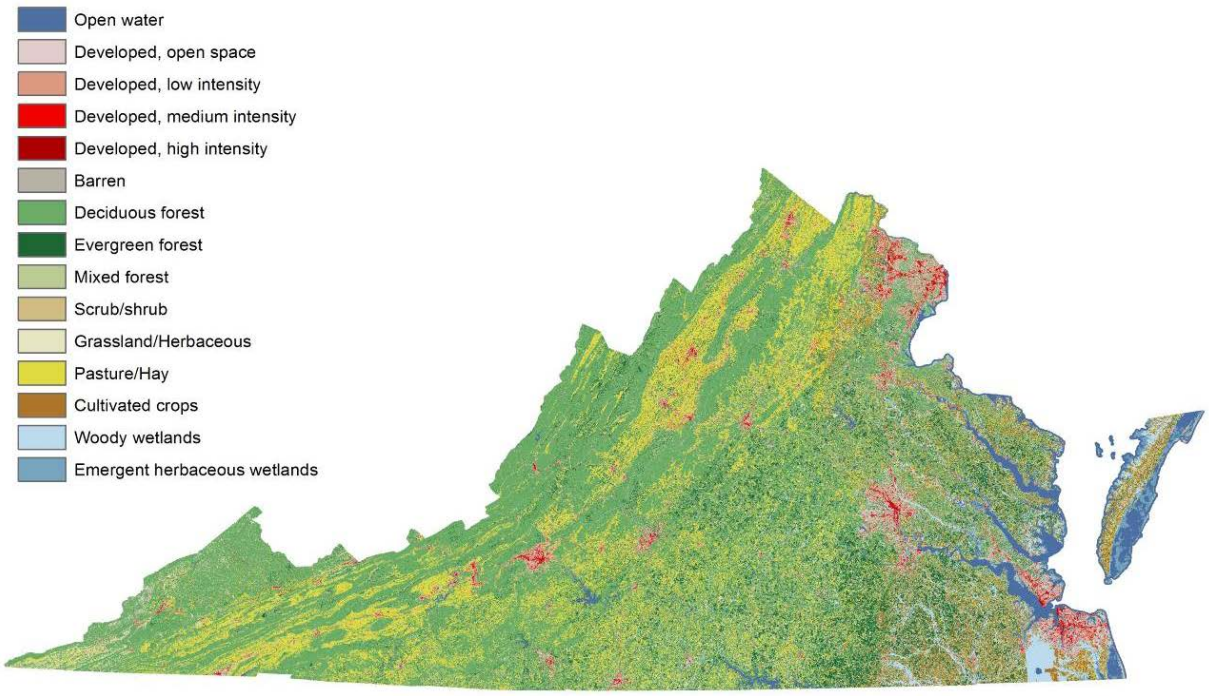

Figure 16. Virginia land cover types (2006 imagery).

The state's most urban county-sized management units are Arlington (90% developed), Fairfax County (56%), Virginia Beach (44%), and Henrico (42%), whereas the most heavily forested units are Bath and Alleghany Counties (90% forested). Clarke (55% open) and Culpeper (48%) counties possess the most open and/or agricultural land (Appendix 5).

Following increases in forest land acres through the 20th century, Virginia recently has experienced a net loss of forested acres statewide. Between 1992 and 2009, over 961 square miles of forested land have been lost to other land-uses; the majority (62%) was cleared for urban development, followed by losses for agricultural use (37%) and conversion to lakes/reservoirs (1%). If the recent trend continues, there could be a net loss of an additional 1 million forested acres (nearly 1,600 mi^2) in the next 25 years.

Habitat Suitability Model---- To provide a relative measure of deer habitat quality across Virginia, a deer habitat suitability index (HSI) was developed based on the type and interspersion of forest and open lands in Virginia.. An optimum mixture of diverse forests, interspersed with openings and agriculture, characterizes better deer habitat. Less diversity of habitat and interspersion characterize poorer deer habitat.

The HSI indicated that the majority of Virginia falls in the middle of the range of habitat suitability for white-tailed deer (Figure 17). The best four deer habitat counties, on average, were all located in the Northern Piedmont (Clarke, Fauquier, Culpeper, and Orange). Highly developed cities and counties, generally, scored poorly (e.g., Norfolk, Alexandria). Due to the broad scale of this model, micro-habitats could be under- or over-valued (e.g., urban parks and greenways, residential landscapes with desirable plantings, very rocky or steep slopes).

Habitat quality would appear to be much more uniform in eastern counties than in western counties of Virginia. In western Virginia, open diverse habitats in valleys were consistently modeled as better deer habitats than the completely forested ridges and mountains. In many counties, the demarcation line between these deer habitat types and their respective deer HSI values is stark. As noted by the model, areas of contiguous mature forest with little interspersion in western Virginia are marginal deer habitats.

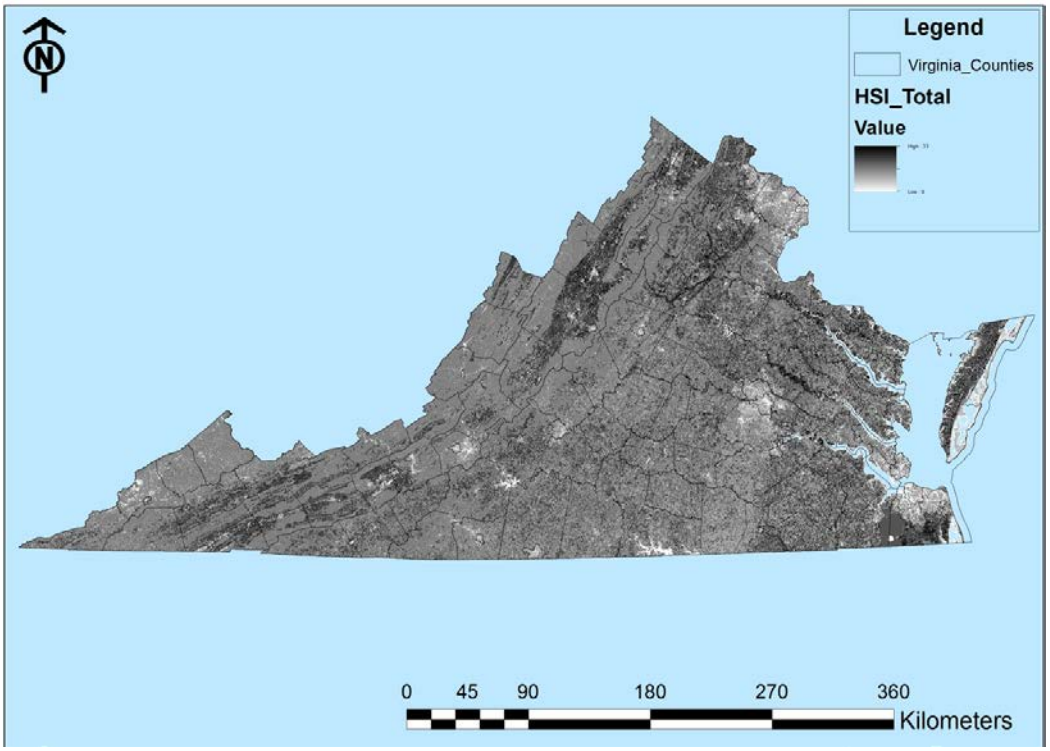

Figure 17. Habitat suitability model for white-tailed deer in Virginia. Higher values are darker.

Public Land Deer Habitat----Eighty-nine percent (89%) of the huntable deer habitat in Virginia exists on private land, whereas 11% is found on public lands (Appendix 5). Most public deer hunting lands in Virginia are located along and west of the Blue Ridge Mountains. Public land composes more than half of the estimated available deer habitat in 3deer management units in western Virginia: Alleghany County (59%), Bath County (59%), and Craig County (58%).

On a statewide basis, the U.S. Forest Service (USFS) owns the most public land open to deer hunting (2,601 square miles, 69% of all huntable public land), followed by the U.S. Department of Defense (420 mi^2,11%), VDGIF (308 mi^2, 8%), U.S. Fish & Wildlife Service (203 mi^2, 5%), State Parks (109 mi^2; 3%), State Forests (91 mi^2; 2%) and the U.S. Army Corps of Engineers (40 mi^2; 1%). These figures do not include the 484 square miles of National Park Service properties closed to deer hunting (e.g., Shenandoah NP).

With ownership restricted to the western part of Virginia, the George Washington and Jefferson National Forests are an especially important resource for deer-related recreation and habitat west of the Blue Ridge Mountains. On average, National Forest lands represent 20% of the total huntable deer habitat in the 30 counties that contain USFS properties and 93% of the public land open to deer hunting west of the Blue Ridge.

Because of the importance of public land in western Virginia (and USFS properties in particular), habitat quality on public lands has become a source of controversy for citizens interested in the management of deer and other wildlife species. Most publicly-owned properties in western Virginia, including USFS and VDGIF lands, are found on slopes and ridge tops with poorer soils than the more fertile privately-owned valley lands. Therefore, public lands will almost always contain poorer deer habitat than neighboring private lands.

Deer habitat quality on public lands appears to have declined over the last three decades. The long-term deterioration of habitat conditions has likely had multiple causes, including changes in land management practices (e.g., reduced timber cutting), reduced staff working directly on for wildlife habitat management, forest maturation, and even deer herbivory, in some areas.

Timber harvests (e.g., clearcuts, shelterwood cuts, selection cuts, thinnings, salvage cuts) on National Forest lands have declined substantially since the peak five-year period (1985-89) when 5,983 acres (0.33%) were harvested annually (Figure 18). Even including other timber stand improvements (e.g., pre-commercial thinnings, removal of cull trees), only 9,946 acres (0.55%) were treated annually during peak years (Figure 18).

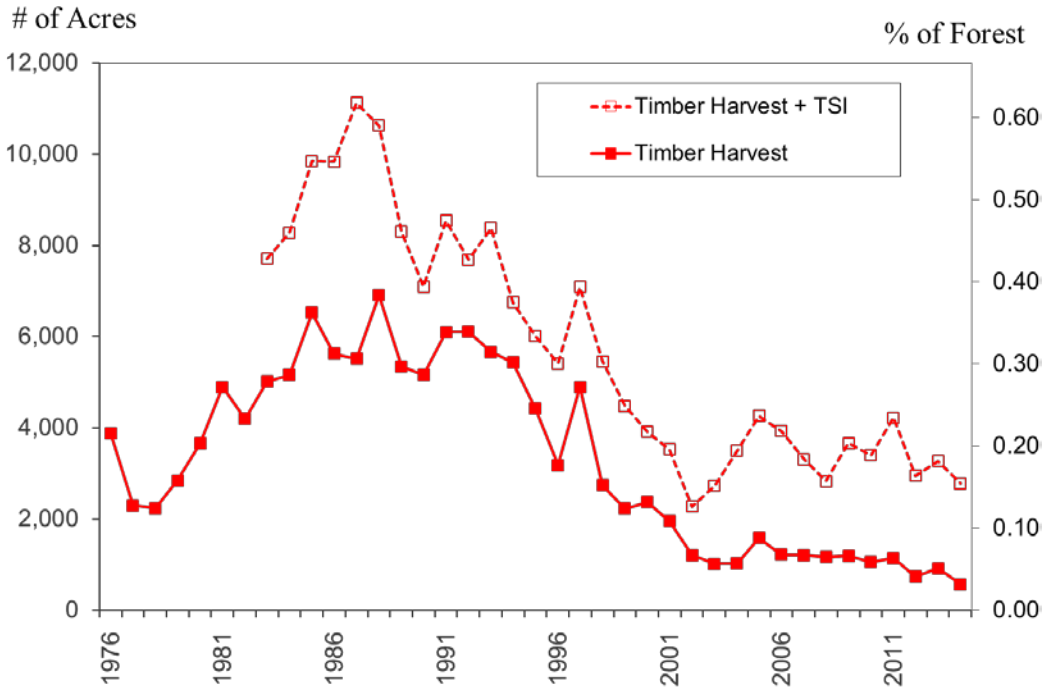

Figure 18. George Washington and Jefferson National Forests timber harvest and timber stand improvement (TSI) management history, 1976-2014 (data provided by the USFS).

The use of prescribed fire has increased significantly on National Forest lands, with a peak 5-year period occurring from 2010-2014 when an average of 15,847 acres (0.88%) were annually burned (Figure 19). Both prescribed and wild fires (Figure 19) increase the abundance of succulent plants and soft mast. Longer-term habitat benefits may also be provided by fires that thin the canopy, allowing sunlight to reach the forest floor and stimulating more sustainable ground-level herbaceous cover. Recent research by The Nature Conservancy on National Forest lands in Virginia showed that 24% of burned areas resulted in open gaps in the forest canopy. The ultimate long-term success of prescribed fire for improving deer habitat quality will depend on many factors including site quality, stand condition, and fire intensity. From pre-European settlement in the 1700s through the 1930s when aggressive fire suppression began, wild fires were much more frequent and extensive. During certain year, wild fires still may have significant impacts (e.g., 2012).

Although timber harvests and timber stand improvements have drastically declined in National Forests over the last 30 years (Figure 18), the net extent of openings created and/or maintained has actually remained about the same. Early successional habitat management lost due to declining timber harvests has been offset by the increase in prescribed fire and wildfire impacts (assuming that 24% of burned areas create open canopies) (Figure 20). Similar to 30 years ago, an average of about 11,000 acres (0.6%) of open habitats are being created and maintained annually on National Forest lands.

Forest maturation is a consequence of reduced timber harvests that decreases habitat diversity and successional habitats. Early successional habitats support forbs and young woody vegetation important to deer for both food and cover. The amount of forested habitat classified as being within the 0-10-year age class on the George Washington and Jefferson National Forests declined from >70,000 acres (4.1% of total area) in 1989 to 15,000 acres (0.9%) by 2004 (see Figure 21). In addition to the decline in early successional habitats (i.e., the 0-10-year-old age age), the standing timber has also grown older. In 1989 the dominant stand ages were 61-80 years old (Figure 21); in 2015, the dominant stand age is now 91-110 years old. Although still not considered to have the characteristics of old growth, these aging stands of timber may also have declining value for deer. Forest age classification alone may misrepresent the occurrence of open woodlands, created through burning or timber management, where widely-spaced large trees identify the stands as older forests, but where sunlit shrubby understories are similar to a young, regenerating forest.

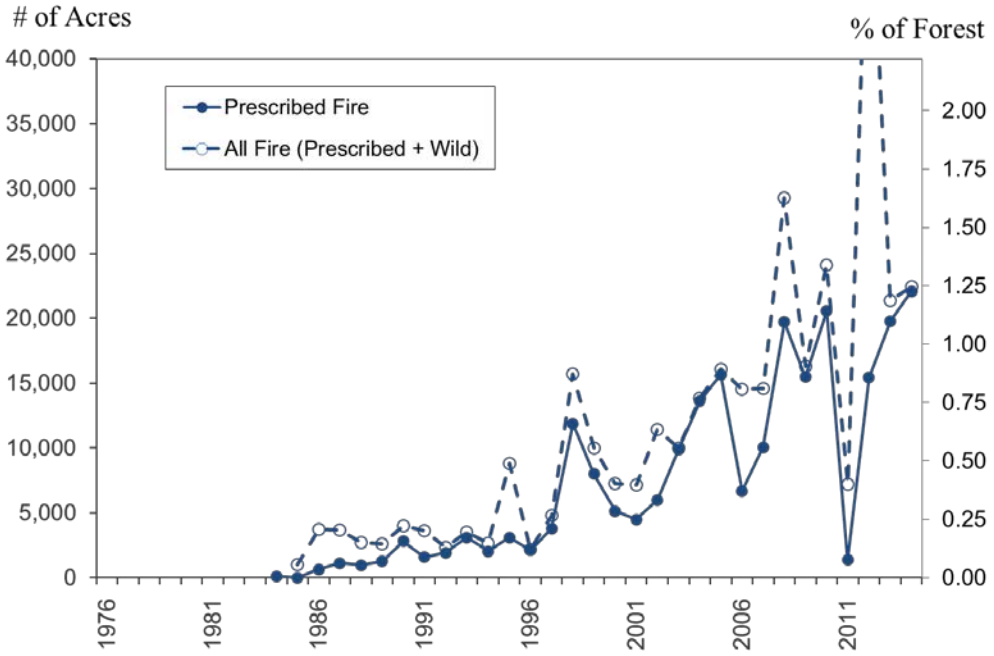

Figure 19. George Washington and Jefferson National Forests prescribed fire and wild fire management history, 1986-2014 (data provided by the USFS). During 2012, all fires burned 58,954 acres (3.28%).

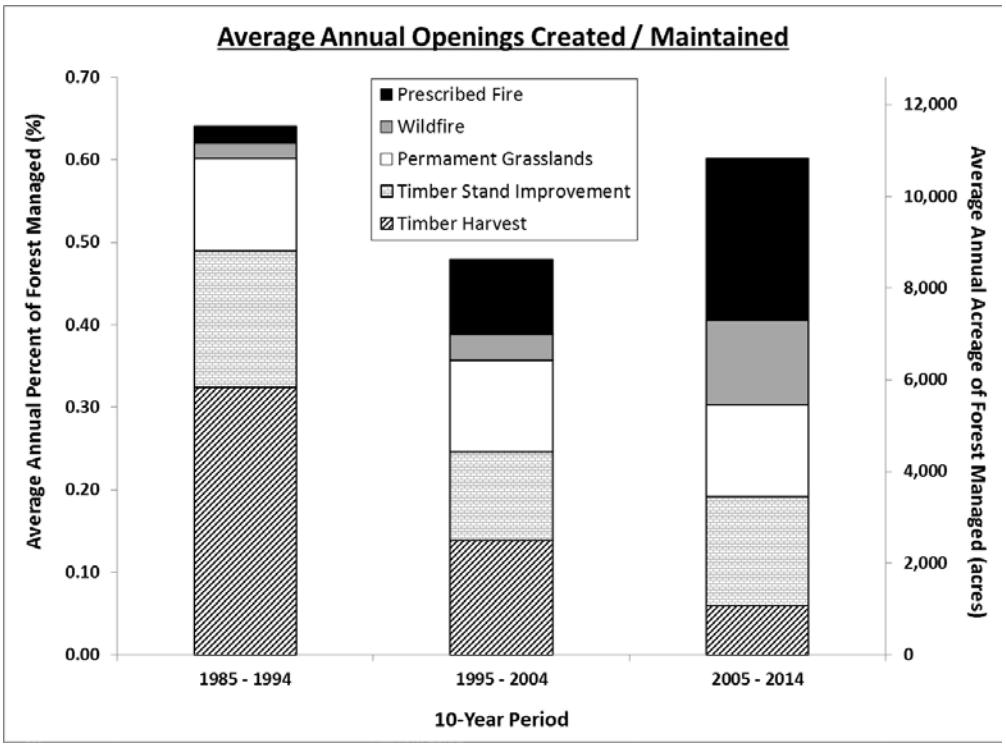

Figure 20. Average annual openings created and maintained by treatment type during 10-year periods on George Washington and Jefferson National Forest.

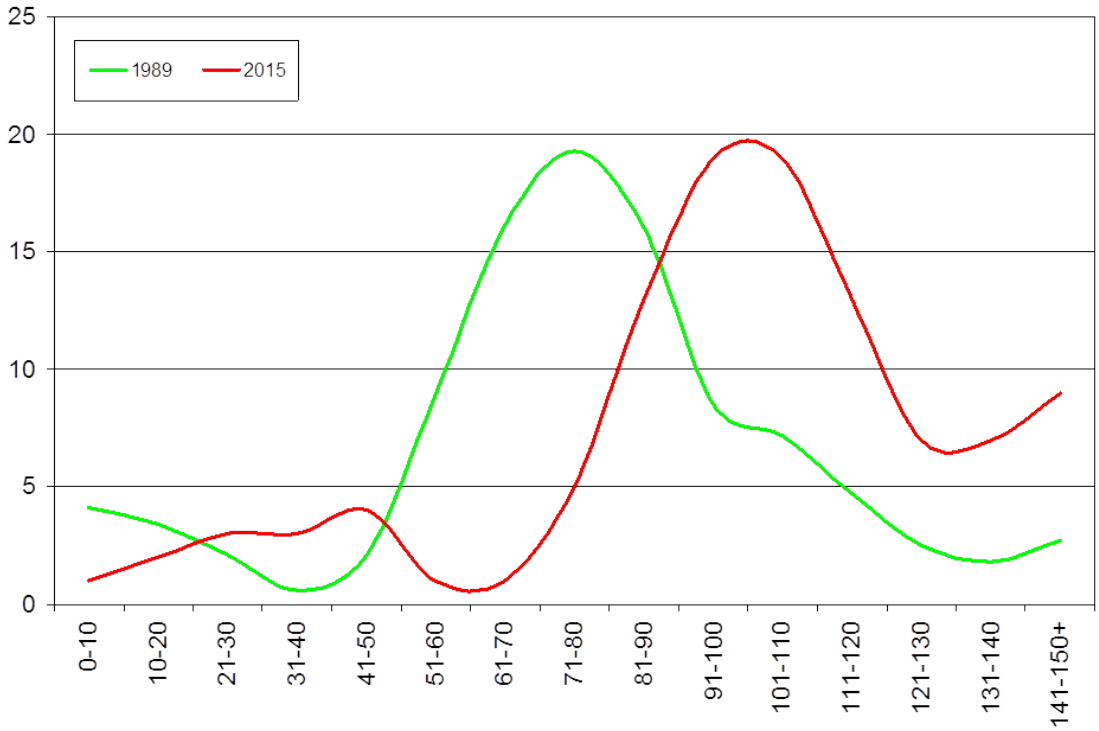

Figure 21. Percent of National Forest timber stands by age class (years).

While it might seem obvious that declining habitat quality (and deer abundance) on public land has been a direct result of the significant decreases in the peak timber harvest since the late 1980s (Figure 18), timber harvests on National Forest lands have never been an intensive management activity at the landscape level. Even at the peak during 1985-89, annual timber harvests still represented only an average of 0.33% of the landscape (i.e., a timber rotation of about 300 years). The timber rotation period is the time between establishing a stand of trees and when that stand is harvested. The best timber rotations for deer management will depend on a variety of factors, but an optimal rotation period to benefit deer habitat will typically be 125 years or shorter. As important as timber management is, it is unlikely that the historically low intensity of timber harvests on National Forests have ever produced large landscape benefits for deer.

Permanent openings and roadside corridors also occur on USFS lands and provide potential local value for deer habitat. Permanent openings (e.g., grasslands, right-of-ways, old farm areas) were annually maintained on 20,089 acres (1.12%) during 2008-12. Another 59,016 acres (3.28%) of roadside corridors occur throughout the George Washington and Jefferson National Forests. Because these roadside corridors include all classes of roads (e.g., seasonally closed roads, open USFS roads, state highways) with varying amounts of openings, herbaceous cover, and traffic volume, their associated value as deer habitat is mixed.

Habitat management practices, impacts, and trends on VDGIF Wildlife Management Areas (WMA) west of the Blue Ridge have been similar to those observed on USFS properties. Over the five years (2008-12), an annual average of 0.24% of WMA lands had timber harvested and 0.29% were treated with prescribed fire. Permanent openings are also maintained on 1.00% of WMA properties.

Even without active management of forests, natural disturbances such as wind, ice storms, disease, pests, fire, etc. will produce dispersed canopy gaps where some minimal level of deer forage will be produced. However, the biological carrying capacity for deer will remain below the level that could be achieved with active forest management. Further, without management to improve deer forage on National Forests and State WMAs, it is unlikely that deer populations can be sustained at levels to meet public demands for viewing and hunting without significant deer damage to plant communities. Management activities that produce forage for deer can also reduce deer browse pressure on sensitive plant species and regenerating forest trees.

Deer Populations

Deer Population Size----Population reconstruction computer models indicate that Virginia's statewide prehunt deer population has been relatively stable over the past decade, fluctuating between 901,000 and 1,117,000 animals (mean = 973,000; Figure 22).

Since the early 1990's, deer population status in Virginia has been monitored using an annual index of the antlered buck kill per square mile of deer habitat. Although this technique does not provide a total number of deer or absolute deer density (i.e., number of deer per square mile) within an area, this index does provide a reliable method to compare relative deer densities among management units and regions of the state and to monitor deer population trends over time.

Use of this index is based on the assumption that, in most habitats in Virginia, deer populations exhibit density-dependent population responses (i.e., deer condition and reproductive rates are inversely correlated with deer density). While the antlered buck index is generally assumed to track changes in population size, interpretation of this index can also be influenced by other factors such as habitat quality, hunting regulations, hunting pressure, and hunter selectivity.

Antlered buck kill data comes from the Department's deer checking systems (big game check stations, telephone, and Internet). Estimated deer habitat comes from the VDGIF GIS staff. All land types except developed, barren, and open water are considered potential deer habitat. Since 2004, deer kill data and habitat data have been maintained on a FIPS (Federal Information Processing Standards) basis (i.e., by county and city). In counties with significant amounts of public lands available for hunting, private and public lands are treated as separate management units. Current deer population status for private and public land in Virginia as of fall 2013 is shown in Figure 23 and Figure 24 respectively. Data shown are based on a three-year average (2010-2013) antlered buck kill per square mile of habitat. County groups were determined by cluster analysis.

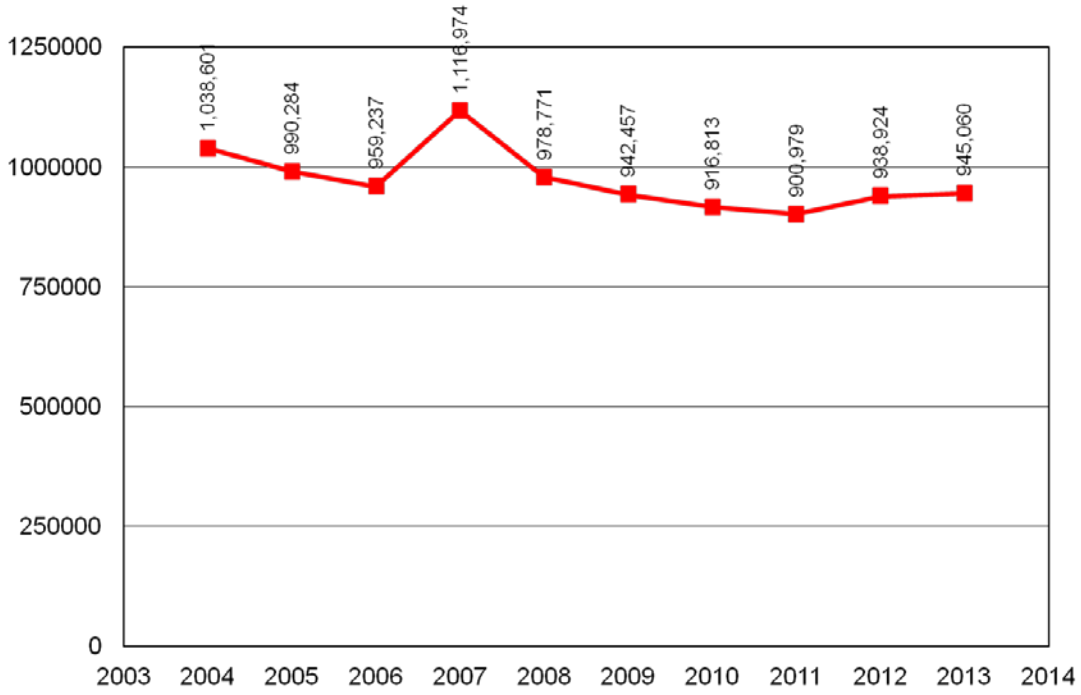

Figure 22. Virginia estimated prehunt deer herd population reconstruction, 2004-2013.

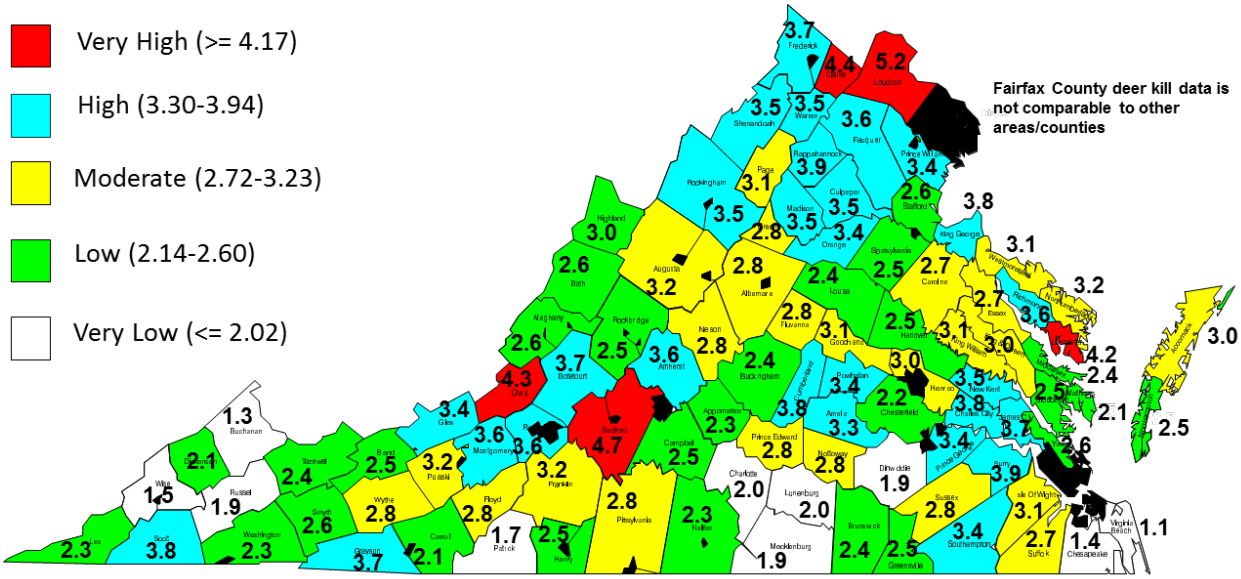

Figure 23. Relative deer population abundance by county on private lands in 2014. *<u>NOTE</u>: Developed from a cluster analysis of the 2012-2014 deer density index (antlered deer killed per square mile of habitat), which is not a density estimate, but indicates relative abundance among management units. Cluster labels (e.g., very high, high, etc.) are subjective. Fairfax County is mostly hunted by archery equipment, which yields lower deer harvests than firearms and would produce an incomparable index.*

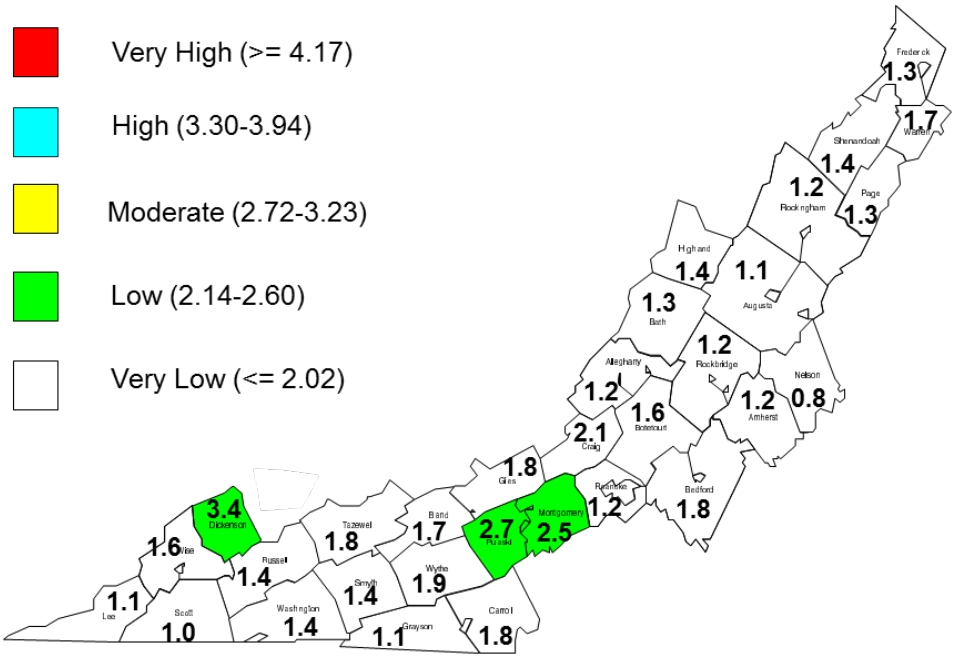

Figure 24. Relative deer population abundance by county on public lands in 2014. *NOTE: See Figure 23 for more information on the index.*

Private land deer population densities vary widely across Virginia with the highest in Loudoun County and the lowest in Buchanan County (Figure 23). The largest area of moderate deer herds is located in the Shenandoah Valley and counties just over the Blue Ridge in the northern Piedmont. Nearly one half of the management units in eastern Virginia are characterized as having low deer densities. The lowest private land deer densities occur across the southern border of Virginia, with notable clusters in far southwest Virginia and the southeast corner of Virginia. Using the same criteria as private lands, public land deer herds in western Virginia are nearly all classified as having very low deer populations (Figure 24).

Deer Population Trends----Over much of the past two decades, the statewide deer population has been relatively stable, but deer population denisty on certain private and public lands have changed significantly during this time. These changes, as measured by the deer density index (antlered buck kill/sq.mi. of habitat), are shown for private lands and public lands in Figures 25 and 26, respectively.

Long term declines in private land deer herds over the past 20 years have been documented in the Alleghany Highland counties (Alleghany, Bath, and Highland), the northern Shenandoah Valley, and the southeast corner of Virginia. Stable counties are scattered across Virginia but tend to occur in contiguous clusters. Over half of the private land deer management units have demonstrated a greater than or equal to 25% increase over the past twenty years. Several isolated individual counties have demonstrated very significant increases (greater than or equal to 100%), such as Gloucester, Hanover, and Spotsylvania.

Private land deer herds in the Cumberland Plateau counties of Buchanan, Dickenson, and Wise have demonstrated very significant increases. Put in context, deer herds in these counties have been low for decades and are still considered low by current standards. Second, all four counties on the Northern Neck have demonstrated very significant deer population increases over the past twenty years.

The deer population indices for western public land deer herds have significantly declined over the past twenty years for nearly all deer management units (Figure 26). Only three units have demonstrated an increase and these represent very small areas of public lands and a very low number of public land deer killed.

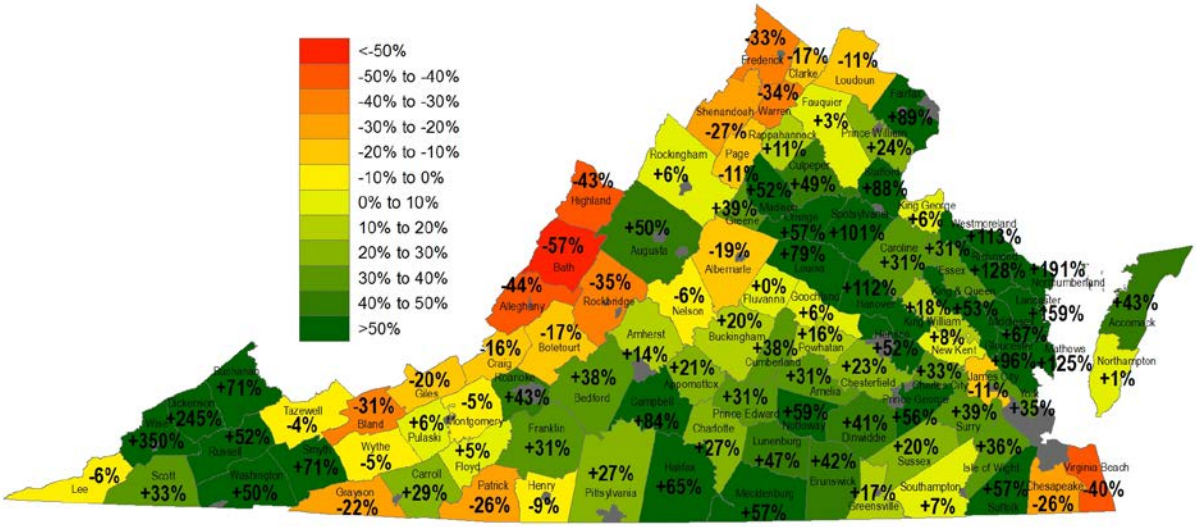

Figure 25. Percent change in the private land deer population index over the last 20 years (1994-2013).

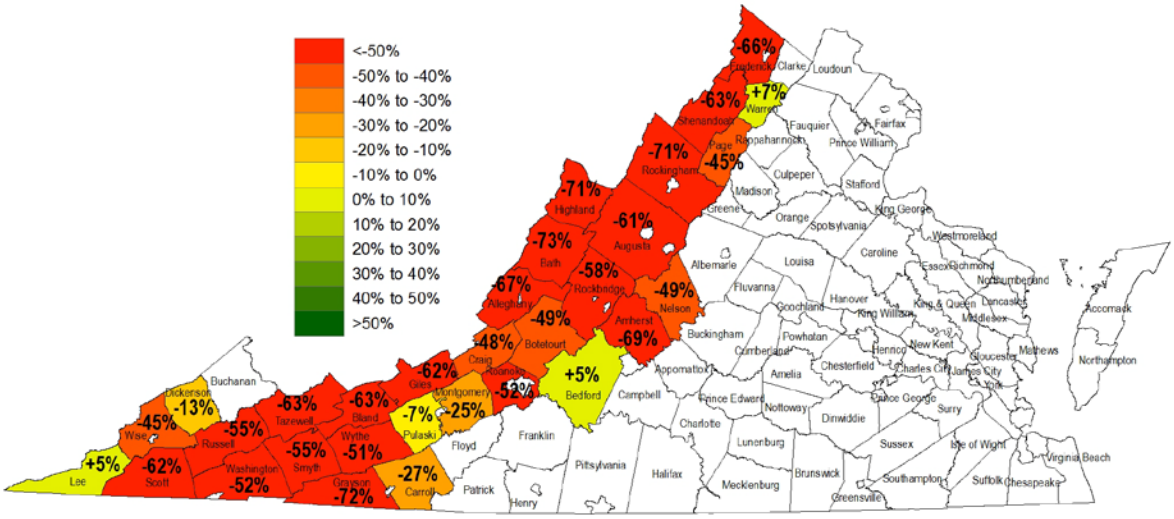

Figure 26. Percent change in the public land deer population index over the last 20 years (1994-2013).

Since the mid 1990's, the Department has documented a 64% decline in the total deer kill on public lands west of the Blue Ridge (Figure 27). There are likely a number of factors involved in this decline, including but not limited to: declining deer habitat quality on National Forest lands, declining public land deer hunter numbers (and therefore pressure), predators, and liberal either-sex deer hunting day regulations enacted on adjacent private lands over the past decade or so. Liberal deer seasons on private lands, established to address the needs of multiple stakeholders (e.g., farmers, motorists, residents, hunters), can unintentionally impact adjacent public lands with poorer habitats and more conservative seasons. To address this decline, either-sex deer hunting days on western Virginia public lands have been cut significantly. These changes have been successful in reducing the female deer kill. Female deer kill numbers and levels on public lands in many western counties are the lowest in decades. It remains to be seen, however, if these management changes will be successful in increasing the western Virginia public land deer herd(s).

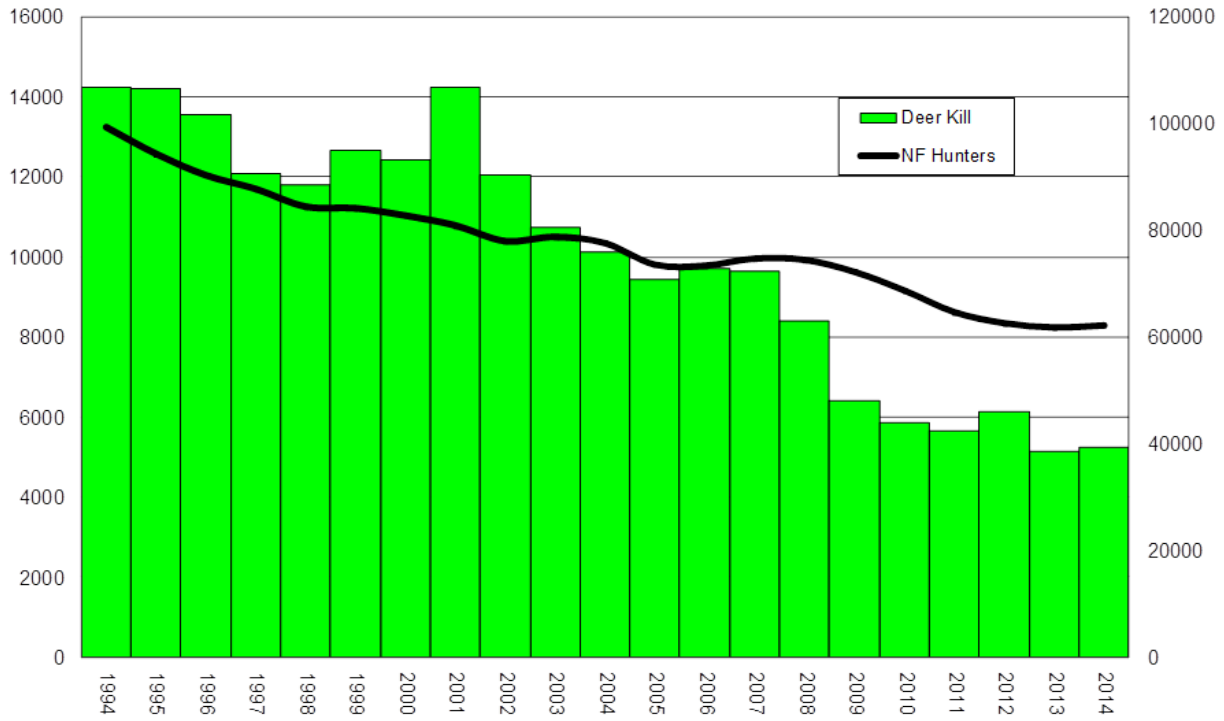

Figure 27. Public land deer kill west of the Blue Ridge and number of National Forest hunters, 1994-present.

The annual bowhunter survey provides deer observation data, including deer seen per unit time, reported by cooperating archers participating in the early archery season over the last 15 years. Consistent with the deer density index and population reconstruction, statewide deeer observations tended to increase until around 2007 but have since tended to decrease, especially in the western part of Virginia (Figure 28). Deer were seen much more frequently on private lands than on public lands (Figure 29). In contrast with harvest data, deer observed by archery hunters on public lands have not declined dramatically since 2000 (Figure 29).

Predation of Deer---Predation of deer, especially by coyotes, has become an increasing concern among hunters in Virginia over the last decade. Currently, no data exist in Virginia to assess whether predation by coyotes, black bears, or bobcats is having any significant impact on deer populations. Bears and coyotes have exhibited strong population growth and range expansion in Virginia over the past 20 years. Research and experience throughout the Eastern US has shown that both species prey on deer, especially fawns during the first few weeks after birth, but measurable impacts to deer populations are often inconclusive. A large research project with potential relevance for Virginia was conducted in central Pennsylvania during the early 2000s and found that black bears and coyotes caused similar mortality on deer fawns, but that neither predator ultimately limited the growth of deer populations.

Herds at very low deer densities due to poor habitat, disease, or overharvest can become suppressed by predators that otherwise could not limit a healthy deer population. This scenario could apply in the western mountains of Virginia, where mature forests on thin soils yield unproductive deer herds. IN such situations, predators likely reduce the available yield of deer available to hunters in some areas, just like disease, weather, changing habitat, and other natural events largely beyond human control. Using adaptive management, impacts to deer populations can be mitigated by adjusting antlerless kill, even without knowing all of the specific mortality factors involved. Monitoring harvest trends may demonstrate the need to reduce antlerless harvests to compensate for predator impacts in some areas.

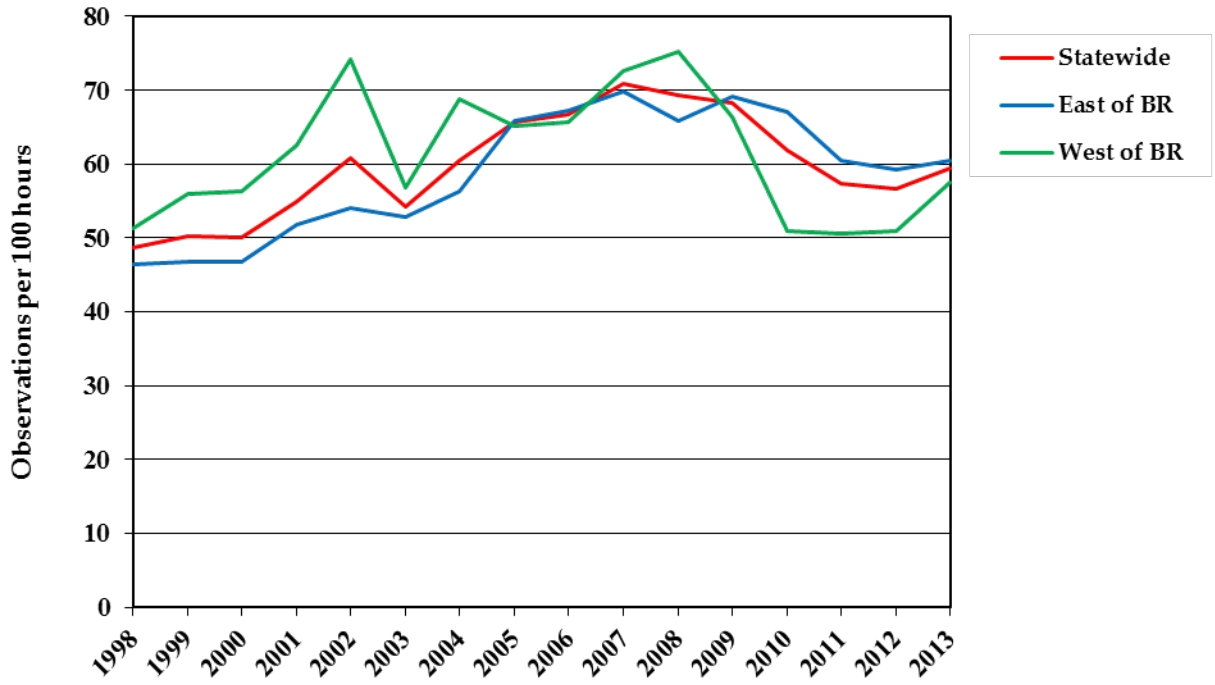

Figure 28. Deer observed (per 100 hours hunting) by cooperating early archery hunters from 1998-2013 east and west of the Blue Ridge Mountains and statewide in Virginia. Includes combined observations of bucks, does, and fawns.

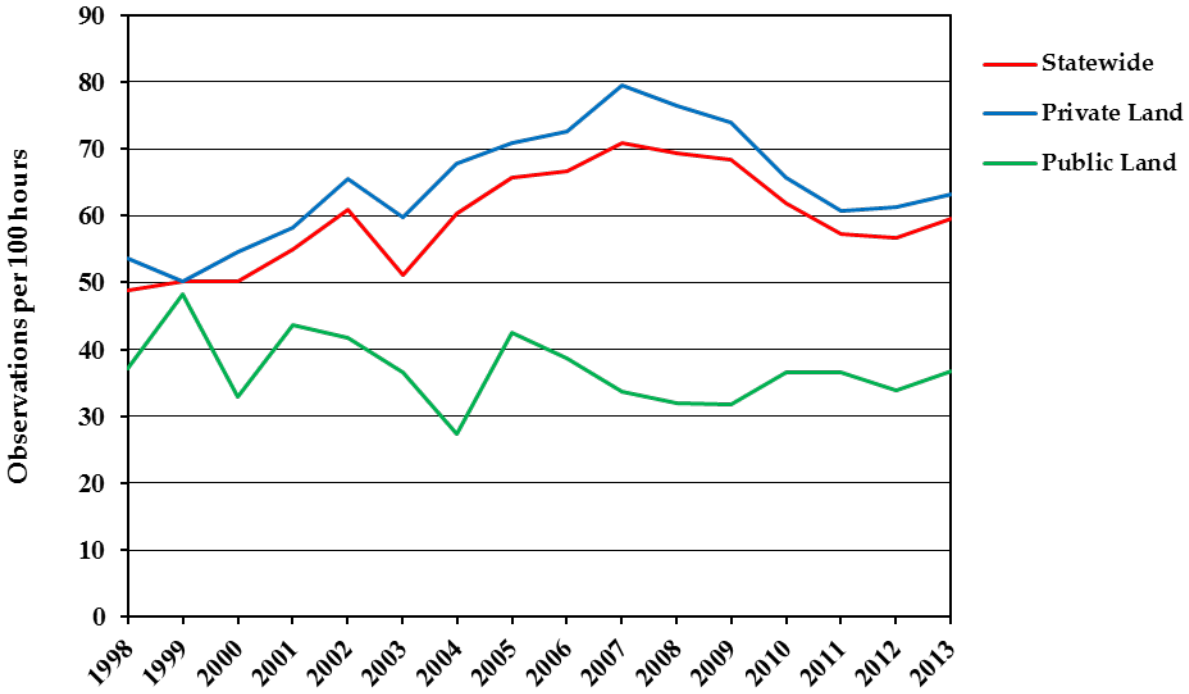

Figure 29. Deer observed (per 100 hours hunting) by cooperating early archery hunters from 1998-2013 by land ownership and statewide in Virginia. Includes combined observations of bucks, does, and fawns.

Demand

Citizen demands related to deer are based on positive or negative experiences with deer. Cultural carrying capacity (CCC) can be viewed as the deer population at which positive demands for deer (e.g., recreation) balance negative demands (e.g., damage) in a given area. CCC for deer, which can vary widely between communities and over time, is challenging to determine and monitor.

Cultural Carrying Capacity Study.----During 2011-2014, Virginia Tech and VDGIF developed a predictive model to estimate CCC by management unit (county) and surveyed a random sample of residents in selected counties in Virginia regarding their experience with, and opinions about, deer. These 15 counties (Appendix 6) were chosen to represent the full spectrum of expected benefits (e.g., low to high hunting participation) and risks (e.g., agricultural damage, residential plant damage, vehicle collisions) associated with deer. This survey (hereafter, "2013 CCC survey") can be considered as an approximate surrogate to a statewide general population survey, although a higher percentage of respondents hunted as compared to the actual Virginia population. Among the questions on the 2013 CCC survey, respondents were asked about how important it is to consider different demands when managing deer (Table 1).

Table 1. 2013 CCC survey respondent opinions (%) about the importance of considering the following demands or considerations when managing deer populations in Virginia (n = 2320). Demands are ordered from highest to lowest importance based on a constructed score (Extremely Important = 3, Important = 2, Somewhat Important = 1, Not at all Important = 0).

Demand/Consideration	***Extremely Important***	***Important***	***Somewhat Important***	***Not at all Important***	***Importance Score (mean)***
Ensure that deer exist in Virginia	54	32	10	4	2.36
Reduce deer-vehicle collisions	51	32	13	3	2.31
Maintain deer population health and condition	43	39	14	4	2.21
Address public concerns about tick-borne diseases	41	41	15	3	2.20
Limit damage to agricultural operations	31	44	20	5	2.02
Minimize damage to forest plants and wildlife	22	44	26	9	1.79
Limit damage to residential plantings	13	34	37	16	1.44
Enhance hunter satisfaction	14	29	26	31	1.26
Enhance opportunities to view or photograph deer	11	22	34	33	1.12

Virginia Human Population and Development Trends. ---- Societal demands associated with deer are related strongly to characteristics of the human population. The growth and distribution of human populations in Virginia significantly influences deer habitat supply as well as deer recreation and damage demands. Growing at a rate of 1.4% each year since 1960, the estimated population in Virginia now exceeds 8 million people. Primary population centers include areas around Richmond, Norfolk, and northern Virginia (Figure 30). Rapidly growing human populations are not uniform across the state (Figure 31). While growth has been concentrated in urban and suburban areas, some rural areas have experience population declines.

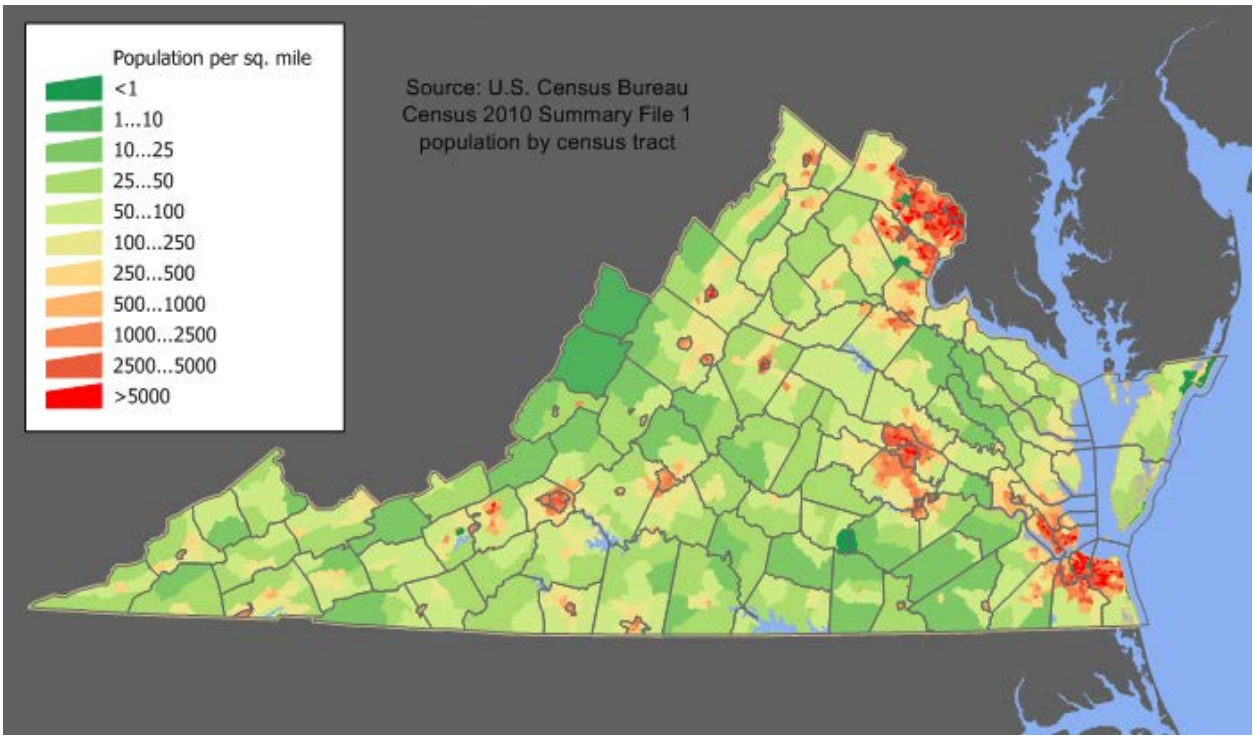

Figure 30. Virginia human population densities, 2010, from U. S. Census data.

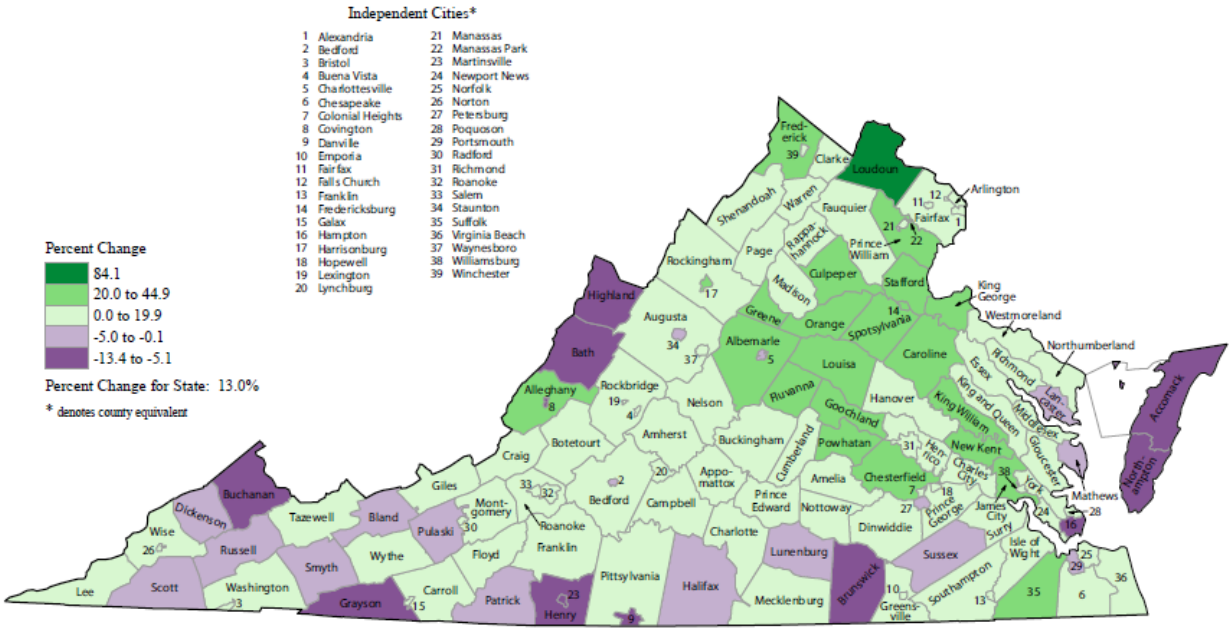

Figure 31. Virginia human population changes, 2000-2010, from U. S. Census data.

Two byproducts of human population growth that impact deer management are changes in land use and cultural norms. Land development fragments and reduces the land base available for hunting, intensifying competition among land uses and activities on remaining undeveloped lands. Land is being developed in Virginia faster than the rate of population growth. The trend toward more land developed per capita is related to exurban residential growth, among working farms and forests, rather than in urban and suburban areas. Exurbia is a challenging landscape for hunting, and in turn, for deer population management. Although land development can result in a net loss of deer habitat, deer often thrive in suburban and exurban landscapes.

Population growth is not only driving land development, it is also urbanizing Virginia. This population shift impacts all Virginians, regardless if they live in cities, because of the growing political influence of urban areas. Deer hunters represent a small segment of the Virginia population: 6.7% in 1980 compared to only 2.7% in 2013, although the proportion of citizens who hunt varies across the Commonwealth (Figure 32). Urbanization, a decline in rural culture and direct contact with nature, lack of access to land, and expanding recreational opportunities that compete with hunting have all been implicated in the decline in hunting. Major social, cultural, and demographic changes in modern society have also given rise to the animal protectionist movement. Opposition to traditional wildlife management and consumptive uses of animals is greater among urban than rural residents. Even so, hunting to reduce deer populations in developed areas still has support among urban residents. The 2013 CCC Survey found that 74% of Prince William County residents supported hunting to reduce deer populations, while 11% opposed it and 15% were neutral (n = 151).

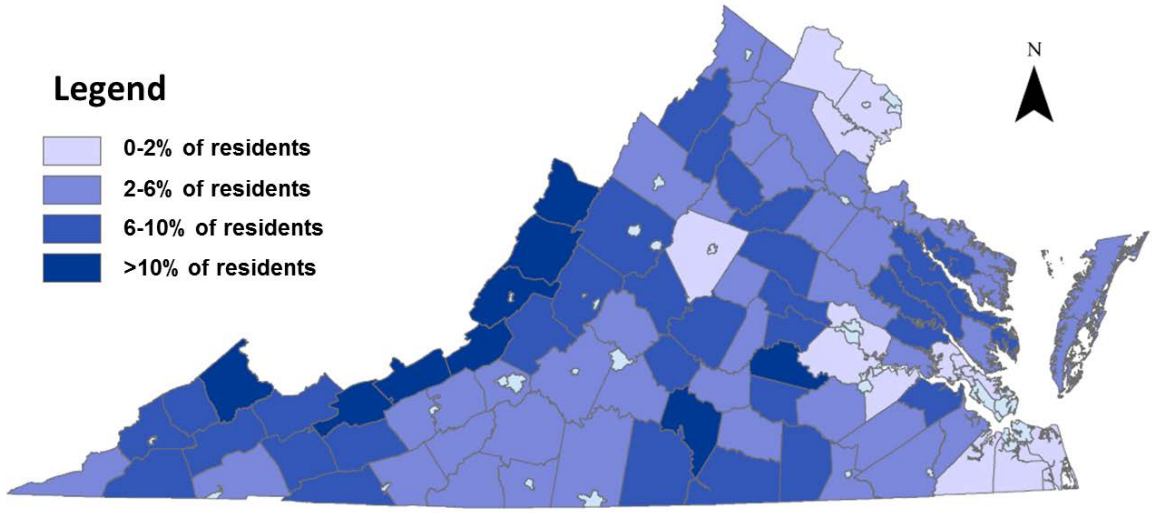

Figure 32. Hunting licenses purchased per capita, 2010-2011.

Public Perceptions of Deer Populations

Data from two statewide surveys conducted during the last 15 years indicate that Virginians generally desire a smaller deer population where they live. According to the 2013 CCC survey, over three times as many respondents (36%) believed the deer population was too large rather than too small (11%) in the county where they lived (36% believed it was just right and 18% had no opinion). When asked what recommendation they would offer VDGIF about managing the deer population in their county, 43% of 2013 CCC survey respondents recommended reducing the deer population, 45% recommended maintaining the population at its current level, and 12% recommended increasing it. A decade earlier (2000), a survey by Virginia Tech, Responsive Management, and George Mason University produced similar results: 32% indicated that deer populations in their counties should be decreased, 47% indicated that populations should remain the same, and 10% indicated they should increase (11% of respondents expressed no opinion).

Although regional trends in citizen desire for deer populations were similar for the 2000 survey, there were some notable regional differences in the 2013 CCC survey. Out of the 15 diverse counties surveyed (Appendix 6), only Rockingham County residents expressed a different desire for deer populations; in this county, more respondents wanted larger deer populations (31%) than smaller populations (14%), and more respondents recommended that VDGIF increase the deer population (29%) than decrease it (20%). The other extreme was Roanoke County, where 55% of respondents to the 2013 CCC survey believed the deer population was too large and 4% believed it was too small.

Hunters generally support higher deer populations than other stakeholders. In most years, slightly more participants in the annual hunter survey have advised VDGIF to increase the deer herd rather than decrease it; however, more respondents have advised VDGIF to stabilize the herd than change it (Table 2). The greatest demand for increasing the deer herd has been from the Northern Mountains region, and the greatest demand for decreasing the deer herd has been from the Southern Piedmont (see Fig 1 for regions).

Table 2. Statewide hunter survey participants' desire (% responding) regarding how VDGIF should manage the deer herd, 2004-04 to 2013-2014.

Hunting Season	***Increase the Herd***	***Stabilize the Herd***	***Decrease the Herd***	***No Opinion***
2004-05	22	42	22	14
2005-06	29	42	16	14
2006-07	18	44	20	18
2007-08	20	43	19	17
2008-09	24	44	18	13
2009-10	23	39	21	18
2010-11 (no survey)	-	-	-	-
2011-12	23	40	18	20
2012-13 (no survey)	-	-	-	-
2013-14	30	36	13	21
Average	24	41	18	17

Deer Hunter Demands

Number of Deer Hunters----The white-tailed deer is the most popular game species in the Commonwealth of Virginia. Traditionally, the number of deer hunters and days spent afield hunting have provided useful measures of demand for deer program managers to work with. Data on these indices are obtained through analyses of license sales and periodic hunter surveys.

The 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation reported that hunting-related expenditures in Virginia (by both resident and nonresident hunters) totaled nearly $877 million for all species. Past hunters surveys have indicated that nearly 90% of those who purchase licenses in Virginia hunt deer, and typically over 50% of Virginia's hunting days afield are spent in pursuit of deer.

According to VDGIF license data, there were 226,000 deer hunters in Virginia in fall 2013. The number of licensed big game hunters has declined significantly in Virginia over the past two decades, declining from 298,000 in 1994 (Figure 33). Although the big game license has also included bear (until 2015) and turkey hunting privileges, it still represents deer hunter numbers well since over 97% of licensees hunt deer.

Over the last 20 years these figures represent an overall 24% decline or 1.2% average annual decline. This means that on average Virginia has lost about 3,600 licensed deer hunters annually over the past two decades. Projecting this declining trend into the future leaves an estimated 188,000 big game hunters in ten years (2023) and 133,000 in twenty-five years (2038).

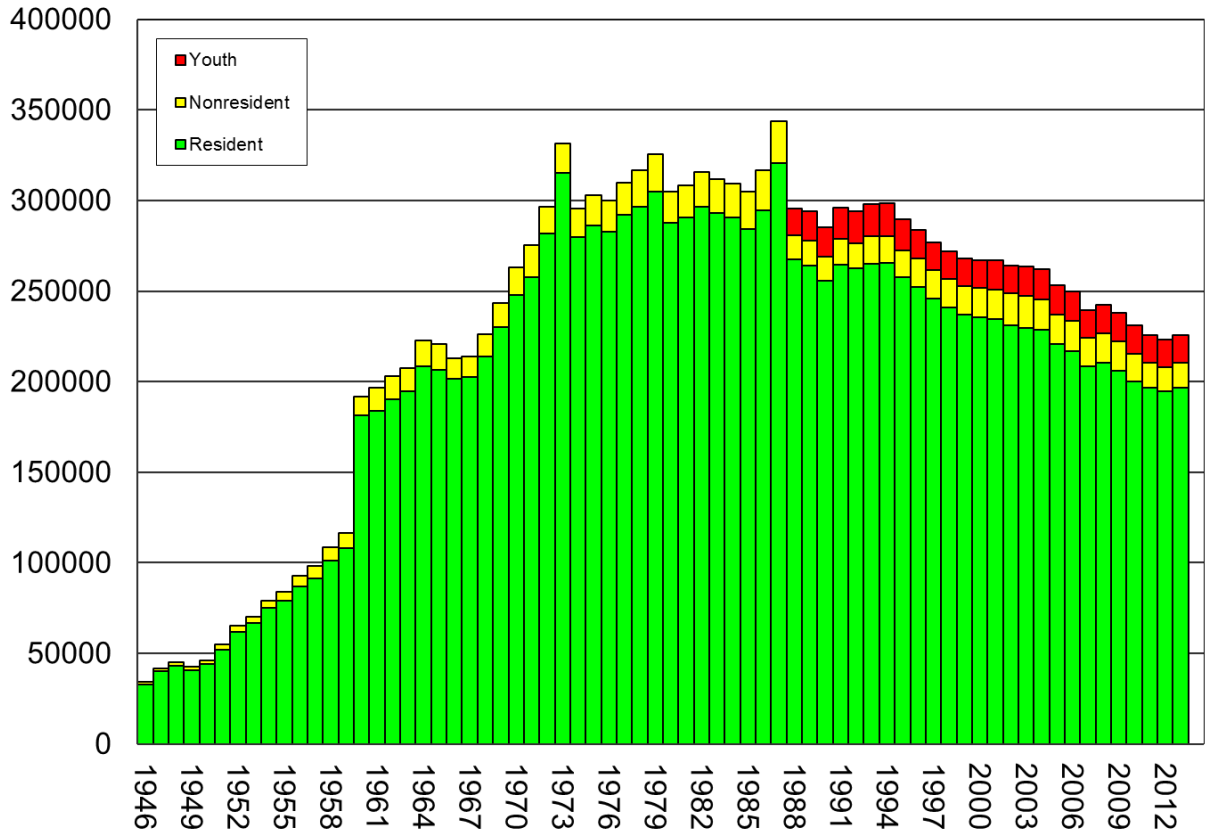

Figure 33. Virginia big game license sales, 1946-2013.

As a component of the statewide human population, estimated licensed deer hunter numbers and their relative representation in Virginia's demographic profile also are decreasing (Table 3). Over the past 20 years, the estimated number of licensed deer hunters has declined from 4.4% of the total population to 2.7% of the population.

Table 3. Virginia human population and estimated licensed deer hunter numbers, 1995-2013.

Year	*Human Population*	*Licensed Deer Hunters*	*Percent of Population*
1995	6,618,358	289,838	4.4%
2000	7,079,030	267,067	3.8%
2005	7,540,027	253,399	3.4%
2010	8,001,024	231,037	2.9%
2013	8,260,405	225,574	2.7%

Additionally, Virginia's licensed hunters are growing older. The age structure of Virginia's big game hunters over the past 5 years demonstrates a large percentage of hunters between the ages of 30 and 60. The rate of declines in big game hunting license sales is expected to increase as this wave of hunters grows older.

However, the relationship between the number of licensed big game hunters and the actual number of big game hunters in Virginia is complicated because numerous groups of individuals are exempt from purchasing a hunting license (e.g., landowners and their spouse, children, grandchildren, spouses of their children and grandchildren, and parents of the landowners, all regardless of residency, etc.) and the number and participation trend of these exempt hunters is currently unknown. Anecdotal evidence (e.g., an increasing percentage of exempt hunters reporting deer harvests) indicates that the number of these exempt big game hunters has increased significantly over the same time frame that big game license sales have declined.

Continued declines in hunter numbers could negatively impact Department finances and control of deer populations in some areas. On the positive side, female participation in big game hunting has increased significantly in Virginia over the past decade.

To address this decline, the Department has taken several proactive steps to improve hunter recruitment and retention including enacting a special youth antlerless deer regulation and creating a special youth deer hunting weekend (the last weekend in September). Additionally, an apprentice hunting license was created and apprentice license holders can now hunt on the youth deer hunting weekend.

Archery Deer Hunters-----According to 2013 license data, there are approximately 42,000 archery deer hunters in Virginia (Figure 34). This does not include crossbow deer hunters (see below). Archery deer hunter numbers peaked in the early 1990's at almost 70,000. Since 2005, archery deer hunter numbers have declined by about 32% or 20,000 hunters from 62,000 to 42,000, but this much of this decline was expected as a portion of archery deer hunters switched to crossbows.

Crossbow Deer Hunters-----According to 2013 license data, there are approximately 30,000 crossbow deer hunters in Virginia (Figure 35). Crossbows were made legal for all deer hunters in fall 2005 at which time a crossbow license was created. Prior to that, crossbows had only been legal for deer hunters with physical disabilities that prevented them from hunting with traditional archery equipment. Since 2005, crossbow hunter numbers have doubled. As expected, Department license sale data clearly indicates that crossbow use increases as deer hunters grow older. Combining bows and crossbows, there are now approximately 72,000 deer hunters participating in Virginia's archery deer seasons. Legislation passed during 2014 repealed the crossbow license, requiring only a single archery license for any type of bow or crossbow hunting.

Muzzleloading Deer Hunters-----According to 2013 license data, there were approximately 96,000 muzzleloading deer hunters in Virginia (Figure 36). A special muzzleloading license was created in fall 1990 and sales of this license increased >200% over the next 15 years, peaking at just under 119,000 in fall 2004. Since that time, the number of licensed muzzleloading deer hunters has declined about 20%.

Dog Deer Hunters-----Hunting deer with dogs is a long-standing tradition in eastern Virginia and much of the southeastern United States. The most recent available data (2007-08 hunter survey) revealed that 29% of hunters statewide used dogs. In 2004, the figure was 30%. This translated into approximately 55,000 deer hunters who used dogs at least once per season in Virginia. The 2004-05 hunter survey also revealed that 44% of deer hunters used dogs and 56% did not use dogs in regions of Virginia where deer hunting both with and without dogs is permitted. The only region of the state where a majority of deer hunters used dogs in 2004 was Tidewater (73%).

Deer Hunter Effort----According to the 2013-14 hunter survey, licensed resident Virginia deer hunters spent approximately 3.2 million days afield in pursuit of deer. This total includes nearly 1.64 million general firearms hunting days, 511,000 archery hunting days, 360,000 crossbow hunting days, and over 704,000 muzzleloader hunting days. Although down slightly from their peak in the mid 1990's, hunter surveys indicate that days afield in pursuit of deer have been fairly stable over the past decade. (Figure 37).

Deer Harvest ---- Official records of Virginia's statewide deer kill have been maintained since 1923. Data on the deer kill since 1947 are based on known minimum figures derived from the mandatory big game checking system, whereas data generated prior to 1947 were estimates provided by local game wardens. Except for 2 periods during the mid-1960s and mid-1990s, Virginia's annual deer harvest has increased steadily from an estimated 793 deer in 1923 to over 200,000 deer in recent years (Figure 38). During the 2014-2015 deer season, 192,186 deer were reportedly harvested in Virginia. A complete history of Virginia hunter deer kill records can be found in Appendix 7.

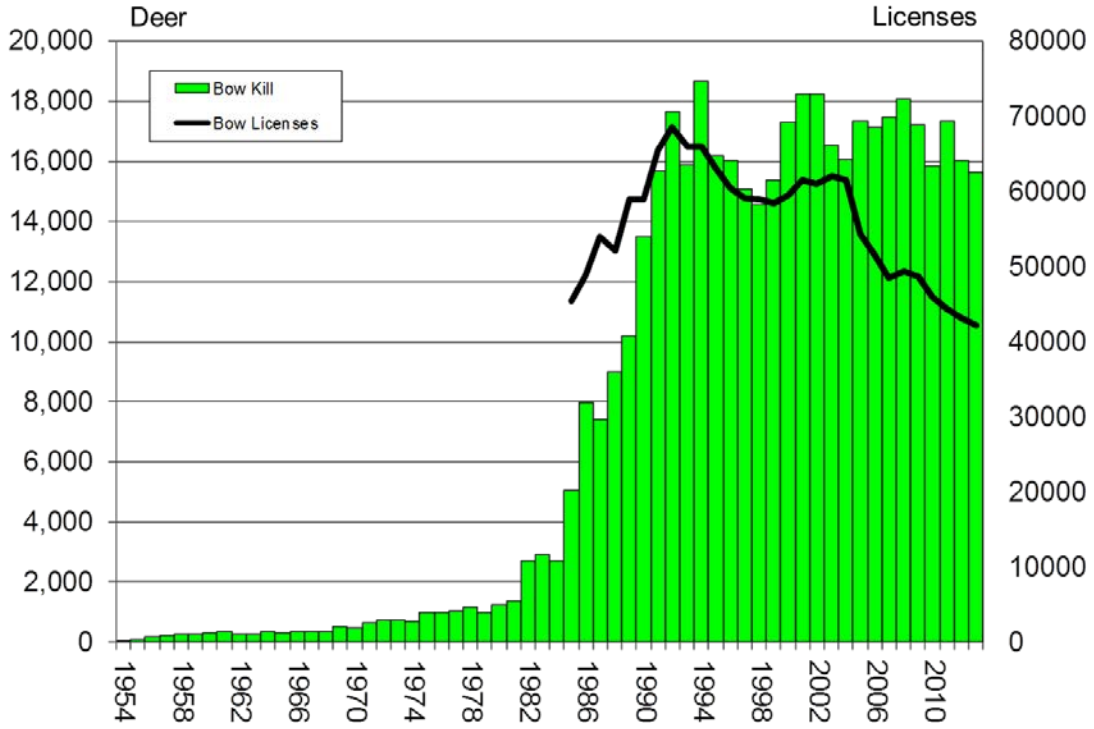

Figure 34. Virginia archery license sales and deer kill, 1954-2013.

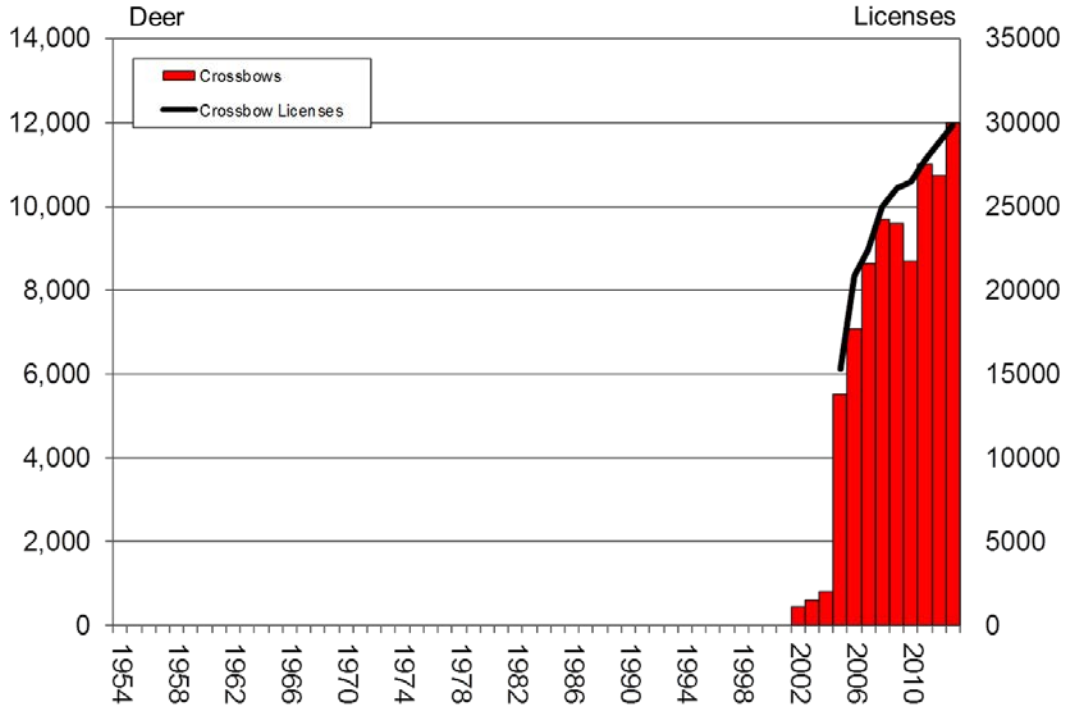

Figure 35. Virginia crossbow license sales and deer kill, 2002-2013.

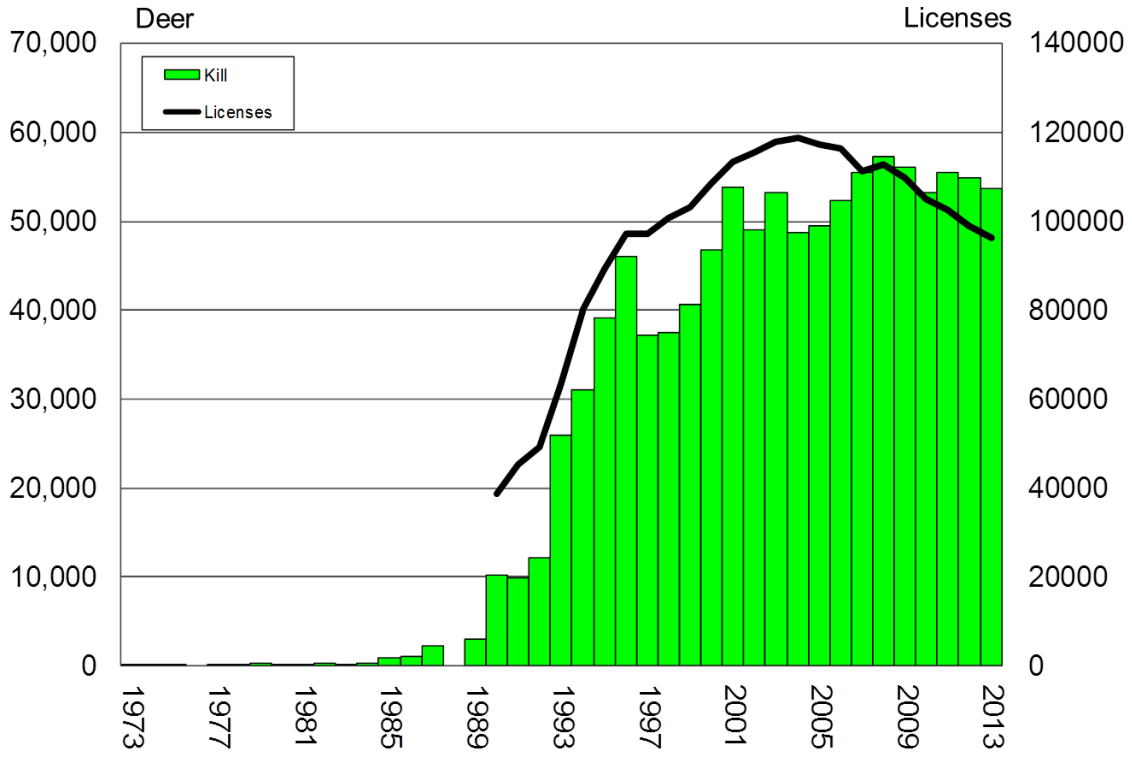

Figure 36. Virginia muzzleloading license sales and deer kill, 1973-2013.

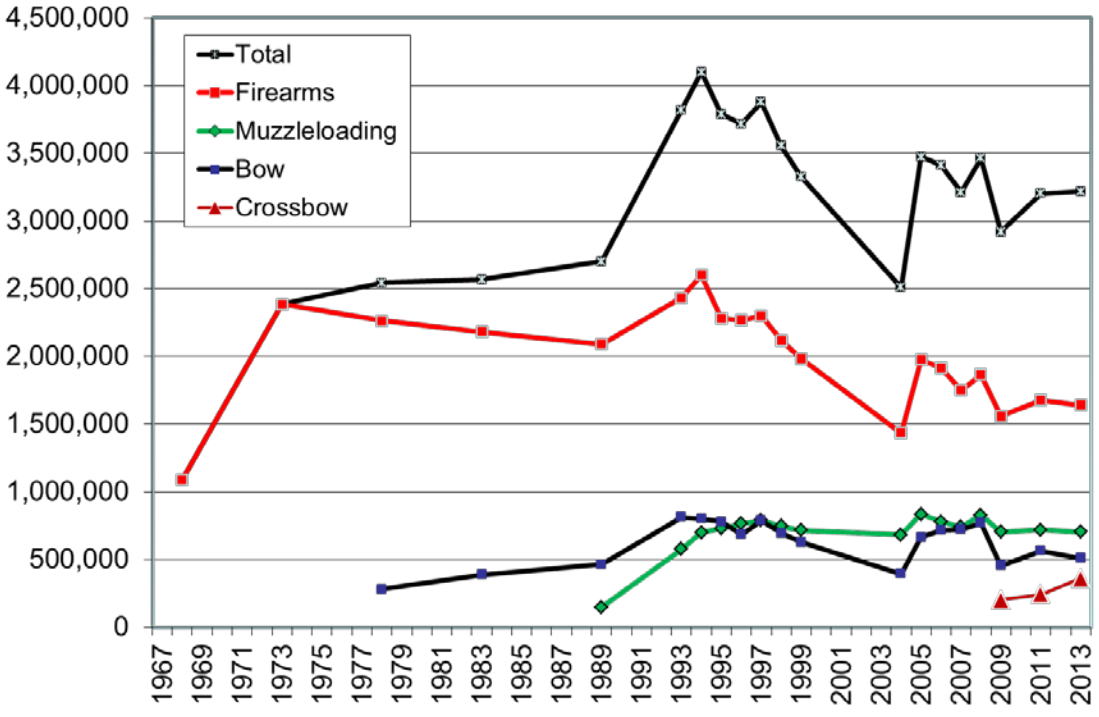

Figure 37. Virginia deer hunter days afield from hunter surveys, 1968-2013.

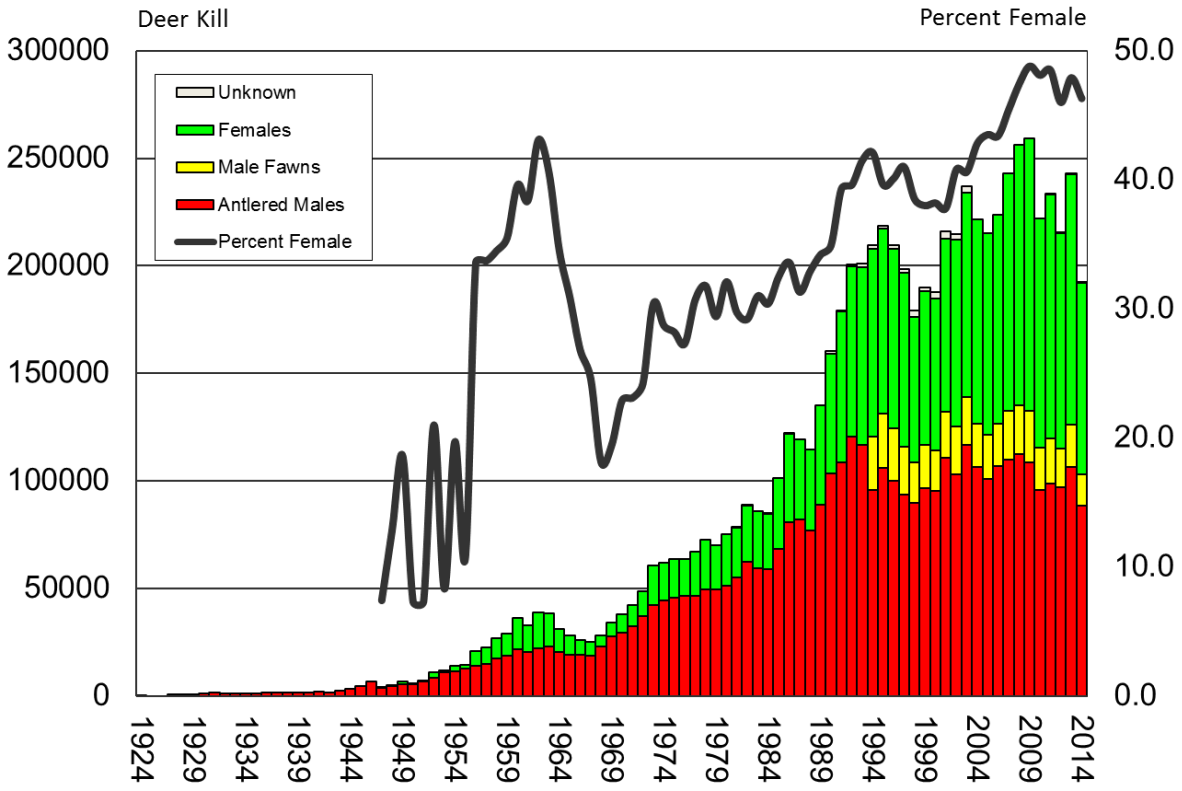

Figure 38. Virginia deer harvest,1923-2014.

Deer Hunter Success----Successful hunters are defined as those who harvest at least one deer per year. Hunter success is an important management metric that is monitored through hunter surveys. Hunter success has increased over the past 10-20 years from an average of about 57% to a current average of about 63% (Figure 39). Higher success rates are also linked to liberal antlerless deer hunting opportunities and harvests.

Deer Hunter Satisfactions----To measure satisfaction among Virginia deer hunters, a hunter satisfaction index (HSI) (rated on a 7-point Likert scale; 1: poor, 4: adequate, 7: excellent) was introduced in the 1993-94 hunter survey. When participants in the 2013-14 deer season were asked, "*Overall, how do you rate the quality of your deer hunting?*," most expressed "adequate" satisfaction (Figure 40). Average HSI's vary by region of the state, with deer hunters in the Northern Mountain region consistently demonstrating the lowest levels of satisfaction (or highest levels of dissatisfaction).

Data on the various components of deer hunter satisfaction are dated, but still relevant. In an ideal season, Virginia deer hunters in 1994-95 ranked feeling safe in the field as the most important satisfaction component, followed by seeing deer sign while hunting, seeing deer while hunting, and having the challenge of deer hunting. Results from the 1994-95 Virginia survey confirmed previous work which suggests that hunters' perception of deer population size is the single most important satisfaction variable under management control.

Participants in the 2013-2014 hunter survey generally rated deer populations in the area in which they hunted most as "moderate" (4.2 on a 7-point Likert scale where 1 = low, 4 = moderate, and 7 = high). These ratings ranged from a low of 3.46 in the Northern Mountains to 4.46 in the Tidewater. Of those surveyed, 41% statewide reported that the number of deer in the area they hunted during 2013-2014 had remained about the same as in previous years; 19% said deer populations had increased since previous years, and 35% said populations had declined (5% expressed no opinion). In 2004-05, when deer populations were increasing across much of the state, the statewide mean response was 4.7 and ranged from a low of 4.1 in the Northern Mountains to 5.0 in the Tidewater.

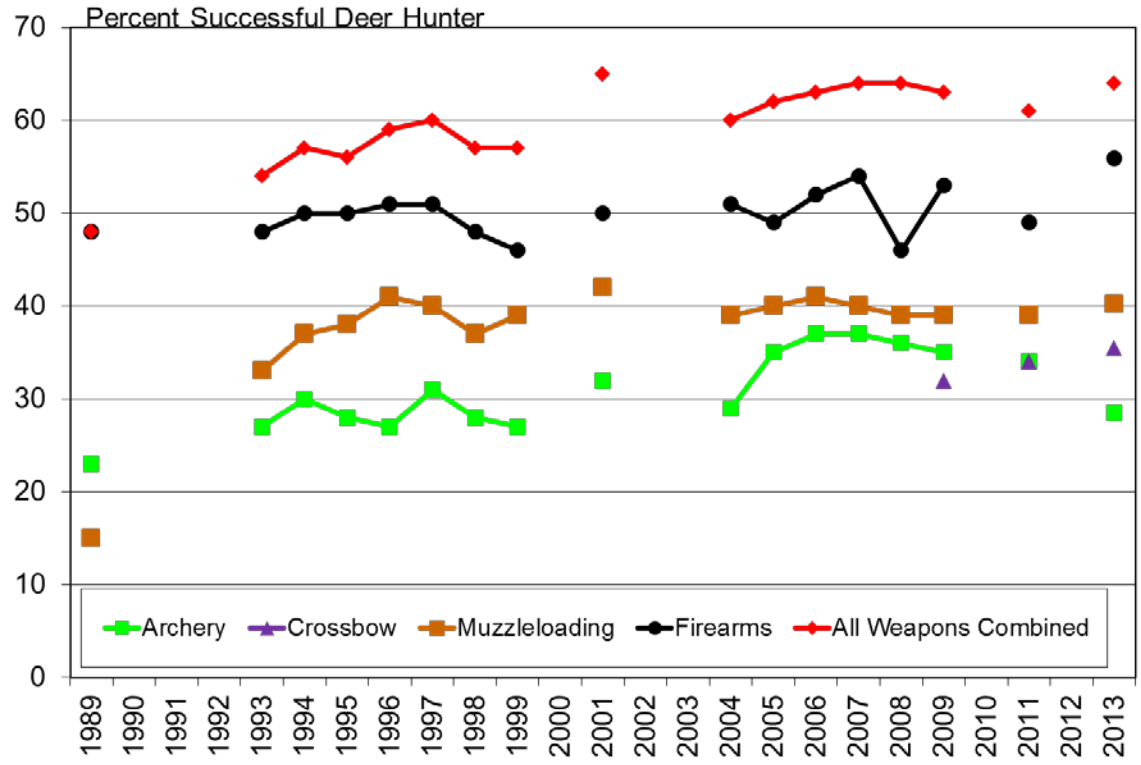

Figure 39. Virginia deer hunter success rates by weapon.

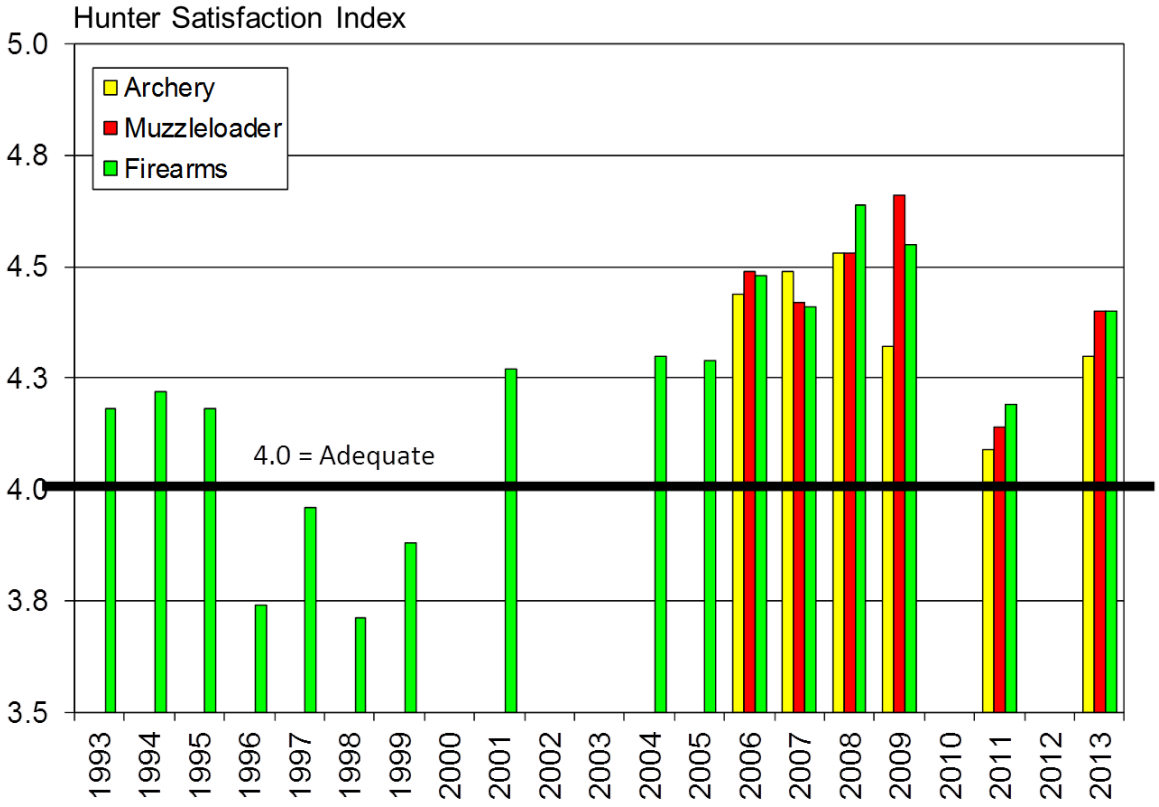

Figure 40. Virginia deer hunter satisfaction index by weapon/season (1 = poor, 7 = excellent).

Hunter Motivations----According to recent surveys by Responsive Management, Americans primarily hunt for recreation, for meat, to be with family or friends, and/or to be close to nature. Between 2006 and 2013, recreation dropped from the most important (33% of respondents) to the second-most important (31%) reason to hunt, being with friends and family fell from second-most important (27%) to third-most important (21%) , and hunting for meat rose from third-most important (22%) to the most important (35%) reason people hunted. Women, the fastest growing segment of hunters, were much more likely (55% of respondents) than men (27%) to say that meat was the most important reason for hunting.

The rising importance of hunting for meat can likely be attributed to the increasing influence of women hunters, economic conditions that encourage self-sufficiency, and the growing locavore movement. Locavores prefer locally-produced foods, including harvested game and fish.

Hunting for meat is strongly supported by both the American and Virginia public. In a 2014 Responsive Management survey, more Virginians supported hunting for meat (88%) than any other reason, including protecting humans from harm (87%) and for animal population control (86%). Similarly, 85% of Americans surveyed by Responsive Management in 2006 supported hunting for meat.

Venison is an important component of food assistance programs. Hunters for the Hungry is a nonprofit organization based in Virginia that coordinates the donation, processing, and distribution of venison from hunters to food banks and other charities. Since 1991, the program has provided more than 23 million servings (nearly 6 million pounds) of venison.

Quality Deer Management (QDM)----QDM is a management philosophy emphasizing reduced harvests of young antlered bucks and increased harvests of antlerless deer. QDM generally involves guidelines or restrictions that protect young antlered bucks from harvest so that most survive into older age classes. Although QDM is most commonly practiced voluntarily by hunt clubs or private landowners, state-mandated QDM regulations are becoming more common across the eastern United States.

In Virginia, QDM has traditionally been practiced voluntarily by landowners or hunt clubs without regulations mandating QDM to all hunters. Since 1988, most of VDGIF's QDM efforts have focused on technical guidance to landowners and hunt clubs through the Deer Management Assistance Program (DMAP). Out of more than 800 DMAP cooperators controlling some 1.4 million acres, approximately 85% practice some form of QDM.

Based upon three hunter surveys and two landowner surveys in Shenandoah County that showed strong support for QDM, the VDGIF Board adopted the first county-wide antler point restriction (APR) regulation to take effect in that county during the 2006-07 season. This regulation mandates that only one antlered buck taken per license year may have less than four antler points one inch or longer on one side of the antlers. In fall 2008, the regulation was extended to Rockingham County, and in fall 2013, it was extended to Alleghany, Augusta, Bath, Highland, and Rockbridge counties.

In addition to the counties listed above, QDM regulations have also been established on three state Wildlife Management Areas (a designated section of Fairystone Farms, Featherfin, and Hog Island) and at the Radford Army Ammunition Plant in Pulaski and Montgomery counties.

Intensive Deer Management (IDM)---- Intensive deer management (characterized by confining deer within high fences, supplemental feeding and, in some instances, selective breeding) has increased dramatically across North America over the past two decades. High fences are erected to restrict antlered buck movements to enhance survival rates, resulting in more large, old antlered bucks in the deer population than could be achieved under natural, free range conditions. Some deer breeders artificially manipulate the genetics of fenced deer through selective breeding practices intended to develop larger antlers (sometimes extremely large). Both fencing and selective breeding are designed to meet a demand for trophy deer.

IDM is not without controversy. At several levels, IDM is incompatible with the North American Model of Wildlife Conservation. For instances, IDM promotes the privatization of wildlife and often creates markets fro the private sale of public owned wildlife resources. Further, deer ''hunting'' under the intensive deer management model also violates the concept of fair chase, which as a cornerstone principle of hunting in North America is important for maintaining public support for hunting.

Although legal hunting in general is supported by 83% of Virginians and 78% of Americans, according to recent surveys by Responsive Management, some aspects of IDM receive little support. A 2006 survey by Responsive Management regarding public perception of individual motivations to hunt indicated that hunting for a trophy received the least public support in the US (28%) while hunting for meat received the highest support (85%). A 2014 Responsive Management survey of Virginia residents also found the most public support for hunting was for the meat (88%) with the least public support for trophy hunting (38%).

Surveys and focus groups conducted in 2007 by Responsive Management found that only 20% of the American public - and only 23% of hunters - supported hunting (of any species) within high fence enclosures; only 27% of the American public supported hunting over bait. According to the 2014 Responsive Management survey, 25% of the Virginia public - and 28% of Virginia hunters - supported hunting (of any species) within high fence enclosures; 26% of the Virginia public – and 28% of Virginia hunters - supported hunting over bait. Virginia residents opposed hunting deer (66%), bear (71%), and turkeys (67%) over bait.

Many deer management professionals believe that activities associated with IDM (e.g., confining and concentrating deer, transporting live deer, feeding deer) are the most significant risk factors for spreading chronic wasting disease, tuberculosis, brucellosis and other deer/livestock diseases into new areas. For more than 20 years, the Department has taken proactive positions opposing deer farming, high fence enclosures of native deer, and deer feeding/baiting.

As noted above, hunting over bait is often a component of IDM, but baiting is also a tradition in several areas of the United States. Some form of hunting deer over bait is allowed in 22 states, or parts thereof, but hunting deer over bait is prohibited in 25 states, including Virginia. Hunting of any game animal over bait has been prohibited in Virginia, by statute, since at least 1936.

Virginia Senate Joint Resolution 79, referred for study following the 2014 General Assembly, directed VDGIF to "study the effects of a removal of the prohibition against hunting over bait." VDGIF submitted a report to the General Assembly in November 2014 recommending that the prohibition on hunting over bait be maintained (see Supporting Documents). The report outlined biological and sociological concerns with hunting over bait, including negative impacts on target and non-target wildlife populations and habitat, law enforcement concerns, changes in animal behavior, sportsmanship and fair chase concerns, and disease transmission risks. In October 2014, staff presented their report to the Board of VDGIF.

Deer Hunter-Citizen Conflicts----Though dated, the most recent data available revealed that, during the period of 1998 to 2000, trespassing was the most common problem landowners had with hunters of all types of game in Virginia – both those who do and do not use dogs. Data from this survey (conducted by Responsive Management, Virginia Tech, and George Mason University) did not permit comparison of trespassing complaints between deer hunters and other hunters, nor among different types of deer hunters.

The most recent data available regarding conflicts between hunters comes from the Department's 2008-09 hunter survey. Statewide, hunters reporting being disturbed during the 2008-09 deer firearms season were disturbed most frequently by other hunters (41%), followed by hunting dogs (28%), and then by other outdoor users (25%). Although other hunters were the disturbance reported most frequently in all regions of the state (28-53%), other outdoor users were reported more frequently than hunting dogs in the mountains (28% vs. 23%), but hunting dogs were reported more frequently than other outdoor users in the Piedmont and Tidewater regions (29% vs. 20%).

The Department routinely receives complaints from residents and other hunters about trespass, violation of privacy, and interference from deer hunters who use dogs. Investigations of many complaints eventually reveal that no trespass violations occurred. Although hunting deer with hounds is popular in many areas of eastern Virginia, changing land uses, demographics, and societal attitudes are exerting pressures on the sport not seen a generation ago. These modern trends are a recipe for conflicts involving hunters and other citizens. Due to relatively large acreage requirements, high visibility, frequent interactions with landowners and other outdoor users, and hunting methods that some people find unacceptable, deer hunting with hounds can be controversial. As currently practiced, hound-hunting poses no threat to deer populations and remains an important tool in controlling deer populations in some areas.

The Department has traditionally addressed deer hound-hunting issues on a case-by-case basis. With assistance from VDGIF, governing bodies in the counties of Accomack (1997), King George (1986),

Richmond (2004), and Westmoreland (1996) chartered hunter/landowner advisory committees to develop non-regulatory solutions to hunter-landowner conflicts, mostly related to hunting deer with dogs.

Over the last decade, the Virginia Deer and Bear Management Plans have both identified issues associated with use of hounds, contained goals and objectives to maintain hound-hunting while ensuring hunting ethics and respect for citizen rights, and identified strategies to address these objectives.

During 2007-09, the Department, in conjunction with Virginia Tech, undertook the *Hunting with Hounds in Virginia: A Way Forward* process to address the aforementioned issues more comprehensively. The goal of the process was founded upon stakeholder investment during development of the Bear and Deer Management Plans: *"To provide diverse opportunities for hunting with hounds in Virginia in a manner that is fair, sportsmanlike, and consistent with the rights of property owners and other citizens."* Products from the process included a peer-reviewed technical report written by Department staff (see Supporting Documents), survey and written comment summaries (Virginia Tech), and recommendations by a Stakeholder Advisory Committee. As of 2015, no regulatory or statutory changes have been made as a result of this process.

Nonconsumptive Deer Demands

In addition to hunting, deer watching and photography are important recreational activities in Virginia. According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, over 2.5 million people participated in non-consumptive wildlife activities (e.g., observing and photographing wildlife) in Virginia and contributed an additional $959 million dollars to the state economy. In 2008, the Virginia Birding and Wildlife Trail (VBWT) alone contributed $8.6 million to the economy of the Commonwealth. Although most wildlife viewers use the VBWT to bird watch, surveyed users reported that deer was the most popular mammal that led them to visit a specific trail site. The 2013 CCC survey indicated that 15% of respondents took a trip specifically to view or photograph deer in Virginia during 2012; however, respondents ranked viewing and photography opportunities of least importance among different demands to consider when managing deer (Table 1). A survey conducted by Virginia Tech, Responsive Management, and George Mason University in 2000 found that 20% of all Virginians reported making at least 1 trip during the period 1998 to 2000 for the primary purpose of observing, photographing, or feeding wildlife (excludes trips to zoos or museums); more trips were made to view white-tailed deer (69%) than any other species.

Deer Damage Demands

Deer management demands are not related only to recreation. Modern deer management in Virginia is driven just as much by the adverse effects of deer as the positive demands. Examples of negative demands commonly associated with Virginia's deer herds include crop depredation, deer-vehicle collisions, residential plant damage, deer-related human diseases (e.g., Lyme disease), and deer ecosystem impacts.

Demand for out-of-season kill permits exemplifies deer damage issues throughout Virginia. During 1996-2010, 30,618 kill permits were issued to 9,579 individual citizens. During this 15-year-period, deer taken on kill permits represented about 5% of the total hunter harvest during regular hunting seasons; however, in some areas, kill permits may contribute a much greater proportion of the total kill (e.g., Chesapeake, 55%; Alleghany County, 42%; Virginia Beach, 28%). Virtually all deer (97%) taken on kill permits are antlerless. Nearly half (44%) of the permits issued resulted in no deer being killed, but 94% of permit holders were still satisfied with their permits, according to a Department survey in 2011. The largest numbers of kill permits have been issued for soybeans (20%), shrubs (19%), trees damage (14%), gardens (12%), and corn (12%).

Results from the 2013 CCC survey suggest that, overall, Virginia residents do not consider deer as a nuisance in the county where they live. Fewer respondents agreed (29%) than disagreed (48%) that deer are a nuisance in their county (23% were neutral). Respondents were ambivalent about whether conflicts with deer in their county are exaggerated (28% agreed, 28% disagreed, and 44% were neutral).

A telephone survey conducted during February-March 2005 by Responsive Management indicated that deer was the most problematic species for landowners. Of the 23% of Virginians who reported they had

problems with wild animals and/or birds within the past 2 years, more had problems with deer (49%) than raccoons (16%), opossums (10%), skunks (9%), birds (7%), squirrels (6%), or any other type of wildlife. Damage to yards (37%) and gardens (34%) were the two most common citizen complaints.

In September 2013, the Virginia Wildlife Conflict Helpline (Helpline), a collaborative effort between VDGIF and the USDA, APHIS, Wildlife Services program (WS), became operational. The toll-free Helpline is intended to provide a single source of consistent, expert technical assistance, education, and referrals to callers experiencing wildlife conflicts. The Helpline can also provide data on type, seasonality and geographic distribution of conflicts and identify needs for proactive intervention by managers (e.g., targeted public information and education). Of the 8,485 calls the Helpline responded to during its first year of operation (ending September 2014), 1,214 calls were for deer, second only to bear (1,437). VDGIF and WS staff met in 2015 to refine reporting of different types of deer conflicts received by the Helpline (e.g., agricultural crop damage vs. residential garden damage); because these changes were implemented, meaningful analyses will become practical beginning in 2016.

Deer Crop Damage----Deer damage to agricultural crops represents one of the most important public demands related to deer management in Virginia. Compared to urban demands, 81% of kill permits from 2006-2010 were issued for agricultural damage. In addition to data presented below, the Virginia Wildlife Conflict Helpline should provide important information on deer crop damage in the future.

In the 2013 CCC survey, 53% of respondents (n = 494) who identified themselves as agricultural producers indicated they had suffered deer damage in 2012. These producers estimated the monetary value of deer damage as follows: 47% provided no estimate, 17% reported $1-500, 10% reported $501-1,000, 14% reported $1,001-5,000,7% reported $5,001-10,000, and 6% reported greater than $10,000. Over the previous five years (2008-2012), 13% believed the risk of deer damage had decreased, 47% believed it had remained about the same, and 41% said it had increased. Deer crop damage severity assessments by crop type from this VT CCC survey are shown below in Table 4.

Table 4. 2013 CCC survey estimates of deer damage severity by type of agricultural product.

		Severity of Damage			
Product	**N**	**None**	**Low**	**Moderate**	**Severe**
Soybeans	149	17%	16%	31%	36%
Corn	166	19%	30%	37%	14%
Other field crops	121	36%	22%	24%	18%
Tree fruit plantings	96	45%	19%	25%	11%
Nursery or Christmas tree stock	48	73%	8%	13%	6%
Alfalfa, hay, or pasture crops	149	40%	30%	23%	8%
Grapes, brambles, small fruits	83	53%	17%	18%	12%
Other commodity	69	54%	9%	26%	12%

To gauge the demands related to deer crop damage, the VDGIF uses the number of deer kill permits issued as an index. Between 1989 and 2008, the number of deer kill permits issued statewide rose steadily, increasing fourfold from about 500 to 2,500 deer kill permits issued annually (Figure 41). Since the peak in 2008, kill permits related to agricultural damage from deer have declined about 35%, down to approximately 1,700-1,800 annually. This decline is primarily due to liberalization of deer seasons in the Tidewater region.

Though dated, two studies from the 1990s provided the only comprehensive estimates of agricultural damage from deer in Virginia. A committee established by VDGIF to investigate deer damage estimated the amount of agricultural crop damage caused by deer in Virginia in 1992 at approximately $11.4 million. The majority of this damage was to soybeans ($6.3 million), peanuts ($2.0 million), and orchards ($1.9 million). A 1996 survey of deer damage by Virginia Tech found that 58% of respondents reported experiencing deer damage during 1995. Although producers were more likely to report damage than homeowners (71% versus 36%, respectively), the severity of damage being reported by both producers and homeowners was similar.

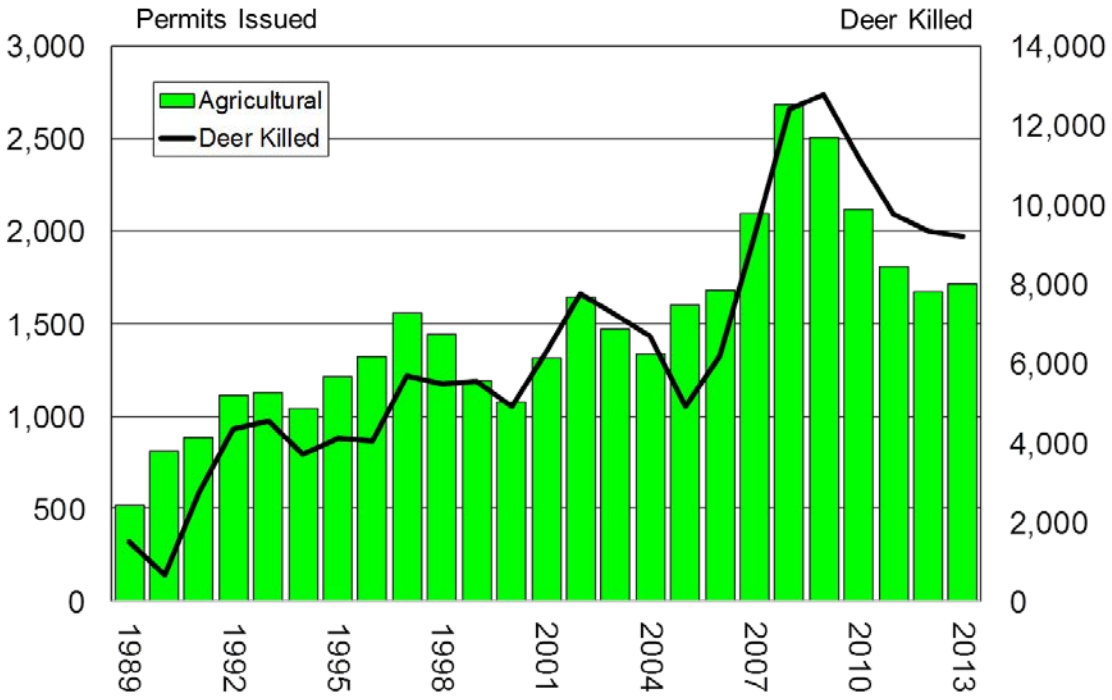

Figure 41. Virginia agricultural deer kill permits issued and deer killed, 1989-2013. Kill permit data up to 1998 includes agricultural and urban combined.

Deer-Vehicle Collisions----Deer-vehicle collisions are a critical deer management concern in Virginia. Trends in deer-vehicle collisions in Virginia are influenced both by deer and human populations. Human population growth increases traffic volume and the number of roads, fragmenting deer habitats. As a result, deer cross busier highways more often, which can lead to more accidents even with a stable deer population.

Thousands of deer-vehicle collisions occur in the Commonwealth each year (Figure 42, Appendix 8). Based on aggregated insurance company claims and vehicle registrations, the Highway Loss Data Institute estimated that over 52,000 animal-vehicle collisions likely occurred in Virginia during 2012, the large majority of which undoubtedly involved deer. Based on their own claims and market share in Virginia, State Farm Insurance projected that there were over 63,000 deer-vehicle claims for all insurance companies in the state during July 1, 2013 - June 30, 2014. In Virginia, 17% of total State Farm comprehensive and collision policy claims were related to deer collisions, compared to 9% nationally. Virginia has ranked 5th-7th in the nation in State Farm's total deer-vehicle claims over the last several years. Based on State Farm's estimates for total claims and average cost per claim in 2013 ($3,300), the total property damage from deer-vehicle collisions in Virginia could exceed $200 million annually (not including work-time loss and other costs).

Although grossly under-reported, deer collisions documented by police that result in human fatalities, human injuries, or property damage have increased significantly over the last 40 years in Virginia. Research from Virginia (VA Transportation Research Council and VDGIF) and elsewhere suggests that police reports grossly underestimate property damage accidents, but fatalities and injuries data are presumably more accurate.

The top five counties in Virginia for total deer collisions, according to police reports compiled by the Virginia Department of Motor Vehicle (DMV), are Loudoun, Chesterfield, Fauquier, Albemarle, and Henrico. According to data compiled by the Highway Data Loss Institute for 2006-2011, Loudoun and Prince William counties were ranked 7th and 12th, respectively, among all counties in the nation for the highest insurance claim frequencies for animal vehicle strikes (of all kinds) in November; deer were presumably the prominent contributor.

According to DMV records, deer-vehicle collisions result in less than 2% of all human casualties from motor vehicle accidents in Virginia. During 2009-13, a statewide annual average of 3.8 fatal and 469 injury accidents resulted from direct impacts with deer. According to a separate analysis, there were an annual average of 2.4 fatalities and 1018 injuries caused by drivers attempting to avoid animals (of all kinds) during 2002-2006. Although deer could not be separated out of this total, the clear spike in such accidents during November each year suggested that deer likely comprised the large majority.

Approximately 9% of respondents to the 2013 CCC survey experienced one deer-vehicle collision during 2012, while another 4% experienced two or more; approximately 11% of respondents reported that other drivers in their household had collisions with deer during 2012.

Urban Deer Conflicts----Urban deer conflicts are one of the most pressing deer management issues in Virginia. Over the past two decades, VDGIF has received requests for information and assistance from numerous city and county governments, landowner associations, and private landowners regarding urban deer issues. Management of deer in urban environments often involves deer populations that traditionally have not been hunted, that occur in residential areas, and that have experienced significant population growth, all of which can create the potential for damage to ornamental plants and property. To address urban deer problems, VDGIF maintains several site-specific programs to reduce deer populations (e.g., kill permits, DPOP, urban archery hunting). As with agricultural deer damage, kill permits related to urban deer damage have declined since 2008, primarily due to liberalization of deer seasons (Figure 43). In the future, the Virginia Wildlife Conflict Helpline will provide additional information on urban deer conflicts.

The most common problems associated with deer in urban areas are vehicle collisions and residential plant damage. The 2013 CCC survey indicated that 39% of the respondents had experienced deer damage to residential plants during 2012. Damage to home flower gardens, vegetable gardens, and trees or shrubs were the most frequent types of plant damage. Approximately 2/3 of those respondents who experienced residential plant damage in 2012 reported the amount of deer damage at less than $300; approximately 27% of reported $300-$1000 in damage, and approximately 7% reported greater than $1000 in damage.

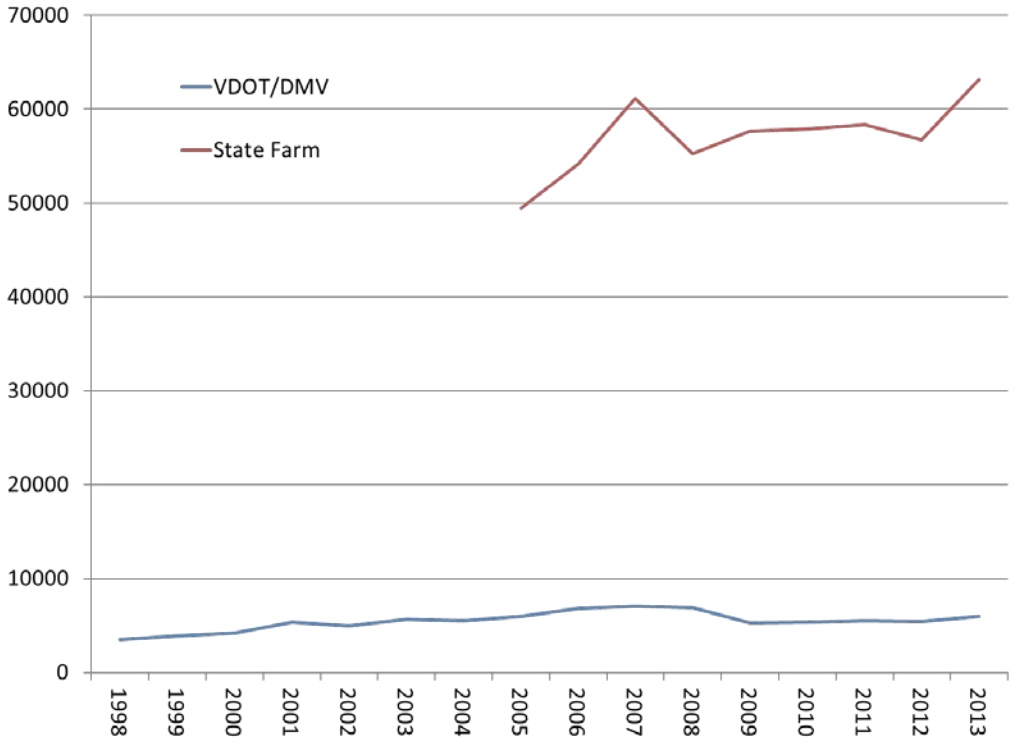

Figure 42. Statewide deer-vehicle collision data, 1998—2013. Total reported accidents obtained from Virginia Department of Transportation (VDOT) and Virginia Department of Motor Vehicles (DMV). Projected claims are from State Farm Insurance Company.

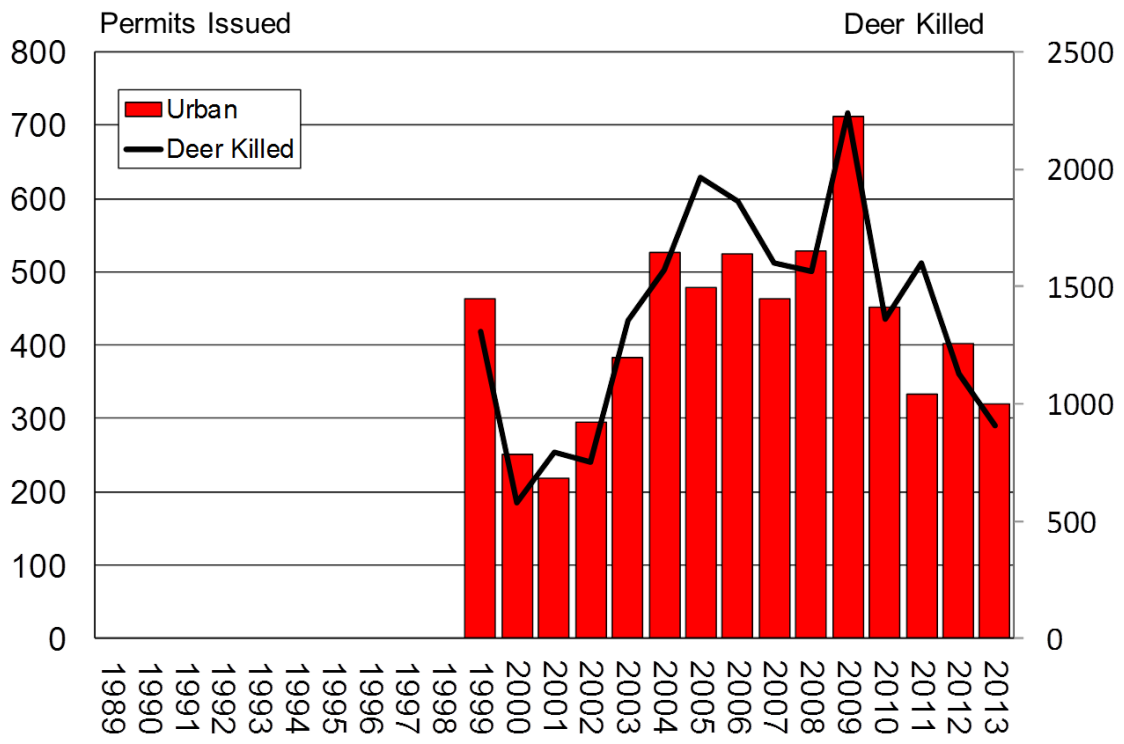

Figure 43. Virginia urban deer kill permits issued and deer killed, 1999-2013.

During 2004, the Conservation Management Institute at Virginia Tech conducted a survey of administrative leaders from cities, towns, and counties in Virginia to gauge their community's experiences with nuisance animals. Of the 65 localities that responded, nearly half (32) ranked deer among the top 10 most important nuisance species; 14 (25%) localities ranked deer number one among nuisance species. For comparison, 10 localities ranked dogs most important, and 7 ranked cats as most important.

Deer managers across the country have developed and refined strategies and techniques to address urban deer issues (see Supporting Documents). Although non-lethal methods may reduce problems at specific sites, lethal population reduction programs usually are required to resolve community-wide conflicts. Hunting is the most practical, cost-effective, and publicly-supported means to control free-ranging deer populations in most landscapes, although sharpshooting may be more effective in some controlled settings. Non-lethal alternatives typically are limited in applicability, prohibitively expensive, logistically impractical, or technically infeasible. For example, fertility control remains largely experimental and appears to be most applicable in closed populations, such as islands or fenced areas, where deer are approachable and unable to disperse naturally. Immunocontraceptives like porcine zona pellucida (PZP) and GonaCon, the first agent approved for use in free-ranging wild deer, have not been approved for general use in Virginia. Surgical sterilization can be effective in small, closed deer populations, but deer capture and surgery makes this option cost-prohibitive for general use.

Deer Ecosystem Impacts----Deer ecosystem impacts have become more of a management concern in Virginia as the density of deer herds has increased and forests have matured. The effects of deer on forest composition and regeneration, habitat structure, and species diversity are well-documented. In certain parks and other forested areas in the Commonwealth, deer have removed much of the understory vegetation up to a level they can reach, leading to conspicuous "browse lines." Heavy deer browsing can diminish nutritive value of habitats for deer, displace wildlife communities that are dependent upon understory vegetation (e.g.,

neotropical migrant songbirds, small mammals), prevent the regeneration of valuable forest tree species (e.g., oaks), damage certain unique or sensitive plant communities, and increase the competitive success of non-native invasive plants over native plants. Deer herbivory is a noted stressor for some species of concern listed in the Virginia Wildlife Action Plan.

The 2006-2015 plan directed the Department to develop practical, efficient assessments of deer impacts to ecosystems. During 2012-2015, Virginia Tech has been conducting a research project to model deer herbivory in western Virginia according to inherent landscape features (e.g., land ownership, topography). The results of this study should be available by 2016.

Human and Domestic Animal Diseases----Human diseases associated with deer include Lyme disease, erhlichiosis, babesiosis, rabies, brucellosis, and bovine tuberculosis (TB). Bovine tuberculosis, which also impacts cattle, has not been known to occur in Virginia since isolated cases were detected in captive fallow deer st two Tidewater facilities in the mid-1990s. Rabies is very rare in deer, but caution is warranted for anyone handling a suspect animal. Brucellosis and foot-and-mouth disease are reportable livestock diseases that can infect deer and be transmitted by deer. Neither disease has been found in Virginia's deer or livestock.

Lyme disease, erhlichiosis, babesiosis are tick-borne human illnesses. Lyme disease is caused by infection with the bacterium *Borrelia burgdorferii*. As the principle host species for adult black-legged ticks, the primary vector for Lyme disease, deer play a role in the maintenance of Lyme disease but are not actually able to become infected with the bacterium. Black-legged ticks become infected with Lyme disease after feeding on an infected small mammal, such as a white-footed mice. With the exception of one long-term study in a small, peninsular community in Connecticut (Kilpatrick et al. 2014), there have been no robust assessments of a relationship between deer populations and incidence of Lyme disease (see Supporting Documents). Further, a clear relationship has not been established between deer populations and the abundance of black-legged ticks. Research on islands and peninsulas suggest that tick abundance can be reduced when deer populations are completely eradicated or reduced to some very low threshold population density, a level that is unlikely achievable in most free-ranging, mainland deer populations.

According to data from the U. S. Centers for Disease Control and Prevention, confirmed cases of Lyme disease reported in Virginia increased from 195 in 2003 to 959 in 2007, before plateauing at an average of approximately 840 between 2008 and 2012.. Of respondents to the 2013 CCC survey, 7% reported that they, or someone in their household, had been diagnosed with a tick-borne illness (e.g., Lyme disease) during 2010-2012. In recent years, Lyme disease appears to be spreading southward and the highest incidence is in Northern Virginia, the Shenandoah Valley, and the New River Valley.

Two important deer diseases, hemorrhagic disease (HD) and chronic wasting disease (CWD), are both diligently monitored for and present in Virginia. Hemorrhagic disease, a clinical condition caused by infection with blue tongue virus (BT) and/or epizootic hemorrhagic disease virus (EHD), is spread by midges and does not affect humans. Blue tongue virus most commonly affects sheep, whereas EHD is the form of the disease that typically causes clinical illness in deer. Cattle demonstrate resistance to most of the "traditional" viruses causing HD, but are susceptible to some of the newly emerging variants.

Chronic wasting disease is caused by a type of infectious protein, known as a prion. Other prions cause scrapie in sheep and bovine spongiform encephalopathy ("mad cow disease") in cattle. However, there is no evidence at this time that humans can contract CWD from consuming venison, nor has the disease been shown to transmit to livestock under natural conditions. The susceptibility of exotic species of deer held in captivity (e.g., fallow, axis, muntjac) is currently unknown.

The Department asked a series of questions about CWD on a special survey of deer, bear, and turkey hunters who took part in the 2009-10 season, just following the discovery of CWD in Frederick County, VA. Respondents expressed the most concern about the health of wild deer (86% agreeing to some degree), followed by the future of deer hunting (85% agreeing), health of livestock (73%), and eating venison (55%). Approximately 7% and 10% of respondents indicated that they would hunt less or in different areas, respectively, because of their concerns about CWD.

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SUPPORTING DOCUMENTS

Life History and Biology of White-tailed Deer

The life history and biology of white-tailed deer are not covered in this plan. Persons interested in the life history and biology of white-tailed deer should consult any or all of the following references:

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An Evaluation of Deer Management Options

Northeast Deer Technical Committee. 2009. An evaluation of deer management options.
http://www.dgif.virginia.gov/wildlife/deer/evaluation-of-deer-management-options.pdf

This document revised a 1996 publication of the same name which was featured in the 1999 and 2006-2015 deer plans. The main contribution of this document has been to enumerate advantages and disadvantages of different options available to manage deer populations:

(1) Allow nature to take its course;
(2) Use fencing and repellents to manage conflicts with deer populations;
(3) Use of non-lethal techniques to reduce deer-vehicle collisions;
(4) Provide supplemental food to alleviate conflicts with biological and cultural carrying capacity;
(5) Trap and transfer excess deer to other locations;
(6) Use fertility control agents to regulate deer populations;
(7) Reintroduce predators to control deer populations;
(8) Control deer herds with sharpshooters; and
(9) Use hunting as a deer management tool.

This document concluded that hunting is the most practical and cost-effective means to control free-ranging deer populations in most settings. Alternatives to hunting typically are limited in applicability, prohibitively expensive, logistically impractical, or technically infeasible.

Managing White-tailed Deer in Suburban Environments: A Technical Guide

DeNicola, A. J., K. C. VerCauteren, P. D. Curtis, and S. E. Hygnstrom. 2000. Managing white-tailed deer in suburban environments: a technical guide. Cornell Cooperative Extension, Ithaca, NY. http://www.dgif.virginia.gov/wildlife/deer/suburban.pdf .

This publication provides an overview of the complex social and biological issues involved in managing white-tailed deer and addresses the usefulness of various options to resolve localized deer-human conflicts.

Major content areas include:

- Biology of the white-tailed deer
- Regulations regarding white-tailed deer
- Deer ecology and management
- Human dimensions and deer management
- Developing an integrated management strategy
- Estimating deer population size
- Management techniques (non-lethal, vehicle collision reduction, population reduction)
- Experimental deer management (fertility control)
- Deer damage control supplies and materials information
- Resource contacts

This document stresses the need for public involvement when developing community deer management programs. Integrating proven techniques into a long-term strategy will be more successful than seeking simple, quick fixes. Although non-lethal methods may reduce problems at specific sites, lethal population reduction programs usually are required to resolve community-wide conflicts. Because reproductive output of deer that live in urban environments commonly is high, a decision to postpone active management often will lead to greater difficulty when efforts are implemented in the future.

Lyme Disease: The Ecology of a Complex Ecosystem

Ostfeld, R. S. 2011. Lyme disease: the ecology of a complex ecosystem. Oxford University Press. 216pp.

This book provides a readable overview of the history, science, factors, dogma, and complexity of Lyme disease from an ecosystem perspective. Of most interest to deer managers is Chapter 3, entitled, “It’s the Deer.” (There are also chapters entitled, “It’s the Mice,” and, “It’s the Weather.”). Although the author does not discount the role of deer as the preferred host of the adult black-legged tick, he refutes the simplistic notion that deer are the only - or even the primary - factor influencing Lyme incidence in humans. The author’s primary conclusion is that the disease cannot simply be “blamed” on one factor (e.g., deer, mice), but must be viewed according to ecological food webs, biodiversity, and ecosystem functioning.

Hunting with Hounds in Virginia

VDGIF. 2008. Hunting with hounds in Virginia: a way forward. Technical Report, Richmond, VA.

This 121 page peer-reviewed report was written by VDGIF technical staff to inform the *Hunting with Hounds in Virginia: A Way Forward* process during 2007-2009. Major sections of the report included:

- Background information on the history and tradition of hound-hunting, modern trends impacting the sport, and rationale for addressing the issues in Virginia.
- A description of hound-hunting as currently practiced, including distribution of different styles and hunting for different species with hounds (e.g., deer, bear, foxes).
- Values associated with hound-hunting: biological, sociological, and economic.
- Concerns associated with hound-hunting: biological, sociological, and economic.
- Legal aspects of hound-hunting in Virginia, including state, federal, and local laws; a comparison of laws among states; and pragmatic issues impacting law enforcement.
- Approaches used to address the issues, ranging from nonregulatory approaches (e.g., education, hunter self-governance, stakeholder collaboration, property access management) to regulatory or statutory approaches (e.g., dog/hunter/club registration or permits, dog management laws, closures by season or area, complete prohibitions).

Hunting over Bait in Virginia

VDGIF. 2014. A study report on the effects of removing the prohibition against hunting over bait in Virginia. Report of Senate Joint Resolution 79. Richmond, VA. http://www.dgif.virginia.gov/hunting/study-report-hunting-over-bait.pdf.

A video of staff presenting this report to the Board of VDGIF is available at: https://www.youtube.com/watch?v=qjNeuGYZS80.

Virginia Senate Joint Resolution 79, referred for study by the Senate Rules Committee following the 2014 General Assembly, directed VDGIF to "study the effects of a removal of the prohibition against hunting over bait." VDGIF submitted a report to the General Assembly in November 2014 recommending that the prohibition on hunting over bait be maintained. The report outlined biological and sociological concerns with hunting over bait, including the following:

- Baiting frequently results in overabundant wildlife populations, especially deer, which can cause significant damage to human property (e.g., vehicles, crops) and wildlife habitat by over-browsing native vegetation.
- Baiting alters natural animal behavior, making them less "wild," which can lead to increased intra- and interspecific competition and increased conflicts between wildlife and people, habituation, and human safety issues.
- Baiting repeatedly and artificially congregates wildlife at the same location and increases the risk of disease introduction, amplification, and spill-over into other wildlife species, domestic livestock, and humans.
- A majority of hunters and non-hunters in Virginia and nationwide oppose hunting over bait because they think it violates the principle of "fair chase" hunting. Baiting jeopardizes the Public Trust, can create conflicts between hunters and between landowners, and erodes hunter image and agency credibility.

ACCOMPLISHMENTS OF THE 2006-2015 VIRGINIA DEER MANAGEMENT PLAN

Progress in Meeting Plan Objectives

The 2006-2015 Virginia Deer Management Plan contained 17 objectives. Table 5 and Figures 44-46 below provide a summary of progress toward meeting each objective since plan implementation in 2007 through January 2015.

Table 5. Progress toward achieving objectives identified in the 2006-2015 Deer Management Plan.

Objective by Goal Area	Objective Met? (2007-2014)	Explanation
Population		
To update deer population management objectives by management unit biennially beginning January 1, 2007.	No	Updates not needed biennially; considered updating in 2011, but waited for CCC study
To meet deer population management objectives within 5 years after they are updated through January 1, 2015.	Mixed. 73%/67% of private units met during last 10/5) years. 35% of public units met during last 10 years.	See Figs 44-46 and Appendices 9-11.
To develop or continue management programs for local deer management areas within the larger management units through January 1, 2015.	Yes	Continued DMAP, DCAP, DPOP, kill permits, and urban archery
Habitat		
To update the status of deer habitat by management unit as data become available through January 1, 2015.	Yes	Updated: 2006 National Land Cover Dataset
To promote deer habitat management compatible with the needs of diverse native wildlife species and humans on private and public lands through January 1, 2015.	Mixed	Significant educational and regulatory effort to discourage deer feeding. Staff encouraged early successional habitat with private and public landowners.
Damage		
To quantify agricultural, urban, ecosystem, vehicular, forestry, animal health, human safety, and other deer impacts by January 1, 2010.	Mixed	Monitored various datasets annually (e.g., insurance claims, kill permits). 2013 CCC survey updated some data.
To reduce agricultural damage, as measured by the demand for out-of-season kill permits for agricultural deer damage, to < 1,000 permits annually through January 1, 2015.	No	Peaked in 2008 at 2,500 permits, and since has averaged ~ 1,700 annually.

Objective by Goal Area	Objective Met? (2007-2014)	Explanation
To continue a management program for urban deer through January 1, 2015.	Yes	Urban archery, DPOP
To implement a program to manage deer-vehicle collisions by January 1, 2010.	Mixed	Improved collision data; participated in educational and research initiatives.
To minimize deer-related diseases that impact humans and domestic animals through January 1, 2015.	Yes	Discouraged deer feeding; continued captive/illegal deer restrictions; assisted state and local Lyme disease initiatives.
To manage deer ecosystem impacts within limits that permit functioning of a biologically diverse ecosystem through January 1, 2015.	Mixed	Assessment procedures in progress
Recreation		
To manage deer-related recreation to yield current levels of deer viewing opportunities through January 1, 2015.	Unknown (presumed yes)	No defined metric. Birding and Wildlife Trail increased opportunity.
To reduce deer hunting related accidents by 25% by January 1, 2010.	No	No trend; see Appendix 12.
Consistent with deer population management objectives and the rights of all Virginia citizens, maintain an annual average of at least 420,000 hunter-days of archery deer hunting, 615,000 hunter-days of muzzleloading deer hunting, and 1,400,000 hunter-days of general firearms deer hunting (with and without dogs) through 1/1/2015.	Yes. 2013-14 exceeded all levels by >15%	Expanded opportunities (liberal antlerless, youth and apprentice day, season expansion in some areas)
To manage deer-related recreation to yield a statewide deer gun hunter satisfaction index (HSI) of greater than or equal to 4.0 (adequate) on both public and private lands in all regions annually through January 1, 2015.	Yes, statewide; No, only in N. Mtn. region	See Figure 40 for statewide.
To ensure that deer hunting methods in Virginia are fair and sportsmanlike.	Yes	Maintained prohibitions on high fence hunting and baiting. Wrote popular articles.
To ensure that deer-related recreational activities are consistent with and respect the rights of private property owners and other Virginia citizens through January 1, 2015.	Mixed	Undertook hound-hunting project (2007-2009), which used every strategy under this objective in the deer plan.

Progress in Meeting Deer Population Objectives

Deer population management objectives (i.e., reduce, stabilize, or increase the deer population) are set on a county/city deer management unit basis. Deer population objectives for private and public lands were developed as part of the 2006-2015 Virginia Management Plan (DGIF 2007) and are shown in Figures 44-46 and in Appendices 9-11.

An antlered buck kill per square mile of estimated deer habitat is used as the annual index of deer populations in Virginia. Antlered buck kill data comes from the Department's deer checking systems (big game check stations, telephone, and Internet). Estimated deer habitat comes from the VDGIF GIS staff and is based on 2006 GAP satellite data. All land types except developed, barren, and open water are considered potential deer habitat.

Data presented are the current fall 2014 deer population status and deer population trends by management unit. Private land trends were calculated by examining the annual rate of change in the antlered buck kill index over two time frames including the last 10 years (2005-2014) and the last five years (2010-2014). Public land trends were calculated by examining the annual rate of change in the antlered buck kill index over only the last 10 years (2005-2014).

An exponential regression ($y = ae^{rt}$; where, y = population index, a = y intercept, $e = 2.718$, r = instantaneous rate of change, and t = years) was used to determine trends in deer population by management unit. The annual rate of change (R) = $e^r - 1$. Lambda (λ) = 1 + R and the percent change over the past decade = $\lambda^{10} - 1$ and the percent change over the last five years = $\lambda^5 - 1$.

The deer population in each management unit was considered to be increasing or decreasing if the population index changed at least 25% over the past decade and/or the last five years and the statistical significance level of the exponential regression model was $p < 0.10$.

For example, in the ten year model an annual rate of change (R) in the population index of greater than or equal to 2.26% or less than or equal to -2.84%, and a statistical significance level of $p < 0.10$ would represent a change of at least a 25% (positive or negative) in the population index over a decade (1.0226^{10} = 1.25 or 0.9716^{10} = 0.75). Counties that displayed an annual rate of change between -2.83% and 2.25% or lacked the required statistical significance level ($p < 0.10$) were deemed to be stable.

Similarly, in the five year model an annual rate of change (R) in the population index of greater than or equal to 4.56% or less than or equal to -5.59%, and a statistical significance level of $p < 0.10$ would represent a change of at least a 25% (positive or negative) in the population index over the last 5 years (1.0456^5 = 1.25 or 0.9441^5 = 0.75). Counties that displayed an annual rate of change between -5.58% and 4.55% or lacked the required statistical significance level ($p < 0.10$) were deemed to be stable.

The ten year private land trend analysis indicates that the deer population management objective was met in 71 of 97 units (73%) and was not met in 26 units (27%). The five year private land trend was met in 65 of 97 units (67%) and was not met in 32 units (33%).

The ten year public land trend analysis indicates that the management objective was met in 11 of 31 units (35%) and was not met in 20 units (65%).

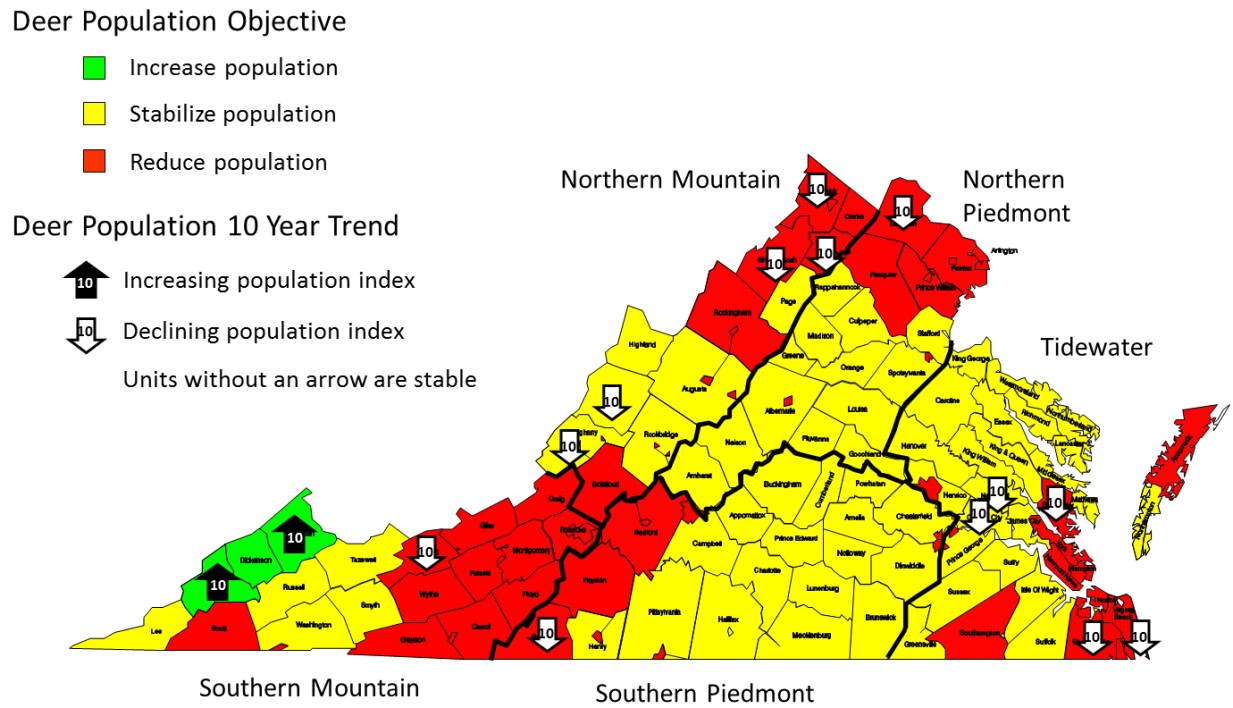


Figure 44. 2014 private land deer population status by management unit relative to population objectives in the 2006-2015 Deer Plan (10 year trend).

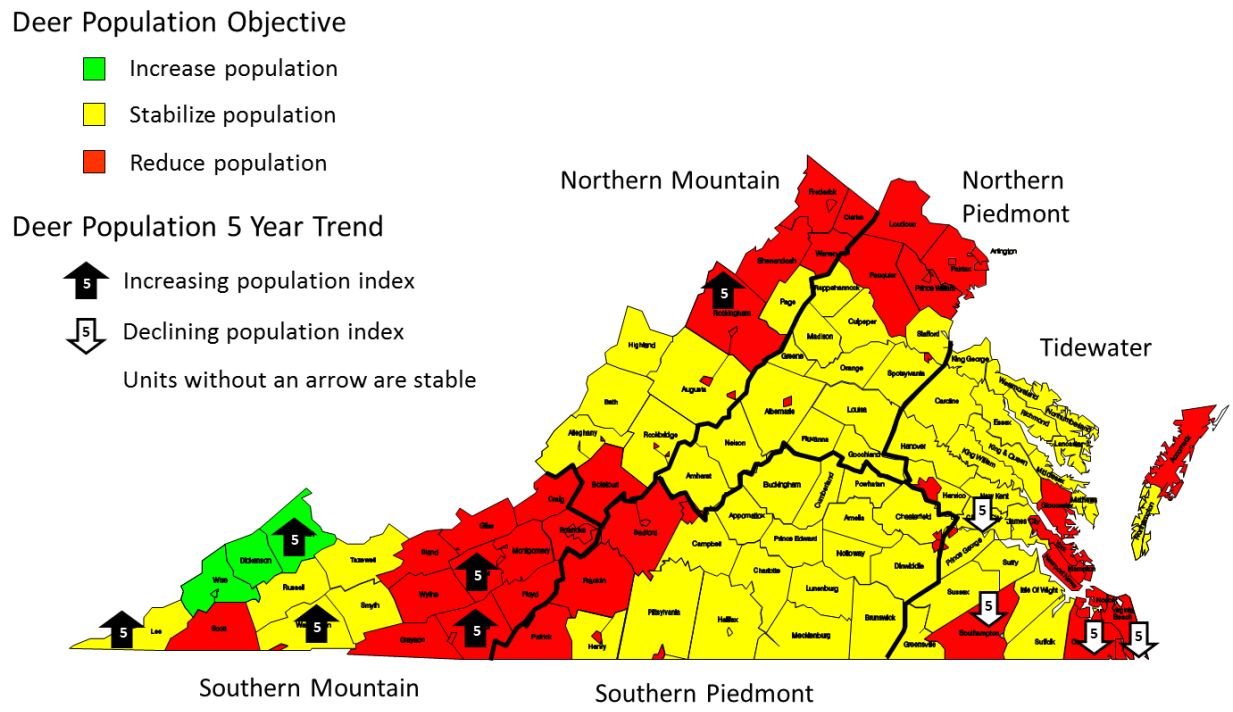


Figure 45. 2014 private land deer population status by management unit relative to population objectives in the 2006-2015 Deer Plan (5 year trend).

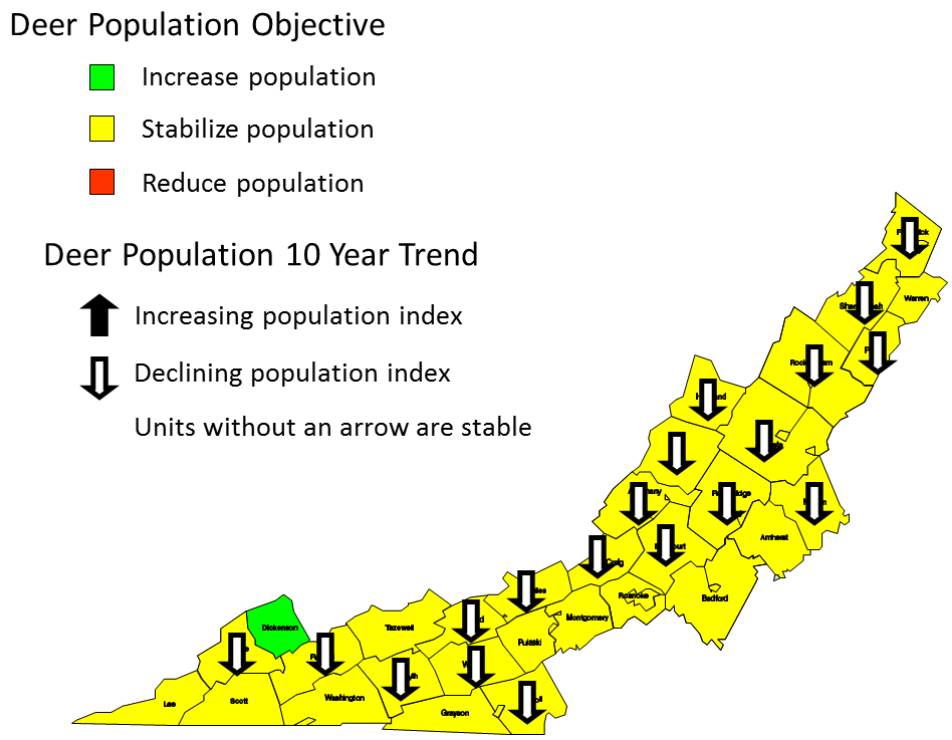


Figure 46. 2014 pubic land deer population status by management unit relative to population objectives in the 2006-2015 Deer Plan (10 year trend).

MISSION, GOALS, OBJECTIVES, AND STRATEGIES

This section outlines and describes the goals for managing deer in Virginia through 2024. The Stakeholder Advisory Committee (SAC) developed goals with technical feedback from VDGIF staff. These goals reflect the values of a diverse public and are broad statements of principles and ideals about *what* should be accomplished with deer management in Virginia. Simultaneously, overarching values were identified as a mission for deer management, which describes why and how deer should be managed in Virginia. As the underpinning for deer management direction, these guiding public values should be relatively stable over time. These goals will be reconsidered during the next revision of the Virginia Deer Management Plan in 2024.

Following each goal statement are a number of objectives. These objectives describe, with specific milestones when possible, *how* these goals will be attained. Unlike the publicly developed goals, objectives are often quantifiable, have deadlines for achievement, and were developed by VDGIF staff (in consultation with the SAC). The more technical deer management issues about how to achieve public values (i.e., how to achieve goals) are primarily provided via the expertise of VDGIF staff. Prioritization of objectives by the SAC and VDGIF staff involved with broad aspects of deer management (Appendix 13) will help direct limited deer program resources toward the most important tasks. Unlike previous versions of the deer plan, this revision includes objectives for education and outreach under each of the four goal areas.

Potential strategies were also developed by VDGIF staff in consultation with the SAC. While this is not an operational plan detailing all specific steps or actions to achieve objectives, these strategies represent some approaches, techniques, and programs that will be considered to accomplish objectives. As with objectives, decisions about what strategies to use are largely the technical realm of wildlife professionals, but still with input and considerations about what techniques are most acceptable to the public. Educational strategies will be important components of accomplishing virtually every objective in the Plan.

Public goals are much less likely to need amending between plan revisions than objectives and strategies. While goals should remain relatively constant over time, specific objectives and strategies will need flexibility to respond to changing social, environmental, technical, and administrative conditions. To keep the plan relevant and responsive, specific objectives and strategies may be added, deleted, or amended by VDGIF as new information or circumstances demand. Recognizing the adaptive significance of corrective changes in management approaches, the Stakeholder Advisory Committee endorsed this flexibility in updating objectives and strategies between revisions. VDGIF staff will submit any interim updates to the SAC for review. Updated objectives will be provided as addenda to the Plan on the agency website.

Mission for Deer Management

Sustainably manage white-tailed deer as a wild, free-roaming public resource to serve the needs and interests of all citizens of the Commonwealth.

Manage deer populations, deer habitat, deer-related recreation, and deer damage using approaches that are:

- **innovative,**
- **flexible,**
- **proactive,**
- **transparent,**
- **technically sound,**
- **scientifically sound,**
- **ethical,**
- **ecologically responsible, and**
- **more natural than artificial.**

These overarching values and principles establish, at the most basic level, why and how white-tailed deer should be managed in Virginia. VDGIF has a legislative mandate (§29.1-103) to manage Virginia's white-tailed deer resource. A basic tenet of deer management in Virginia is that white-tailed deer are a public resource that should never be privately owned. Deer, like other native wildlife, are managed in trust by VDGIF for all citizens. Successful deer management depends not only on the best scientific information and techniques, but also the support and engagement of a diverse citizenry.

Population Goal

Manage local deer populations to balance:

- **the varied needs and reasonable expectations of a diverse human community (cultural carrying capacity),**
- **the requirements of a biologically diverse ecosystem, and**
- **the anticipated future social/ecosystem demands.**

Hunting is the preferred population management method, where appropriate and feasible.

The VDGIF's strategic plan states that Virginia's wildlife populations should be managed to maintain optimum populations to serve the needs of the Commonwealth. Cultural carrying capacity (CCC) is defined as the number of deer that can coexist compatibly with humans. At CCC, the deer population is in balance with positive demands for deer (i.e., recreation) with the negative demands (i.e., damage). CCC is a function of the tolerance levels of human populations to deer and the effects of deer. CCC can vary widely within and among communities. Development of CCC deer management objectives are subjective and must take into account the combination of social, economic, political, and biological perspectives of the community. The CCC for deer generally occurs well below the biological carrying capacity (BCC) - the maximum number of deer that a habitat can sustain over time.

Even at population levels below CCC and BCC, deer can cause significant impacts to natural ecosystems. Deer herbivory is a noted stressor for some species of concern listed in the Virginia Wildlife Action Plan. Deer populations are to be managed not only to meet the desires of constituents, but also to protect ecosystem integrity and biodiversity.

Proactive population management entails anticipating changes in CCC and ecosystem requirements in the future. Deer population objectives and strategies should accommodate expected future demands.

Although there are a number of techniques for managing deer populations in different circumstances, tradition, management efficiency, and cost effectiveness necessitate the use of hunting as the primary deer population management strategy for free-ranging deer across most of Virginia. Additionally, public input received through surveys and other means indicates that the citizens of Virginia are supportive of deer hunting. For the purposes of this plan, *hunting* refers to the legal pursuit and/or taking of wild animals under fair chase conditions for recreational and/or management purposes; sharpshooting is not considered hunting.

Objective 1. Through January 1, 2025, meet deer population management objectives for management units within 5 years after they are updated (Figures 47 and 48).

Deer management in Virginia is predicated on the fact that herd density and health are best controlled by regulating antlerless deer harvests levels. Management objectives are accomplished by increasing or decreasing the number of either-sex deer hunting days during the general firearms season and muzzleloader seasons. Deer hunting is a viable, cost-efficient management tool that not only maintains a healthy deer resource, but also diminishes deer crop damage levels, deer-vehicle collision rates, and deer-ecosystem impacts. The existence of the Hunters for the Hungry Program encourages hunters to harvest deer they may not otherwise take and donate excess deer meat to food banks.

Potential Strategies:

a. Use hunting as the primary deer population management strategy, where appropriate.

b. Manage illegal mortality to achieve population objectives through law enforcement, education, incentives, and other deterrence strategies.

c. Where hunting is deemed inappropriate, unacceptable, or ineffective, a combination of other management practices will be used.

Objective 2. Annually through January 1, 2025, monitor population status (size, trends, condition, etc.) by management unit using harvest data, hunter surveys, and other methods.

Successful deer management depends on knowledge about the past, current, and likely future status of deer populations of interest. Information on population size and trends is important for monitoring herd status relative to population objectives. Mandatory reporting of deer harvests provides much of the data needed to assess status, but information from other sources (e.g., hunter surveys, deer damage reports) often complement harvest information.

Potential Strategies:

a. Incorporate measures of hunter effort in monitoring deer population trends.
b. Develop new procedures for monitoring deer populations, especially where deer hunting and harvest data are not available or not representative (e.g., Fairfax County). Potential approaches might consider browser/smart phone apps, GIS-enabled database to enter hunt logs, landowner sightings, trail cameras, etc..
c. Monitor effects of regulation changes.
d. Continue to improve data quality related to deer population management.

Objective 3. To review, and update as necessary, deer population management objectives by management unit biennially beginning January 1, 2017.

A deer management plan must have defined management units and contain four components: a measure of current deer population status (see Objective 2), a population management objective, a management strategy to attain the objective, and a method to monitor population response (i.e., management success or failure). There are only three logical population objectives: increase the deer population, stabilize the deer population, or reduce the deer population.

In Virginia, deer harvest objectives/regulations are set on a county basis. There are currently 98 management units ranging in size from 26 to 971 square miles (average = 399). These management units include every county and the cities of Chesapeake, Suffolk, and Virginia Beach. Other cities and towns are not considered deer management units; they are local deer management areas where deer population objectives may differ from the surrounding deer management unit(s).

Due to differences in public demands, habitats, and accessibility, deer population objectives and hunting regulations have been differentiated between public (e.g., National Forest and VDGIF lands) and private lands for 31 counties west of the Blue Ridge and for Amherst, Bedford, and Nelson counties east of the Blue Ridge. Wildlife management areas, state parks, state forests, military areas, and national wildlife refuges often have antlerless harvest regulations that differ from the county where they are located. Population objectives on public and private lands can influence one another. For example, objectives to reduce deer population on private land can unintentionally impact deer populations on adjacent public land where objectives may call for increasing deer populations.

Development of deer population objectives integrates social, economic, political, administrative, biological, and ecological perspectives. The challenge in establishing population objectives is balancing social and ecosystem demands while being mindful of future trends in each. Methods used to determine local CCC should consider all deer interests (i.e., stakeholders). Ideally,

the community and/or stakeholders should reach a consensus on the desired deer population level and objective (increase, stabilize, or decrease). In addition to stakeholder input, managers should incorporate information on ecosystem impacts of deer in each management unit.

The process used to develop deer population management objectives for the 2015-2024 Plan (Figures 47 and 48) was improved based on information gained from the Virginia Tech CCC study. A predictive model for CCC was developed based on various metrics of risks (e.g., agricultural damage, residential plant damage, vehicle collisions) and benefits (e.g., hunting). Residents of 15 counties across Virginia (Appendix 6) - representing the full spectrum of benefits and risks - were surveyed regarding their opinions about deer populations. Although most model metrics were not validated by survey results, the VDGIF deer density index (antlered deer killed per square mile of deer habitat) was strongly correlated with human tolerance or desire for deer populations. At higher deer densities, it was apparent that people wanted fewer deer; at lower deer densities, it was clear that people would tolerate more deer. A survey conducted by Virginia Tech in 1998 also found that human tolerance for deer dramatically declined when the deer density index surpassed 3.6 antlered deer killed per square mile of habitat. Based on the findings of these two studies and the current relative deer abundance by county, lower and upper bounds in the deer density index were established to correspond with "default" objectives to either increase or reduce deer populations, respectively. Higher deer populations were suggested for counties with a three-year average deer density index of 2.0 or fewer antlered deer killed per square mile of habitat. Lower deer populations were suggested for counties with a three-year average deer density index of 3.6 or more. Counties with deer density indices between 2.0 and 2.8 were slated for increased or stabilized deer populations, and counties with deer density indices between 2.8 and 3.6 were slated for stabilized or reduced deer populations. During September 2014 and again during February 2015, regional VDGIF wildlife and law enforcement staff - who routinely interact with diverse stakeholders (e.g., agricultural producers, homeowners, hunters, environmental organizations) regarding local deer populations and human-deer conflicts - reviewed these "default" objectives and suggested modifications based on various local considerations (e.g., human population growth and development, ecological impacts from deer, disease transmission risks). At their December 2014 meeting, the Stakeholder Advisory Committee reviewed the draft objectives. These draft objectives were also presented to the public along with regulations proposals during spring 2015.

The objective to increase deer populations on all public lands in western Virginia is in response to significant long-term declines in deer harvests and stakeholder demands for higher deer populations (Figure 48). However, any deer population growth that could be achieved with even more conservative harvest regulations is likely to be modest. Unless biological carrying capacity is increased on public lands via significant landscape-level habitat improvements, it will likely be impossible to stimulate meaningful deer population growth in these areas. Without significant habitat improvements on public lands, increases in deer populations could compound ecosystem impacts and damage concerns of adjoining private landowners.

Potential Strategies

a. Employ surveys and other public input methods to establish CCC by management unit.

b. Evaluate and implement, where appropriate, alternative procedures to determine CCC.

c. Define and monitor appropriate measures of biodiversity or deer impacts to ecosystems by management unit.

d. Predict future social/ecosystem trends using best available information.

e. Develop and implement an adaptive procedure for balancing CCC, ecosystem, and future considerations in setting deer population management objectives.

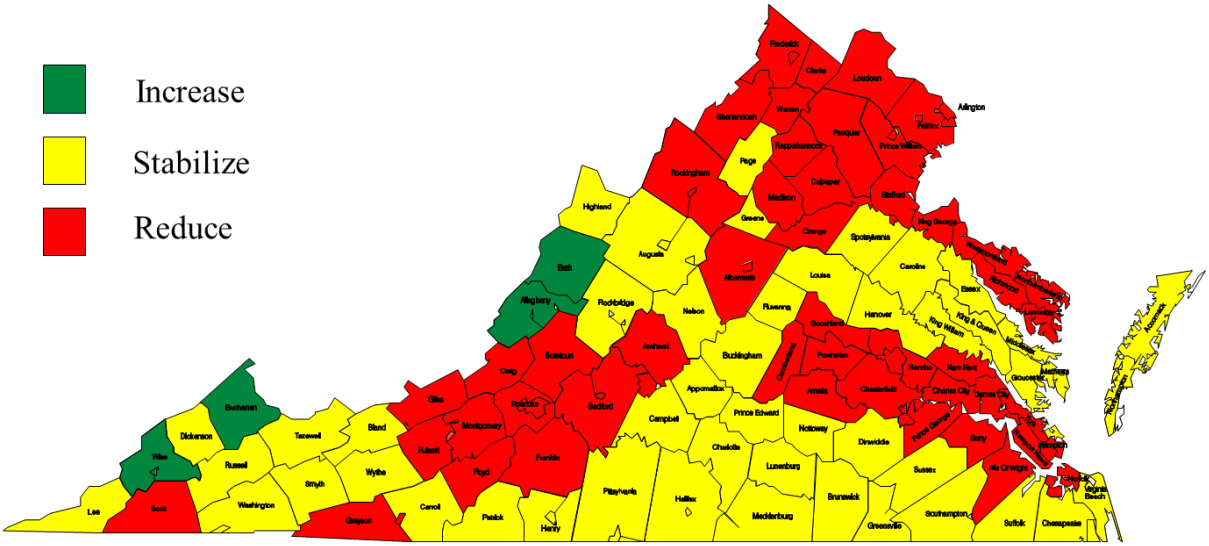


Figure 47. Private land deer population objectives, 2015. *Updated objectives will be provided as addenda to the Plan on the agency website.*

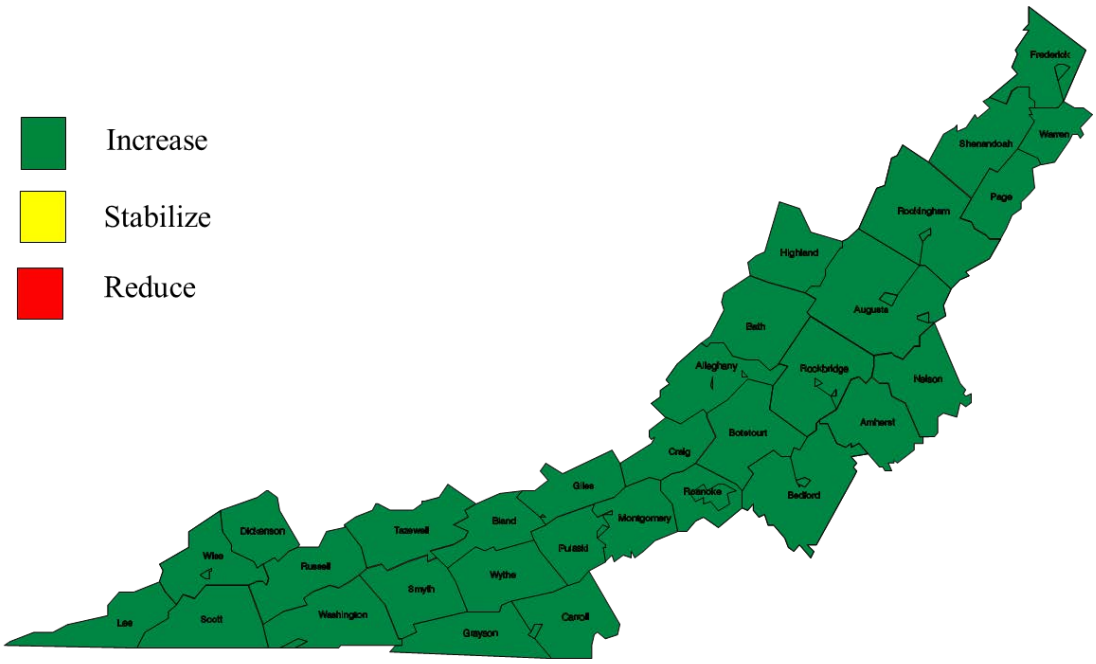


Figure 48. Public land deer population objectives, 2015. *Updated objectives will be provided as addenda to the Plan on the agency website.*

Objective 4. Maintain and/or enhance the use of hunting as a management tool through January 1, 2025.

Because of its effectiveness as a population management tool, it is important to preserve, or increase when necessary, the use of hunting. Challenges to be addressed include declining numbers of hunters, lack of hunter access, and restrictive laws or local ordinances impeding hunting. Opportunities include a growing public awareness and demand for local, natural food sources, like venison, and continued support for hunting that addresses community and ecological objectives.

Potential Strategies:

a. Develop, enhance, and evaluate hunter recruitment programs.

b. Remove impediments to hunting as a population control tool. Ensure that laws and ordinances do not unnecessarily restrict hunting.

c. Improve hunter access.

d. Foster cooperation and connections between hunters and landowners.

e. Support programs like Hunters for the Hungry that promote a positive image for hunters and help meet other management objectives.

f. Monitor trends in eating locally produced, organic food, including wild venison, and promote the benefits for deer population management.

g. As necessary to meet population objectives, consider innovative alternative options and modifications to population management programs.

h. Determine and demonstrate the effectiveness of different harvest approaches in managing deer populations (e.g., hunting during regular seasons, special hunts, Earn-a-Buck, Quality Deer Management, supervised and coordinated urban group archery).

Objective 5. Manage limiting factors to meeting population objectives through January 1, 2025.

A number of factors can limit attainment of deer population objectives. For populations below their objective, these could include high hunting pressure, disease, poor habitat, predation, low fawn recruitment, and other factors which suppress deer populations. For deer herds over objective, human attitudes toward active management, lack of hunting, restricted hunter access, hunter selectivity, and local weapons ordinances are among the factors that could limit the needed control of deer numbers.

Potential Strategies:

a. Determine, monitor, and mitigate limiting factors to meeting deer population objectives (e.g., hunting pressure, bag limits, season length, either-sex restrictions, poaching, diseases, habitat, predation, mast availability, fawn recruitment, human attitudes, lack of hunting, hunter access, weapon limitations)

b. Manage diseases, with an emphasis on prevention, that can impact deer populations:

1. Restrict supplemental feeding and other activities which unnaturally concentrate deer.
2. Regulate captive deer, including rehabilitated wild deer, to minimize risk for disease transmission to wild deer populations.
3. Remove and test illegally-held captive deer for CWD, bovine tuberculosis, and other diseases, as appropriate.
4. Prevent introduction of infectious diseases using regulations and policies.
5. Manage endemic diseases to prevent deer population impacts when possible.
6. Develop and update disease surveillance and response plans as needed.

a. Determine and address dynamics of habitat, deer populations, hunter effort, and predators on National Forests and Department-owned lands in western Virginia.

b. Determine and mitigate the impacts of other conservation programs on deer populations (e.g., public land habitat management, land use zoning).

Objective 6. To develop or continue programs for managing local deer populations within the larger management units through January 1, 2025.

Regulations on deer hunting are designed purposefully to apply to large areas (i.e., counties), be as simple and uniform as possible, and avoid confusion. When setting regulations on this basis, one assumes that deer habitats, deer densities, hunter pressures, and public demands are similar over the entire affected area. However, these factors often vary within a management unit. As a result, regulations in some areas may be too conservative, whereas in other areas, they may be too liberal. To meet the unique management needs and challenges in such areas, alternative site-specific management regulations (e.g., public versus private lands west of the Blue Ridge Mountains) and programs must be developed and implemented (e.g., DMAP, DCAP, DPOP, out-of-season kill permits, etc.).

Local deer management areas may include national parks, battlefields, and refuges; state parks and forests; regional, county, and city parks; cities, towns, and developed sections of counties; resorts and planned communities; industrial or utility developments; military installations; government research facilities; airports; and any other areas deemed by VDGIF to merit deer management assistance beyond that provided for by state hunting regulations pertaining to the larger management unit.

Deer population management objectives for a local area may differ from that of the larger management unit. Owners or managers of local deer management areas generally set deer population management objectives within their respective areas. For most cities and other highly urbanized areas, the objective is almost always to decrease the deer population. VDGIF's role is to provide assistance to local managers to achieve these objectives.

Potential Strategies

a. Provide site-specific deer management programs (e.g., Deer Management Assistance Program [DMAP], Damage Control Assistance Program [DCAP], Deer Population Reduction Program [DPOP], out-of season kill permits, urban archery season).

b. Provide technical assistance to communities and landowners implementing deer management programs.

c. Develop a protocol/guidelines regarding the conditions under which alternative methods to deer hunting are considered appropriate and acceptable.

Objective 7. Through January 1, 2025, increase stakeholder support and tolerance for deer population management, including the need for management and methods used.

As noted above, successful deer management depends not only on the best scientific information and techniques, but also the support and engagement of a diverse citizenry. Public attitudes and perceptions often determine the success or failure of deer management. In the future, more emphasis will need to be placed on public education to achieve deer management objectives.

Potential Strategies:

a. Advocate public outreach and education messages to change attitudes and behaviors in support of deer population management.

b. Collaborate with other agencies, non-governmental organizations, schools, private entities and individuals, etc. (e.g., National Archery in the Schools program, hunter education instructors).

c. Increase distribution and access to the Deer Management Plan.

d. Develop and widely distribute popular outreach materials on important deer management topics (e.g, brochures, public service announcements, social media, smart phone and browser apps, GIS-enabled databases and maps).

e. Increase public awareness about the complexity of deer management (e.g., CCC, ecological impacts, laws, different land types and ownerships).

f. Demonstrate costs and benefits of various management strategies (e.g., contraception, trapping and relocation, sharpshooting, hunting).

g. Inform local government officials about the impact of local ordinances on deer management.

h. Inform hunters and public about deer hunting to improve awareness and sportsmanship.

i. Encourage landowners, hunters, and other citizens to express their views on deer management and to report deer management techniques impacting them.

j. Inform public regarding biology and management of deer diseases.

k. Develop metrics of stakeholder support and tolerance for deer population management.

Recreation Goal

Provide and promote quality deer-related recreational opportunities for all citizens that are safe, diverse, accessible, and consistent with deer population and damage goals. Preserve the heritage and tradition of observing and hunting deer for both management and recreational benefits. Ensure that deer-related recreation methods are sportsmanlike and ethical and that those methods are consistent with and respect the rights of private property owners and other citizens.

White-tailed deer are popular among wildlife watchers, hunters, and the general public. Deer hunting traditions include archery hunting, muzzleloader hunting, firearms hunting with dogs, and firearms hunting without dogs. Hunting demands for recreation have led to the development of programs designed to achieve hunter satisfaction while also achieving population management objectives. Public and hunter awareness of this important dual role of hunting will be critical to successful deer management in the future. Hunters must also recognize the importance of practicing their sport in such a way that respects landowners and other outdoor users and maintains support for deer hunting by the general public. For the purposes of this plan, *hunting* refers to the legal pursuit and/or taking of wild animals under fair chase conditions for recreational and/or management purposes; sharpshooting is not considered hunting.

Objective 1. To maintain current levels of deer viewing opportunities through January 1, 2025.

According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, over 2.5 million people participated in non-consumptive wildlife activities (e.g., observing and photographing wildlife) in Virginia and contributed an additional $959 million dollars to the state economy. In a 2008 survey, users of the Virginia Birding and Wildlife Trail reported that deer was the most popular mammal that led them to visit a specific trail site. A survey conducted by Virginia Tech, Responsive Management, and George Mason University in 2000 found that Virginians took more trips to observe white-tailed deer (69%) than any other wildlife species. Given the popularity of deer, some citizens are tempted to lure deer into view using artificial feeding, an activity which wildlife managers strongly discourage.

Potential Strategies

a. Identify non-hunting deer-related recreational demands using surveys and other methods.

b. Develop quantifiable objectives for non-hunting deer-related recreation.

c. Maximize recreational opportunities when feasible and acceptable.

d. Ensure that deer viewing and photography activities do not facilitate human-deer conflicts. Discourage feeding of deer.

e. Ensure that permitted captive deer exhibitors promote recreational viewing and educate visitors.

Objective 2. To reduce deer hunting related accidents by 25% by January 1, 2025.

In an ideal season, Virginia deer hunters have consistently ranked feeling safe in the field as their most important hunting satisfaction component. Existing programs should be evaluated and enhanced to improve hunter safety.

Potential Strategies

a. Promote mandatory hunter safety certification for all deer hunters.

b. Evaluate current hunter education programs.

c. Cooperate with other agencies and organizations to deliver hunter safety information.

d. Emphasize safe use of tree stands.

e. Develop weapons safety instruction.

f. Enact laws and regulations to address safety concerns (e.g., blaze orange, tree stands).

Objective 3. Maintain an annual average of at least 871,000 hunter-days of archery deer hunting, 705,000 hunter-days of muzzleloading deer hunting, and 1,640,000 hunter-days of general firearms deer hunting (with and without dogs) through January 1, 2025, consistent with deer population management objectives and the rights of all Virginia citizens.

Traditionally, deer hunter numbers and days spent afield hunting have provided the most common measures of demand for deer management programs. Overall, hunter survey results indicate that the number of deer hunters has declined over the past 20 years. The objective listed above is designed to maintain diverse deer hunting recreation at levels current with the Plan (based on the 2014 hunter survey). The most recent available data (2007-08 hunter survey) revealed that 29% of deer hunters statewide used dogs; during the 2004-05 hunting season, 44% of deer hunters used dogs in regions of Virginia where deer hunting with dogs is permitted.

Current, or enhanced, deer hunter numbers and effort levels will be required to meet population management objectives specified in this plan. As noted under Objective 4 in the Population Goal, a number of challenges must be addressed to retain or increase deer hunter opportunities (e.g., difficulty in new hunters getting started, lack of hunter access, restrictive laws or local ordinances impeding hunting). Opportunities include a growing public awareness and demand for local, natural food sources, like venison, and continued support for hunting that addresses community and ecological objectives.

Potential Strategies

a. Identify recreational demands for all types of deer hunting (e.g., archery, muzzleloading, firearms, hunting with dogs, still hunting) through hunter surveys and other sources (e.g., checking system).

b. Maximize recreational opportunities when feasible and acceptable.

c. Foster cooperation and connections between hunters and landowners.

d. Maintain hunting recreation quality by preserving diverse types of hunting opportunities.

e. Manage the allocation of recreational opportunities among users (e.g., by weapon, method).

f. Promote deer hunting among nontraditional groups.

g. Develop and enhance recruitment programs for all types of hunters (e.g., youth, women, weapons, dogs).

h. Support programs that provide additional incentives for hunters to continue hunting (e.g., Hunters for the Hungry).

i. Remove impediments (e.g., confusing laws, costs) to hunting deer as recreational pursuits. Ensure that laws and ordinances do not unnecessarily restrict hunting or viewing.

j. Improve hunter access on private and public lands.

i. Monitor trends in eating locally produced, organic food, including wild venison, and promote the benefits for deer population management.

Objective 4. To manage deer-related recreation to yield hunter satisfaction indices of greater than or equal to 4.0 (adequate) for archery, muzzleloader, and general firearms seasons on both public and private lands in all regions annually through January 1, 2025.

While deer hunter numbers and hunting days provide some measures of hunting demand, recreational satisfaction is more complex and includes many other elements of the hunting experience. Hunter satisfactions involve multiple components of the hunting experience and include, but are not limited to: seeing deer and deer sign, being close to nature, being safe, seeing trophies, etc. Managing for specific components of hunting satisfaction can enhance the overall recreational experience. Gun deer hunter satisfactions in Virginia have been monitored with an index derived from annual hunter surveys. Favorable hunter satisfactions also will help retain deer hunting as an important and viable population management tool.

Potential Strategies

a. Determine the relative importance and sensitivity of deer hunting satisfactions as they relate to the overall recreational experience.

b. Determine desirable attributes of quality deer hunting experiences (e.g., hunter density, specific characteristics of and demand for quality deer, access needs, etc.).

c. Understand, regulate, and achieve optimum allocation of hunting opportunity, harvest, and effort (e.g., either-sex days, season length, access, season timing, bag limits) among user groups to maximize overall satisfactions.

d. Provide diverse deer hunting experiences and opportunities to satisfy varied demands by deer hunters.

e. Provide Quality Deer Management (QDM) opportunities where appropriate.

f. Focus efforts to increase hunter satisfaction in areas where it is currently inadequate (e.g., Northern Mountain, National Forest lands).

g. Improve information regarding quality hunting areas (e.g., improved habitats on National Forest lands).

Objective 5. Ensure that deer hunting methods in Virginia are sportsmanlike and ethical through January 1, 2025.

The future of deer hunting will be affected significantly by public perception of deer hunters and deer hunting activities. Therefore, guidelines, regulations, and education pertaining to deer hunting should address concerns for ethics and fair chase.

Two fair chase issues that have been addressed already by Virginia law are baiting and hunting deer within high-fence enclosures. Use of corn, salt, or other food items to lure deer for hunting purposes is illegal. Due largely to fair chase and wildlife ownership issues, the Virginia

General Assembly, in 2001, enacted a moratorium on constructing or hunting behind fences that confine deer (§29.1-525.1).

Potential Strategies

a. Based on surveys or other methods, describe and define deer hunting activities that are not considered sportsmanlike or ethical.

b. Develop and implement educational programs, regulations, guidelines, and recognition programs to encourage hunter ethics.

c. Manage illegal activities to promote sportsmanlike and ethical behavior through law enforcement, incentives, and other deterrence strategies.

d. Enact regulations to address hunting activities that are not considered fair, sportsmanlike, and ethical.

e. Maintain prohibition and strict regulation of existing deer hunting enclosures.

f. Maintain prohibition on use of bait to hunt deer.

g. Discourage hunters from wasting deer meat.

Objective 6. Ensure that deer-related recreational activities are consistent with and respect the interests and rights of private property owners and other Virginia citizens through January 1, 2025.

Under some circumstances, deer hunting or non-hunting deer-related recreational activities may create conflicts with landowners, other hunters, other outdoor recreationists, motorists, and other citizens. Deer hunting with dogs is an important tradition in Virginia, but it has garnered public and landowner concerns regarding trespassing dogs and/or hunters, hunting from or near roads, and the welfare of hunting dogs. Further, certain forms of deer hunting may not be acceptable in or near urban areas due to concerns for human safety and privacy. The future of deer hunting for population management, damage control, and recreational benefits depends on its compatibility with Virginia's citizens. Therefore, it is important that deer hunting activities be conducted in a manner that respects concerns of landowners and other Virginia citizens.

Potential Strategies

a. Using surveys and other methods, identify and describe deer hunting activities (e.g., when, where, frequency), including hunting with dogs, that may result in conflicts with landowners and other Virginia citizens.

b. Develop and implement educational programs, regulations, guidelines, and recognition programs to reduce conflicts between deer hunters and other Virginia citizens.

c. Discourage illegal activities that fail to respect the interests and rights of landowners and other citizens through law enforcement, incentives, and other deterrence strategies.

d. Establish a dialogue between deer hunters and landowners who experience problems or conflicts with deer hunters.

Objective 7. Through January 1, 2025, increase stakeholder support and tolerance for deer-related recreation, for both management and recreational benefits.

As noted above, successful deer management depends not only on the best scientific information and techniques, but also the support and engagement of a diverse citizenry. Public attitudes and perceptions often determine the success or failure of deer management. In the future, more emphasis will need to be placed on public education to achieve deer management objectives.

Potential Strategies

a. Advocate public outreach and education messages to change attitudes and behaviors in support of deer-related recreation.

b. Collaborate with other agencies, non-governmental organizations, schools, private entities and individuals, etc. (e.g., National Archery in the Schools, hunter education instructors).

c. Increase distribution and access to the Deer Management Plan.

d. Develop and widely distribute popular outreach materials on important deer management topics (e.g, brochures, public service announcements, social media, smart phone and browser apps, GIS-enabled databases and maps).

e. Increase public awareness about the complexity of deer management (e.g., hunting laws, different land types and ownerships).

f. Educate public about non-hunting deer-related recreational opportunities.

g. Educate public about deer hunting recreational opportunities.

h. Educate public about hunting opportunities that help attain different recreational satisfactions.

i. Educate landowners about liability protection when allowing hunting on their own land (COV 29.1-509).

j. Educate hunters and the general public about ethics in deer hunting.

k. Educate landowners and hunters regarding laws and responsibilities of each party in preventing conflicts (e.g., dog retrieval, trespass, firearms, road hunting, landowner permission requirements, etc.).

l. Educate hunters about the effect of hunting on other citizens.

m. Enforce laws that protect landowner rights.

n. Educate non-hunting deer recreationists about trespassing, feeding of deer, and other potential conflicts with landowners and other citizens.

o. Target educational messages by audience, including youth, hunters, landowner, policy makers, landowners, general public, etc.

p. Promote the ecological and personal benefits of eating wild game through directed education campaigns.

q. Promote the benefits of hunting for communities (e.g., economics, damage abatement).

r. Develop metrics of stakeholder support and tolerance for deer-related recreation.

Damage Goal

Manage deer damage (e.g., agricultural, residential, ecosystem, vehicular, forestry, animal health, human health and safety, other impacts) at local and regional scales consistent with deer population objectives. Promote shared public/agency responsibility for managing deer damage. Hunting is the preferred damage management method when lethal approaches are necessary, where appropriate and feasible.

Deer management demands in Virginia can be categorized as positive demands (e.g., observation or hunting) or negative demands (e.g, deer damage). This damage goal references deer population objectives, which are based largely on cultural carrying capacity and involve considerations of both positive and negative demands for deer. Most of the pressure for the change in deer management direction from establishing and allowing deer herd expansion to controlling population growth that has taken place over the past decade can be attributed to deer damage demands. Examples of damage demands commonly associated with deer management in Virginia include deer crop depredation, deer-vehicle collisions, urban deer conflicts, and deer ecosystem impacts.

Citizens, communities, VDGIF, and other agencies share responsibility in managing deer damage. While VDGIF has primary responsibility for managing deer populations (and therefore deer impacts) by providing opportunities and programs to control deer populations, the decisions and actions of landowners and community leaders directly influence the occurrence of local deer damage and the effectiveness of programs developed to address damage. Citizens' decisions about planting gardens or ornamental plants, feeding deer or other wildlife, hunting deer or allowing deer to be hunted, erecting barriers to exclude deer, participating in community planning processes, etc. impact local deer movements and abundance, with consequences for themselves and their neighbors. Community leaders can influence human-deer conflicts with their decisions whether or not to use deer control programs, enact ordinances, involve and/or educate citizens, etc.

Deer hunting is a viable, cost-efficient management tool that not only maintains a healthy deer resource, but also diminishes deer crop damage levels, deer-vehicle collision rates, and deer-ecosystem impacts. For the purposes of this plan, *hunting* refers to the legal pursuit and/or taking of wild animals under fair chase conditions for recreational and/or management purposes; sharpshooting is not considered hunting.

<u>Objective 1</u>. To quantify deer damage, tolerance for damage, and public acceptance of prevention alternatives for agricultural, urban, ecosystem, vehicular, forestry, animal health, human safety, and other deer impacts by January 1, 2020.

Reliable estimates of deer damage have been difficult to obtain, and even less information is currently available regarding tolerance for deer damage. The Virginia Wildlife Conflict Helpline, a collaborative effort since 2013 between VDGIF and the USDA, APHIS, Wildlife Services program (WS), should provide additional information on deer conflicts in the future. Issuance of out-of-season crop depredation kill permits has been used to monitor deer agricultural damage demands on a county and statewide basis over time. As provided by Virginia State Statute §29.1-529. *Killing of deer or bear damaging fruit trees, crops, livestock or personal property or creating a hazard to aircraft*, the VDGIF is authorized to permit owners or lessees of land where deer are causing commercial or personal property damage to kill deer. Data on deer-vehicle collisions are obtained through police reports and automobile insurance claims. Urban deer conflicts are monitored through demand for kill

permits and other site specific programs (e.g., DPOP, urban archery season). Ongoing research with Virginia Tech may provide a method to acquire data on ecological/forestry impacts by deer across Virginia.

Potential Strategies

a. Develop and conduct surveys to monitor deer damage levels by management unit.

b. Determine acceptable levels of human tolerance to deer damage by management unit.

c. Document trends in damage and public tolerance.

d. Conduct research to assess the effects of nonhunted lands (refugia) on the incidence of deer damage.

e. Develop unit-specific objectives to inform statewide damage objectives (Objectives 2-4 below) as valid damage data become available at the management unit level

Objective 2. To reduce agricultural damage, as measured by the demand for out-of-season kill permits for agricultural deer damage, by 30% (from approximately 1,700 to 1,200 permits annually) by January 1, 2025.

Deer damage to agricultural crops represents one of the most important public demands related to deer management in Virginia. In addition to kill permit issuance data, the Virginia Wildlife Conflict Helpline should provide important information on deer crop damage in the future.

Potential Strategies

a. Use hunting as the primary lethal deer population damage management strategy.

b. Foster cooperation between hunters and landowners who experience deer damage.

c. Provide site-specific management programs (e.g., DMAP, DCAP, DPOP, kill permits).

d. Provide technical assistance to communities and landowners implementing deer management programs.

e. Implement programs to raise tolerance and/or mitigate damage (e.g., technical assistance on fencing).

f. Collaborate with other agencies to achieve deer damage objectives.

g. Evaluate the effect of other conservation /environmental programs on deer conflicts (e.g., Conservation Reserve Program field borders).

h. Consider factors including ethics, safety, and public perception of lethal damage-management programs (e.g., kill permits).

i. Develop a better metric(s) to reflect agricultural deer damage.

<u>Objective 3</u>. To reduce residential damage, as measured by the demand for out-of-season kill permits for residential deer damage, by 30% (from approximately 430 to 300 permits annually) by January 1, 2025.

Unhunted areas or refuges have become increasingly common over the last several decades. In these areas, traditional deer hunting is often deemed inappropriate or unacceptable (e.g., urban/suburban areas, national parks, etc.). To meet deer management demands in these areas, alternative management strategies and/or management programs must often be implemented. Urban deer management issues are expected to remain a challenge in many parts of Virginia for the foreseeable future.

Until a better metric is developed, issuance of kill permits will be used to gauge deer damage in residential areas. However, an increase in kill permit issuance could reflect either an actual increase in deer damage or an expansion of the use of kill permits in new areas. The Virginia Wildlife Conflict Helpline should provide an independent metric for residential deer conflicts in the future.

<u>Potential Strategies</u>

a. Provide and promote site-specific deer management programs (e.g., urban archery season, kill permits, DPOP). Expand programs to meet unaddressed needs in urban areas.

b. Foster cooperation between hunters and landowners who experience deer damage.

c. Provide technical assistance to communities and landowners implementing deer management programs.

d. Consider factors including ethics, safety, and public perception of lethal damage-management programs (e.g., kill permits).

e. Develop a better metric(s) to reflect residential deer damage.

<u>Objective 4</u>. To reduce deer-vehicle collisions, as measured by aggregated insurance claims, by 30% by January 1, 2025.

Thousands of deer-vehicle collisions occur in the Commonwealth each year, resulting in at least $200 million in total property damage and as many as 500 injuries annually. Although controlling deer populations through hunting is a primary means to reduce collisions, VDGIF has collaborated with VDOT and other partners to investigate highway mitigations (e.g., fencing, underpasses, and signage). Currently, insurance company claims aggregated by the Highway Loss Data Institute and State Farm Insurance provide the best metric for tracking deer-vehicle collisions in Virginia. These data are complemented by police reports compiled by the Virginia Department of Motor Vehicles.

<u>Potential Strategies</u>

a. Use hunting as the primary lethal deer population damage management strategy.

b. Continue to coordinate annually with the Virginia Department of Transportation (VDOT), Department of Motor Vehicles, and the insurance industry to accurately monitor deer-vehicle collisions on a management unit basis.

c. Develop objectives for deer-vehicle collisions by management unit.

d. Ensure that development, right-of-way management, and road construction projects consider deer-vehicle collisions.

e. Support research on incidence and prevention of deer vehicle collisions in Virginia.

f. Assist VDOT with development of carcass disposal procedures that are environmentally safe, socially acceptable, practical, and cost effective.

Objective 5. To minimize deer-related diseases that impact humans and domestic animals through January 1, 2025.

Human diseases associated with deer include Lyme disease, erhlichiosis, babesiosis, rabies, brucellosis, and bovine tuberculosis (TB). Bovine tuberculosis, which also impacts cattle, has not been known to occur in Virginia since isolated cases were detected in captive fallow deer at two Tidewater facilities in the early 1990s. Rabies is very rare in deer, but caution is warranted for anyone handling a suspect animal. Brucellosis and foot-and-mouth disease are reportable livestock diseases that can infect deer and be transmitted by deer. Neither disease has been found in Virginia's deer or livestock. Lyme disease, erhlichiosis, and babesiosis are tick-borne human illnesses. Risks for a number of deer-related diseases can be minimized by curtailing artificial human activities that concentrate deer (e.g., feeding deer, moving deer).

Potential Strategies

a. Discourage supplemental feeding and other activities which unnaturally concentrate deer to reduce risk of disease transmission.

b. Remove and test illegally-held captive deer for CWD, bovine tuberculosis, and other diseases as appropriate.

c. Regulate captive deer, including rehabilitated wild deer, to minimize risk of disease transmission to wild deer.

d. Prevent introduction and spread of infectious diseases using management techniques supported by regulations and policies.

e. Develop and update disease surveillance and response plans as needed.

Objective 6. To manage deer ecosystem impacts within limits that permit functioning of a biologically diverse ecosystem through January 1, 2025.

Deer ecosystem impacts have become more of a management concern in Virginia as the population density of deer has increased and forests have matured. Heavy deer browsing can diminish nutritive value of habitats for deer, displace wildlife communities that are dependent upon understory vegetation (e.g., neotropical migrant songbirds, small mammals), prevent the regeneration of valuable forest tree species (e.g., oaks), and damage certain unique or sensitive plant communities. Even at low population levels, deer may cause some measurable impact to natural ecosystems. However, removing deer completely would reduce animal diversity and deplete the ecosystem of a keystone

herbivore. The challenge is to manage deer impacts within limits that permit functioning of a biologically diverse ecosystem.

Potential Strategies

a. Monitor the effects of deer on ecosystem structure and diversity at a landscape level over time.

b. Determine levels of deer impacts and the associated influences on ecosystem function and diversity.

c. Develop and use efficient methods to assess deer ecosystem impacts on a management unit basis. Among many potential options, approaches might include use of citizen science, enclosures, expert opinion surveys, browse surveys, etc.

d. Develop ecosystem impact objectives by management unit.

e. Implement deer population control, deer exclusion, or other techniques to manage impacts.

Objective 7. To develop policies and protocols for alternative approaches to managing site-specific deer damage when hunting is ineffective, unacceptable, or not feasible by January 1, 2018.

Deer managers across the country have developed and refined strategies and techniques to address urban deer issues (see Supporting Documents). Although hunting is the most practical, cost-effective, and publicly-supported means to control free-ranging deer populations in most landscapes, sharpshooting may be more effective in some controlled settings. Non-lethal alternatives typically are limited in applicability, prohibitively expensive, logistically impractical, or technically infeasible. However, management agencies are continually challenged to better define circumstances when non-lethal methods would be acceptable. Clearly articulated policies and protocols are needed to guide when, where, and how alternative deer damage abatement methods are used and evaluated.

Potential Strategies

a. Evaluate efficacy of alternative approaches (e.g., sharpshooting, fencing, underpasses) for managing deer impacts.

b. Develop a protocol/guidelines that:
   i. include a consistent, shared public / agency responsibility for problems.
   ii. accommodate site-specific management options for unique deer management situations.
   iii. consider land and habitat management options to reduce deer impacts on crops and communities.
   iv. ensure public safety.
   v. consider input from affected individuals, municipalities, agricultural producers, private organizations, and government organizations (VDACS, USDA).
   vi. consider programs developed and implemented in other states.
   vii. consider innovative alternative options and modifications to population management and damage reduction programs.

c. Monitor public satisfactions with alternative deer damage management policies.

<u>Objective 8</u>. Through January 1, 2025, increase stakeholder support for deer damage-management methods and tolerance for deer-related damage.

As noted above, successful deer management depends not only on the best scientific information and techniques, but also the support and engagement of a diverse citizenry. Public attitudes and perceptions often determine the success or failure of deer management. In the future, more emphasis will need to be placed on public education to achieve deer management objectives.

<u>Potential Strategies</u>

a. Advocate public outreach and education messages to change attitudes and behaviors in support of deer damage management.

b. Collaborate with other agencies, non-governmental organizations, schools, private entities and individuals, etc. (e.g., agribusiness, insurance companies, VA Dept. of Agriculture and Consumer Services)

c. Target audiences to increase public awareness about deer damage issues and solutions.

d. Inform and educate deer hunters, other hunters, the agricultural community, and the general public about deer damage issues using a variety of techniques (e.g., hunter education programs, workshops, brochures, popular articles, videos, smart phone and browser apps, GIS-enabled databases and maps).

e. Develop educational materials for agricultural producers regarding deer damage abatement programs and techniques (e.g., fencing).

f. Develop educational materials for the public regarding deer damage prevention and abatement techniques (e.g., exclusion, repellents, dogs).

g. Educate community leaders and citizens, especially drivers, on techniques to reduce deer-vehicle collisions (e.g., news releases during the fall breeding season, within the driver education curriculum, review other effective programs, use movable message boards at hotspots, remove sight-line barriers).

h. Educate public about human and animal health relating to deer in coordination with Virginia Department of Health and other appropriate agencies.

i. Educate hunters, landowners, and the general public about deer ecosystem impacts and simple ways to monitor such impacts.

j. Provide quantification of damage for information and education purposes; e.g., agricultural losses, collisions (costs, injury), residential (landscape, gardens), health.

k. Educate the public about complexity and trade-offs of managing deer damage (e.g., hunter desire for high deer populations vs. damage abatement reducing populations).

l. Develop metrics of stakeholder support for deer damage methods and tolerance for deer-related damage.

Habitat Goal

Manage deer habitat compatible with deer population, recreation, and damage goals while working within the constraints of diverse land ownerships and ecosystems.

White-tailed deer have specific habitat requirements, which include food, water, cover, and space. Of these 4 generic habitat components, food typically is the most critical or important. Further, habitat quality for deer is significantly correlated with soil quality, and soil fertility directly affects the quality of deer habitat. In addition to soil quality, habitat type, successional stage, and amount of habitat interspersion or edge all play large roles in determining the quality of deer habitat. In general, habitat management practices that improve soil fertility, increase the number of habitat types, revert habitat back to an earlier successional stage, or increase the interspersion of habitat types will increase biological carrying capacity for deer.

Objective 1. To update and evaluate the deer habitat status in each management unit by January 1, 2017.

Available deer habitat is estimated on a management unit basis (county/city). The quantity of deer habitat per management unit is roughly estimated as the sum of forested, open/agriculture, and wetland areas. This equals the total land area in the management unit minus developed and barren areas. Deer habitat data will be updated when new datasets become available statewide.

In the past, attributes of habitat *quality* have not been tracked as closely as habitat *quantity*. Forest age, forest type, tree stocking rate (i.e., density), and habitat interspersion are examples of elements that can be incorporated into a more complete picture of habitat status for deer.

Potential Strategies

a. Incorporate the most recent landscape inventory data (e.g., the 2011 National Land Cover Database, other appropriately-scaled data).

b. Monitor changes in habitat status on a management unit basis.

c. Incorporate attributes of forest age, forest type, tree stocking rate (i.e., density), habitat interspersion, etc. in addition to basic estimates of total forest cover.

d. Identify management unit differences in habitat across Virginia related to population, recreation, or damage goals.

e. Ensure that data provide direct measures of habitat quality related to population, recreation, or damage goals and will support justifications for proactive management.

Objective 2. To identify management units where habitat is a limiting factor for achieving deer population, recreation, or damage goals by January 1, 2017.

Poor habitat quality limits the attainment of deer population objectives in some areas of Virginia. In western Virginia, deer habitat quality has declined on National Forests and Wildlife Management Areas. Poor soils predominate and deer habitat has never been exceptional on most mountain lands. However, deer habitat conditions in these areas have worsened over the last several decades for several primary reasons: fire suppression, forest succession (maturation), and reduced timber harvests.

Potential Strategies

a. Determine when habitat becomes a limiting factor for achieving deer population, recreation, or damage goals.

b. Determine impact of habitat changes for achieving deer population, recreation, or damage goals.

c. Consider differences between public and private ownerships.

Objective 3. To promote appropriate deer habitat management, especially in management units where habitat is a limiting factor, for achieving deer population, recreation, or damage goals through January 1, 2025.

Any activity that alters deer habitats – either intentionally (e.g., forest management) or unintentionally (e.g., residential development, agriculture) - has implications for managing deer populations, deer impacts to humans, and other wildlife species. Given that nearly 90% of land in Virginia is privately owned, management practices that impact private land habitat greatly influence deer density, distribution, and condition. Actions that impact deer habitat on private lands often can increase human-deer conflicts, particularly in residential or urban areas. Habitat management practices designed primarily for deer can positively or negatively impact other wildlife species and ecosystems.

Potential Strategies

a. Provide technical assistance to landowners for managing wildlife habitat.

b. Support habitat management objectives on public lands to meet population goals (e.g., provide comments to agency management plans, manipulate vegetation for early successional wildlife as needed).

c. Promote habitat management practices that provide long-term benefits to a diversity of wildlife species:

   i. Emphasize manipulation of natural vegetation (e.g., burning, disking, timber management) rather than promote more artificial methods (e.g., establishment of food plots, mineral blocks).
   ii. Promote restoration, regeneration, and productivity of plant species important to wildlife, particularly those that provide diverse hard and soft mast (e.g., American chestnuts, acorns, grapes, berries).
   iii. Discourage supplemental feeding of deer.

d. Cooperate with local governments, developers, and communities to ensure that impacts to deer and other wildlife are considered during development.

e. Collaborate with other agencies, non-governmental organizations, private entities and individuals to achieve habitat management.

<u>Objective 4</u>. Through January 1, 2025, increase stakeholder support and tolerance for deer habitat management, including the need for management and method used, for meeting deer population management, recreation, or damage goals.

As noted above, successful deer management depends not only on the best scientific information and techniques, but also the support and engagement of a diverse citizenry. Public attitudes and perceptions often determine the success or failure of deer management. In the future, more emphasis will need to be placed on public education to achieve deer management objectives.

<u>Potential Strategies</u>

a. Advocate public outreach and education messages to change attitudes and behaviors in support of deer habitat management.

b. Collaborate with other agencies, non-governmental organizations, schools, private entities and individuals, etc. (e.g., U. S. Forest Service, VA Dept. of Forestry, VA Natural Heritage Program, The Nature Conservancy).

c. Target audiences to increase public awareness about habitat and habitat diversity implications on both public and private lands.

d. Educate public about the relationship between deer habitat quality and deer population densities, recreation, and deer damage.

e. Using a variety of techniques (e.g., hunter education programs, workshops, brochures, popular articles, videos, smart phone and browser apps, GIS-enabled databases and maps) inform and educate deer hunters, other hunters, and the general public about deer habitat issues.

f. Develop metrics of stakeholder support and tolerance for deer habitat management.

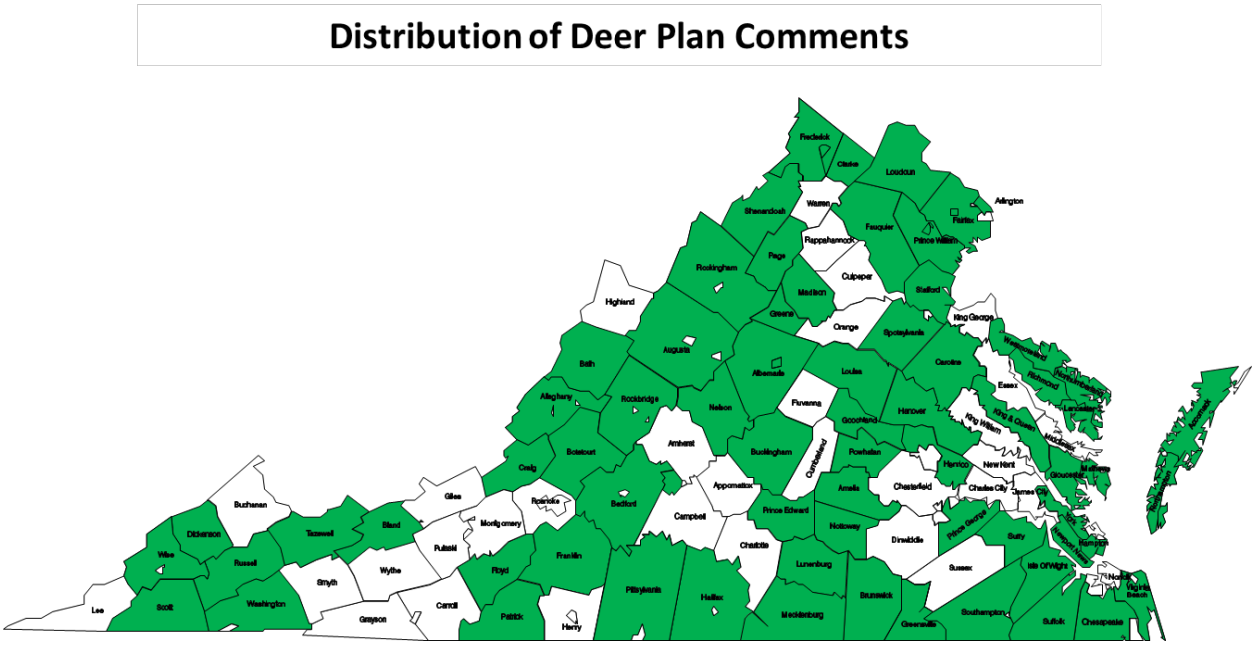
Appendix 1 – Members of the Stakeholder Advisory Committee for revision of the Virginia Deer Management Plan during 2014-2015.

Committee members

Kirby Burch, Virginia Hunting Dog Alliance
Ed Clark, Ph.D., The Wildlife Center of Virginia
Carol Hardy Croy, Ph.D., U. S. Forest Service
Matt Dowdy, Virginia Forestry Association
Tommy Hines, Virginia Soybean Association
Todd Jones, Lynchburg City Police Department
Bill McShea, Ph D., Smithsonian Conservation Biology Institute
Matt Moore, Highway Loss Data Institute
Chris Muckenfuss, Plum Creek Timber
Kathy Parker, Ednam Forest (neighborhood)
David Griffith, Virginia Deer Hunters Association
Jon Robertson, Virginia Bowhunter Association
Wilmer Stoneman, Virginia Farm Bureau
Richard Wilkes, DVM, Virginia Department of Agriculture and Consumer Services
Keith Wilt, Quality Deer Management Association - Rockingham Branch

Appendix 2. Summary and incorporation of public comments regarding the 2015-2024 Draft Virginia Deer Management Plan. Full comments are available upon request.

Between June 10 and July 10, 2015, the Draft 2015-2024 Virginia Deer Management Plan was made available for public review and comment on the VDGIF website. A press release and several media interviews broadened public awareness about the Plan. In addition, a specific post regarding the Deer Plan was made to the VDGIF Facebook page with a link to the Deer Plan and comment form. The Facebook post was accessed 2,644 times, 1,630 of which were links to the Deer Plan or other webpages. We received 448 unique comments from 211 individuals or organizations (regional, statewide, and national) from 72 different localities in Virginia (see map below) or from out-of-state (e.g., a few were received from Maryland and Washington, D.C.).



The following table shows individual comment summaries, the parts of the plan addressing each comment, and a response to each comment, including if a change was made to the plan. Full comments are available upon request.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
-	-	-	-	-
Manassas, Clarke Co., and Prince William Co.	Wants more measurable outcomes for accomplishments.	Accomplishments	NA	Due to the nature of many metrics, including some under development, more measurable outcomes from the previous plan are not possible.
Fairfax	Support outreach	All	Last	Each goal area includes an objective regarding outreach.
Fairfax	Welcomes added emphasis on education and outreach. Suggested approaches: - browser/smart phone apps - GIS-enabled databases for hunter & landowner reports	All	Last objective in each	The current strategies address the need for new methods to provide outreach and education. These specific ideas have been added to the list of potential strategies. (pp. 77, 82, 88, 91)
Washington	Concerned about deer damage.	Damage	3	Damage concerns are addressed throughout the plan. Hunting opportunities may be modified to address damage.
Fairfax	Deer sterilization is a win-win.	Damage	7	Although deer sterilization is experimental, if shown as successful, it could be considered along with other alternative approaches under this objective.
Fairfax	Human land development is the real problem with human-deer conflicts.	Damage	3,4	Current strategies include consideration of development.
Fairfax	Human land development is the real problem with human-deer conflicts.	Damage	3,4	Current strategies include consideration of development.
Fairfax	Reduce animal-vehicle collisions with better road design (e.g., under or overpasses)	Damage	4,7	Current strategies include road design, underpasses, etc.
Maryland (State)	Human land development is the real problem with human-deer conflicts.	Damage	3,4	Current strategies include consideration of development.
Maryland (State)	Drivers are responsible for reducing collisions with deer.	Damage	8	Strategies include informing drivers of ways to reduce collisions.
Maryland (State)	Lethal deer management is ineffective.	Damage	3,7	Hunting is generally the most practical, effective management strategy, but the plan provides flexibility for alternative approaches where hunting is not feasible or acceptable.
None given	Meat from deer killed on a kill permit should be consumed.	Damage	2,3	Current strategies include consideration of ethics in damage management programs.
Hampton	Sterilization should be considered in cities where hunting is prohibited.	Damage	7	Although deer sterilization is experimental, if shown as successful, it could be considered along with other alternative approaches under this objective.
Stafford	Provide kill permits for residential deer damage.	Damage	3	Current strategies include the use of kill permits. Kill permits can be issued for residential damage.
Rockbridge	Concerned about excessive crop damage kills and waste of carcasses.	Damage	2,8	Although the necessity of kill permits is recognized in some situations, current strategies include consideration of ethics in damage management programs.
Bedford	Consider nonlethal alternatives, too.	Damage	7	Current strategies include consideration of nonlethal alternatives.
Fairfax	Supports deer management to address ecological impacts.	Damage	6	Current goals and strategies address ecological damage.
Fairfax	Desire assistance in hunting an urban subdivision.	Damage	3	Current strategies include technical assistance to communities.
Stafford	Reducing kill permits seems an illogical way to reduce damage.	Damage	2	Although issuance of kill permits is currently the best metric for assessing agricultural damage, it is appropriate to add a strategy to develop better metrics, if possible (p. 84).
Lynchburg	Limited hunting options to manage deer in urban areas; consider creative ideas (e.g., moving deer out of city).	Damage	7	Current objectives and strategies provide for alternative methods to be used where hunting is not feasible or acceptable.
Henrico	Damage objectives are arbitrary.	Damage	2,5	Added a strategy to develop better metrics under the agricultural objective (p. 84). Collision strategies already include road design mitigation and improving metrics.
Isle of Wight	Concerned with deer damage and limited opportunities to lethally remove deer in an urban area.	Damage	3,7	Current objectives recognize challenges associated with deer control but address both lethal and alternative methods.
Arlington	Obtain data on ecological impacts from deer.	Damage	6	Current strategies include research on ecological impacts and metrics.
Arlington	Study roadside vegetation to reduce collisions.	Damage	4	Current strategies include right-of-way management.
Shenandoah	Concerned about abuse of kill permits.	Damage	2	Although the necessity of kill permits is recognized in some situations, current strategies include consideration of ethics in damage management programs. Current goal and strategies promote the use of hunting as the preferred method to address deer damage.
Fauquier	Kill permits are not working and are being abused.	Damage	2	Although the necessity of kill permits is recognized in some situations, current strategies include consideration of ethics in damage management programs. Current goal and strategies promote the use of hunting as the preferred method to address deer damage.
Albemarle	Incorporate 4-poster tick treatment into the plan.	Damage	5	Although specific technologies are beyond the scope of this plan, the current strategies address tickborne diseases.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Bedford	Concerned that we don't have information about what a ecologically balanced ecosystem looks like. Suggested approaches: 1-use deer exclosures 2-use trained citizen scientists to collect data. 3- define this ecological balance as "Ecological Carrying Capacity".	Damage	6	Current strategies call for research into ecological impacts and improved methods to assess them. Some potential approaches have been added for consideration. (p. 87)
Fairfax	Provide forest landowners with simple methods and guidelines to monitor herbivory. Provide electronic reporting of monitoring for landowners and public access to information.	Damage	6,8	Current strategies address development of practical ecological assessment. The current strategy on education regarding ecological impacts was expanded to include landowners and monitoring (p. 88).
Fairfax	Damage Goal – Introduction. Suggest changing the first sentence of the goal to read "Manage deer damages at local and regional scales by controlling deer numbers."	Damage	NA	The current goal considers deer damage abatement to be conducted within the larger context of population objectives for the larger management unit. Management of deer damage includes approaches beyond controlling deer numbers (e.g., problem deer removal, nonlethal abatement).
Fairfax	Objective 3. Agrees with the objective, even if achieving it in only 10 years in urban areas seems unrealistic.	Damage	3	Supportive comments.
Fairfax	Objective 6. While annual seedling/sapling counts may not be the metric that is ultimately selected for monitoring forest regeneration or biological diversity, it is a good metric that can be implemented immediately and could involve stakeholders in a constructive manner.	Damage	6	The current strategies address the need for improved ecological monitoring techniques.
Fairfax	Objective 7. suggest adding to the statement of the objective ". . .when recreational hunting is either not feasible, unacceptable, or not effective . . . "	Damage	7	Change made (p. 87).
Washington, D.C.	P.85 Objective 7. Non-lethal methods shouldn't be "summarily dismissed".	Damage	7	The current strategies recognize the need for alternatives to hunting, in some cases.
Washington, D.C.	Says there are no data to show a linear relationship between deer numbers and collision rates. Failed to cite the VDOT study that concluded "there is little evidence that increased deer harvest reduced deer/vehicle collisions (McShea et al. 2008)." It can't be assumed (or promoted) that increased hunting will reduce collisions and the plan should state that specifically. McShea, W.J. and C.M. Stewart, L.J. Kearns, S. Liccioli, and D.Kocka, 2008. Factors affecting autumn deer-vehicle collisions in a rural Virginia County. Human–Wildlife Conflicts 2(1):110–121, Spring.	Damage	4	As noted, it can't always be assumed that hunting will reduce vehicle collisions due to a number of other factors. But a number of other studies cited in the bibliography provide evidence that reducing deer populations (through hunting or other population control measures) reduces collisions. In Virginia, unpublished data from Blacksburg and Lynchburg provide strong support. Hunting is just one of many options to consider for reduction of vehicle collisions.
Washington, D.C.	Singling out and managing only deer is not a viable way to manage complex ecosystem issues which are affected by many influences. It is also contradictory to use ecosystem impacts as a rationale for increasing hunting in certain areas while ignoring the environmental consequences of deliberately manipulating habitat and sex ratios to increase deer in others.	Damage	6	Although there are other factors implicated in inadequate forest regeneration, numerous studies provide evidence of deer impacts to understory tree regeneration and other plants, as well as indirect impacts to animals that depend on such plants. Although hunter desires may conflict with ecological objectives (thus the inclusion of ecological integrity in the population goal), hunting is necessary to maintain deer populations at levels that permit biologically diverse ecosystems.
Washington, D.C.	Objective 2 - fencing and technical advice should be mentioned more often as a strategy for agricultural damage (only 1 out of 8 strategies)	Damage	2,8	Although current strategies for education include outreach on damage abatement techniques, a more explicit reference to fencing has been added (p. 88).
Washington, D.C.	Objective 3 - none of the 5 suggested strategies refer to the promotion of non-lethal methods (e.g., repellents, barriers, etc.) to reduce residential damage.	Damage	3,8	Although current strategies for education include outreach on damage abatement techniques, a more explicit reference to exclusion, repellents, dogs, etc. has been added (p. 88)
Washington, D.C.	Objective 8 for agricultural producers. - strategies e & f need to be clear about what the education materials contain. - strategy c should not just increase awareness about damage, but should increase awareness about solutions. - strategy a - it is unclear how education should change attitudes? If supporting lethal management, then tha is inappropriate.	Damage	8	Although current strategies for education include outreach on damage abatement techniques, a more explicit reference to fencing has been added to strategy e.. The term "solutions" has been added to strategy c. (p. 88).

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Washington, D.C.	Objective 6 - ecosystem impact strategies are vague and overly broad. Specific ecosystem goals need to be spelled out with appropriate strategies. Deer influences need to be validated.	Damage	6	Current strategies and metrics for ecological damage are currently vague, as the techniques are being worked out for practical application on a management unit basis. Strategies are already included to improve these needed measures.
Washington, D.C.	Supports educating drivers about defense driving. But feels more should be done: - review other effective programs (e.g., Rochester Hills, MN) - use movable message boards at hotspots -remove sight-line barriers	Damage	8	Current strategies call for reducing deer collisions and educating drivers. Additional examples have been added for strategy consideration. (p. 88)
Manassas, Clarke Co., and Prince William Co.	Objective 4. Add new strategy to increase hunter awareness and appreciation for ECC.	Damage	8	Current strategies under the last damage objective include education of hunters about ecological impacts. This would seem to be the more relevant perspective than under recreation.
Manassas, Clarke Co., and Prince William Co.	Damage Goal (intro text). Make it also compatible with ECC.	Damage	6	Ecosystem impacts are already among the damage objectives, so there is no need for a compatibility statement.
Patrick	Concerned that kill permits are impacting the deer herd.	Damage	2	Although the necessity of kill permits is recognized in some situations, current strategies include consideration of ethics in damage management programs.
Charlottesville	Concerned that kill permits are impacting the deer herd and meat is wasted.	Damage	2,3	Although the necessity of kill permits is recognized in some situations, current strategies include consideration of ethics in damage management programs. Current strategies include consideration of ethics in damage management programs.
Fairfax	Concern that ongoing ecosystem research will not yield a practical or relevant technique statewide.	Damage; Program History	6	Current strategies address the need for improved ecosystem impacts measures. The ongoing project is a first step to develop an evaluation tool for such impacts, primarily at the management unit (e.g., county) scale to inform population objectives. The focus is on western Virginia because it is the region where desire for deer conflicts most with biological carrying capacity. Both of these points were noted in the background text describing deer research (p. 24).
Manassas, Clarke Co., and Prince William Co.	Objective 4. strategy d. Amend the strategy to include ecosystem health and biodiversity.	Damage; Habitat	6; 2	Damage goals and objectives already include deer ecological impacts, so a separate mention of ecological damage in this habitat objective is unnecessary.
Fauquier	Human development and lack of hunter access are fueling the deer problem in NOVA.	Damage; Population	3,4; 4	Current strategies include consideration of development and hunter access.
Fairfax	Also remove “Recreational” from the third sentence of the Damage Goal to promote the coordinated, supervised archery practiced within the Fairfax County Deer Management Program (& expanded to private properties) as better alternatives.	Damage; Population; Damage	NA	Different modifiers for "hunting" are sometimes necessary and context dependent. The terms traditional, recreational, and managed associated with hunting are general synonymous with regulated hunting, but the potential confusion is understood. Unless a modifier is used, "hunting" is defined in narrative sections to make the meaning clear (p. 20 in program history and on pp. 71,78, and 83 under Population, Recreation, and Damage goals, respectively).
Fairfax	Thank you for pointing out the limitations in controlling Lyme disease with deer population management.	Damage; Supply and Demand	5	Supportive comments.
Isle of Wight	The plan doesn't track kill permits.	Damage; Supply and Demand	1, 2,3	The plan does track kill permits; see Fig 41, page 52.
Fairfax	Wanted a more thorough treatment of the specific urban challenges, but recognized that more detailed treatment might be beyond the scope of a statewide plan.	Damage; Supply and Demand	3	The style of the plan attempts to strike a balance between readability and providing a lot of technical information.
Washington, D.C.	- Agrees with acknowledgement that hunting is unlikely to reduce Lyme disease. - Because of design flaws, thinks Kilpatrick et al. (2014) doesn’t qualify as an exception. - Need to avoid any reference to Lyme control as justification for hunting.	Damage; Supply and Demand	5	Supportive comments. This plan makes no judgment on Kilpatrick et al. (2014) which is a peer-reviewed scientific paper in the Journal of Medical Entomology.
Fairfax	Include absence of wild predators as a factor in the rebound in deer populations	Executive Summary	NA	In shortening parts of the Executive Summary to accommodate more of the goals, etc., the history paragraph was removed.
Buckingham	Consider safety/practicality of habitat management techniques (e.g., burning)	Habitat	3	Current objective and strategies address appropriateness of management activities.
Arlington	Reduce invasive species to improve habitat.	Habitat	3	Current objective and strategies promote native vegetation.
Russell	Increase timber harvests to diversify habitat, educate public about this, and restore American chestnut.	Habitat	3,4	Current objectives and strategies address all of these issues.
Botetourt	Increase timber harvests to improve deer habitat and prevent wildfire on National Forests.	Habitat	3	Current strategies address the need for more active management on National Forest and VDGIF lands, to include timber harvests and *prescribed* fire.
Fauquier	Increase timber cutting for habitat management.	Habitat	3	Current strategies address the need for more active habitat management, including timber cutting.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Alleghany	Need more public education about habitat management.	Habitat	4	Current strategies address public outreach regarding deer habitat management.
Alleghany	Need more timber harvesting.	Habitat	3	Current strategies address the need for more active management on National Forest and VDGIF lands, to include timber harvests and prescribed fire.
Franklin	Food plots are key to deer management.	Habitat	2	Although current strategies do not discourage food plots, they favor more natural forms of habitat management.
Fairfax	Objective 1. Strategy suggestion: In revising habitat in each management unit, consider imperviousness as a better measure of non-habitat than development. If developed land cover is used, only use the highest category as lower categories actually provide excellent habitat. Use appropriate Habitat Suitability Indexes for the other developed categories. Evaluate the utility of other data sets, especially Existing Vegetative Type.	Habitat	1	Point is noted for future modeling, and the need to improve habitat evaluation is addressed in current strategies.
Manassas, Clarke Co., and Prince William Co.	Objective 4. strategy b: Include Virginia Natural Heritage Program for collaboration.	Habitat	4	Change made (p. 91).
Manassas, Clarke Co., and Prince William Co.	Habitat Goal. Objective 3. Add new strategies: - browse impacts - manage for native vegetation - do not promote invasive species.	Habitat; Damage; Population	3; 6; 3	The current strategies address the use of native vegetation, natural manipulation, and sustainable management. The damage and population objectives address ecological impacts to native vegetation.
Augusta	Work with USFS to cut more timber and reduce doe hunting on National Forests.	Habitat; Population' Supply and Demand	2,3; 3	Objectives are to increase deer populations on western public lands. Current objectives and strategies recognize habitat as a limiting factor on these lands and encourage active management, in collaboration with the USFS. Prescribed burning in recent years has compensated for some loss in timber harvests.
Alleghany	Enhance wildlife management areas.	Habitat; Recreation	3; 4	Current strategies address habitat and recreational components of public wildlife management areas.
Fairfax	The habitat model under-values urban/suburban habitats; the patch size may be in appropriate.	Habitat; Supply and Demand	1	Point is noted for future modeling, and the need to improve habitat evaluation is addressed in current strategies. Added a sentence in the background text noting that, due to the broad scale of this model, micro-habitats could be under- or over-valued (e.g., urban parks and greenways) (p. 28).
Greene	Lethal management of deer is inhumane.	Mission; Population; Recreation	4;5	The Mission has been updated to direct all deer management activities to be ethical (p. 70).). Ethical principles cover broad considerations and encompass a wide array of cultural expectations, including aspects of humaneness.
Washington, D.C.	In the mission statement (p. 69), humane should be added as a quality of deer management.	Mission; Recreation; Damage	5; 2,3	The Mission has been updated to direct all deer management activities to be ethical (p. 70).). Ethical principles cover broad considerations and encompass a wide array of cultural expectations, including aspects of humaneness.
Hanover	Consider format and editorial changes (e.g., more actual plan up front and background later, less apologetic)	NA	NA	Executive Summary was reconfigured (pp 3-4)
Chesapeake	Support the plan	NA	NA	
Lunenburg	Disappointed that VDGIF asks for public input but then disregards it in other instances (e.g., urine ban, elk restoration).	NA	NA	Concern is noted, but this process is different than that used for hunting regulations. Input obtained on this deer plan is used directly by deer program staff and the Stakeholder Advisory Committee.
Lancaster	Opposed to Sunday hunting.	NA	NA	Although the plan addresses hunting opportunity and satisfaction within many goal areas, Sunday hunting is never specifically addressed as either a pro or a con.
Fauquier	Typo on p. 64: recommendation submitted Nov 2015, not 2014	NA	NA	Correction made (p 64)
Fauquier	Supports Sunday hunting.	NA	NA	Although the plan addresses hunting opportunity and satisfaction within many goal areas, Sunday hunting is never specifically addressed as either a pro or a con.
Dickenson	Disappointed that VDGIF asks for public input but then disregards it in other instances (e.g., bear license).	NA	NA	Concern is noted, but this process is different than that used for hunting regulations. Input obtained on this deer plan is used directly by deer program staff and the Stakeholder Advisory Committee.
Rockbridge	In the executive summary, focus on the process, the actual plan, and changes since the last plan.	NA	NA	Executive Summary was reconfigured (pp 3-4)
Virginia Beach	Disappointed that VDGIF asks for public input but then disregards it in other instances (e.g., bear license).	NA	NA	Concern is noted, but this process is different than that used for hunting regulations. Input obtained on this deer plan is used directly by deer program staff and the Stakeholder Advisory Committee.
Albemarle	Need more of the actual plan up front rather than historical information. Tell me early on how this will impact me as a hunter.	NA	NA	Executive Summary was reconfigured (pp. 3-4); however, it is not the intent of this plan to prescribe particular hunting seasons.
Page	Disappointed with bear license	NA	NA	This issue is unrelated to the deer plan.
Newport News	This is less of a plan and mostly just background information.	NA	NA	As described in the Introduction, this is a strategic plan, not an operational plan. Broad goals, objectives, and strategies are meant to guide the agency to develop and implement more specific tactics to manage deer. Important background information is necessary as the planning context.
Fauquier	Oppose new bear license.	NA	NA	This issue is unrelated to the deer plan.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Halifax	Concern about specific SAC member.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of views.
Goochland	Concern about specific SAC member.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of views.
Fairfax	The current SAC under-represents certain stakeholders; e.g., public land managers, ecologists, urban jurisdictions, and minorities.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of key perspectives, and they did include ecological interests, public land managers, and urban jurisdictions. Logistics limit the number of representatives for each stake.
Prince William	Great work and DGIF is doing a good job.	NA	NA	Supportive comments.
Isle of Wight	Concern about specific SAC member and lack of hunting representation on the SAC.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of views, including 4 different types of hunters.
Fairfax	Compliments on the plan and VDGIF and Fairfax Co.'s deer management programs.	NA	NA	Supportive comments.
Powhatan	Disappointed that VDGIF asks for public input but then disregards it in other instances (e.g., bear license).	NA	NA	Concern is noted, but this process is different than that used for hunting regulations. Input obtained on this deer plan is used directly by deer program staff and the Stakeholder Advisory Committee.
Rockingham	Disappointed with recent agency actions (e.g, trout, bear, quail, elk)	NA	NA	These actions are/were unrelated to this plan.
Rockingham	Disappointed with lack of public meetings during last regulation cycle and location of Board members in state.	NA	NA	Regulation cycle processes, and locations of VDGIF Board members, are unrelated to this plan.
Tazewell	Disappointed with bear license	NA	NA	This issue is unrelated to this plan.
Charlottesville	Many hunters were disappointed that VDGIF asks for public input but then disregards it in other instances (e.g., urine ban, elk restoration).	NA	NA	Concern is noted, but this process is different than that used for hunting regulations. Input obtained on this deer plan is used directly by deer program staff and the Stakeholder Advisory Committee.
Charlottesville	Concern about specific SAC member and lack of hunting representation on the SAC.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of views, including 4 different types of hunters.
Winchester	To increase revenue, every hunter should have to buy a license since deer belong to the state.	NA	NA	Changing license structure or increasing agency revenue are beyond the scope of this plan.
Fairfax	The plan is vague and not really needed.	NA	NA	As described in the Introduction, this is a strategic plan, not an operational plan. Broad goals, objectives, and strategies are meant to guide the agency to develop and implement more specific tactics to manage deer.
Fairfax	The plan appears to be a promotional piece for hunting, is not reader-friendly, and needs more supporting research cited.	NA	NA	The plan supports hunting as the preferred means of managing deer populations because it is the most practical, effective means available, and hunting is strongly supported by the public. The style of the plan attempts to strike a balance between readability and providing a lot of technical information.
Southampton	Good plan and keep up the good work.	NA	NA	Supportive comments.
Goochland	Private landowners should have been represented on the SAC.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of key perspectives, and they included a mix of private and public landowners (see Appendix 1). Logistics limit the number of representatives for each stake. In addition, both current strategies and background text address the many issues associated with landowners.
Fairfax	Wants definitions (if different) or consistent use for the varied references to types of "hunting" (e.g., regulated hunting, recreational hunting, traditional hunting, managed hunting).	NA	NA	Different modifiers for "hunting" are sometimes necessary and context dependent. The terms traditional, recreational, and managed associated with hunting are general synonymous with regulated hunting, but the potential confusion is understood. Unless a modifier is used, "hunting" is defined in narrative sections to make the meaning clear (p. 20 in program history and on pp. 71,78, and 83 under Population, Recreation, and Damage goals, respectively).
Fairfax	Select a term to describe the group archery hunting as used in northern VA (e.g., Suburban Whitetail Management of Northern Virginia, Belvoir Bowhunters).	NA	NA	As a form of regulated hunting, defining group archers versus individual archers is not necessary for this plan. This northern VA group hunting plays a unique role, but is simply a variant of regulated hunting.
Washington, D.C.	To better represent the constituents, feels the SAC was under represented by representatives from the humane and wildlife rehabilitation communities. Wants at least 4 representatives.	NA	NA	Concern is noted, but SAC members were chosen to represent a diversity of key perspectives, and they did include a representative from the wildlife rehabilitation community. Logistics limit the number of representatives for each stake.
Rockingham	Too many does are being harvested (restructure season)	Population	1,4	Population objectives are established based on CCC. Antlerless hunting opportunities can be modified to address population objectives without changing season length. Current strategies call for modifying antlerless hunting opportunities to meet deer population objectives.
Rockingham	Concern that deer management units are too large to address declining National Forest herds.	Population	3	Public and private lands in western counties are separate management units; objectives are to increase deer populations on all public land units there.
Isle of Wight	Concerned about coyote predation.	Population	5	Predation is listed among potential limiting factors to attaining deer population objectives.
Isle of Wight	Concerned about impacts of hunting dogs running during spring.	Population	5	Although there is no evidence of biological impacts from this activity, it would be addressed as a limiting factor if identified as such.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Nottoway	Concerned about impacts of hunting dogs running out of season.	Population	5	Although there is no evidence of biological impacts from this activity, it would be addressed as a limiting factor if identified as such.
Mecklenburg	Desire for fewer deer in Mecklenberg and Lunenberg counties to reduce collisions.	Population	3	Population objectives in these 2 counties are to stabilize deer populations to meet CCC. Both have relatively low deer densities and few complaints.
Fairfax	Hunting programs on urban parks are very successful; nonlethal approaches are impractical.	Population	4,6	Hunting is the most practical, effective tool for managing free-ranging deer populations.
Spotsylvania	Enjoy deer but support management where needed.	Population	1	
Clarke	Expand collaboration with non-profit/private organizations in site-specific deer management.	Population	6	Current programs in strategies already allow for use of private/non-profit entities to participate.
Fauquier	Deer populations are too low on western public lands.	Population	3	Objectives are to increase deer populations on western public lands.
Page	Access to public hunting land is lacking.	Population	4	Current strategies include lack of access as an impediment.
Rockingham	Concerned about abuse with automated harvest system.	Population	2	Although there is no evidence that the automated harvest system is less accurate than traditional check stations, current strategies direct the agency to continually improve data quality.
Patrick	Desire more deer in Patrick County	Population	3	The objective is to stabilize the deer population in this county to meet CCC. The previous plan called for the deer population to be reduced.
Dickenson	Consider alternate antlerless harvest strategies (e.g., permits)	Population	4	Current strategies include examination of alternative harvest strategies to control populations.
Prince William	Don't continue decreasing deer populations in Prince William County.	Population	3	Although deer populations have decreased, data on CCC indicate a need for further population reduction in this county.
Bland	Concurs about declining deer populations in Bland County.	Population	3	A stabilize objective for this county provides direction to stop the significant deer population decline.
Floyd	Don't continue decreasing deer populations in Floyd County.	Population	3	Although deer populations have decreased, data on CCC indicate a need for further population reduction in this county.
Brunswick	Concerned about coyote predation.	Population	5	Predation is listed among potential limiting factors to attaining deer population objectives.
Southampton	Too many does are killed in Southampton County	Population	3	Southampton Co. was changed from "reduce" to "stabilize" population objective to address declines.
Shenandoah	Concern for overharvest of deer in Shenandoah County.	Population	3	Although deer populations have decreased, data on CCC and the risk of CWD spread indicate a need for further population reduction in this county.
Augusta	Support Earn-A-Buck but concerned about abuse of automated checking system.	Population	2	Although there is no evidence that the automated harvest system is less accurate than traditional check stations, current strategies direct the agency to continually improve data quality.
None given	Concerned that too many does are being killed during late seasons	Population	3	Late seasons are only established in areas needing additional antlerless harvests to meet population objectives.
Fairfax	Assist with deer management programs	Population	6	Technical assistance to communities and landowners is a current strategy.
Bedford	Increase harvest of does to control populations.	Population	1,4	Current strategies recognize the importance of antlerless hunting opportunities to control deer populations.
Bedford	Promote bow hunting in urban areas.	Population	6,7	Current strategies include an urban archery season and promotion of hunting.
Bedford	Concern for overharvest of does in rural areas and on DMAP.	Population	3,6	Current strategies allow for populations to be managed on a county/city level and on a site-specific level with programs like DMAP, which alllow for flexible tag issuance.
Nelson	Concern about overharvest of does.	Population	1	Current strategies promote adjusting antlerless hunting opportunities to achieve population objectives.
Nelson	Concern harvest reports are inaccurate.	Population	2	Current strategies direct the agency to continually improve data quality.
Albemarle	Suggest moving deer from urban (where overabundant) to rural (less abundant) areas.	Population	6	Current strategies promote localized deer management. Hunting is recognized as the most practical method to control most deer populations, even in urban areas, but current strategies allow for consideration of alternative methods when hunting is not feasible. Trapping and transferring deer is generally not feasible.
Fauquier	Choose hunting to control park populations rather than sharpshooting.	Population	1,4,6	Under the current goal, objectives, and strategies, hunting is the preferred method to control deer populations on a landscape and property (e.g., park) level.
Fauquier	Concerned about abuse with automated harvest system.	Population	2	Although there is no evidence that the automated harvest system is less accurate than traditional check stations, current strategies direct the agency to continually improve data quality.
Alleghany	Habitat decline is more important than predation in mountain habitats.	Population	5	Current strategies address limiting factors, including predation and habitat.
Alleghany	Removing bear from big game license could reduce bear harvest and increase predation on deer.	Population	5	Although the new bear license is unrelated to this plan, current strategies address predation, along with other factors, preventing attainment of deer population objectives.
Alleghany	Concerned about abuse with automated harvest system.	Population	2	Although there is no evidence that the automated harvest system is less accurate than traditional check stations, current strategies direct the agency to continually improve data quality.
Scott	Observed deer population decline in Scott Co. but cannot just be predation	Population	3; 5	Although deer populations have decreased, data on CCC indicate a need for further population reduction in this county. Current strategies address predation, among other limiting factors to deer populations.
Alleghany	Concerned about abuse with automated harvest system.	Population	2	Although there is no evidence that the automated harvest system is less accurate than traditional check stations, current strategies direct the agency to continually improve data quality.
Loudoun	Supportive of plan and aggressive seasons in urban areas; concerned about low deer herds in rural areas.	Population	3	Current objective and strategies address establishment of population objectives based on CCC and ecological considerations, which differ between urban and rural areas.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Bedford	It does not make sense to increase public land deer herds in Bedford Co. due to property damage.	Population	3	The private land population objective for Bedford County is to reduce the deer herd. This objective directly addresses the large majority of human damage concerns. Public lands are managed as a separate unit in western counties, as noted in the narrative for this objective.
Bedford	Improving access and connections between hunters and landowners are key for managing deer populations.	Population	4	Current strategies address hunter access and connections with landowners.
Page	Concerned about declining deer herds; shorten muzzleloader season, reduce the bear population, work with Shenandoah National Park on CWD management.	Population	1, 5	Current strategies call for modifying hunting opportunities and addressing limiting factors (to include predation, disease) to meet deer population objectives. In addition, strategies call for VDGIF to address potential impacts of other conservation programs on deer populations (e.g., NPS CWD management).
Prince George	DMAP is being abused.	Population	6	DMAP is a program to address site-specific deer management needs, and is supported by current strategies. Objectives already address hunting ethics.
Caroline	Although it provides useful biological data and communication to clubs, DMAP is being incorrectly used by clubs and impacts other landowners.	Population	6	DMAP is a program to address site-specific deer management needs, and is supported by current strategies. Objectives already address hunting ethics.
Lynchburg	Bag limits on public land are harmful.	Population	1,3, 5	Current strategies address impacts of antlerless hunting opportunities.
Amelia	Concerned that liberal seasons have reduced deer populations too much.	Population	1, 3	Current strategies address modification of hunting opportunities to achieve population objectives, which are established to address CCC and ecological impacts.
Chesterfield	Modify doe days based on harvest data.	Population	1, 2	Current strategies address changing antlerless opportunities to achieve deer population objectives and monitoring impacts of such changes.
Loudoun	Increase Bath Co. deer herd; quit reducing Loudoun Co. deer herd.	Population	3	The current objective is to increase the deer population in Bath County. The current objective remains to decrease the deer population in Loudoun County further to address CCC (e.g., high levels of deer-human conflicts).
Alleghany	Concern about too many bears predating on deer.	Population	5	Current strategies identify predation as a potential limiting factor to meeting deer population objectives.
Shenandoah	Concern about declining public land deer herds in Highland and Shenandoah Counties due to poor regulations.	Population	1, 3, 5	Current objectives are to increase deer populations in these areas. Public land seasons have been very conservative, so other limiting factors are likely limiting attainment of deer population objectives.
Prince George	Too many does shot in some areas.	Population	1,3	Although specific regulations are beyond the scope of this plan, current strategies call for modifying antlerless hunting opportunities to meet deer population objectives.
Scott	Allow more does to be harvested where the populations allow.	Population	1,3	Current strategies call for modifying antlerless hunting opportunities to meet deer population objectives.
Russell	Deer population needs to increase or stabilize in Russell County.	Population	3	The current objective calls for stabilizing the deer population in Russell County.
Winchester	Increase deer populations in Warren and Shenandoah Counties.	Population	3	Both counties have objectives to continue reducing the deer populations to meet CCC and to address CWD concerns. Both counties are part of the CWD Containment Area.
Alleghany	Reduce deer bag limits, improve habitat, and kill more predators in the Alleghany Highlands.	Population	5	Current strategies address potential limiting factors, including hunting, habitat, and predation. Additional hunting pressure management strategies, such as bag limit restrictions, have been added as potential strategies (p. 75).
Botetourt	Reduce muzzleloader season to increase populations.	Population	1	Current strategies address changing hunting opportunities to achieve population objectives. Objective 3 under the Recreation Goal specifies the amount of muzzleloader effort relative to other methods.
Brunswick	Reduce doe harvest where HD has impacted herds.	Population	1; 5	Current strategies address limiting factors (disease) and the need to adjust hunting seasons accordingly to meet population objectives. Doe days were reduced in a number of HD counties during the past regulation cycle.
Spotsylvania	Allow Sunday hunting on WMAs where needed.	Population	1, 4	Current strategies address changes and enhancements to hunting opportunities to address deer population objectives.
Chesterfield	Concerned about coyote predation.	Population	5	Predation is listed among potential limiting factors to attaining deer population objectives.
Westmoreland	Do not mention that alternatives to hunting will be considered or used. Public will not support sharpshooters.	Population	1	In several goals, objectives, and strategies, the plan makes clear that hunting is the preferred method of population management; however, situations exist where hunting cannot be used or is not the most effective method to use.
Spotsylvania	Concerned about coyote predation.	Population	5	Predation is listed among potential limiting factors to attaining deer population objectives.
None given	Fewer deer in Spotsylvania County than stated.	Population	3	Based on best judgments of CCC and moderate to low deer populations, staff chose to establish an objective to stabilize the deer population in Spotsylvania County; however, the trends in deer and human populations are of a concern.
Fairfax	Need more input from urban residents impacted by hunting activities nearby.	Population	7	Added a strategy to encourage landowners to express views on deer management and report deer management activities that impact them (p. 77).
Caroline	Desires optimal populations for muzzleloading and crossbow hunting.	Population	3	Population objectives are established to meet CCC, which balances all demands for deer (hunters, farmers, drivers, etc.)
Goochland	Deer herds are declining due to aggressive seasons and predators.	Population	3, 5	Current strategies address hunting and predation as a potential limiting factor to achieving deer population objectives.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Fairfax	Advocates for balancing positive demands with negative demands only at lower densities where our future forests, vehicle collisions, and health of the deer herd aren't forfeited. At higher densities, objectives such as fair chase, sportsmanship, prohibiting baiting, and prohibiting trapping/euthanasia become unaffordable luxuries.	Population	3, 5	Current goal calls for balance between cultural carrying capacity, ecological integrity, and other damage concerns. Cultural carrying capacity includes the vehicle collisions and other property damage along with the desires of deer hunters. Current objectives and strategies call for achieving population objectives based on this balance while recognizing the importance of reducing all types of damage from deer.
Fairfax	Because we don't understand present social and ecosystem demands, how could "anticipated future social/ecosystem demands" be part of the balance? This only opens the door for speculation by various interests.	Population	3	As explained in the text under the goal, proactive population management entails anticipating changes in CCC and ecosystem requirements in the future, so deer population objectives should accommodate expected future demands (e.g., human population growth).
Fairfax	Objective 2. Consider new tools for monitoring deer population status. - browser/smart phone app and a GIS-enabled database to enter hunt logs landowner sightings. - use trail cameras for landowners of standardized sightings.	Population	2	The current strategies address the need for improved population monitoring techniques. Examples have been included as potential strategies. (p, 72)
Fairfax	Objective 4. Supports using hunting for deer control. Add to the examples in strategy "g": "supervised and coordinated urban group archery".	Population	4	Change made (p. 75).
Washington, D.C.	Concerned that deer density determines CCC.	Population	3	Survey work with Virginia Tech showed that deer density correlates better with tolerance than other metrics, but deer density alone does not *determine* cultural carrying capacity or deer population objectives.
Washington, D.C.	The goal of "balancing the cultural carrying capacity" is largely unrealistic and unachievable.	Population	NA	Although achieving them can be challenging, the intent of goals is to publicly state the ideal future condition with regards to deer management.
Manassas, Clarke Co., and Prince William Co.	Objective 3. (Intro text) - Wants additional emphasis on ecological impacts.	Population	3	The current text in the introduction to this objective recognizes the need to address ecological damage by management unit to inform population objectives.
Manassas, Clarke Co., and Prince William Co.	Objective 3. (Intro text) - Wants "ecological" added to the list of perspectives.	Population	3	The term "biological" in the first sentence is meant to include "ecological" considerations, as evidenced by the use of the term ecosystem twice in this paragraph.
Manassas, Clarke Co., and Prince William Co.	Potential Strategy c - Highlight this one and use ECC	Population	3	The current strategy articulates the inclusion of ecological considerations without the introduction of a new term. While the term ECC might sound meaningful, it is not commonly used and various technical definitions make it often confusing.
Manassas, Clarke Co., and Prince William Co.	Potential Strategy e - Use ECC instead of "ecosystem".	Population	4	The current strategy articulates the inclusion of ecological considerations without the introduction of a new term. See discussion of ecological carrying capacity above.
Manassas, Clarke Co., and Prince William Co.	Objective 7. e. Add to increase awareness of ECC.	Population	7	Added "ecological impacts" to the list (p 77).
Manassas, Clarke Co., and Prince William Co.	Habitat Goal. Objective 3. amend "a". To provide technical assistance to manage deer populations.	Population	7	Current strategies under the last *population* objective address landowner education about deer *population* management.
Fairfax	Regarding the development of practical, efficient assessments of deer impacts to ecosystems, it is better to start doing something simple now than to wait for years	Population ; Damage; Supply and Demand	3; 6	Current strategies address the need for more research on ecological impacts to deer and how to practically evaluate them. It is hoped that ongoing research will be a first step in that regard. In the meantime, staff professional experience and judgment of ecological impacts is used when setting deer population objectives.
Loudoun	Baiting might improve effectiveness of hunting in urban areas.	Population Damage	4 7	Baiting for regulated hunting is discouraged for ethical and other reasons in this plan, but can be used in urban sharpshooting scenarios. However to meet objectives, added flexibility for population and damage management strategies have been included to consider innovative alternative options and modifications to population management and damage reduction programs. (pp 75, 87)
Fairfax	Objective 1. Recognize that liberal seasons and kill permits have not been sufficient to manage deer in NOVA. Where recreational hunting is deemed "inappropriate or unacceptable" (also add "ineffective"), list all of the "other management practices" that might be used. Do not exclude practices that may not be compatible with tradition, CCC, or the North American Model of Wildlife Management.	Population Damage	4 7	Added term "ineffective" (p. 72). Unethical and unsportsmanlike practices for regulated hunting are discouraged in this plan. However to meet objectives, added flexibility for population and damage management strategies have been included to consider innovative alternative options and modifications to population management and damage reduction programs. (pp 75, 87)
Fairfax	Objective 5. Believes that uniform standards for fair chase and sportsmanship are situational and not uniform. Priority should be first to manage ecological damage.	Population Damage	4 7	Current strategies address the need to consider cultural desires (including ethics) and ecological damage in managing deer populations. Although hunting is to be practiced under fair chase standards, current strategies allow for use of kill permits by landowners and officials under nonsporting conditions to address many types of deer damage. Also to meet objectives, added flexibility for population and damage management strategies have been included to consider innovative alternative options and modifications to population management and damage reduction programs. (pp 75, 87)

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Manassas	To reduce populations in urban areas wants more hunting tools and coordination (including approved baiting).	Population Damage	4 7	Baiting for regulated hunting is discouraged for ethical and other reasons in this plan, but can be used in urban sharpshooting scenarios. However to meet objectives, added flexibility for population and damage management strategies have been included to consider innovative alternative options and modifications to population management and damage reduction programs. (pp 75, 87).
Manassas, Clarke Co., and Prince William Co.	Objective 6. Add new strategy to explore economic incentives to reduce deer herds.	Population Damage	4 7	To meet objectives, added flexibility for population and damage management strategies have been included to consider innovative alternative options and modifications to population management and damage reduction programs. (pp 75, 87). Economic incentives could be considered among the innovative alternatives.
Washington	Need stronger deterrence of game violations.	Population Recreation	1, 5,6	Regulations are included among many strategies, but strategies on enforcement and deterrence have been added (pp 71, 81).
Surry	Need stronger deterrence of game violations.	Population Recreation	1, 5,6,7	Regulations are included among these strategies, but strategies on enforcement and deterrence have been added (pp 72, 81, 82).
Buckingham	Need stronger deterrence of game violations.	Population Recreation	1, 5,6,7	Regulations and education are included among these strategies, but strategies on enforcement and deterrence have been added (pp 72, 81, 82).
None given	Increase penalties for violations	Population Recreation	1, 5,6	Regulations are included among many strategies, but strategies on enforcement and deterrence have been added (pp 72, 81).
Chesterfield	Increase penalties for violations	Population Recreation	1, 5,6,7	Regulations are included among these strategies, but strategies on enforcement and deterrence have been added (pp 72, 81, 82).
Loudoun	Consider aggressive lethal and nonlethal options to control deer in developed areas.	Population, Damage	4 and 7, respectively	Current strategies call for aggressive and innovate methods to control deer populations in urban areas.
Winchester	Opposes killing deer.	Population, Recreation, Damage	Various	Regulated hunting and other lethal methods are effective for addressing deer populations and associated damage. Current objectives and strategies provide for alternative nonlethal methods to be used where hunting is not feasible or acceptable.
Henrico	Lethal control is outdated.	Population, Recreation, Damage	Various	Regulated hunting and other lethal methods are effective for addressing deer populations and associated damage. Current objectives and strategies provide for alternative nonlethal methods to be used where hunting is not feasible or acceptable.
Fairfax	Evaluate use of baiting by supervised, coordinated archer groups whose goal is population control and for whom recreation is a benefit, not the purpose.	Population; Recreation; Damage	1,4,5; 5; 5	-The literature does not provide strong evidence that baiting increases hunter efficiency. Current strategies address the enhanced use of hunting and non-hunting alternatives when hunting is not feasible or acceptable. Current strategies address fair chase and potential disease risks associated with feeding and baiting; diseases could have economic implications to domestic animals and the sport of hunting.
Caroline	Private landowners were under-represented on the SAC.	Population; Recreation; Habitat; Damage; Supply and Demand	3,4; 3,6,7; 2,3,8; 3	Concern is noted, but SAC members were chosen to represent a diversity of key perspectives, and they included a mix of private and public landowners (see Appendix 1). Logistics limit the number of representatives for each stake. In addition, both current strategies and background text address the many issues associated with landowners.
Richmond and Suffolk (2 identical comments)	Private landowners were under-represented on the SAC.	Population; Recreation; Habitat; Damage; Supply and Demand	3,4; 3,6,7; 2,3,8; 3	Concern is noted, but SAC members were chosen to represent a diversity of key perspectives, and they included a mix of private and public landowners (see Appendix 1). Logistics limit the number of representatives for each stake. In addition, both current strategies and background text address the many issues associated with landowners.
Frederick	Desire for fewer deer in the Shenandoah Valley to reduce residential damage and collisions.	Population; Damage	3; 3 and 4	Most Shenandoah Valley counties have objectives to reduce deer populations; the need to address damage is recognized in the damage goal and specific objectives.
Loudoun	Access to control overabundant deer herds is limited in suburban areas.	Population; Damage	4; 3,7	Access and landowner/hunter collaboration is addressed in the current strategies.
Clarke	More flexibility is needed in controlling deer where overabundant or in disease control areas (e.g., hunting at night by permit).	Population; Damage	6; 2,3	Current site-specific strategies offer much flexibility;.
Bedford	Supports hunting to control populations but not killing deer outside of season.	Population; Damage	1; 3	Hunting is the primary population control strategy for all types of damage, but out-of-season kill permits are recognized as necessary in some situations.
Loudoun	Desires fewer deer in Loudoun Co. to reduce collisions and residential damage.	Population; Damage	3;3,4	The current objective is to reduce deer populations in Loudoun County; current damage objectives and strategies address residential damage and collisions.
Loudoun	Desires fewer deer in Loudoun Co. to reduce collisions, residential damage, and Lyme disease.	Population; Damage	3;3,4,5	The current objective is to reduce deer populations in Loudoun County; current damage objectives and strategies address residential damage, Lyme disease risks, and collisions.
Loudoun	Desires fewer deer in Loudoun Co. to reduce collisions, ecological impacts, and Lyme disease.	Population; Damage	3;3,4,5,6	The current objective is to reduce deer populations in Loudoun County; current damage objectives and strategies address residential damage, Lyme disease risks, ecological impacts, and collisions.
Loudoun	Consider aggressive lethal and nonlethal options to control deer in developed areas.	Population; Damage	4; 7	Current strategies call for aggressive and innovate methods to control deer populations in urban areas.
Arlington	Ecological integrity should be a fundamental measure of success for deer management.	Population; Damage	3; 6	The population goal calls for equal consideration between ecological integrity and CCC in establishing and meeting deer population objectives. Damage objectives address ecosystem impacts.
Prince William	Desires fewer deer in Prince William Co. to reduce collisions, residential damage,	Population; Damage	3;3,4,5	The current objective is to reduce deer populations in Prince William County; current damage objectives and strategies address residential

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
	and Lyme disease.			damage, Lyme disease risks, and collisions.
Accomack	Enable hunters to take more does during season so kill permits can be reduced.	Population; Damage	1; 2	Hunting is the primary population control strategy for all types of damage, but out-of-season kill permits are recognized as necessary in some situations.
Prince William	Desires fewer deer in Prince William Co. to reduce collisions and residential damage..	Population; Damage	3; 3, 4	The current objective is to reduce deer populations in Prince William County; current damage objectives and strategies address residential damage and collisions.
Fairfax	Concern about appearance of sharpshooting; consider nonlethal options.	Population; Damage	1,7; 3,7,8	Current goals, objectives, and strategies call for use of recreational hunting wherever possible before other lethal control measures are used, for alternatives (including nonlethal methods) to be considered when hunting is not feasible, and for public education to increase support for deer population and damage management.
Loudoun	Concerned about abuse with automated harvest system and kill permits.	Population; Damage	2	Although there is no evidence that the automated harvest system is less accurate than traditional check stations, current strategies direct the agency to continually improve data quality. Current site-specific programs offer much flexibility.
Fairfax	Desires fewer deer in Fairfax Co. to reduce collisions, residential damage, and Lyme disease. Increase hunting in parks, fence parks, and fence roads.	Population; Damage	3;3,4,5	The current objective is to reduce deer populations in Fairfax County; current damage objectives and strategies address residential damage, Lyme disease risks, and collisions. Strategies cover hunting in parks and use of fencing to mitigate damage.
Fairfax	Desires fewer deer in Fairfax Co. to reduce ecological plant damage.	Population; Damage	3;6	The current objective is to reduce deer populations in Fairfax County; current damage objectives and strategies address damage to native plants by deer.
Spotsylvania	The deer population in Spotsylvania needs to be reduced; concerned with residential damage.	Population; Damage	3,6; 3	Based on best judgments of CCC and moderate to low deer populations, staff chose to establish an objective to stabilize the deer population in Spotsylvania County; however, the trends in deer and human populations make it possible that this population objective will be revised in coming years. Updates can occur as frequently as every 2 years. Current strategies address residential damage at the property and sub-county scale.
Bath	Bath County population has declined due to predation and kill permit use.	Population; Damage	3, 5; 2	The new objective is to increase the deer population in Bath County. Current strategies address predation and other influences as potential limiting factors to achieving deer population objectives.
Westmoreland	Deer herds are declining in Westmoreland County due to aggressive seasons, coyotes, and kill permits.	Population; Damage	3, 5; 2	Current strategies address hunting and predation and other influences as potential limiting factors to achieving deer population objectives.
None given	Deer herds are declining due to aggressive seasons, predators, and kill permits.	Population; Damage	3, 5; 2	Current strategies address hunting and predation and other influences as potential limiting factors to achieving deer population objectives.
Prince William	Deer condition and deer habitat impacts in NOVA are worse that VDGIF knows.	Population; Damage	3; 6	Objectives for all areas in Northern Virginia are to reduce deer populations. Current goals, objectives, and strategies address deer damage to ecosystems. Strategies include refinement/improvement of monitoring programs.
Prince William	Become more aggressive with all tools to control the deer population.	Population; Damage	1,4; 7	Current goals, objectives, and strategies call for VDGIF to be innovative with hunting or other lethal/nonlethal methods to control deer populations and damage.
Prince William	Increase ease of issuance and use of special permits.	Population; Damage	3; 3,7	Current strategies address impediments to hunting and flexibility in damage management.
Stafford	Plan needs to consider more non-lethal management of deer populations, such a sterilization like that used in Fairfax City.	Population; Damage	1, 6; 7	Current goals, objectives, and strategies recognize the need to manage deer populations using innovative methods when hunting is not feasible or acceptable. However, regulated hunting is recognized as the most practical, effective means of controlling a free-ranging deer population. Sterilization is currently experimental, as in the case of the City of Fairfax.
Bedford	Consider predator reintroduction for 24/7 control, population reduction, deer disease control, change deer behavior to not destroy habitat. Wants programs developed and implemented to educate the public about predators and biodiversity.	Population; Damage	1,7; 7	Current strategies address the need to use alternatives to hunting to meet population objectives in some cases, and to educate the public on the need to manage deer populations and their impacts on ecosystems using a variety of methods. Introduction of predators would not be excluded as an option.
Fairfax	First line and Strategy c: Stakeholders can be used to monitor ecosystem impacts & important to get stakeholders involved with this. Keep measures simple.	Population; Damage	1; 8	Current strategies address development of practical ecological assessment. Rather than modify the population strategies, the current damage strategy on education regarding ecological impacts was expanded to include landowners and monitoring (p. 88).
Washington, D.C.	Insufficient attention given to non-lethal methods and coexistence.	Population; Damage	1, 7; 7,8	Current strategies provide for public education regarding coexistence with deer as well as the need for managing deer. Current strategies recognize the need for alternatives to control deer populations and damage when hunting is not feasible or acceptable.
Washington, D.C.	Don't focus so heavily on hunting solutions to conflicts, but give more attention to non-lethal strategies and be more comprehensive (especially in urban areas).	Population; Damage	1; 7	Current strategies recognize the need for alternatives to control deer populations and damage when hunting is not feasible or acceptable.
Washington, D.C.	Overall, non-lethal methods need to be more detailed and unbiased.	Population; Damage	1; 7	Current strategies recognize the need for alternatives to control deer populations and damage when hunting is not feasible or acceptable.
Washington, D.C.	Feels local hunting pressure will have minimal effect on reducing garden & crop damage. Instead, we should educate about exclusion and	Population; Damage	1,7; 3, 7, 8	Current strategies provide for public education regarding coexistence with deer as well as the need for managing deer. Current strategies recognize the need for alternatives to control deer populations and damage when hunting is not feasible or acceptable. The necessity of kill

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
	implement a "robust depredation permit system" for damage when it occurs.			permits is recognized in some situations~~.~~
Washington, D.C.	Need to provide communities greater access to fertility control options, especially in urban/suburban areas.	Population; Damage	1; 7	Current goals, objectives, and strategies recognize the need to manage deer populations using innovative methods when hunting is not feasible or acceptable. However, regulated hunting is recognized as the most practical, effective means of controlling a free-ranging deer population. Fertility control is currently experimental and has shown limited utility in free-ranging settings.
Washington, D.C.	Non-lethal management options are insufficiently covered and/or dismissed (Objective 7 - p.85). Need to embrace these newer solutions.	Population; Damage	1; 7	Current goals, objectives, and strategies recognize the need to manage deer populations using innovative methods when hunting is not feasible or acceptable. However, regulated hunting is recognized as the most practical, effective means of controlling a free-ranging deer population. Fertility control is currently experimental and has shown limited utility in free-ranging settings.
Washington, D.C.	Process to implement fertility control programs needs to be streamlined.	Population; Damage	1; 7	Current goals, objectives, and strategies recognize the need to manage deer populations using innovative methods when hunting is not feasible or acceptable. However, regulated hunting is recognized as the most practical, effective means of controlling a free-ranging deer population. Fertility control is currently experimental and has shown limited utility in free-ranging settings. Strategy c under Population objective 6 is to develop guidelines/protocol for alternative methods.
Washington, D.C.	Need more detail on how public satisfaction with fertility control programs will be monitored.	Population; Damage	1; 7	Current goals, objectives, and strategies recognize the need to manage deer populations using innovative methods when hunting is not feasible or acceptable. Fertility control is currently experimental and has shown limited utility in free-ranging settings. Details about how acceptability will be monitored are beyond the scope of this plan.
Washington, D.C.	Need to place priority on resolving problems by methods (education, exclusion) other than removal of deer.	Population; Damage	1, 7; 7,8	Current strategies provide for public education regarding coexistence with deer as well as the need for managing deer. Current strategies recognize the need for alternatives to control deer populations and damage when hunting is not feasible or acceptable.
Washington, D.C.	Wants a shift away from hunting & desires of a minority group to reduce deer numbers to a focus of resolving conflicts and helping people learn to co-exist with deer.	Population; Damage	1, 7; 7,8	Current strategies provide for public education regarding coexistence with deer as well as the need for managing deer. Current strategies recognize the need for alternatives to control deer populations and damage when hunting is not feasible or acceptable.
Manassas	Objective 6. Add new strategy to expand urban archery programs with added outreach	Population; Damage	6,7; 3,8	Current strategies provide for any number of controlled or individual hunting programs. Current strategies address technical assistance to individuals and communities about deer population and damage management.
Prince William	Wants specific measures of browse impact and to use those measures for deer goals.	Population; Damage	3; 6	As called for in current strategies, specific metrics for assessing deer-ecosystem impacts at relevant scales still need to be developed.
Manassas, Clarke Co., and Prince William Co.	Wants to use the term "ecological carrying capacity (ECC)" with scientific measures.	Population; Damage	3; 6	The term "ecological carrying capacity" is problematic because it is sometimes used interchangeably with "biological carrying capacity;" both denote levels at which the habitat can *sustain* deer, and both may include a threshold below which damage to the deer's (or other wildlife) habitat occur. In any case, the concept of ecological impacts, and their basis in deer population management at the goal and objective levels, is addressed in the plan without the need for a new term. Current strategies call for better measures of ecological damage.
Manassas, Clarke Co., and Prince William Co.	Objective 7. "i". Add "ecological impacts" for public education.	Population; Damage	7	The particular strategy referenced is only about diseases. Education about ecological impacts is now incorporated in strategy e. (p. 77) and also in the last damage objective (p. 88).
Manassas, Clarke Co., and Prince William Co.	Recreation Goal. Objective 1. Add new strategy to assess and manage how overpopulation impacts biodiversity & non-consumptive activities.	Population; Damage	3; 6	Ecological impacts are currently referenced under the most relevant objectives.
Manassas, Clarke Co., and Prince William Co.	Add new strategy to Educate public on ECC and the need to manage deer to promote biodiversity and other non-consumptive wildlife activities.	Population; Damage	7;8	Education about ecological impacts is currently referenced under the most relevant objectives.
Manassas, Clarke Co., and Prince William Co.	Objective 1. Add new strategy to determine ECC numbers.	Population; Damage	3; 6	Current strategies address determining levels of deer impact and improved measures.
Manassas, Clarke Co., and Prince William Co.	Objective 6. Add new strategy to utilize browse surveys as the measure of ECC.	Population; Damage	3; 6	Current strategies call for development and use of specific metrics for assessing deer-ecosystem impacts at relevant scales.
Fairfax	Because of obvious overpopulation and ecological problems, use all available tools to reduce the herd (not just antiquated recreational hunting). Don't try to please everyone with the necessary approach.	Population; Damage	1,4; 7	Current goals, objectives, and strategies call for VDGIF to be innovative with hunting or other lethal/nonlethal methods to control deer populations and damage.
Fairfax	In all NOVA counties, provide easier access and greater effectiveness of management programs (DPOP, DMAP, Kill Permits). The programs should be more widely available.	Population; Damage	3; 3,7	Current strategies address impediments to hunting and flexibility in damage management.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Shenandoah	Despite aggressive seasons, deer damage and population management has failed.	Population; Damage; Accomplishments	1, 3, 4; 2,,4	Current strategies address the need for continued enhancement of hunting and other methods to address population and damage objectives. Trends in a number of areas indicate that not all programs have been failures.
Manassas, Clarke Co., and Prince William Co.	Habitat Goal. Objective 1. Amend "e" to include ECC.	Population; Damage; Habitat	3; 6; 1	Population and Damage goals and objectives already include deer ecological impacts, so the addition of another ecological clause in this habitat objective is unnecessary.
Manassas, Clarke Co., and Prince William Co.	Habitat Goal. Objective 2. d. Determine deer browse impact on current conditions.	Population; Damage; Habitat	3; 6; 2	Population and Damage goals and objectives already include deer ecological impacts, so the addition of another ecological strategy in this habitat objective is unnecessary.
None given	Supports the natural urine lure ban but cautions that CWD could still pose a risk to humans.	Population; Damage; Supply and Demand	5; 5	Supportive comments. Although current strategies address deer-related diseases that impact deer population, humans, and domestic animals, there is currently no evidence that humans can contract CWD from consuming venison, nor has the disease been shown to transmit to livestock under natural conditions.
Stafford	Desires fewer deer in Stafford Co. to reduce residential damage and Lyme disease.	Population; Damage; Supply and Demand	3;3,5	The current objective is to reduce deer populations in Stafford County; current damage objectives and strategies address residential damage and Lyme disease risks.
Manassas	Wants" more aggressive" attention to overabundant deer in urban areas	Population; Damage; Supply and Demand	3; 6; 3	Several objectives, strategies, and sections of background text address the seriousness of urban deer management challenges.
Prince William	Wants more emphasis on ecological impacts of overbrowsing.	Population; Damage; Supply and Demand	3; 6	Current goals, objectives, strategies, and background text address the seriousness of deer impacts to ecosystems.
Manassas, Clarke Co., and Prince William Co.	Wants deer ecosystem impacts "elevated".	Population; Damage; Supply and Demand	3; 6	Several goals, objectives, strategies, and sections of background text address the seriousness of ecological impacts by deer.
Bath	Support continued restrictions on feeding deer.	Population; Habitat	5; 3	Current objectives and strategies discourage supplemental feeding.
Alleghany	Concurs about declining deer populations and habitat on public lands in northern mountains area. Appreciates DGIF and USFS working together on recent initiatives.	Population; Habitat	5; 3	Current goals, objectives, and strategies address these public land issues.
Rockingham	Too little active management on public lands and too many predators, especially bears.	Population; Habitat	5; 3	Current strategies address the need for more active habitat management to address declining deer populations on public lands, and to address predation as a potential limiting factor.
Lynchburg	Lack of timber cutting on public lands is hurting deer populations and hunting.	Population; Habitat; Supply and Demand	5; 3	Current objectives and strategies recognize habitat as a limiting factor on these lands and encourage active management, in collaboration with the USFS.
Alleghany	More active management of habitat is needed on National Forest.	Population; Habitat; Supply and Demand	5; 2	Current objectives and strategies recognize habitat as a limiting factor on these lands and encourage active management, in collaboration with the USFS.
Tazewell	Need more active habitat management on National Forests.	Population; Habitat; Supply and Demand	5; 2	Current objectives and strategies recognize habitat as a limiting factor on these lands and encourage active management, in collaboration with the USFS.
Augusta	Increase doe days in Augusta County to achieve population and damage objectives.	Population; Program History	1, 3	Current strategies and background text address the use of antlerless opportunities to achieve population objectives.
Bedford	Quantity and quality of deer is inadequate on public lands.	Population; Recreation	3;4	Objectives are to increase deer populations on public lands; quality is included in these strategies.
Fairfax	Lethal management of deer is unethical.	Population; Recreation	4;5	Hunting, the most effective means of deer population control, is regulated by season, weapons, etc. to be as ethical as possible.
Henrico	The focus of hunting should be for human food rather than population control.	Population; Recreation	4; 3, 5	Current strategies encourage hunter satisfactions and consumption of deer meat, in addition to population management.
Fairfax	More aggressive seasons and bag limits in Fairfax County.	Population; Recreation	1,3,4; 5	Current strategies promote aggressive seasons to meet population objectives (e.g., reduce deer in Fairfax County.
Pittsylvania	Institute "earn a buck" or minimum antlered points for bucks	Population; Recreation	1; 4	Earn-A-Buck and antler point restrictions are generally established for different reasons. Current strategies address the use of hunting to control populations and quality deer management opportunities for hunter satisfaction.
Fairfax	Earn-A-Buck and antler point restrictions are yielding positive results.	Population; Recreation	1; 4	Supportive comments.
Page	Concerned that youth will abandon hunting with too few deer.	Population; Recreation	3; 3	Current strategies address setting deer populations based on CCC, which includes hunter desires, and enhancing youth hunting opportunities.
Tazewell	Reduced harvest of does and bucks to address reduced deer population in Tazewell County.	Population; Recreation	1; 4	Current strategies address changing antlerless opportunities to achieve deer population objectives.
Chesterfield	Concerned about deer population decline and its impact on hunter retention.	Population; Recreation	1, 3; 3, 4	Current strategies address hunting quality, hunter recruitment, and changing hunting opportunities to achieve deer population objectives.
Bedford	Manage for an even buck:doe ratio by reducing harvest of bucks and increasing harvest of does.	Population; Recreation	1,3; 4	Current strategies address increasing antlerless hunting opportunities where needed and quality of hunting (bucks).
Franklin	Increase harvest of does and decrease harvest of bucks.	Population; Recreation	1; 4	Current strategies address quality of hunting (bucks) and antlerless hunting opportunities.
Gloucester	Dog hunters harvest too many deer; cut their bag and seasons.	Population; Recreation	1; 3,7	Current strategies enable adjustment in hunting opportunities, as needed to meet deer population objectives, and address the need to allocate opportunities among hunters.
Westmoreland	Support hunter education in schools.	Population; Recreation	7; 3	Supportive comments.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Bedford	Need alternative approaches to hunter recruitment for deer population control and revenue.	Population; Recreation	4; 3	Current objectives and strategies address the need for improved hunter recruitment.
Caroline	Provide a means for landowners to express their views on deer management and to report deer management techniques impacting them.	Population; Recreation; Damage	7; 6,7; 8	Although current strategies already address impacts of deer management and recreation on others, we have added a strategy under Population Objective 7 more explicitly addressing this comment (p. 77).
Pittsylvania	Establish open season on deer to reduce the numbers and associated residential damage.	Population; Recreation; Damage	1,3, 6; 5; 3, 7	Deer population objectives are established to address CCC. Current strategies address management of populations using hunting, site-specific programs, kill permits, and alternatives.
Prince William	Expand urban archery season all year, and move away from kill permits over the summer.	Population; Recreation; Damage	1,4; 5; 3	Current strategies address management of populations prefer using hunting, but also call for hunting and damage management to be ethical. The urban archery season balances efficacy with ethics, but kill permits also have a role. Kill permits are most appropriate to address damage, not population control, and they are for killing (not hunting) deer, sometimes in non-sporting situations.
Washington, D.C.	Agrees with positions opposing deer farming, high fence enclosures, deer feeding, and baiting.	Population; Recreation; Damage	5; 5; 5	Supportive comments.
Manassas, Clarke Co., and Prince William Co.	Objective 3. Add new strategy to promote hunting for locavore and recreational benefits.	Population; Recreation; Damage	4; 3	Current goals, objectives, and strategies address promotion of hunting for all of these reasons.
Fairfax	Expand urban archery program in NOVA. Use a 12-month season until population objectives are met.	Population; Recreation; Damage	1,4; 5; 3	Current strategies address management of populations prefer using hunting, but also call for hunting and damage management to be ethical. The urban archery season balances efficacy with ethics, but kill permits also have a role.
Fairfax	In urban areas allow landowners to kill <u>any</u> deer (not just antlerless), especially during summer. - move away from kill permit philosophy - DPOP / DMAP would be more effective.	Population; Recreation; Damage	1,4; 5; 3	Current strategies recognize that removal of antlerless deer is the most critical component in controlling deer populations. Kill permits are most appropriate to address damage (including by antlered deer, in some cases), not population control; they are for killing (not hunting) deer, sometimes in non-sporting situations. Since DPOP and DMAP are forms of hunting, they must abide by ethical standards.
Washington, D.C.	The plan is too hunter focused (e.g., opportunity, satisfaction, recruitment, consumption, and education). Need more attention to non-hunters and use of non-lethal management. Focus on satisfying hunter demand also ignores ecological consequences.	Population; Recreation; Supply and Demand	1,3; 4	Both the population goal and objectives consider hunting to be the preferred population method, regardless of the hunter satisfaction aspect. Hunter satisfaction is important for sustaining hunting as a management tool, as noted in the current strategies. Although hunter desires may conflict with ecological objectives (thus the inclusion of ecological integrity in the population goal), hunting is necessary to maintain deer populations at levels that permit biologically diverse ecosystems.
Washington, D.C.	The plan must recognize that hunting is not only in decline, but unlikely to rebound … therefore immediately need new management concepts.	Population; Recreation; Supply and Demand	1; 3	The background text and current strategies recognize the challenges presented by decreasing hunter numbers; thus, a number of strategies address hunter recruitment and use of other methods when hunting is not feasible or acceptable.
Pittsylvania	Hemorrhagic disease kills more deer than CWD, yet there are more needless restrictions on the latter (e.g., natural lures ban).	Population; Supply and Demand	5	Current strategies call for preventing the introduction of infectious diseases (like CWD, which spread by deer or deer parts, fluid, etc.) and to manage endemic diseases (like HD) when possible. Little can be done to stop the spread of HD, but prevention of CWD into new areas is both possible and necessary for the long term health of the deer population.
Isle of Wight	Concerned about coyote predation.	Population; Supply and Demand	5	Predation is listed among potential limiting factors to attaining deer population objectives. Background text explains predation.
Washington	Too few does are being taken.	Populations	1,4	Antlerless hunting opportunities can be modified to achieve population objectives.
Patrick	Concern about low deer populations.	Populations	3	Population objectives are established based on CCC. Antlerless hunting opportunities can be modified to address population objectives.
Alleghany	Game wardens are stretched too thin.	Populations	5	Poaching added to the list of potential limiting factors to deer populations. Expanded strategy to mitigate limiting factors (p. 75).
Fairfax	Take more does where needed and less on National Forests.	Populations	3	Current objectives and strategies call for adjusting antlerless hunting opportunities to achieve population objectives.
Fairfax	Improve access to control urban deer populations.	Populations	4	Current strategies address improving access to meet population objectives.
Fairfax	Access to deer is the biggest limiting factor in urban areas.	Populations	4	Current strategies address improving access to meet population objectives.
Russell	Game wardens are stretched too thin.	Populations	5	Poaching added to the list of potential limiting factors to deer populations. Expanded strategy to mitigate limiting factors (p. 75).
Rockingham	Concern about low deer populations in western Rockingham County due to seasons and predation.	Populations	5	Current strategies address potential limiting factors, including hunting and predation.
Charlottesville	Concern about deer populations in western VA due to poor habitat and predators.	Populations	5	Current strategies address potential limiting factors, including habitat and predation.
Hanover	Relieved that deer populations are still healthy following last season's harvest decline. The plan is well done.	Populations	1	Supportive comments. Current strategies enable additional modifications to hunting opportunities if deer populations do not stay on track to meet objectives.

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Tazewell	Reduce doe harvest further in western VA to recover herds.	Populations	1,3	Objectives for all western public land units are to increase deer populations, and private land objectives are to increase or stabilize in most areas. Current strategies address changing antlerless hunting opportunities to meet deer population objectives.
Bedford	Suggests more importance based on ecological carrying capacity than cultural carrying capacity.	Populations	3	Current goal calls for balance between cultural carrying capacity and ecological integrity (p. 71). Current objectives and strategies call for achieving population objectives based on this balance while recognizing the importance of reducing ecological damage from deer.
Bedford	Concerned that CCC is based on public surveys of people uninformed about deer management and who aren't old enough to have seen ecological damage.	Populations	3	CCC for this plan was based only partly on random citizen surveys. Survey data and data on deer trends, human populations, complaints, etc. were used by staff to recommend draft population objectives.
Fairfax	When deer densities cause ecological damage, other objectives (e.g., recreation, sportsmanship, fair chase) should be given less consideration.	Populations	3	Current goal calls for balance between cultural carrying capacity and ecological integrity (p. 71). Current objectives and strategies call for achieving population objectives based on this balance while recognizing the importance of reducing ecological damage from deer.
Fairfax	Address the exceptions where hunting seasons have not "stabilized or reduced deer herds". Despite very liberal frameworks, urban and exurban areas have not responded.	Populations	1,4, 6	Current strategies address the need to manage local populations differently from surrounding management units, in some cases, and to enhance hunting and to use alternative means to control deer populations where hunting is not feasible or acceptable.
Washington, D.C.	What is a healthy deer? Disagree with emphasis on weights, antler measures, and fecundity as a measure of "health" (all based on human & consumptive values).	Populations	1	Numerous studies show a strong relationship between higher deer densities and higher parasite loads, disease transmission risks, lower fecundity, increased starvation and fawn abandonment, etc. So, it is accurate to say that lower density deer herds are healthier without reference to any human value.
Loudoun	Limited hunting opportunities contribute to NOVA deer population.	Populations; Damage	1;4	There is already an objective to maintain and/or enhance the use of hunting as a management tool. Added a strategy for using hunting as the primary lethal management strategy to reduce collisions (p 85).
Bedford	Concern about deer impacts to residential plantings and natural plants. Suggest enclosures for demonstration purposes.	Populations; Damage	3,7; 6,3,8	Current goals, objectives, and strategies recognize the need to manage deer populations and deer damage to residential plantings and natural plants, as well as provide educational resources regarding deer impacts and management.
Bedford	Glad that herbivory and ecosystem impacts are components of the plan	Populations; Damage	3; 6	Supportive comments.
Fairfax	Until better densities for ecological damage are determined, use deer densities over 25 or 30 deer per sq. mile as too high (as used by biologists in the 70s & 80s).	Populations; Damage; Program History	3	Deer densities at which ecological integrity is compromised varies by habitat productivity, stage of succession, and other landscape attributes, just as CCC varies by human community through space and time. Therefore, it would be unrealistic to set a threshold maximum without further research, which will hopefully assist with developing practical metrics at the management unit level. Current strategies address the need for ongoing and future research into appropriate measures of ecological damage.
Henrico	Quantity and quality of deer is inadequate in Southampton and Sussex Counties.	Populations; Recreation	3;4	These counties have objectives to stabilize the population based on CCC. Southampton Co. was changed from "reduce" to "stabilize." Recreation objective 4 includes consideration of quality.
Patrick	Need for more access to public and private land.	Populations; Recreation	4; 3	Current strategies address lack of access as an impediment to hunting.
Fairfax	Public needs to understand need for hunting; hunters need to understand that hunting is privilege.	Populations; Recreation	7; 7	Current strategies address the need to educate the general public and hunters.
Shenandoah	Concerned about quantity and quality of deer.	Populations; Recreation	1,3; 4	Current strategies address adjusting hunting opportunities to achieve deer population objectives and hunting quality.
Fairfax	Wants to use parks again without worrying about hunters there. Hunting is ineffective anyway.	Populations; Recreation	1,6,7; 7	Current strategies recognize that regulated hunting is the most practical, effective means of controlling a free-ranging deer population, including in many urban settings, but also allow for alternatives to be used when hunting is not feasible or acceptable. Current strategies also encourage hunters to understand their impacts on others, including recreational users and adjacent landowners.
Fairfax	Urban areas become refugia for deer.	Populations; Supply and Demand	6	Current strategies and background text recognize the challenges of deer management in urban areas, which can comprise good habitat for deer, as well as refugia.
Bedford	Deer populations should not be increased anywhere in VA until the ecological carrying capacity can be established. Concerned that habitat damage has already progressed to far for short-term recovery.	Population; Damage	1,3; 6	Current goal calls for balance between cultural carrying capacity and ecological integrity (p. 71). Current objectives and strategies call for achieving population objectives based on this balance while recognizing the importance of reducing ecological damage from deer.
Washington, D.C.	Concerned that hunting (and hunter satisfactions) is the primary tool to achieve density targets.	Population; Recreation	1; 4	Both the goal and objectives consider hunting to be the preferred population method, regardless of the hunter satisfaction aspect. Hunter satisfaction is important for sustaining hunting as a management tool, as noted in the current strategies.
Fairfax	Wants more data on every program (e.g., DPOP)	Program History	NA	Although this plan presents a lot of data, it is not the intention to provide exhaustive data on every program. Such data are available upon request.
Fairfax	Specify that 1600 was near the beginning of European settlement. Natives had settled here for thousands of years.	Program History	NA	Change made (p. 10).
Fairfax	Contends that deforestation & agriculture as practiced through the late 1800s didn't reduce deer	Program History	NA	As noted in this paragraph, land use changes were a mixed bag. Some of the extensive land clearings would have resulted in openings too large and coverless to be optimal deer habitat.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
	populations. They improve deer habitat (as has "suburban" development).			
Fairfax	Old Figure 2 states that 1,417 deer were imported from other states. Text on the previous page says 1,305. Increase the information provided in Figure 3 by showing numbers imported and in-state transfers for each year in different colors.	Program History	NA	Plan updated to be consistent.
Fairfax	Wants a list and map of the 45 jurisdictions that have urban archery seasons to show readers it is a statewide problem.	Program History	NA	Added Appendix 4 showing participating urban archery localities.
Fairfax	If the CCC predictive model was used in setting management objectives, describe it in more detail.	Program History	NA	Although the desire for more detail about specific items of interest is understandable, the style of the plan attempts to strike a balance between readability and providing a lot of technical information. More information on the model is available upon request.
Fairfax	Are there any VT results of the herbivory study to provide yet?	Program History	NA	Results are expected in 2016.
Henrico	There is a disconnect between new landowners and hound-hunters exercising retrieval of dogs; encourage respect.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Henrico	Hunt quality/satisfaction should be considered.	Recreation	4	Satisfaction is considered for all seasons in this objective; quality is included in this goal.
Surry	Concern about deer dog "trespass."	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Louisa	Concern about deer hunting with dogs; restrict via permit.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Westmoreland	Concern about retrieving hunting dogs without permission.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Chesterfield	Concern about deer hunting with dogs; restrict via permit.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Shenandoah	Virginia deer are of poor quality; restructure seasons.	Recreation	4	These issues are addressed in the current objective and strategies.
Halifax	Increasing cost of hunting may reduce participation.	Recreation	3	Cost is addressed as a potential impediment in the current strategies.
Rockingham	Hunting costs are too high and unfair.	Recreation	3	Cost is addressed as a potential impediment in the current strategies. Changing the current cost of licenses is beyond the scope of this plan.
Washington	Access is limited on some public hunting areas.	Recreation	3	Access is addressed as a potential impediment in the current strategies.
Washington	Support for better hunter and landowner relations.	Recreation	6	This issue is addressed in the current strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Washington	Consider antlerless opportunities during muzzleoader seasons (SWVA).	Recreation	4	Either-sex days are adjusted to achieve population objectives. Allocation of either-sex hunting opportunities may affect recreational satisfaction. Added a strategy to reflect these ideas (p 80).
Rockingham	Concerned about overharvest of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Scott	Too many young bucks are being killed.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Washington	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Craig	Concerned about low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Bedford	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Wise	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Page	Concerned about overharvest of bucks and small buck:doe ratio.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Surry	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Surry	More youth opportunities.	Recreation	3,7	The need for youth hunting opportunities is recognized in these strategies.
Surry	Concerned with wounding and safety risks associated with buckshot.	Recreation	2,5	Safety and ethics are recognized in these strategies.
Goochland	Concern about deer dog "trespass," retrieving dogs without permission, and	Recreation	5,6	These issues are all addressed in the current strategies that ensure that hunting is sportsmanlike, ethical, respects other citizen and landowners,

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
	impacts of hunting dogs running out of season.			while encouraging support and tolerance among stakeholders.
Prince Edward	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Prince Edward	Concerned about landowner/deer hound conflicts.	Recreation	6	These issues are all addressed in the current strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Arlington	Cost and number of hunting licenses needed reduces hunting participation.	Recreation	3	Cost and requirements are addressed as a potential impediment in the current strategies.
Fairfax	Support lethal management if deer are consumed.	Recreation	5,7	Current strategies encourage use of deer meat.
Accomack	Concern about deer dog "trespass" and retrieval of hunting dogs without permission.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Spotsylvania	Concern about deer dog "trespass."	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Albemarle	Improve diversity of deer seasons (e.g., pistol).	Recreation	3,4	Current objectives and strategies provide for allocation of hunting opportunities among diverse seasons.
Page	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Frederick	Too many young bucks are being shot and there is poor buck:doe ratio.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Greensville	Dog hunting disturbs still hunters.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Rockingham	Concerned about low quality of bucks.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Rockingham	Concerned that rifle hunters' trophy opportunities are impacted by ever more "modern" weapons during earlier seasons.	Recreation	4	Current strategies address allocation of opportunity among hunters. Allocation of season timing (and other factors) may affect recreational satisfaction. Added a strategy to reflect these ideas (p 80).
Buckingham	Encourage women hunters.	Recreation	3	Added women as another example of hunters to recruit (p. 79).
Buckingham	Seems unfair that siblings can't hunt free on private land.	Recreation	3	Current objectives and strategies provide for maximizing recreational opportunities, but specific license changes are beyond the scope of this plan.
Hanover	Concerned that dog hunting reduces trophy potential of Virginia herd.	Recreation	3 through 7	Current objectives and strategies address concerns about fair allocation, quality of hunts, and reducing conflicts between different types of hunters and other citizens.
Henrico	Hunting deer with dogs is unethical.	Recreation	5	Current objective and strategies address ethical considerations.
Prince William	Concern about abuse and constraints associated with Earn-A-Buck	Recreation	3	Objectives already address hunting ethics. Current strategies address potential impediments to hunter participation. There is no evidence of significant abuse of Earn-A-Buck.
Bedford	Concern about abuse associated with Earn-A-Buck	Recreation	3	Objectives already address hunting ethics. There is no evidence of significant abuse of Earn-A-Buck.
Nottoway	Concerned about hound hunting impacts to landowners.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Bedford	Concerned about overharvest/low quality of bucks.	Recreation	4	Quality of bucks is addressed in the current strategies.
Fauquier	Concerned about hound hunting impacts to landowners	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Newport News	Concerned about a lack of access and lack of public land for hunting .	Recreation	3	Current strategies include improving access on private and public lands.
Virginia Beach	Concern about hound hunting impacts to surrounding landowners and hunters.	Recreation	6	Current strategies address this issue that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Pittsylvania	Eliminate hunting with hounds in Pittsylvania County	Recreation	6	Current strategies address this issue that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
York	Thanks for Sunday hunting and urban archery season.	Recreation	3	Supportive comments.
York	Focus on quality rather than quantity.	Recreation	3,4	The goal and current strategies address quality or recreational experience.
York	Concern about allocation between archery and muzzleloader hunting.	Recreation	4	Current strategies address allocation of opportunity among hunters. Allocation of season timing (and other factors) may affect recreational satisfaction. Added a strategy to reflect these ideas (p 80).
York	Phase out dog hunting.	Recreation	3,6	Current strategies address hound hunting, and the plan advocates diverse opportunities including hound hunting.
None given	Prohibit dog hunting for deer.	Recreation	3,6	Current strategies address hound hunting, and the plan advocates diverse opportunities including hound hunting.
Scott	Extend rifle seasons to provide more opportunity for youth. Combine and simplify big game seasons to reduce confusions.	Recreation	3	Current strategies address increasing opportunities (speficially for youth) and removing impediments (to include confusing laws).

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Fairfax	Buckshot wastes meat.	Recreation	5	Current strategies do discourage the wasting of deer meat.
Fairfax	Improve website to more effectively identify hunter access and increase efficiency for urban hunters.	Recreation	3,4,7	Current strategies call for improved communication on hunter opportunities.
Washington	Establish a 6 point antler rule.	Recreation	4	Current strategies address hunting quality.
Augusta	Concerned about poor buck quality and buck:doe ratio; suggests one buck limit.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Northumberland	Concerned with image and ethics of hunting deer with dogs.	Recreation	5, 7	Current goal, objectives, and strategies address ethical hunting and positive hunter image.
Isle of Wight	The plan doesn't address divides in hunting community.	Recreation	6, 7	Current strategies address improved relationship between and among hunters and other citizens.
Isle of Wight	The plan doesn't address hunting conflicts or complaints.	Recreation	6	Current strategies address better identification of hunting activities causing conflicts that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Page	Reducing hunting accidents needs to be its own plan.	Recreation	2	Current strategies address hunting safety.
Fairfax	Concern about abuse associated with Earn-A-Buck	Recreation	3	Objectives already address hunting ethics. There is no evidence of significant abuse of Earn-A-Buck.
Washington	Concerned about young buck age structure; suggests one buck limit.	Recreation	4	Quality of bucks (hunting experience) is addressed in the current strategies.
Washington	Decrease license costs.	Recreation	3	Current strategies address impediments to hunting, such as costs.
Augusta	Put antler restrictions on both bucks for simplicity and to increase buck quality.	Recreation	3,4	Simplification of rules and quality of bucks (hunting experience) are addressed in the current strategies.
Madison	Concern about landowner liability concerns if they lease land to hunters.	Recreation	7	Add a strategy to inform landowners about liability for allowing hunting (p. 82). Virginia Code Section 29.1-509 exempts landowners who provide recreational opportunities to the public from liability for injury or damages, unless they charge a fee or there is a "willful or malicious failure to guard or warn against a dangerous condition, use, or structure."
Caroline	Strategy a. in Recreation Objective 3 unnecessarily singles out dogs.	Recreation	3, 6	As noted, understanding dog vs non-dog as stated within Recreation objective 3 may unnecessarily single out dogs, so this reference was deleted. However developing a better understanding of dog-related issues is pertinent to impacts on landowners and other citizens, so a similar strategy was included under Recreation objective 6 (p. 82).
Caroline	Strategy d in Recreation Objective 3 should not use the word "preserve."	Recreation	3	This strategy supports direction to preserve diverse hunting traditions found in the goal statement.
Caroline	Strategy e in Recreation Objective 3 is too vague.	Recreation	3	To clarify this statement, add "weapons" and "methods" as examples of users for which we need to allocate opportunities (p. 79).
Caroline	Rewrite Recreation objective 7 to take burden off of landowner	Recreation	7	The current objective refers to all stakeholders, including hunters, landowner, etc.
Caroline	Add strategy to Recreation objective 7 noting that some hunting methods are not suitable in populated areas.	Recreation	6, 7	Current strategies already provide for educational, policy, and regulatory approaches for addressing hunting methods that lead to conflict.
Caroline	Recreation objective 7, strategy j. needs to be deleted or it must educate dog hunters on laws pertaining to dogs.	Recreation	7	To be clear that this strategy addresses many potential areas of conflict, other examples of laws and responsibilities are also included (p. 82).
Northampton	Disapprove of Sunday hunting on safety, privacy, and religious grounds.	Recreation	3	Although the plan addresses hunting opportunity and satisfaction within many goal areas, Sunday hunting is never specifically addressed as either a pro or a con.
Rockingham	Hunting licenses are too expensive.	Recreation	3	Current strategies address impediments to hunting, such as costs.
Chesterfield	Stop or restrict dog hunting for deer.	Recreation	3,6	Strategies address hound hunting conflicts, but the plan also advocates diverse opportunities including hound hunting.
Chesterfield	License expense reduces participation.	Recreation	3	Current strategies address impediments to hunting, such as costs.
Loudoun	Early rifle seasons in NOVA orphans fawns and removes bucks.	Recreation	4; 5	Current strategies address ethics of hunting and quality of bucks.
Stafford	Concern about overharvest of bucks; reduce bag limit.	Recreation	4	Current strategies address quality of hunting (bucks).
Prince George	Concern about young buck age structure.	Recreation	4	Current strategies address quality of hunting (bucks).
Nottoway	Consider antler restrictions on Big Woods WMA.	Recreation	4	Current strategies address quality of hunting (bucks).
Scott	Reduce buck bag limit or establish antler restrictions to improve buck quality.	Recreation	4	Current strategies address quality of hunting (bucks).
Charlottesville	Hound hunters need to recognize that conflicts exist.	Recreation	6,7	Current strategies call for increased dialogue and education among hunters and landowners on this issue.
Winchester	Seasons are too confusing and spread out.	Recreation	3	Current strategies address the need to address confusion in regulations while still allocating recreational opportunities among diverse users.
Botetourt	Expand antler point restrictions.	Recreation	4	Current strategies address quality of hunting (bucks).
Loudoun	Concern that late NOVA seasons can conflict with spring turkey hunting.	Recreation	3, 7	Current strategies address hunting impacts on others.
Caroline	Hound hunters don't care for their dogs, their dogs have killed chickens, and dogs/hunters create road hazards.	Recreation	5, 6, 7	Current strategies address hunting activities that impact other citizens, ethics, and present a poor image to the public.

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Chesterfield	Reducing landowner conflicts and improving the public perception of hunting needs to be elevated in the plan. Surveys to document conflicts should be conducted.	Recreation	6,7	The current goal, objectives, and strategies all address conflict between hunters, landowners, and other citizens. Current strategies include surveys to monitor conflicts.
Westmoreland	License expense reduces participation.	Recreation	3	Cost is addressed as a potential impediment in the current strategies.
Westmoreland	Regulations are too confusing.	Recreation	3	Current strategies address the need to address confusion in regulations.
Richmond	Educate youth and the public about hound hunting to improve relationships.	Recreation	7	Current strategies include youth and public education to improve hunter-citizen relationships.
Bath	License expense reduces participation.	Recreation	3	Cost is addressed as a potential impediment in the current strategies.
Washington	Establish antler restrictions and enforce buck bags.	Recreation	4	Current strategies address hunting quality.
Caroline	Desires an older buck age structure.	Recreation	4	Current strategies address quality of hunting (bucks).
Isle of Wight	Concern about hound hunter trespass.	Recreation	6	These issues are addressed in the current objective and strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
King and Queen	Give accurate information on right to retrieve and other dog hunting laws to reduce confusion and address landowner privacy.	Recreation	3, 7	Current strategies address confusing laws and include educating both hunters and landowners about laws and responsibilities associated with hound hunting and other types of hunting.
King and Queen	Hound hunters trespassing on private property endangers hunter access.	Recreation	3	Current strategies address hunter access and connections with landowners.
King and Queen	Repeal the right to retrieve law to address landowner rights.	Recreation	6	Current strategies address impacts of hound hunting on landowners that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders. .
Stafford	Keep the cost of licenses low.	Recreation	3	Cost is addressed in the current strategies as a potential impediment to hunting.
Poquoson	Appreciate Sunday hunting.	Recreation	3	Current strategies encourage maximizing hunting opportunities. Although the plan addresses hunting opportunity and satisfaction within many goal areas, Sunday hunting is never specifically addressed as either a pro or a con.
Mathews	Concern about deer dog "trespass," retrieving dogs without permission, and general conflicts in a modern VA landscape. Suggest restrictions.	Recreation	5,6	These issues are all addressed in the current strategies that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Tazewell	Institute antlered points for bucks to keep interest of youth.	Recreation	3,4	Current strategies address youth recruitment and quality of hunting (bucks).
Bedford	Promote wildlife watching as a revenue source (but barely mentioned in the plan as a revenue source). Develop and promote a plan to supplement/replace hunting revenue.	Recreation	1	Current strategies address the need to improve metrics associated with deer watching. The narrative of this objective recognizes the economic importance. Replacing/supplementing hunting revenue to fund all Department responsibilities is an Agency-wide problem that extends well beyond the needs of the deer management program.
Manassas, Clarke Co., and Prince William Co.	Objective 7. Add heading for "Potential Strategies"	Recreation	7	Correction made.
Buckingham	Consider economics in feeding restrictions.	Recreation; Damage	5; 5	Current strategies address fair chase and potential disease risks associated with feeding and baiting; diseases could have economic implications to domestic animals and the sport of hunting.
Amelia	WMAs need to be improved for hunting.	Recreation; Habitat	4; 3	Current strategies address the need to increase quality deer hunting and improve deer habitat on public lands.
Stafford	Baiting should be considered.	Recreation; Population	5; 5	Baiting is discouraged by the plan for ethical and disease risk reasons.
Henrico	Maintain strong opposition to baiting.	Recreation; Population	5; 5	Baiting is discouraged by the plan for ethical and disease risk reasons.
Pittsylvania	Baiting should be considered.	Recreation; Population	5; 5	Baiting is discouraged by the plan for ethical and disease risk reasons.
Pittsylvania	Allow baiting during late seasons.	Recreation; Population	5; 5	Baiting is discouraged by the plan for ethical and disease risk reasons.
Henrico	Allow baiting.	Recreation; Population	5; 6	Baiting is discouraged by the plan for ethical and disease risk reasons.
Pittsylvania	Allow baiting west of Rt. 29	Recreation; Population	5; 7	Baiting is discouraged by the plan for ethical and disease risk reasons.
Chesterfield	Recent regulation changes ignore wishes of average hunter (e.g., ban on natural lures, Sunday hunting).	Recreation; Population	3; 5	Current strategies support steps to prevent introduction of infectious diseases. Although the plan addresses hunting opportunity and satisfaction within many goal areas, Sunday hunting is never specifically addressed as either a pro or a con.
Fairfax	Need a new Hunters for the Hungry location in Fairfax Co.	Recreation; Population	4; 3	Current strategies encourage support of Hunters for the Hungry program.
Prince George	Concerned about poor buck quality and too many does being shot; suggests limit of one buck and one doe in southern Piedmont.	Recreation; Population	4; 1	Quality of bucks (hunting experience) and antlerless hunting opportunities are addressed in the current strategies.
Northumberland and Hanover (2 identical comments)	Hound hunting for deer no longer fits in Virginia's landscape, and needs to be restricted.	Recreation; Supply and Demand	6	These issues are addressed in the current objective and strategies and background text that ensure that hunting is sportsmanlike, ethical, respect other citizen and landowners, while encouraging support and tolerance among stakeholders.
Fairfax	Need to show abundance data for Fairfax, Arlington, and other urban areas.	Supply and Demand	NA	Added a note to caption of Fig 23: Fairfax County is mostly hunted by archery equipment, which yields lower deer harvests than firearms and would produce an incomparable index (p. 33).

County/City of Residence	Summary of Comment	Area of Plan: Goal, Chapter	Objective	Changes to Plan and/or Response
Fairfax	Data on Virginians desire for lower deer population is presented in a biased manner.	Supply and Demand	NA	Data was re-checked and it is correct.
Fairfax	Took issue with categorizing NLCD "developed" land as poor deer habitat.	Supply and Demand	NA	Added an explanation noting that developed land is excluded from most basic habitat analyses because of limited hunting opportunities, which would confound the deer population density index, (antlered deer kill per square mile of (huntable) habitat) (p. 27).
Fairfax	Assigning an HSI value of 0 to "developed" land is a mistake. It is good habitat.	Supply and Demand	NA	Point is noted for future modeling, and the need to improve habitat evaluation is addressed in current strategies. Added a sentence in the background text noting that, due to the broad scale of this model, micro-habitats could be under- or over-valued (e.g., urban parks and greenways) (p. 28).
Fairfax	Concerns about how Fairfax County population index: - need an explanation in the text why Fairfax is not comparable (e.g., archery, fewer hunters, EAB regs., limited access). It is referenced in Appendix 8. - black color should be in the legend. - a map should show all non-firearms areas with a better index.	Supply and Demand	NA	Added a note to caption of Fig 23: Fairfax County is mostly hunted by archery equipment, which yields lower deer harvests than firearms and would produce an incomparable index (p.33).
Fairfax	Just provided other ideas about the CCC study results.	Supply and Demand	NA	Although the desire for more detail about specific items of interest is understandable, the style of the plan attempts to strike a balance between readability and providing a lot of technical information. More information on the study is available upon request.
Fairfax	While opposition to traditional management is greater in urban than rural areas, should also note strong support in urban areas. Can cite surveys conducted in 2010 (by Fairfax County biologist) and 2014 (by Great Falls Citizens Association) to document this. But also should note opinions are strongly divided.	Supply and Demand	NA	Data about support for hunting in urban areas have been included. (p. 40).
Fairfax	Add to the effects of heavy deer browse in the last paragraph: "... increase the competitive success of non-native invasive plants over native "	Supply and Demand	NA	Change made (p. 55).
Fairfax	It is irrelevant whether there is a linear relationship between deer populations and abundance of black-legged ticks. We suggest that sentence be removed.	Supply and Demand	NA	Term "linear" has been removed (p. 55). However, it is important to note the lack of a relationship above some minimal threshold, which has already been noted in the plan text.
Manassas, Clarke Co., and Prince William Co.	Wants ecological carrying capacity also referenced in intro paragraph for DEER PROGRAM SUPPLY AND DEMAND	Supply and Demand	NA	The term "ecological carrying capacity" is unclear because it can mean "biological carrying capacity;" both denote levels at which the habitat can *sustain* deer, and both may include a threshold below which damage to the deer's (or other wildlife) habitat occur. The concept of ecological impacts and their basis in deer management are addressed.
Manassas, Clarke Co., and Prince William Co.	Under Deer Habitat, wants an additional reference that agricultural and suburban landscapes provide ideal habitats.	Supply and Demand	NA	The habitat section of the background text already makes multiple references to how agricultural and urban landscapes impact deer populations. However, a sentence has been added in reference to the habitat suitability model noting that, due to the broad scale of this model, micro-habitats could be under- or over-valued (e.g., urban parks and greenways) (p. 28). More discussion about developed lands, deer populations, and human interactions can be found in the Demand section.
Manassas, Clarke Co., and Prince William Co.	Need to comment that Triassic Basin sandstones are very high in phosphorous and are classified thus by DEQ related to water quality compliance.	Supply and Demand	NA	Although the desire for more detail about specific items of interest is understandable, the style of the plan attempts to strike a balance between readability and providing a lot of technical information.
Manassas, Clarke Co., and Prince William Co.	Wants to see suburban landscapes as a specific habitat type.	Supply and Demand	NA	In addition to the new sentence about the habitat suitability model above, another clause has been added noting that developed land is excluded from most basic habitat analyses because of limited hunting opportunities, which would confound the deer population density index, (antlered deer kill per square mile of (huntable) habitat) (p. 27). More discussion about development is found in the Demand section.
Manassas, Clarke Co., and Prince William Co.	Feels private land habitat has been ignored while only discussing public land habitats.	Supply and Demand	NA	Public land, particularly in the western part of VA, has been of historical and current interest. A survey of private land habitats for deer can be accomplished with less detail. Developed lands, deer populations, and human interactions can be found in the Demand section.
Manassas, Clarke Co., and Prince William Co.	Deer browsing as a reason declining quality of forest habitat on public lands.	Supply and Demand	NA	"Deer herbivory" added as a potential reason for decline (p. 29).
Manassas, Clarke Co., and Prince William Co.	Because grasses do not provide the best habitat, would remove mention of them in early successional habitats.	Supply and Demand	NA	Change made (p. 30). Although deer eat some grass, it is generally less preferred than broad-leaved plants.
Manassas, Clarke Co., and Prince William Co.	Wants to cite VA data that coyotes are not significant predators of deer.	Supply and Demand	NA	While deer research conducted in VA (e.g., Quantico, Virginia Tech) indicate that coyotes do predate on deer, data is lacking to conclude how significant the impact is.

Appendix 3. Major deer regulation and season changes.

Antler Point Restrictions (APR)

- 1985, APR initiated on Radford Army Ammunition Plan (RAAP) public deer hunts.
- 1997, APR initiated on a Quality Deer Management (QDM) portion of Fairystone Farms WMA.
- 2006, APR initiated on Featherfin WMA.
- 2006, Shenandoah County APR initiated.
- 2011, APR expanded to Rockingham County.
- 2013, APR expanded to Alleghany, Augusta, Bath, Highland, and Rockbridge counties.

Archery

- 1954, first archery deer season held in Virginia.
- 1985, archery license created.
- 1993, archery extended forward a week to open the first Saturday in October.
- 1996, crossbows allowed for persons who have disabilities which prohibit them from hunting with traditional archery equipment.
- 2002, urban archery (UA) season created.
- 2003, Saturday openings initiated for archery, muzzleloading, and firearms deer seasons.
- 2003, late portion of UA added (January through March).
- 2005, crossbow license created and crossbows made legal for all deer hunters.
- 2008, early September antlerless only archery season initiated on NOVA.
- 2014, April antlerless only archery season initiated in NOVA.
- 2014, archery and crossbow license combined.

Bag Limits

- 1980, bag limit increased to two deer per season (one per day), west of the Blue Ridge.
- 1991, two per day bag limit and Saturday either-sex deer hunting day initiated in most of Virginia.
- 1993, tags removed from archery and muzzleloading licenses; all tags located on big game license.
- 1993 second early Saturday either-sex deer hunting day initiated.
- 1993, statewide deer bag limit of two per day three per license year (one of which must be antlerless).
- 1997, daily bag limit reduced to one deer per day west of the Blue Ridge.
- 2004, two antlerless only deer tags added to bear, deer, turkey (big game) license, bringing total to six deer tags (three either-sex and three antlerless only).
- 2008, Earn A Buck (EAB) initiated in eight counties (one antlerless required before second antlered).
- 2013, 2:1 EAB initiated in four NOVA counties (two antlerless required before second antlered).

Bait and feeding

- 1999, feeding of bear, deer, and turkey prohibited on Department and National Forest lands.
- 2006, September through January deer feeding ban initiated.
- 2013, feeding prohibition expanded (to all areas with a deer season open, removal before hunting).
- 2014, report on removal of prohibition on baiting submitted to Virginia Senate.

Bonus Deer Permits

- 1991, bonus deer permits created by statute (number and type to be set by Board).
- 1991-92, one antlerless and one either-sex tag per hunter per year east of the Blue Ridge and west of the Blue Ridge in Botetourt, Clarke, Frederick, and Warren counties only
- 1993, bonus deer permits made unlimited and statewide restricted to private lands and “special deer management areas.”
- 1997, bonus deer permits restricted on one set per year per hunter.

- 1999, bonus deer permits made antlerless only and unlimited.
- 2009, bonus deer permits increased from two to six antlerless only deer tags.

Chronic Wasting Disease (CWD)

- 2002 Virginia begins CWD surveillance.
- 2002, implemented captive deer movement restrictions.
- 2005 CWD found in Hampshire County WV.
- 2005, implemented deer carcass importation restrictions.
- 2006, prohibited feeding deer during September 1 through early January.
- 2008, required mandatory testing of hunter-killed deer.
- 2009 CWD found in Frederick County VA.
- 2010, developed CWD Response Management Actions and put them in regulation (2013).
- 2013, prohibited importation of carcasses from an enclosure anywhere.
- 2015, prohibited possession or use of deer scents/lures that contain natural deer urine or other bodily fluids used for the purposes of taking, attempting to take, attracting, or scouting wildlife in VA.

Firearms

- 1940, 50 of 98 counties still closed to deer hunting (see table below)

County	Year Opened	County	Year Opened	County	Year Opened
Accomack	1944	Giles	1946	Rappahannock	1952
Amherst	1944	Grayson	1945	Richmond	1942
Arlington		Greene	1953	Roanoke	1946
Augusta	1944	Henry	1961	Rockbridge	1949
Bedford	1962	Lancaster	1944	Rockingham	1945
Bland	1946	Lee	1949	Russell	1952
Botetourt	1946	Loudoun	1959	Scott	1945
Buchanan	1999	Madison	1954	Smyth	1945
Carroll	1953	Mathews	1944	Spotsylvania	1946
Clarke	1954	Montgomery	1963	Stafford	1952
Craig	1946	Northampton	1972	Tazewell	1946
Culpeper	1952	Northumberland	1944	Warren	1947
Dickenson	1960	Orange	1952	Washington	1945
Fairfax	1958	Page	1945	Westmoreland	1942
Fauquier	1953	Patrick	1957	Wise	1945
Floyd	1959	Prince William	1957	Wythe	1945
Franklin	1958	Pulaski	1954		

- 1946, first rifle restriction; unlawful to shoot a deer with a rifle of caliber less than .25 in counties west of the Blue Ridge Mountains.
- 1948, unlawful (statewide) to hunt or kill a deer with a rifle of caliber less than .25
- 1957, unlawful (statewide) to hunt or kill big game with a rifle of caliber less than .23. (Winchester's .243 was introduced in 1955.)

- 1993, firearms either-sex deer hunting days split between public and private lands west of the Blue Ridge Mountains for the first time.
- 1999, youth antlerless deer regulation initiated.
- 1999, deer season opened in Buchanan County (the last county in VA to open a modern deer season).
- 1999, Clarke and private lands in Frederick have seven week firearms deer season.
- 2001 Patrick County extended from 2 to 4 weeks.
- 2003, Saturday openings initiated for archery, muzzleloading, and firearms deer seasons.
- 2008, late antlerless only NOVA firearms season extended to three months (last Saturday in March)
- 2008, either-sex firearms deer hunting days split in western Rockingham County.
- 2009, youth deer hunting day started (last Saturday in September).
- 2013, apprentice license holders added to September youth deer hunting day.

Kill Permits

- 1950, 29.1-529 enacted by the Virginia General Assembly (27 changes made since 1950 and 14 changes since 1994).
- 1994, antlerless only, some exceptions
- 1998, discretion for non-commercial lands under 5 acres
- 1999, 24 hour disposal of carcasses; land must be hunted in previous year; complaint process defined
- 2002, time limits within close proximity to residential areas
- 2003, fees allowed for non-commercial permits; restrictions for convicted game law violators
- 2004, killing over bait in cities, towns, and some counties when authorized by Director
- 2009, impeding made unlawful.
- 2010, defined how carcasses may be used.

Miscellaneous Important Dates

- 1900, Federal Lacey Act effectively puts an end to commercial market hunting.
- 1916, Virginia Game Commission is created.
- 1938, Pittman-Robertson Federal Aid in Wildlife Restoration Act passed.
- 1952, Virginia Game Commission initiates statewide program to collect data on deer.
- 1953, Virginia hires first deer biologist.
- 1988, Damage Control Assistance Program (DCAP) and Deer Management Assistance Program (DMAP) started.
- 1993, Board puts moratorium on deer farming permits.
- Mid 1990s, created DPOP (Deer Population Reduction Program) to allow for extended deer seasons (early and late) on public lands in Fairfax County and later to the rest of Virginia.
- 2001, high fencing of deer is made illegal by Virginia General Assembly (29.1-525.1).

Muzzleloading

- 1973, first late “primitive” weapon muzzleloading season is held west of the Blue Ridge.
- 1989, inline muzzleloaders allowed.
- 1990, muzzleloading license is created.
- 1991, early muzzleloading season is initiated (one week with one deer tag).
- 1993, early muzzleloading season extended to two weeks.
- 1993, sabots allowed.
- 1995, scopes allowed.
- 1997, early muzzleloading west of the Blue Ridge restricted to one antlered buck.
- 1999, copper bullets allowed in muzzleloaders.
- 2003, Saturday openings initiated for archery, muzzleloading, and firearms deer seasons.
- 2006, smokeless powder allowed in muzzleloaders.

- 2009, removed the one antlered buck limit from the early muzzleloading season west of the Blue Ridge.
- 2008, early muzzleloading season west of the Blue Ridge extended from one to two weeks in length.
- 2014, blaze orange required of deer hunters during muzzleloading deer seasons (to and from stand).
- 2014, muzzleloading pistols allowed (with restrictions).

Northern Virginia

- 1991, initiated bonus deer permit system (2 tags).
- Mid 1990s, created a DPOP (Deer Population Reduction Program) to allow for extended deer seasons (early and late) on public lands in Fairfax County.
- 1999, bonus deer permits were made unlimited and for antlerless deer only.
- 1999 and 2000, first regulated rifle hunt held on Upper Potomac Regional Park (130 deer taken).
- 2000, 855 deer killed on DPOP permits in Fairfax and Loudoun.
- 2000, along with Fairfax County Regional Park Authority (FCPA) developed a pilot archery program.
- 2001, 763 deer killed on DPOP permits in Fairfax and Loudoun.
- 2001 and winter 2002, working with FCPA archery hunting program implemented on Fountainhead (Northern Virginia Regional Park Authority) and Huntley Meadows (FCPA).
- 2002, archery hunting program initiated on Bull Run and Upper Potomac regional parks.
- 2002, urban archery season is initiated in Fairfax County.
- 2002, 610 deer killed on DPOP permits in Fairfax and Loudoun.
- 2004 increased the number of deer tags on the big game license from 4 to 6 deer tags by adding two new antlerless only deer tags (doubling the antlerless deer season bag limit).
- 2006, late antlerless only firearms deer season initiated (1 month).
- 2008, early antlerless only September archery season initiated in Loudoun and Prince William.
- 2008, late firearms season extended two months to end of March.
- 2008, Earn-A-Buck initiated.
- 2009, increased the number of antlerless only deer tags on bonus deer permits from 2 to 6.
- 2011, unlimited daily deer bag limit initiated.
- 2011, issued 4,300 DPOP deer tags for 22 properties in the Fairfax County.
- 2012, issued 2000 DPOP tags to the Fairfax County Deer Management Program.
- 2014, September antlerless deer only firearms deer season initiated.
- 2014, April antlerless only archery deer season initiated.

Safety

- 1987, blaze orange required in firearms deer season.
- 1988, hunter education required.
- 2014, blaze orange required for deer hunters during muzzleloading deer seasons (to and from stand).

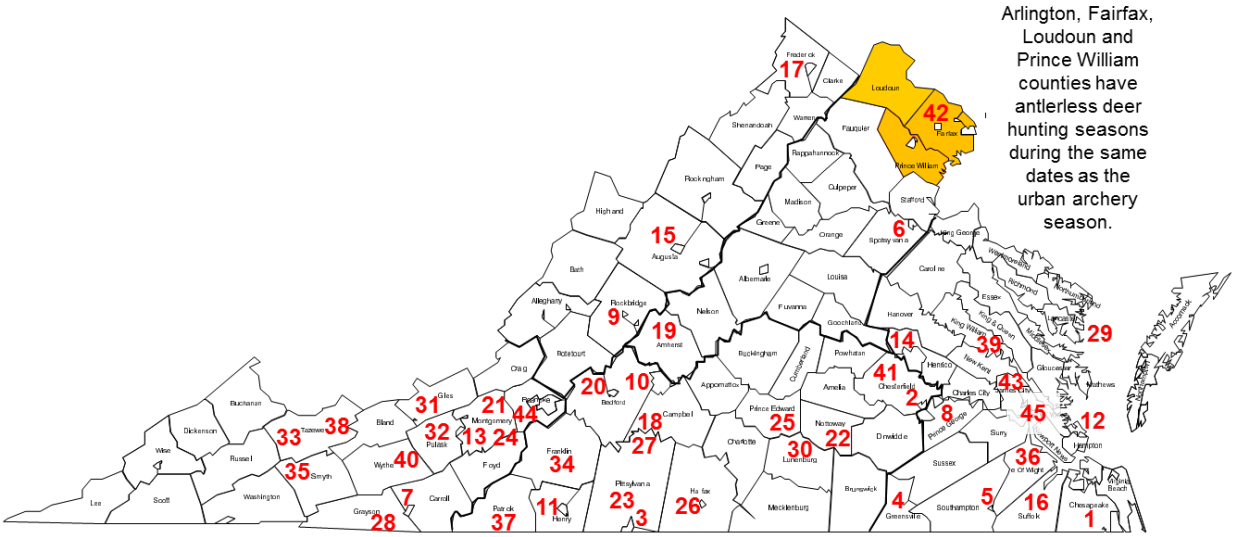
Tagging and Checking

- 1947, mandatory check station system initiated.
- 1993, deer tags removed from archery and muzzleloading licenses and put on big game license.
- 2004, telephone checking system initiated.
- 2007, Internet checking system initiated.

Youth

- 1999, youth antlerless deer regulation initiated.
- 2009, youth deer hunting day started (last Saturday in September).
- 2013, apprentice license holders added to youth deer hunting day.

Appendix 4. Localities participating in the urban archery deer hunting season, 2015.



Cities		Towns		Counties	
1	Chesapeake	18	Altavista	41	Chesterfield
2	Colonial Heights	19	Amherst	42	Fairfax
3	Danville	20	Bedford	43	James City
4	Emporia	21	Blacksburg	44	Roanoke
5	Franklin	22	Blackstone	45	York
6	Fredericksburg	23	Chatham		
7	Galax	24	Christiansburg		
8	Hopewell	25	Farmville		
9	Lexington	26	Halifax		
10	Lynchburg	27	Hurt		
11	Martinsville	28	Independence		
12	Poquoson	29	Irvington		
13	Radford	30	Kenbridge		
14	Richmond	31	Pearisburg		
15	Staunton	32	Pulaski		
16	Suffolk	33	Richlands		
17	Winchester	34	Rocky Mount		
		35	Saltville		
		36	Smithfield		
		37	Stuart		
		38	Tazewell		
		39	West Point		
		40	Wytheville		

Appendix 5 – Deer habitat data for all counties and cities in Virginia based on 2006 satellite imagery from U.S. Geological Survey's National Land Cover Dataset. All numerical data are in square miles (mi^2).

County/City	Total Area	Developed	Barren	Forest	Scrub/ Shrub	Grassland	Pasture/ Hay	Crop	Woody Wetland	Emergent Wetland	Habitat[1]	National Park	Habitat[2]	%	Public Land	% Public	% Private
Accomack	455.0	30.5	7.8	44.7	9.6	0.9	40.0	89.3	110.1	91.1	385.7	22.9	362.8	80%	29.6	8%	92%
Albemarle	723.0	68.1	0.5	484.4	2.3	2.9	157.9	3.0	0.6	0.0	651.1	21.9	629.2	87%	0	0%	100%
Alleghany	445.0	25.6	0.4	401.2	0.3	1.8	15.6	1.2	0.0	0.0	420.1	0.0	420.1	94%	221.8	53%	47%
Amelia	357.0	10.0	1.2	224.6	13.6	17.6	65.9	3.6	18.3	0.3	343.9	0.0	343.9	96%	4.0	1%	99%
Amherst	475.0	36.9	0.1	367.3	1.6	0.3	66.2	1.4	0.0	0.0	436.8	3.6	433.2	91%	89.3	20%	80%
Appomattox	334.0	12.7	1.1	219.6	13.0	6.9	74.9	2.9	3.2	0.0	320.5	2.8	317.7	95%	17.7	6%	94%
Arlington	26.0	23.5	0.0	2.4	0.0	0.0	0.0	0.0	0.2	0.0	2.6	2.1	0.5	2%	0.8	31%	69%
Augusta	970.0	85.4	0.6	570.9	0.2	0.0	289.4	23.8	0.0	0.0	884.3	24.0	860.3	89%	320.1	36%	64%
Bath	532.0	19.4	0.2	481.1	0.2	0.5	28.3	1.2	0.0	0.0	511.3	0.0	511.3	96%	299.3	59%	41%
Bedford	755.0	58.1	0.1	476.8	3.0	0.7	207.9	4.8	0.0	0.0	693.2	10.7	682.5	90%	34.8	5%	95%
Bland	359.0	12.2	0.1	271.6	1.8	3.5	68.4	0.4	0.4	0.0	346.1	0.0	346.1	96%	119.7	35%	65%
Botetourt	543.0	42.2	0.6	405.0	0.2	0.8	89.3	2.5	0.0	0.0	497.8	3.6	494.2	91%	128.9	26%	74%
Brunswick	566.0	29.6	1.5	386.2	19.5	30.4	64.7	17.5	15.9	0.4	534.6	0.0	534.6	94%	10.0	2%	98%
Buchanan	504.0	32.9	4.9	428.4	0.5	21.4	15.1	0.1	0.0	0.0	465.5	0.0	465.5	92%	0	0%	100%
Buckingham	581.0	16.3	2.4	436.4	21.0	18.5	73.6	1.8	8.7	0.2	560.2	0.0	560.2	96%	23.4	4%	96%
Campbell	504.0	35.7	0.7	309.4	14.5	9.7	127.1	3.6	1.7	0.1	466.1	0.0	466.1	92%	0	0%	100%
Caroline	533.0	35.7	1.0	312.4	57.3	2.3	28.3	43.5	51.1	1.0	495.9	0.1	495.8	93%	117.9	24%	76%
Carroll	476.0	34.3	0.3	296.8	2.5	3.2	138.8	0.3	0.3	0.0	441.9	6.2	435.7	92%	16.8	4%	96%
Charles City	183.0	7.5	1.4	94.7	13.0	1.3	10.6	20.5	30.0	3.7	173.8	0.0	173.8	95%	8.4	5%	95%
Charlotte	475.0	15.3	1.2	297.0	17.5	21.6	96.1	2.6	22.5	0.4	457.7	0.0	457.7	96%	1.8	0%	100%
Chesterfield	426.0	122.2	1.2	234.1	8.7	6.0	20.5	8.4	21.6	1.7	301.0	0.1	300.9	71%	14.5	5%	95%
Clarke	177.0	11.7	0.0	65.6	0.0	0.1	93.8	4.3	0.3	0.5	164.6	0.0	164.6	93%	0.5	0%	100%
Craig	331.0	11.6	0.0	282.5	0.2	1.7	29.5	3.5	0.0	0.0	317.4	0.0	317.4	96%	182.6	58%	42%
Culpeper	381.0	21.2	2.3	166.7	6.3	5.6	132.9	38.1	5.8	1.8	357.2	0.0	357.2	94%	0.5	0%	100%
Cumberland	298.0	9.0	0.5	203.5	9.9	10.0	46.0	2.1	17.0	0.2	288.7	0.0	288.7	97%	26.5	9%	91%
Dickenson	332.0	24.6	2.1	268.1	0.6	22.1	14.0	0.1	0.0	0.0	304.9	0.0	304.9	92%	24.8	8%	92%
Dinwiddie	504.0	27.5	1.1	320.9	26.5	15.2	51.8	34.4	25.2	0.3	474.3	2.9	471.4	94%	20.5	4%	96%
Essex	258.0	11.8	0.0	128.0	17.7	0.6	23.7	39.9	28.9	7.0	245.8	0.0	245.8	95%	1.9	1%	99%
Fairfax	395.0	221.4	0.4	142.0	4.0	0.7	4.3	4.8	15.6	1.9	173.3	5.6	167.7	42%	16.2	9%	91%
Fauquier	650.0	45.6	0.6	298.9	9.1	3.2	219.7	59.2	13.2	0.4	603.7	0.0	603.7	93%	22.1	4%	96%
Floyd	381.0	19.7	0.1	247.2	1.3	1.5	110.8	0.4	0.6	0.1	361.9	7.9	354.0	93%	0	0%	100%
Fluvanna	287.0	12.2	0.6	210.3	6.8	6.8	44.7	0.8	4.1	0.1	273.6	0.0	273.6	95%	1.7	1%	99%
Franklin	692.0	30.5	0.6	473.0	3.9	9.2	173.2	2.2	0.3	0.1	661.9	6.2	655.7	95%	1.5	0%	100%
Frederick	415.0	47.8	0.8	236.7	0.0	1.0	121.0	6.0	0.1	0.1	364.9	2.5	362.4	87%	8.0	2%	98%
Giles	357.0	15.7	0.5	291.4	0.5	1.3	46.7	1.5	0.2	0.0	341.6	0.0	341.6	96%	101.0	30%	70%

County/City	Total Area	Developed	Barren	Forest	Scrub/ Shrub	Grassland	Pasture/ Hay	Crop	Woody Wetland	Emergent Wetland	Habitat[1]	National Park	Habitat[2]	%	Public Land	% Public	% Private
Gloucester	217.0	19.7	0.5	91.2	11.4	1.0	7.3	22.8	52.7	10.4	196.8	0.0	196.8	91%	1.4	1%	99%
Goochland	284.0	18.5	1.2	183.1	9.7	8.8	47.5	4.4	9.3	0.2	263.0	0.0	263.0	93%	0	0%	100%
Grayson	443.0	21.5	0.7	287.4	4.4	4.4	124.3	0.6	0.1	0.0	421.2	1.7	419.5	95%	59.8	14%	86%
Greene	157.0	13.3	0.3	103.8	0.0	0.5	36.7	1.6	0.0	0.0	142.6	23.6	119.0	76%	2.9	2%	98%
Greensville	295.0	17.6	0.3	139.8	22.7	8.1	16.2	45.7	44.8	0.2	277.5	0.0	277.5	94%	4.2	2%	98%
Halifax	819.0	43.4	2.2	500.1	26.0	60.2	152.3	5.8	30.2	0.5	775.1	0.0	775.1	95%	5.8	1%	99%
Hanover	473.0	49.5	1.3	238.0	33.3	2.3	51.2	48.2	47.0	0.2	420.2	1.3	418.9	89%	0	0%	100%
Henrico	238.0	100.8	1.5	70.7	7.8	0.9	8.3	18.1	28.8	0.9	135.5	2.0	133.5	56%	0.4	0%	100%
Henry	382.0	35.2	0.2	271.8	7.1	17.1	49.4	0.4	0.6	0.1	346.5	0.0	346.5	91%	5.7	2%	98%
Highland	416.0	15.4	0.2	330.6	0.1	0.1	67.3	1.4	0.1	0.1	399.7	0.0	399.7	96%	113.9	28%	72%
Isle of Wight	316.0	28.5	0.6	111.5	16.2	5.6	25.3	69.9	50.9	8.3	287.7	0.0	287.7	91%	2.4	1%	99%
James City	143.0	27.8	0.5	66.2	4.9	0.4	2.7	10.6	20.2	8.6	113.6	4.4	109.2	76%	6.2	5%	95%
King & Queen	316.0	11.7	0.4	178.7	29.2	3.2	18.2	38.3	30.4	5.9	303.9	0.0	303.9	96%	6.6	2%	98%
King George	180.0	14.4	0.7	95.6	8.3	0.6	12.7	22.9	20.5	2.2	162.8	0.0	162.8	90%	12.3	8%	92%
King William	275.0	12.1	0.3	138.9	17.9	1.3	17.0	41.6	37.4	8.4	262.5	0.0	262.5	95%	3.8	1%	99%
Lancaster	133.0	10.7	0.3	65.8	5.9	0.7	8.2	21.4	17.8	2.3	122.1	0.0	122.1	92%	1.7	1%	99%
Lee	437.0	31.1	3.2	273.1	1.3	84.2	44.0	0.2	0.0	0.0	402.8	11.6	391.2	90%	22.4	6%	94%
Loudoun	520.0	102.7	0.3	169.2	4.4	1.9	194.4	39.4	6.5	0.4	416.2	0.6	415.6	80%	0	0%	100%
Louisa	497.0	23.6	1.1	317.2	43.3	12.0	63.7	17.7	18.7	0.2	472.8	0.0	472.8	95%	0	0%	100%
Lunenburg	432.0	13.2	3.3	285.3	26.2	26.0	65.1	2.6	9.9	0.1	415.2	0.0	415.2	96%	0	0%	100%
Madison	321.0	18.2	0.1	194.4	0.0	1.2	97.8	8.3	0.6	0.2	302.5	51.1	251.4	78%	11.2	4%	96%
Mathews	86.0	5.6	0.4	25.7	4.2	0.2	2.8	9.8	30.3	6.3	79.3	0.0	79.3	92%	0	0%	100%
Mecklenburg	624.0	30.6	1.4	370.3	20.1	53.5	126.6	9.6	14.7	0.3	595.1	0.0	595.1	95%	28.0	5%	95%
Middlesex	130.0	8.8	0.2	63.9	7.6	0.6	8.1	24.6	14.7	2.2	121.7	0.0	121.7	94%	0	0%	100%
Montgomery	388.0	50.2	0.3	247.1	0.3	1.5	84.5	3.6	0.1	0.0	337.1	0.0	337.1	87%	34.3	10%	90%
Nelson	472.0	30.0	0.1	373.3	3.1	1.4	60.9	1.6	0.0	0.0	440.3	3.2	437.1	93%	33.8	8%	92%
New Kent	210.0	15.9	0.1	118.4	13.8	0.9	6.1	16.9	29.5	8.3	193.9	0.0	193.9	92%	1.6	1%	99%
Northampton	207.0	14.6	6.2	25.2	5.0	0.2	24.7	53.1	23.7	61.2	193.1	0.0	193.1	93%	18.0	9%	91%
Northumberland	192.0	12.2	0.2	84.6	7.1	0.7	20.2	37.2	26.4	3.3	179.5	0.0	179.5	93%	0	0%	100%
Nottoway	315.0	18.7	0.9	202.6	10.8	12.5	53.6	2.1	12.9	0.2	294.7	0.0	294.7	94%	39.3	13%	87%
Orange	342.0	21.3	0.9	175.8	14.5	3.4	99.3	21.4	3.9	0.5	318.8	2.0	316.8	93%	0	0%	100%
Page	311.0	26.0	0.0	210.1	0.0	0.1	69.3	3.8	0.0	0.0	283.3	59.8	223.5	72%	43.0	15%	85%
Patrick	483.0	22.1	0.4	374.7	6.3	9.9	69.5	0.7	0.2	0.0	461.3	8.3	453.0	94%	13.7	3%	97%
Pittsylvania	971.0	60.9	1.6	565.1	30.7	43.8	255.1	8.4	4.3	0.1	907.5	0.0	907.5	93%	4.2	0%	100%
Powhatan	261.0	9.0	0.9	180.6	6.2	7.8	41.0	2.4	11.7	0.4	250.1	0.0	250.1	96%	9.5	4%	96%
Prince Edward	353.0	14.9	1.1	230.6	12.0	11.7	64.3	1.2	13.8	0.1	333.7	0.0	333.7	95%	21.2	6%	94%
Prince George	266.0	23.2	0.5	132.4	30.4	2.6	12.5	31.9	30.0	1.5	241.3	0.8	240.5	90%	14.7	6%	94%
Prince William	338.0	103.4	0.6	151.5	6.1	1.4	25.7	28.5	19.5	1.7	234.4	24.2	210.2	62%	44.2	19%	81%
Pulaski	321.0	28.3	0.2	185.4	0.6	1.8	103.9	1.7	0.2	0.0	293.6	0.0	293.6	91%	38.8	13%	87%
Rappahannock	267.0	12.8	0.0	179.7	0.0	0.4	72.1	0.7	0.2	0.1	253.2	48.7	204.5	77%	0	0%	100%
Richmond	191.0	8.2	0.0	97.6	9.2	1.0	17.6	31.2	20.3	6.0	182.9	0.0	182.9	96%	9.1	5%	95%

County/City	Total Area	Developed	Barren	Forest	Scrub/ Shrub	Grassland	Pasture/ Hay	Crop	Woody Wetland	Emergent Wetland	Habitat[1]	National Park	Habitat[2]	%	Public Land	% Public	% Private
Roanoke	251.0	51.8	0.2	174.4	0.4	1.3	21.7	1.3	0.0	0.1	199.2	5.2	194.0	77%	16.5	8%	92%
Rockbridge	600.0	43.5	0.3	415.4	0.2	0.1	134.4	3.1	0.0	0.0	553.2	2.7	550.5	92%	133.8	24%	76%
Rockingham	851.0	58.2	1.0	504.1	0.0	0.5	257.0	29.3	0.0	0.0	790.9	59.0	731.9	86%	219.6	28%	72%
Russell	475.0	32.9	2.0	269.5	3.1	14.6	152.6	0.6	0.0	0.0	440.4	0.0	440.4	93%	10.2	2%	98%
Scott	537.0	28.5	0.6	381.1	3.2	19.7	103.3	0.9	0.5	0.0	508.7	0.0	508.7	95%	54.8	11%	89%
Shenandoah	512.0	37.3	0.5	314.9	0.0	0.2	145.2	10.3	0.0	0.0	470.6	0.8	469.8	92%	119.2	25%	75%
Smyth	452.0	23.3	0.5	300.2	4.7	2.1	119.6	1.5	0.3	0.0	428.4	0.0	428.4	95%	136.6	32%	68%
Southampton	600.0	35.7	0.1	210.4	47.3	10.1	34.7	146.2	113.5	1.1	563.3	0.0	563.3	94%	0.2	0%	100%
Spotsylvania	401.0	46.2	1.5	224.6	44.9	2.2	35.4	21.7	23.4	0.4	352.6	13.7	338.9	85%	4.6	1%	99%
Stafford	270.0	44.1	1.6	161.9	10.0	2.1	13.5	16.5	17.6	2.8	224.4	0.1	224.3	83%	53.9	24%	76%
Surry	279.0	15.0	0.1	122.3	34.3	4.1	21.6	37.4	41.2	3.1	264.0	0.7	263.3	94%	6.6	3%	98%
Sussex	491.0	26.0	1.7	242.1	59.8	6.6	24.8	56.8	72.3	0.6	463.0	0.0	463.0	94%	0	0%	100%
Tazewell	520.0	41.1	1.8	336.4	4.9	22.7	111.5	1.1	0.1	0.0	476.7	0.0	476.7	92%	22.9	5%	95%
Warren	214.0	25.8	0.1	139.3	0.0	0.3	47.9	0.7	0.3	0.1	188.6	23.6	165.0	77%	13.0	7%	93%
Washington	563.0	35.5	0.6	329.5	5.1	4.8	186.9	2.3	0.5	0.0	529.1	0.0	529.1	94%	58.1	11%	89%
Westmoreland	229.0	14.3	0.3	100.2	9.9	0.4	22.0	46.9	31.6	3.3	214.3	0.7	213.6	93%	2.4	1%	99%
Wise	404.0	31.4	21.2	285.0	1.5	39.2	26.0	0.2	0.0	0.0	351.9	0.0	351.9	87%	66.9	19%	81%
Wythe	463.0	28.5	0.4	244.8	0.9	1.8	184.8	2.1	0.3	0.1	434.8	0.0	434.8	94%	103.9	24%	76%
York	106.0	30.6	0.2	47.2	2.7	0.5	0.8	3.7	15.9	4.3	75.1	8.1	67.0	63%	31.9	42%	58%
City																	
Alexandria	15.0	13.9	0.0	0.9	0.0	0.0	0.0	0.0	0.2	0.0	1.1	0.4	0.7	5%	0	0%	100%
Bedford	6.8	4.2	0.0	1.5	0.0	0.0	1.1	0.0	0.0	0.0	2.6	0.0	2.6	38%	0	0%	100%
Bristol	11.5	8.9	0.0	1.6	0.0	0.1	0.9	0.0	0.0	0.0	2.6	0.0	2.6	23%	0	0%	100%
Buena Vista	6.5	3.0	0.0	2.5	0.0	0.0	0.9	0.0	0.0	0.0	3.4	0.0	3.4	52%	0.2	6%	94%
Charlottesville	10.3	9.2	0.0	1.2	0.0	0.0	0.1	0.0	0.0	0.0	1.3	0.0	1.3	13%	0	0%	100%
Chesapeake	340.0	76.1	0.5	15.3	5.8	2.3	15.8	64.1	156.4	4.3	264.0	0.0	264.0	78%	94.5	36%	64%
Colonial Heights	7.5	5.2	0.0	0.8	0.1	0.0	0.0	0.1	1.1	0.1	2.2	0.0	2.2	29%	0	0%	100%
Covington	4.4	3.1	0.0	1.0	0.0	0.0	0.2	0.0	0.0	0.0	1.2	0.0	1.2	27%	0	0%	100%
Danville	43.9	22.9	0.0	14.8	0.6	1.7	3.1	0.1	0.1	0.0	20.4	0.0	20.4	46%	0	0%	100%
Emporia	6.7	3.4	0.0	1.8	0.2	0.0	0.1	0.4	0.7	0.0	3.2	0.0	3.2	48%	0	0%	100%
Fairfax	6.4	5.3	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	16%	0	0%	100%
Falls Church	2.0	1.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4	20%	0	0%	100%
Franklin	7.7	3.2	0.0	1.6	0.3	0.0	0.2	1.1	1.2	0.1	4.5	0.0	4.5	58%	0	0%	100%
Fredericksburg	10.5	6.7	0.2	2.2	0.3	0.0	0.3	0.1	0.5	0.0	3.4	0.3	3.1	30%	0	0%	100%
Galax	8.1	4.1	0.0	2.2	0.0	0.1	1.7	0.0	0.0	0.0	4.0	0.0	4.0	49%	0	0%	100%
Hampton	53.0	40.3	0.2	2.1	0.2	0.0	0.1	0.5	5.7	2.7	11.3	0.0	11.3	21%	4.5	40%	60%
Harrisonburg	17.4	12.5	0.0	1.8	0.0	0.0	2.8	0.3	0.0	0.0	4.9	0.0	4.9	28%	0	0%	100%

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Hopewell	10.2	7.6	0.0	1.2	0.1	0.0	0.0	0.1	1.3	0.1	2.8	0.0	2.8	27%	0	0%	100%
Lexington	2.5	2.2	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.3	12%	0	0%	100%
Lynchburg	49.4	28.1	0.0	17.9	0.0	0.0	2.9	0.1	0.0	0.0	20.9	0.0	20.9	42%	0	0%	100%
Manassas	10.1	9.0	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.9	0.0	0.9	9%	0	0%	100%
Manassas Park	1.8	1.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	11%	0	0%	100%
Martinsville	10.9	6.7	0.0	3.9	0.1	0.1	0.2	0.0	0.0	0.0	4.3	0.0	4.3	39%	0	0%	100%
Newport News	68.0	43.9	0.2	11.5	0.7	0.1	0.4	0.4	7.0	3.5	23.6	0.0	23.6	35%	12.7	54%	46%
Norfolk	53.0	49.9	0.4	1.2	0.1	0.0	0.1	0.0	1.4	1.1	3.9	0.0	3.9	7%			
Norton	7.6	3.0	0.0	4.0	0.0	0.3	0.2	0.0	0.0	0.0	4.5	0.0	4.5	59%	0.5	11%	89%
Petersburg	23.1	12.0	0.0	6.5	1.3	0.1	0.3	1.3	1.3	0.0	10.8	1.5	9.3	40%	0	0%	100%
Poquoson	15.5	4.9	0.0	1.3	0.2	0.0	0.1	0.1	1.9	6.4	10.0	0.0	10.0	65%	4.5	45%	55%
Portsmouth	33.0	26.7	2.8	1.2	0.2	0.0	0.1	0.0	1.1	1.0	3.6	0.0	3.6	11%			
Radford	9.8	4.6	0.0	3.5	0.0	0.0	1.4	0.0	0.0	0.0	4.9	0.0	4.9	50%	0	0%	100%
Richmond	60.0	47.4	0.1	9.8	0.5	0.1	0.5	0.2	1.8	0.1	13.0	0.0	13.0	22%	0	0%	100%
Roanoke	42.4	37.1	0.0	4.0	0.0	0.0	1.1	0.0	0.0	0.0	5.1	0.9	4.2	10%	0	0%	100%
Salem	14.4	12.4	0.0	1.6	0.0	0.0	0.4	0.0	0.0	0.0	2.0	0.0	2.0	14%	0	0%	100%
Staunton	19.3	10.1	0.0	3.9	0.0	0.0	4.9	0.1	0.0	0.0	8.9	0.0	8.9	46%	0	0%	100%
Suffolk	400.0	46.0	0.5	101.8	21.9	6.5	23.4	74.3	118.4	9.4	355.7	0.0	355.7	89%	56.2	16%	84%
Virginia Beach	248.0	108.5	3.9	13.2	3.5	0.5	12.1	28.5	56.3	22.6	136.7	0.0	136.7	55%	45.5	33%	67%
Waynesboro	14.0	9.2	0.0	1.9	0.0	0.0	2.7	0.2	0.0	0.0	4.8	0.0	4.8	34%	0	0%	100%
Williamsburg	8.9	4.3	0.0	3.4	0.1	0.0	0.0	0.1	0.7	0.1	4.4	0.3	4.1	46%	0	0%	100%
Winchester	9.3	7.7	0.0	0.7	0.0	0.1	0.8	0.0	0.0	0.0	1.6	0.0	1.6	17%	0	0%	100%
State	***39588.9***	***3766.1***	***115.6***	***23236.3***	***1024.3***	***770.5***	***6840.8***	***1696.9***	***1753.5***	***320.2***	***35642.5***	***484.4***	***35158.1***	***89%***	***3771.1***	***11%***	***89%***
Percent of Total		***10%***	***0%***	***59%***	***3%***	***2%***	***17%***	***4%***	***4%***	***1%***	***90%***	***1%***	***89%***				

[1] Habitat = Forest + Scrub/Shrub + Grassland + Pasture/Hay + Crop + Woody Wetland + Emergent Wetland or = Total Area – Developed - Barren
[2] Huntable Habitat = Habitat[1] – National Park Lands (unhunted)
[3] Public Land = NF + VDGIF + DOD + COE + FED WMA + NWR + SF + SP
[4] % Public = Percent of deer habitat (Habitat[2]) publicly owned. This data does not include unhunted National Park Lands (e.g., Shenandoah National Park)
[5] % Private = Percent of deer habitat privately owned

Appendix 6. Counties (n = 15) chosen to represent the full spectrum of predicted deer-related benefits (e.g., low to high hunting participation) and risks (e.g., agricultural damage, residential plant damage, vehicle collisions, Lyme disease cases) for a citizen Cultural Carrying Capacity survey, 2013.

County	Surveys Received
Amelia	163
Appomattox	171
Bland	213
Chesapeake	112
Henrico	116
James City	203
Prince George	133
Prince William	151
Richmond	160
Roanoke	185
Rockingham	194
Spotsylvania	145
Stafford	144
Washington	170
York	173

Appendix 7. Virginia deer harvest, 1923 to present.

Year	Antlered Males[1]	Male Fawns	Total Males[2]	Females	Percent Female[3]	Unknown[4]	Total Kill[5]
1923							793
1924							267
1925							
1926							
1927							687
1928							561
1929							790
1930							1,299
1931							1,399
1932							1,151
1933							1,040
1934							1,184
1935							1,158
1936							1,475
1937							1,526
1938							1,391
1939							1,365
1940							1,691
1941							1,901
1942							1,448
1943							2,282
1944							3,433
1945							4,545
1946							6,543
1947	3,722	0	3,722	297	7.40%	0	4,019
1948	4,497	0	4,497	665	12.90%	0	5,162
1949	5,624	0	5,624	1,286	18.60%	0	6,910
1950	5,284	0	5,284	415	7.30%	0	5,699
1951	6,699	0	6,699	531	7.30%	0	7,230
1952	8,595	0	8,595	2,279	21.00%	0	10,874
1953	10,814	0	10,814	983	8.30%	0	11,797
1954	11,307	0	11,307	2,772	19.70%	0	14,079
1955	12,705	0	12,705	1,522	10.70%	0	14,227
1956	13,857	0	13,857	6,998	33.60%	0	20,855
1957	14,897	0	14,897	7,576	33.70%	0	22,473
1958	17,588	0	17,588	9,253	34.50%	0	26,841
1959	18,696	0	18,696	10,273	35.50%	0	28,969
1960	21,836	0	21,836	14,309	39.60%	0	36,145
1961	20,261	0	20,261	12,614	38.40%	0	32,875
1962	22,080	0	22,080	16,758	43.10%	0	38,838
1963	22,816	0	22,816	15,575	40.60%	0	38,391
1964	20,411	0	20,411	10,768	34.50%	0	31,179
1965	19,325	0	19,325	8,658	30.90%	0	27,983
1966	19,138	0	19,138	7,018	26.80%	0	26,156
1967	18,810	0	18,810	6,124	24.60%	0	24,934
1968	22,960	0	22,960	5,081	18.10%	0	28,041
1969	27,541	0	27,541	6,609	19.40%	0	34,150
1970	29,393	0	29,393	8,745	22.90%	0	38,138
1971	32,588	0	32,588	9,781	23.10%	0	42,369
1972	36,967	0	36,967	11,808	24.20%	0	48,775

Year	Antlered Males[1]	Male Fawns	Total Males[2]	Females	Percent Female[3]	Unknown[4]	Total Kill[5]
1973	42,327	0	42,327	18,462	30.40%	0	60,789
1974	44,190	0	44,190	17,799	28.70%	0	61,989
1975	45,553	0	45,553	17,890	28.20%	0	63,443
1976	46,316	0	46,316	17,355	27.30%	0	63,671
1977	46,453	0	46,453	20,606	30.70%	0	67,059
1978	49,506	0	49,506	23,039	31.80%	0	72,545
1979	49,362	0	49,362	20,578	29.40%	0	69,940
1980	51,090	0	51,090	24,118	32.10%	0	75,208
1981	55,135	0	55,135	23,251	29.70%	2	78,388
1982	62,531	0	62,531	25,834	29.20%	175	88,540
1983	59,168	0	59,168	26,615	31.00%	0	85,783
1984	58,769	0	58,769	25,613	30.40%	50	84,432
1985	68,453	0	68,453	32,972	32.50%	0	101,425
1986	80,889	0	80,889	40,871	33.60%	41	121,801
1987	81,935	0	81,935	37,374	31.30%	0	119,309
1988	76,871	0	76,871	37,691	32.90%	0	114,562
1989	88,940	0	88,940	46,154	34.20%	0	135,094
1990	103,488	0	103,488	55,408	34.90%	1,515	160,411
1991	108,377	0	108,377	70,210	39.30%	757	179,344
1992	120,691	0	120,691	79,170	39.60%	585	200,446
1993	116,500	0	116,500	82,720	41.50%	1,902	201,122
1994	95,636	24,724	120,360	87,530	42.10%	1,483	209,373
1995	106,147	25,111	131,258	86,101	39.60%	1,117	218,476
1996	100,053	24,405	124,458	83,209	40.10%	2,076	209,743
1997	93,601	22,385	115,986	80,546	41.00%	2,029	198,561
1998	89,535	18,918	108,453	67,811	38.50%	2,763	179,027
1999	96,745	19,867	116,612	71,555	38.00%	1,876	190,043
2000	95,399	18,678	114,077	70,588	38.20%	3,213	187,878
2001	110,659	21,557	132,216	80,317	37.80%	3,339	215,872
2002	103,142	22,285	125,427	86,548	40.80%	2,872	214,847
2003	116,629	22,346	138,975	94,897	40.60%	3,163	237,035
2004	106,384	20,349	126,733	94,759	42.80%	0	221,492
2005	101,041	20,403	121,444	93,638	43.50%	0	215,082
2006	106,830	19,720	126,550	97,225	43.40%	0	223,775
2007	109,718	22,947	132,665	110,127	45.40%	0	242,792
2008	112,207	22,686	134,893	121,489	47.40%	0	256,382
2009	108,647	24,020	132,667	126,480	48.80%	0	259,147
2010	95,831	19,512	115,343	106,731	48.10%	0	222,074
2011	98,874	21,008	119,882	113,106	48.50%	116	233,104
2012	96,853	18,314	115,167	100,031	46.50%	43	215,241
2013	106,349	20,349	126,698	117,624	48.12%	118	244,440
2014	88,311	14,781	103,092	89,026	46.30%	68	192,186

[1]Antlered Males data, 1947-1993, includes Male Fawns.
[2]Total Males = Antlered Males + Male Fawns.
[3]Percent Female = Females / Total Kill
[4]Unknown includes animals of undocumented sex
[5]Total Kill = Total Males + Females + Unknown.

Appendix 8. Statewide deer-vehicle collision data, 1980--2013, obtained from Virginia Department of Transportation, Virginia Department of Motor Vehicles, and State Farm Insurance Company.

Year	Fatal Accidents[1]	Persons Killed[1]	Injury Accidents[1,2]	Persons Injured[1,3]	Property Damage Accidents[1,4]	State Farm Insurance Projections[5]
1980	1	1	67	78	1,165	
1981	1	1	76	89	1,305	
1982	0	0	77	96	1,369	
1983	0	0	93	103	1,569	
1984	1	1	103	127	1,717	
1985	0	0	136	167	1,972	
1986	2	2	169	206	2,430	
1987	0	0	186	214	2,767	
1988	0	0	170	206	2,637	
1989	1	2	177	205	2,563	
1990	3	3	204	242	3,220	
1991	2	2	199	231	[1,741][4]	
1992	1	1	220	272	[268]	
1993	1	1	221	264	[239]	
1994	1	2	227	264	[196]	
1995	1	1	249	308	[204]	
1996	3	3	285	332	[239]	
1997	2	2	308	354	[313]	
1998	1	1	367	422	3,656	
1999	4	4	369	439	3,518	
2000	2	2	350	410	3,825	
2001	4	4	447	521	4,887	
2002	1	1	372	424	4,566	
2003	0	0	382	450	5,314	
2004	1	1	407	456	5,105	
2005	5	6	451	517	5,485	49,437
2006	3	3	458	519	6,378	54,208
2007	3	3	493	549	6,579	61,141
2008	3	3	530	585	6,385	55,283
2009	5	5	538	608	4,750	57,667
2010	2	2	460	516	4,903	57,942
2011	5	6	461	527	5,014	58,354
2012	4	4	403	470	4,998	56,759
2013	3	3	485	555	5,502	63,145

[1] Data reported by investigating law enforcement officers. Data cannot be used in discovery or as evidence in a Federal or State court proceeding or considered for other purposes in any action for damages against VDOT, DMV, or the State of Virginia.
[2] Accidents involving deer with no persons killed but at least one person injured.
[3] Persons injured in fatal and injury crashes.
[4] Accidents involving deer with no persons killed or injured but with damage to vehicles or other property (report not required for property damage crashes less than $1500). Data for 1991-1997 were not used in this report due to a change in methodology.
[5] Includes claims during July 1 - June 30 of each year, projected for the insurance industry as a whole based on State Farm's personal vehicle market within each state. The data is based on comprehensive and collision claims only..

Appendix 9. 2014 Virginia private land deer status by management unit for the past 10 years.

County	***Index[1]***	***Relative[2] Abundance***	***Status[3]***	***Management Objective[4]***	***Objective Met***	***Percent[5] Change***
Accomack	3.0	Moderate	Stable	Reduce	No	-17.1%
Albemarle	2.8	Moderate	Stable	Stabilize	Yes	-13.2%
Alleghany	2.6	Low	Declining	Stabilize	No	-29.5%
Amelia	3.3	High	Stable	Stabilize	Yes	-23.4%
Amherst	3.6	High	Stable	Stabilize	Yes	-4.1%
Appomattox	2.3	Low	Stable	Stabilize	Yes	-5.3%
Augusta	3.0	Moderate	Stable	Reduce	No	-17.1%
Bath	2.6	Low	Declining	Stabilize	No	-35.5%
Bedford	4.7	Very High	Stable	Reduce	No	-23.7%
Bland	2.5	Low	Declining	Reduce	Yes	-26.7%
Botetourt	3.7	High	Stable	Reduce	No	-11.4%
Brunswick	2.4	Low	Stable	Stabilize	Yes	-18.0%
Buchanan	1.3	Very Low	Increasing	Increase	Yes	82.6%
Buckingham	2.4	Low	Stable	Stabilize	Yes	-5.2%
Campbell	2.5	Low	Stable	Stabilize	Yes	7.4%
Caroline	2.7	Moderate	Stable	Stabilize	Yes	-10.0%
Carroll	2.1	Low	Stable	Reduce	No	7.0%
Charles City	3.8	High	Declining	Stabilize	No	-30.9%
Charlotte	2.0	Very Low	Stable	Stabilize	Yes	-15.5%
Chesapeake	1.4	Very Low	Declining	Reduce	Yes	-42.5%
Chesterfield	2.2	Low	Stable	Stabilize	Yes	-25.8%
Clarke	4.4	Very High	Stable	Reduce	No	-6.9%
Craig	4.3	Very High	Stable	Reduce	No	-14.4%
Culpeper	3.5	High	Stable	Stabilize	Yes	2.7%
Cumberland	3.8	High	Stable	Stabilize	Yes	-2.9%
Dickenson	2.1	Low	Stable	Increase	No	18.4%
Dinwiddie	1.9	Very Low	Stable	Stabilize	Yes	-22.8%
Essex	2.7	Moderate	Stable	Stabilize	Yes	-20.3%
Fairfax[6]	2.8	Moderate	Stable	Reduce	No	18.6%
Fauquier	3.6	High	Stable	Reduce	No	-24.4%
Floyd	2.8	Moderate	Stable	Reduce	No	-6.6%
Fluvanna	2.8	Moderate	Stable	Stabilize	Yes	-13.2%
Franklin	3.2	Moderate	Stable	Reduce	No	-23.0%
Frederick	3.7	High	Declining	Reduce	Yes	-29.4%
Giles	3.4	High	Stable	Reduce	No	-26.1%
Gloucester	2.5	Low	Declining	Reduce	Yes	-26.1%
Goochland	3.1	Moderate	Stable	Stabilize	Yes	-15.6%

County	Index[1]	Relative[2] Abundance	Status[3]	Management Objective[4]	Objective Met	Percent[5] Change
Grayson	3.7	High	Stable	Reduce	No	-13.8%
Greene	2.8	Moderate	Stable	Stabilize	Yes	7.9%
Greensville	2.5	Low	Stable	Stabilize	Yes	-4.9%
Halifax	2.3	Low	Stable	Stabilize	Yes	2.6%
Hanover	2.5	Low	Stable	Stabilize	Yes	9.1%
Henrico	3.0	Moderate	Stable	Stabilize	Yes	-20.5%
Henry	2.5	Low	Stable	Stabilize	Yes	-4.4%
Highland	2.8	Moderate	Stable	Stabilize	Yes	-8.4%
Isle of Wight	3.1	Moderate	Stable	Stabilize	Yes	-4.0%
James City	3.7	High	Stable	Stabilize	Yes	-23.0%
King & Queen	3.0	Moderate	Stable	Stabilize	Yes	-24.6%
King George	3.8	High	Stable	Stabilize	Yes	-10.2%
King William	3.1	Moderate	Stable	Stabilize	Yes	-17.3%
Lancaster	4.2	Very High	Stable	Stabilize	Yes	-13.4%
Lee	2.3	Low	Stable	Stabilize	Yes	-6.5%
Loudoun	5.2	Very High	Declining	Reduce	Yes	-27.8%
Louisa	2.4	Low	Stable	Stabilize	Yes	10.4%
Lunenburg	2.0	Very Low	Stable	Stabilize	Yes	3.9%
Madison	3.5	High	Stable	Stabilize	Yes	-5.4%
Mathews	2.1	Low	Stable	Stabilize	Yes	-8.2%
Mecklenburg	1.9	Very Low	Stable	Stabilize	Yes	-3.0%
Middlesex	2.4	Low	Stable	Stabilize	Yes	-23.6%
Montgomery	3.6	High	Stable	Reduce	No	2.7%
Nelson	2.8	Moderate	Stable	Stabilize	Yes	-14.4%
New Kent	3.5	High	Declining	Stabilize	No	-28.0%
Northampton	2.5	Low	Stable	Stabilize	Yes	-20.1%
Northumberland	3.2	Moderate	Stable	Stabilize	Yes	-5.8%
Nottoway	2.8	Moderate	Stable	Stabilize	Yes	-15.3%
Orange	3.4	High	Stable	Stabilize	Yes	-3.3%
Page	3.1	Moderate	Stable	Stabilize	Yes	7.6%
Patrick	1.7	Very Low	Declining	Reduce	Yes	-38.4%
Pittsylvania	2.8	Moderate	Stable	Stabilize	Yes	3.8%
Powhatan	3.4	High	Stable	Stabilize	Yes	-17.6%
Prince Edward	2.8	Moderate	Stable	Stabilize	Yes	-13.4%
Prince George	3.4	High	Stable	Stabilize	Yes	-10.6%
Prince William	3.4	High	Stable	Reduce	No	-17.3%
Pulaski	3.2	Moderate	Stable	Reduce	No	5.5%
Rappahannock	3.9	High	Stable	Stabilize	Yes	-16.4%
Richmond	3.6	High	Stable	Stabilize	Yes	0.5%
Roanoke	3.6	High	Stable	Reduce	No	-3.9%
Rockbridge	2.5	Low	Stable	Stabilize	Yes	-19.4%

County	***Index***[1]	***Relative***[2] ***Abundance***	***Status***[3]	***Management Objective***[4]	***Objective Met***	***Percent***[5] ***Change***
Rockingham	3.5	High	Stable	Reduce	No	6.3%
Russell	1.9	Very Low	Stable	Stabilize	Yes	11.3%
Scott	3.8	High	Stable	Reduce	No	-14.5%
Shenandoah	3.5	High	Declining	Reduce	Yes	-34.4%
Smyth	2.6	Low	Stable	Stabilize	Yes	-4.4%
Southampton	3.4	High	Stable	Reduce	No	-20.9%
Spotsylvania	2.5	Low	Stable	Stabilize	Yes	14.5%
Stafford	2.6	Low	Stable	Stabilize	Yes	4.8%
Suffolk	2.7	Moderate	Stable	Stabilize	Yes	-8.2%
Surry	3.9	High	Stable	Stabilize	Yes	-16.9%
Sussex	2.8	Moderate	Stable	Stabilize	Yes	0.0%
Tazewell	2.4	Low	Stable	Stabilize	Yes	-0.8%
Virginia Beach	1.1	Very Low	Declining	Reduce	Yes	-59.1%
Warren	3.5	High	Declining	Reduce	Yes	-32.6%
Washington	2.3	Low	Stable	Stabilize	Yes	16.6%
Westmoreland	3.1	Moderate	Stable	Stabilize	Yes	2.3%
Wise	1.5	Very Low	Increasing	Increase	Yes	74.7%
Wythe	2.8	Moderate	Stable	Reduce	No	-6.6%
York	2.6	Low	Stable	Reduce	No	3.3%

[1] Private land antlered buck kill per square mile of estimated deer habitat index is based on the last 3-year average (2012-2014).
[2] Relative abundance was calculated using a five group cluster analysis on the 3-year average population index described above. Descriptions for each group (very low, low, moderate, etc.) are subjective.
[3] Trends with less than a $\pm$25% change over the last decade and lacking statistical significance ($p < 0.10$) are considered *stable*.
[4] Objectives are from the Virginia Deer Management Plan 2006-2015 (DGIF 2007).
[5] Percent change in the population index over the past decade = λ^{10}-1.
[6] Fairfax County deer kill data is not comparable to other areas/counties (primarily archery only).

Appendix 10. 2014 Virginia private land deer status by management unit for the past 5 years.

County	***Index[1]***	***Relative[2] Abundance***	***Status[3]***	***Management Objective[4]***	***Objective Met***	***Percent[5] Change***
Accomack	3.0	Moderate	Stable	Reduce	No	-3.0%
Albemarle	2.8	Moderate	Stable	Stabilize	Yes	20.7%
Alleghany	2.6	Low	Stable	Stabilize	Yes	-7.0%
Amelia	3.3	High	Stable	Stabilize	Yes	-27.5%
Amherst	3.6	High	Stable	Stabilize	Yes	-0.5%
Appomattox	2.3	Low	Stable	Stabilize	Yes	-10.1%
Augusta	3.2	Moderate	Stable	Stabilize	Yes	22.6%
Bath	2.6	Low	Stable	Stabilize	Yes	-8.7%
Bedford	4.7	Very High	Stable	Reduce	No	-0.3%
Bland	2.5	Low	Stable	Reduce	No	28.9%
Botetourt	3.7	High	Stable	Reduce	No	16.6%
Brunswick	2.4	Low	Stable	Stabilize	Yes	-26.9%
Buchanan	1.3	Very Low	Increasing	Increase	Yes	67.7%
Buckingham	2.4	Low	Stable	Stabilize	Yes	-11.0%
Campbell	2.5	Low	Stable	Stabilize	Yes	3.9%
Caroline	2.7	Moderate	Stable	Stabilize	Yes	-27.2%
Carroll	2.1	Low	Increasing	Reduce	No	28.0%
Charles City	3.8	High	Declining	Stabilize	No	-38.3%
Charlotte	2.0	Very Low	Stable	Stabilize	Yes	-23.2%
Chesapeake	1.4	Very Low	Declining	Reduce	Yes	-36.4%
Chesterfield	2.2	Low	Stable	Stabilize	Yes	-33.3%
Clarke	4.4	Very High	Stable	Reduce	No	23.0%
Craig	4.3	Very High	Stable	Reduce	No	27.0%
Culpeper	3.5	High	Stable	Stabilize	Yes	12.7%
Cumberland	3.8	High	Stable	Stabilize	Yes	-9.6%
Dickenson	2.1	Low	Stable	Increase	No	31.3%
Dinwiddie	1.9	Very Low	Stable	Stabilize	Yes	-20.8%
Essex	2.7	Moderate	Stable	Stabilize	Yes	-27.5%
Fairfax[6]	2.8	Moderate	Stable	Reduce	No	-9.6%
Fauquier	3.6	High	Stable	Reduce	No	29.2%
Floyd	2.8	Moderate	Stable	Reduce	No	13.1%
Fluvanna	2.8	Moderate	Stable	Stabilize	Yes	9.4%
Franklin	3.2	Moderate	Stable	Reduce	No	16.7%
Frederick	3.7	High	Stable	Reduce	No	7.7%
Giles	3.4	High	Stable	Reduce	No	8.7%
Gloucester	2.5	Low	Stable	Reduce	No	3.1%
Goochland	3.1	Moderate	Stable	Stabilize	Yes	-17.5%
Grayson	3.7	High	Stable	Reduce	No	-4.2%
Greene	2.8	Moderate	Stable	Stabilize	Yes	10.6%

County	Index[1]	Relative[2] Abundance	Status[3]	Management Objective[4]	Objective Met	Percent[5] Change
Greensville	2.5	Low	Stable	Stabilize	Yes	-35.6%
Halifax	2.3	Low	Stable	Stabilize	Yes	-24.8%
Hanover	2.5	Low	Stable	Stabilize	Yes	-6.5%
Henrico	3.0	Moderate	Stable	Stabilize	Yes	-48.7%
Henry	2.5	Low	Stable	Stabilize	Yes	2.9%
Highland	2.8	Moderate	Stable	Stabilize	Yes	-3.6%
Isle of Wight	3.1	Moderate	Stable	Stabilize	Yes	-9.1%
James City	3.7	High	Stable	Stabilize	Yes	-5.4%
King & Queen	3.0	Moderate	Stable	Stabilize	Yes	-20.9%
King George	3.8	High	Stable	Stabilize	Yes	-7.6%
King William	3.1	Moderate	Stable	Stabilize	Yes	-26.1%
Lancaster	4.2	Very High	Stable	Stabilize	Yes	-23.0%
Lee	2.3	Low	Increasing	Stabilize	No	37.5%
Loudoun	5.2	Very High	Stable	Reduce	No	-17.6%
Louisa	2.4	Low	Stable	Stabilize	Yes	-8.1%
Lunenburg	2.0	Very Low	Stable	Stabilize	Yes	-10.7%
Madison	3.5	High	Stable	Stabilize	Yes	17.8%
Mathews	2.1	Low	Stable	Stabilize	Yes	-7.7%
Mecklenburg	1.9	Very Low	Stable	Stabilize	Yes	-16.5%
Middlesex	2.4	Low	Stable	Stabilize	Yes	-18.9%
Montgomery	3.6	High	Stable	Reduce	No	39.0%
Nelson	2.8	Moderate	Stable	Stabilize	Yes	5.4%
New Kent	3.5	High	Stable	Stabilize	Yes	-23.9%
Northampton	2.5	Low	Stable	Stabilize	Yes	9.1%
Northumberland	3.2	Moderate	Stable	Stabilize	Yes	-13.3%
Nottoway	2.8	Moderate	Stable	Stabilize	Yes	-21.3%
Orange	3.4	High	Stable	Stabilize	Yes	-2.7%
Page	3.1	Moderate	Stable	Stabilize	Yes	32.6%
Patrick	1.7	Very Low	Stable	Reduce	No	2.3%
Pittsylvania	2.8	Moderate	Stable	Stabilize	Yes	-5.0%
Powhatan	3.4	High	Stable	Stabilize	Yes	-30.1%
Prince Edward	2.8	Moderate	Stable	Stabilize	Yes	-18.7%
Prince George	3.4	High	Stable	Stabilize	Yes	-30.3%
Prince William	3.4	High	Stable	Reduce	No	-20.5%
Pulaski	3.2	Moderate	Increasing	Reduce	No	56.0%
Rappahannock	3.9	High	Stable	Stabilize	Yes	0.9%
Richmond	3.6	High	Stable	Stabilize	Yes	-15.4%
Roanoke	3.6	High	Stable	Reduce	No	13.5%
Rockbridge	2.5	Low	Stable	Stabilize	Yes	-17.8%

County	***Index[1]***	***Relative[2] Abundance***	***Status[3]***	***Management Objective[4]***	***Objective Met***	***Percent[5] Change***
Rockingham	3.5	High	Increasing	Reduce	No	29.3%
Russell	1.9	Very Low	Stable	Stabilize	Yes	17.9%
Scott	3.8	High	Stable	Reduce	No	2.2%
Shenandoah	3.5	High	Stable	Reduce	No	4.0%
Smyth	2.6	Low	Stable	Stabilize	Yes	-1.8%
Southampton	3.4	High	Declining	Reduce	Yes	-28.9%
Spotsylvania	2.5	Low	Stable	Stabilize	Yes	6.7%
Stafford	2.6	Low	Stable	Stabilize	Yes	-14.8%
Suffolk	2.7	Moderate	Stable	Stabilize	Yes	-15.8%
Surry	3.9	High	Stable	Stabilize	Yes	-6.8%
Sussex	2.8	Moderate	Stable	Stabilize	Yes	-12.5%
Tazewell	2.4	Low	Stable	Stabilize	Yes	5.4%
Virginia Beach	1.1	Very Low	Declining	Reduce	Yes	-68.1%
Warren	3.5	High	Stable	Reduce	No	-3.3%
Washington	2.3	Low	Increasing	Stabilize	No	27.5%
Westmoreland	3.1	Moderate	Stable	Stabilize	Yes	-13.8%
Wise	1.5	Very Low	Stable	Increase	No	35.5%
Wythe	2.8	Moderate	Stable	Reduce	No	30.6%
York	2.6	Low	Stable	Reduce	No	-3.9%

[1] Private land antlered buck kill per square mile of estimated deer habitat index is based on the last 3-year average (2012-2014).
[2] Relative abundance was calculated using a five group cluster analysis on the 3-year average population index described above. Descriptions for each group (very low, low, moderate, etc.) are subjective.
[3] Trends with less than a $\pm$25% change over the last 5 years and lacking statistical significance ($p < 0.10$) are considered *stable*.
[4] Objectives are from the Virginia Deer Management Plan 2006-2015 (DGIF 2007).
[5] Percent change in the population index over the past 5 years = λ^{10}-1.
[6] Fairfax County deer kill data is not comparable to other areas/counties (primarily archery only).

Appendix 11. 2014 Virginia public land deer status by management unit for the past 10 years.

County	***Index[1]***	***Status[2]***	***Management Objective[3]***	***Objective Met***	***Percent[4] Change***
Alleghany	1.2	Declining	Stabilize	No	-53.2%
Amherst	1.2	Stable	Stabilize	Yes	-23.8%
Augusta	1.1	Declining	Stabilize	No	-53.8%
Bath	1.3	Declining	Stabilize	No	-60.0%
Bedford	1.8	Stable	Stabilize	Yes	-19.0%
Bland	1.7	Declining	Stabilize	No	-40.5%
Botetourt	1.6	Declining	Stabilize	No	-42.2%
Carroll	1.8	Declining	Stabilize	No	-33.3%
Craig	2.1	Declining	Stabilize	No	-36.5%
Dickenson	3.4	Stable	Increase	No	12.2%
Frederick	1.3	Declining	Stabilize	No	-69.9%
Giles	1.8	Declining	Stabilize	No	-37.1%
Grayson	1.1	Stable	Stabilize	Yes	-31.5%
Highland	1.4	Declining	Stabilize	No	-56.5%
Lee	1.1	Stable	Stabilize	Yes	-27.4%
Montgomery	2.5	Stable	Stabilize	Yes	2.8%
Nelson	0.8	Declining	Stabilize	No	-36.6%
Page	1.3	Declining	Stabilize	No	-50.4%
Pulaski	2.7	Stable	Stabilize	Yes	-11.0%
Roanoke	1.2	Stable	Stabilize	Yes	-37.4%
Rockbridge	1.2	Declining	Stabilize	No	-52.0%
Rockingham	1.2	Declining	Stabilize	No	-50.1%
Russell	1.4	Declining	Stabilize	No	-59.3%
Scott	1.0	Stable	Stabilize	Yes	-31.8%
Shenandoah	1.4	Declining	Stabilize	No	-57.2%
Smyth	1.4	Declining	Stabilize	No	-38.1%
Tazewell	1.8	Stable	Stabilize	Yes	-32.4%
Warren	1.7	Stable	Stabilize	Yes	-29.2%
Washington	1.4	Stable	Stabilize	Yes	-22.3%
Wise	1.6	Declining	Stabilize	No	-36.7%
Wythe	1.9	Declining	Stabilize	No	-31.0%

[1] Public land antlered buck kill per square mile of estimated deer habitat index is based on the last 3-year average (2012-2014).
[2] Trends with less than a $\pm$25% change over the last decade and lacking statistical significance ($p < 0.10$) are considered *stable*.
[3] Objectives are from the Virginia Deer Management Plan 2006-2015 (DGIF 2007).
[4] Percent change in the population index over the past decade = λ^{10}-1.

Appendix 12. Virginia Department of Game and Inland Fisheries hunting accident data, 1960 to present.

Year	*Hunting Accidents*	*Deer Accidents*[1]	*Percent Deer*	*Deer Fatal*	*Deer Archery*	*Deer Muzzleloader*	*Deer Firearms*	*Deer Treestand*[2]
1960	26	11	0.42	4			11	0
1961	40	18	0.45	1			18	0
1962	39	7	0.18	2			7	0
1963	49	16	0.33	3	2		14	0
1964	58	20	0.34	5			20	0
1965	55	19	0.35	3			19	0
1966	42	11	0.26	4			11	0
1967	49	20	0.41	3	1		19	0
1968	38	9	0.24	2			9	0
1969	66	21	0.32	3			21	0
1970	87	29	0.33	5			29	0
1971	75	34	0.45	6			32	0
1972	56	17	0.30	3	2		17	0
1973	74	37	0.50	6			37	0
1974	81	38	0.47	9			38	0
1975	73	31	0.42	6			31	0
1976	83	30	0.36	5			30	0
1977	78	37	0.47	6			36	0
1978	48	24	0.50	3			24	0
1979	67	29	0.43	5			29	0
1980	63	30	0.48	3			29	0
1981	70	33	0.47	9			33	0
1982	86	28	0.33	5			28	0
1983	69	32	0.46	3	1		31	0
1984	55	29	0.53	11			29	0
1985	67	37	0.55	4	1	1	35	0
1986	92	53	0.58	5		1	51	0
1987	72	35	0.49	4			35	0
1988	58	32	0.55	2	1		31	0
1989	53	29	0.55	2	1		27	0
1990	73	33	0.45	3	1		32	0
1991	74	38	0.51	3		3	35	0
1992	75	43	0.57	3		1	34	13
1993	77	54	0.70	4		4	35	15
1994	65	49	0.75	7		7	33	14
1995	93	57	0.61	4	1	8	35	23
1996	70	45	0.64	1	2	3	28	1
1997	67	47	0.70	3	3	3	31	21
1998	63	42	0.67	6	4	8	29	9

Year	Hunting Accidents	Deer Accidents[1]	Percent Deer	Deer Fatal	Deer Archery	Deer Muzzleloader	Deer Firearms	Deer Treestand[2]
1999	63	46	0.73	5	4	4	31	23
2000	51	32	0.63	4	4	4	22	11
2001	70	50	0.71	3	4	4	41	12
2002	47	32	0.68	5	1	6	22	8
2003	45	37	0.82	3	2	6	26	9
2004	50	38	0.76	5	3	8	25	15
2005	53	38	0.72	0	4	7	24	15
2006	46	35	0.76	1	3	4	23	14
2007	49	36	0.73	2	3	1	24	17
2008	46	34	0.74	6	4	2	22	15
2009	58	41	0.71	4	4	5	29	15
2010	51	42	0.82	3	2	6	30	10
2011	39	23	0.59	2	5	2	11	7
2012	42	30	0.71	0	1	3	19	11
2013	48	28	0.58	4	0	4	19	9
2014	24	14	0.58	0	0	1	13	0

[1] Total deer accidents = Archery + Muzzleloading + Firearms + Unknown. Unknown data are not shown.
[2] Treestand accidents are summed for all weapons and unknown. However, treestand accidents vary by weapon and season with treestand accidents accounting for nearly 95% of archery deer hunting accidents, about 37% of muzzleloading deer hunting accidents, and about 17% of firearms deer hunting accidents.

Appendix 13. Priority rankings of the 26 Deer Plan objectives by the Stakeholder Advisory Committee (SAC) and Virginia Department of Game and Inland Fisheries (VDGIF) staff with broad involvement in deer management. A rank of 1 means most important, and 26 means least important. Each respondent independently chose the 9 most important, 9 least important, and 8 moderately-important objectives. Some ranks are tied (e.g., 1.5, 8.5).

IMPORTANCE RANK		DEER PLAN OBJECTIVES
SAC	VDGIF	
(n = 15)	(n = 21)	
		Goal 1 - POPULATIONS
14.5	5	Through January 1, 2025, meet deer population management objectives for management units within 5 years after they are updated (Figures 46 and 47).
3	2	Annually through January 1, 2025, monitor population status (size, trends, condition, etc.) by management unit using harvest data, hunter surveys, and other methods.
22	8.5	To review, and update as necessary, deer population management objectives by management unit biennially beginning January 1, 2017.
11.5	1	Maintain and/or enhance the use of hunting as a management tool through January 1, 2025.
23.5	20.5	Manage limiting factors to meeting population objectives through January 1, 2025.
7.5	6	To develop or continue programs for managing local deer populations within the larger management units through January 1, 2025.
7.5	7	Through January 1, 2025, increase stakeholder support and tolerance for deer population management, including the need for management and methods used.
		Goal 2 - RECREATION
26	26	To maintain current levels of deer viewing opportunities through January 1, 2025.
18.5	23	To reduce deer hunting related accidents by 25% by January 1, 2025.
1.5	16	Maintain an annual average of at least 871,000 hunter-days of archery deer hunting, 705,000 hunter-days of muzzleloading deer hunting, and 1,640,000 hunter-days of general firearms deer hunting (with and without dogs) through January 1, 2025, consistent with deer population management objectives and the rights of all Virginia citizens.
5.5	17	To manage deer-related recreation to yield hunter satisfaction indices of greater than or equal to 4.0 (adequate) for archery, muzzleloader, and general firearms seasons on both public and private lands in all regions annually through January 1, 2025.
1.5	3	Ensure that deer hunting methods in Virginia are sportsmanlike and ethical through January 1, 2025.
4	4	Ensure that deer-related recreational activities are consistent with and respect the interests and rights of private property owners and other Virginia citizens through January 1, 2025.
11.5	18.5	Through January 1, 2025, increase stakeholder support and tolerance for deer-related recreation, for both management and recreational benefits.
		Goal 3 - DAMAGE

IMPORTANCE RANK		DEER PLAN OBJECTIVES
SAC	VDGIF	
(n = 15)	(n = 21)	
5.5	15	To quantify deer damage, tolerance for damage, and public acceptance of prevention alternatives for agricultural, urban, ecosystem, vehicular, forestry, animal health, human safety, and other deer impacts by January 1, 2020.
11.5	14	To reduce agricultural damage, as measured by the demand for out-of-season kill permits for agricultural deer damage, by 30% (from approximately 1,700 to 1,200 permits annually) by January 1, 2025.
25	23	To reduce residential damage, as measured by the demand for out-of-season kill permits for residential deer damage, by 30% (from approximately 430 to 300 permits annually) by January 1, 2025.
18.5	18.5	To reduce deer-vehicle collisions, as measured by aggregated insurance claims, by 30% by January 1, 2025.
16	11.5	To minimize deer-related diseases that impact humans and domestic animals through January 1, 2025.
18.5	8.5	To manage deer ecosystem impacts within limits that permit functioning of a biologically diverse ecosystem through January 1, 2025.
11.5	11.5	To develop policies and protocols for alternative approaches to managing site-specific deer damage when regulated hunting is ineffective, unacceptable, or not feasible by January 1, 2018.
18.5	25	Through January 1, 2025, increase stakeholder support for deer damage-management methods and tolerance for deer-related damage.
		Goal 4 - HABITAT
23.5	11.5	To update and evaluate the deer habitat status in each management unit by January 1, 2017.
21	11.5	To identify management units where habitat is a limiting factor for achieving deer population, recreation, or damage goals by January 1, 2017.
9	20.5	To promote appropriate deer habitat management, especially in management units where habitat is a limiting factor, for achieving deer population, recreation, or damage goals through January 1, 2025.
14.5	23	Through January 1, 2025, increase stakeholder support and tolerance for deer habitat management, including the need for management and method used, for meeting deer population management, recreation, or damage goals.

This publication was supported in part by funds provided from the U.S. Fish & Wildlife Service through the Wildlife and Sport Fish Restoration Program, Project WE99R.