


# BIG GAME MANAGEMENT PLAN 2020-2030



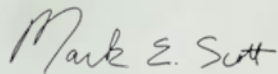
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*Maintaining abundant and healthy big game populations within their ecological and social carrying capacities for Vermonters.*

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Commissioner, Fish & Wildlife Department

2/17/2021  
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Date

  
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Wildlife Director, Fish & Wildlife Department

2/16/2021  
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Date



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## Vermont Fish & Wildlife Department

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## Executive Summary

Wild animals, by Vermont and Federal law, belong to the people of Vermont and thus conserving and managing Vermont's wildlife resources on behalf of the public are obligations of the Vermont Fish & Wildlife Department. The department has a long history of managing Vermont's big game species using the best available science that is informed by a robust public input process. For the past twenty years, the management of Vermont's four big game species – white-tailed deer, black bear, moose, and wild turkey -- has been coordinated by a comprehensive Big Game Management Plan. The plan, updated every decade, identifies issues that these species face, establishes sustainable population and management goals and then prescribes the strategies needed to achieve these goals. Combining wild turkey management with moose management may seem strange on the face of it, but a multi-species approach is appropriate and necessary because all four species face overlapping challenges and, as a group, they represent the backbone of Vermont's hunting and wildlife-viewing opportunities. In addition, the wild turkey's status as a big game species reflects the elevated focus it has received in wildlife restoration efforts in the last 50 years.

### Overarching Goal

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***Maintain abundant and healthy big game populations within their ecological and social carrying capacities for Vermonters.***

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### Overarching Issues of Significant Management Concern

- Habitat Loss
- Declining Hunter Numbers
- Human – Wildlife Conflicts
- Access to Land
- Impacts of Suburbanization on Public Attitudes
- Climate Change
- Collection of Biological Data
- Promoting Utilization

### Overarching Management Objectives and Strategies

1. Recruit new hunters with the primary purpose of introducing new, diverse audiences to, and maintaining support for, hunting.
2. Use Vermont Conservation Design to identify priority big game habitat for conservation, such as young forests and habitat connectivity.
3. Advocate for public hunting access for lands enrolled in the Use Value Appraisal Program (UVA; Current Use) and conserved lands.
4. Maximize opportunity for big game hunters, including liberalizing season length and bag limits, where possible, while still maintaining big game population objectives.
5. Continue outreach to private landowners, municipalities, non-profits, and other landowners on the value of allowing hunting access.
6. Develop a single, comprehensive database to track and record human-wildlife conflicts, including those involving big game species, to more efficiently address conflicts at a district level.
7. Maintain mandatory big game reporting but investigate ways to make it easier for hunters to check the game they harvest, particularly with the use of technology.
8. Continue to provide outreach on the impacts of climate change on big game species.
9. Encourage the responsible utilization of big game species with a primary purpose of increasing support for, and promoting an understanding of, hunting. This could include increasing the amount of utilization-related content on the website and reviewing the current statutory window to sell big game carcasses during the open season and 20 days thereafter to connect the public to hunting and wild game.

## 2020 – 2030 Big Game Species-specific Management Goals, Objectives, and Strategies

### WHITE-TAILED DEER

#### ISSUE 1. Disease

**GOAL: To maintain an abundant and healthy deer population**

##### Management Objectives and Strategies

- 1.1 Enhance the department's disease surveillance, particularly for Chronic Wasting Disease (CWD).
- 1.2 Continue to emphasize, improve, and monitor CWD prevention efforts.
- 1.3 Consider improving restrictions on importation of cervids.
- 1.4 Develop a CWD response plan, including all necessary approvals and authorities.
- 1.5 Increase public outreach regarding CWD.
- 1.6 Continue monitoring other diseases with potential to impact the deer population.

#### ISSUE 2. Deer Wintering Areas

**GOAL: To maintain adequate quantity and quality of deer wintering areas (DWA) to sustain the population at regionally established population objectives.**

##### Management Objectives and Strategies

- 2.1 Continue to protect DWAs through regulatory review.
- 2.2 Continue to update the department's inventory of DWAs opportunistically.
- 2.3 Develop a remote sensing approach to aid in identification of unknown or unmapped DWAs.
- 2.4 Conduct outreach to landowners, land managers, and partner state and federal agencies / organizations about the importance of DWA conservation.
- 2.5 Continue to work with the Vermont Department of Forest Parks and Recreation (FPR) and foresters to ensure that habitat is adequately managed under the UVA program.
- 2.6 Work with FPR to develop guidelines for the management of hemlock DWAs given the potential impacts of hemlock wooly adelgid.
- 2.7 Continue to work with conservation partners that own or manage conserved land to ensure that DWAs and other habitats are properly managed.

#### ISSUE 3. Population Objectives

**GOAL: Maintain the deer population at levels that are socially acceptable and ecologically sustainable.**

##### Management Objectives and Strategies

- 3.1 Manage deer densities using Wildlife Management Unit (WMU)-specific density and physical condition objectives.
- 3.2 Monitor characteristics of deer and habitat that can change in response to deer abundance.
- 3.3 Continue to collect physical condition data including yearling antler beam diameter, fawn and yearling body weight and reproductive data.
  - Consider collecting data on fawn recruitment to better inform population models.
  - Work with foresters to monitor deer impacts to forest health.
- 3.4 Work with landowners and land managers to encourage hunting and inform them about the need to manage deer abundance.
- 3.5 Adjust antlerless deer harvests as necessary to achieve density and physical condition objectives.
  - Monitor the effects of recent changes to deer hunting regulations on the antlerless harvest.
  - Consider additional liberalization of antlerless harvest, where necessary, to achieve annual harvest objectives.

#### ISSUE 4. Deer-Human Conflicts

**GOAL: Minimize the number of deer-human conflicts.**

##### Management Objectives and Strategies

- 4.1 Maintain the deer population to meet hunter satisfaction and minimize landowner and human complaints.
- 4.2 Demonstrate the effectiveness of archery hunting to reduce locally overabundant deer in developed areas.

- 4.3 Work with communities to address locally overabundant deer in developed areas, including establishment of expanded archery zones.
- 4.4 Encourage communication and cooperation between antlerless deer hunters and landowners seeking relief from deer damage.

#### **ISSUE 5. Hunter Satisfaction**

**GOAL: Provide a quality deer hunting experience for as many hunters as possible.**

##### **Management Objectives and Strategies**

- 5.1 Maximize hunting opportunity by providing longer hunting seasons and opportunities to hunt multiple seasons.
- 5.2 Maximize opportunity to harvest a deer.
- 5.3 Ensure there are enough older bucks on the landscape to provide hunters a reasonable chance of seeing one.
- 5.4 Ensure that the proportion of yearlings in the total buck harvest not exceed 50% in any WMU.
- 5.5 Continue to regularly survey hunters and involve them in the rule-making process.
- 5.6 Maximize the accessibility of hunting to recruit, retain, and reactivate new and existing hunters.

## **BLACK BEAR**

#### **ISSUE 1. Bear–Human Conflicts**

**GOAL: Minimize the total number of negative interactions occurring between bears and humans to achieve acceptable levels of human safety.**

##### **Management Objectives and Strategies**

- 1.1 Continue to work with partners to increase public awareness of the factors that lead to human-bear conflicts and the legal and appropriate actions to take to avoid negative interactions.
- 1.2 Continue outreach and education efforts that include improving the bear section of the department’s web page and creating additional “how to” videos to help reach a larger segment of the public.
- 1.3 Better define and clarify existing bear feeding regulations; provide clear guidelines on the appropriate actions to take when encountering a bear; reinforce the department’s position on relocating bears; and, specify when it is appropriate to euthanize a bear that has caused extensive property damage or is a threat to human safety.
- 1.4 “Raise the bar” on getting the public to take more responsibility for addressing local bear-human conflicts rather than depending on department staff to address all problems.
- 1.5 Assist communities experiencing the greatest number of conflicts with creative ways in addressing bear-human conflicts.
- 1.6 Continue to work with the Vermont Department of Environmental Conservation (DEC) to improve their outreach on universal recycling of food scraps to reduce conflicts with bear.

#### **ISSUE 2. Bear Population Size and Distribution**

**GOAL: Maintain the bear population at ecologically sustainable levels, while minimizing human conflicts.**

##### **Management Objectives and Strategies**

- 2.1 Maintain a bear population of between 3,500 and 5,500 allowing for wider fluctuations in annual population estimates and confidence intervals resulting from improvements to the population model.
- 2.2 Continue to use season length, especially during the overlap with the November deer season, as the primary method of adjusting the size of the bear population.
- 2.3 Consider managing bears regionally rather than statewide to address conflict and more specifically manage bears in areas where they are expanding their range beyond forested habitat.

#### **ISSUE 3. Bear Habitat Conservation**

**GOAL: Maintain no-net-loss of function and value of existing bear habitat.**

##### **Management Objectives and Strategies**

- 3.1 Continue to work with Vermont’s regulatory process to maintain functional bear habitat and reduce human-bear conflicts arising from new commercial and residential developments.

- 3.2 Update the Black Bear Habitat Mitigation Guidelines reflecting advances in habitat mitigation strategies as a result of recent research.
- 3.3 Work with Vermont Conservation Design to prioritize the protection of bear travel corridors and linkage habitat while also working to increase the amount of young forest habitat throughout the state.

#### **ISSUE 4. Bear Management Strategies and Season Structure**

**GOAL: Optimize public hunting opportunity for the utilization of bears for food and other uses, ensure hunter satisfaction within biologically sustainable regulations and continue to use public hunting to meet black bear population objectives.**

##### **Management Objectives and Strategies**

- 4.1 Use hunter effort surveys and harvest data collected at a regional scale to inform regional population management.
- 4.2 Continue to promote the hunting of bears for food and increase outreach efforts to improve accessibility of bear hunting to a wider audience.
- 4.3 Continue to work with the Vermont Bear Hound Association to address issues that could possibly restrict bear hunting with hounds in Vermont.
- 4.4 Begin outreach that stresses declining hunter participations will likely necessitate changes in bear season structure and overall bear management.
- 4.5 Evaluate and monitor impacts the new deer season structure may have on the bear harvest and population size.

## **MOOSE**

#### **ISSUE 1. Regional Population Goals**

**GOAL: Maintain a healthy moose population in Vermont's moose management regions.**

##### **Management Objectives and Strategies**

- 1.1 Maintain the moose population within density targets in North Central, East Central and Green Mountain moose management regions.
- 1.2 Provide quality hunting opportunity in all WMUs when appropriate.
- 1.3 Improve current and explore new population monitoring methods. They may include expanding annual deer hunter effort surveys, developing a camera trap network, and monitoring snow urine (urea nitrogen/creatinine ratio) to gauge the impact of winter ticks on moose health.

#### **ISSUE 2. Hunting Permit Thresholds**

**GOAL: Establish moose density thresholds in Wildlife Management Units that would dictate hunting closures or re-openings.**

##### **Management Objectives and Strategies**

- 2.1 Hunting Permit thresholds
  - No permits if less than 75% of target density for 2 consecutive years.
  - Resume permits if within 25% of target density for 2 consecutive years.

#### **ISSUE 3. Disease**

**GOAL: Better understand and address the impacts of parasites and disease on the long-term viability of moose in Vermont**

##### **Management Objectives and Strategies**

- 3.1 Implement a density goal of 1.0 moose/square mile, or lower, for any WMU where winter ticks persist at epizootic levels or are driving population decline by lowering calf survival to an unsustainable level.
- 3.3 Explore the use of snow urine to monitor nutritional status.
- 3.4 Monitor tick load and hair loss on all incidental or legally killed moose, when available, and consider other options, such as hair loss via salt-lick camera traps, when appropriate.
- 3.5 Evaluate methods to supplement and improve population model estimates. These could include using camera



traps to compare trends in deer hunter moose sighting rates, calf-cow ratios, using genetic information to estimate population trends, and considering various trend estimation time frames (i.e. yearly, every 3 years, etc.).

- 3.6 Submit blood serum from euthanized sick-acting moose for ELISA test, and consider the same for all incidental moose mortalities and harvested moose for brainworm screening.
- 3.8 Evaluate the need and feasibility of field necropsies of all incidental moose mortalities.
- 3.9 Maintain WMU E1 and E2 deer density at 10 per square mile or fewer.

#### **ISSUE 4. Moose–Human Conflicts**

**GOAL: Minimize motor vehicle - moose collisions and other forms of damage caused by moose.**

##### **Management Objectives and Strategies**

- 4.1 Continue to improve the protocol for moose/human conflicts.
- 4.2 Consider revising the moose doing damage rule in light of the declining moose population (i.e. sap tubing damage only during sugaring season).
- 4.3 Continue to work with the Vermont Agency of Transportation (VTRANS) to erect and maintain warning signs at traditional moose highway crossings.
- 4.4 Continue to work with VTRANS in implementing roadside brush-clearing projects to improve visibility at the most dangerous moose crossings, when feasible.
- 4.5 Cooperate with VTRANS to investigate the use of new technology that may help reduce moose/vehicle collisions.
- 4.6 Cooperate with VTRANS on the installation of wildlife crossing culverts or travel lanes during interstate and Vermont highway bridge replacements, when feasible.
- 4.7 Issue annual press releases to remind motorists of moose hazards during seasons of increased moose movement.

#### **ISSUE 5. Moose Habitat and Carrying Capacity**

**GOAL: Maintain necessary habitat to support regional moose density objectives.**

##### **Management Objectives and Strategies**

- 5.1 Enhance moose habitat on state and federal lands, especially in regions where young forest comprises less than 10% of forestland.
- 5.2 Support and monitor research into moose and parasite dynamics.

## **WILD TURKEY**

#### **ISSUE 1. Turkey Population Objectives**

**GOAL: Maintain a healthy, sustainable wild turkey population in Vermont.**

##### **Management Objectives and Strategies**

- 1.1 Annually collect and assess turkey harvest data to monitor disease, health and population trends.
- 1.2 Continue conducting turkey brood surveys to assess annual poult production using regionally accepted protocols.
- 1.3 Evaluate and implement new population monitoring and modeling practices (i.e. winter flock surveys, hunter sighting surveys, population models, hunter effort surveys to effectively detect trends in the turkey population and manage it accordingly).
- 1.4 Improve the regional approach to managing turkeys using appropriate population thresholds and indices (i.e. spring toms harvested per square mile of habitat, turkeys harvested per unit of hunter effort, turkeys harvested per number of licensed hunters per WMU, etc.) evaluated at the WMU scale.

#### **ISSUE 2. Turkey Management Strategies and Season Structure**

**GOAL: Maximize the ecological and social benefits derived from Vermont's wild turkey population by administering biologically appropriate and sustainable harvest regulations.**

##### **Management Objectives and Strategies**

- 2.1 Continue prioritizing quality spring hunting over fall hunting.
- 2.2 Consider liberalizing fall hunting opportunities when it is sustainable and in accordance with public preference.

- 2.3 Evaluate and implement methods for using turkey hunting to recruit new hunters such as, but not limited to, the creation of a “novice season” for turkeys like the recently adopted deer novice season.
- 2.4 Liberalize and simplify shot size regulations including the use of non-lead, tungsten shot.

### **ISSUE 3. Diseases**

**GOAL: Safeguard the health of Vermont’s wild turkey population through the effective surveillance of and response to disease outbreaks.**

#### **Management Objectives and Strategies**

- 3.1 Participate in regional studies designed to facilitate the understanding of wild turkey disease distribution and significance.
- 3.2 Implement a disease reporting system (i.e. online report form) designed to facilitate the effective monitoring of and response to disease outbreaks in wild turkeys.

### **ISSUE 4. Turkey–Humans Conflicts**

**GOAL: Maintain public support for wild turkey conservation by providing technical assistance when conflicts arise and by maintaining the turkey population within its cultural carrying capacity limits.**

#### **Management Objectives and Strategies**

- 4.1 Develop standardized protocols for guiding staff response to conflicts caused by wild turkeys.
- 4.2 Develop and disseminate educational materials designed to inform citizens/farmers about techniques for minimizing conflicts.
- 4.3 Strengthen outreach efforts aimed at increasing the public’s awareness of the importance of reporting conflicts with turkeys
  - Develop and implement an online turkey conflict reporting database designed to facilitate the collection, assessment and archiving of conflict data.
  - Annually compile and evaluate conflict reports to document problems and inform management decisions.
- 4.4 Pursue a regional harvest management strategy that strives to minimize conflicts caused by wild turkeys.

### **ISSUE 5. Habitat Changes and Conservation**

**GOAL: Maintain the productivity of Vermont’s landscape for wild turkeys by working to identify, protect, and enhance key habitats.**

#### **Management Objectives and Strategies**

- 5.1 Develop and maintain habitat demonstration sites designed to promote beneficial commercial and non-commercial land management practices.
- 5.2 Provide information and technical assistance to private landowners and other land managers regarding turkey habitat management.
- 5.3 Collaborate with key partners (i.e. NWTF, GMNF, etc.) to promote turkey habitat management and conservation.

## Chapter 1: Introduction

The Vermont Fish & Wildlife Department conserves and manages Vermont's wildlife on behalf of all Vermonters. Vermont law entrusts this stewardship to the department in accordance with the Public Trust Doctrine, and, in keeping with this statutory authority, the department has a long history of managing Vermont's big game species: black bear, moose, white-tailed deer, and wild turkey.

For the past twenty years, Vermont's Big Game Management Plans have provided the framework for management of deer, bear, moose, and wild turkey. These plans, updated every decade, identify issues these species face, establish sustainable population and management goals, and prescribe the strategies needed to achieve those goals. Combining wild turkey management with moose management may seem strange on the face of it, but a multi-species approach is appropriate because all four species face overlapping challenges and, as a group, represent the backbone of Vermont's hunting and wildlife-viewing opportunities. In addition, wild turkey's status as a big game species reflects the elevated focus it has received in wildlife restoration efforts in the last 50 years.

The Big Game Management Plan is created for the sole purpose of providing effective, proactive and coordinated long-term big game management. A single, comprehensive document is also cost effective compared to individual species planning efforts.

Guided by this plan, the department expects to safeguard the long-term presence of healthy and sustainable big game populations. When these species are effectively monitored and managed, Vermont residents will continue to enjoy the diversity of both consumptive and non-consumptive benefits that come with these species, and most importantly, Vermont residents will remain the greatest champions of these species and the habitats they depend on.

- **Benefits to wildlife:** The plan's focus is on sustainable, healthy populations of big game, thus contributing to the overall diversity, integrity and vitality of all of Vermont's natural systems.
- **Benefits to public:** The plan enhances opportunities for big game hunters, bird watchers, wildlife enthusiasts, and the public at large to enjoy the continued abundance of these species and Vermont's natural systems.
- **Benefits to economy:** The plan supports and boosts Vermont's significant wildlife-based economy.
- **Benefits to society:** The plan promotes appreciation for wildlife by minimizing human-wildlife conflicts and providing scientifically derived information about species and the complex ecological and ecosystem processes that affect them.

### Wildlife as a Public Trust

The Public Trust Doctrine, based on Roman civil and English common law, and affirmed by the United States Supreme Court, is the principle that natural resources, including wildlife, are owned by the public and held in trust by the government for the benefit of current and future generations. Wildlife does not belong to private property owners or the government. Nor can individuals possess live wild animals as a commodity or as pets or farm animals. Instead, wildlife is a resource that must be conserved and protected for public benefit by state and federal management.

### Developing the Big Game Management Plan

The Big Game Management Plan is based on current wildlife research and the department's most recent biological and ecological data. However, many of the issues facing Vermont's big game species are more social than biological. In some cases, such as the antler point restrictions that limit white-tailed deer buck take, issues can be partly social. To help address the human component of the big game plan, the planning process included a large, randomized telephone survey of 600 residents and 600 resident hunters in 2018. Vermont Residents' and Hunters' Attitudes Toward Big Game Hunting and Management (Big Game Survey) was designed to be representative of Vermont's population and touched on many topics. Topics included perceived big game population levels, knowledge of issues facing big game species, hunting preferences, wildlife damage and other human-wildlife conflicts. To track trends in opinions, some of the questions from the 1996 and 2007 Vermont Species Management Surveys were repeated.

Direct public input on the plan was also essential. During the development phase, two meetings were held in the summer of 2018 with hunting, conservation, forestry, and animal welfare-related representatives to hear their perspectives on the

key issues for each species and identify other issues of public concern that the key issues did not address. These issues were also presented to the Fish and Wildlife Board (Board) for their input. Strategy development began in the fall of 2018, after the conclusion of the Big Game Survey.

The 2020-2030 Big Game Plan process coincided with completion of the Comprehensive Deer Management Evaluation (CDME). In early 2013, the department, in collaboration with the Board, embarked on a full review of all Vermont deer hunting regulations, including potential new hunting opportunities. This initiative was partly due to the Board and department receiving a constant stream of petitions to change current hunting seasons and regulations, such as a longer archery season and a special flintlock season. The department and Board decided that a single, comprehensive evaluation of current and potential management approaches would be most effective for addressing these various concerns. As a result, in April 2015, the Board approved a set of regulation changes and agreed to a three-year evaluation of the effects of those changes along with further evaluation of remaining issues.

The result of the three-year evaluation was a new round of proposed regulations, including allowing the use of a crossbows for all hunters, the establishment of an early antlerless season and eliminating the antler point restriction of requiring two points or more on one antler in parts of the Northeast Kingdom and spine of the Green Mountains. These proposed regulations, some of the most sweeping in modern Vermont deer hunting, were presented to the Board in early 2019 and were the primary topics at that year's public deer and moose hearings. It should be reiterated that the Big Game Plan is not a regulation-setting document. However, parts of the plan, particularly related to deer population and age-class objectives, were discussed at the heavily attended hearings. More than 750 people attended the eight meetings.

The resulting deer hunting regulation changes, which took effect in 2020, were designed, in part, to address many of the issues identified in this plan and are reflected in many of the Big Game Plan's strategies. The new regulations, for instance, allow for the establishment of expanded archery areas to address suburban deer conflicts. The effects of these changes extend beyond deer. For example, expanded deer hunting opportunities may result in additional bear harvest and reduce the need for more aggressive bear harvest strategies to maintain the bear population within objectives.

Review of the Big Game Plan began in fall of 2019. In September, the department presented the issues and proposed strategies to the Board for their input and then later in the month to stakeholder groups, most of whom were involved in the 2018 issues meeting. A list of invited and attending stakeholder groups is included in Appendix A of this Plan. Public comment on the final draft was to begin in the winter of 2020 and conclude by the spring. However, the COVID pandemic delayed the completion of the final draft due to an extended public comment period.

The draft plan was posted on the department's website on March 3, 2020 and sent to stakeholders on March 27. An in-person public meeting was also scheduled but was subsequently cancelled as COVID guidance evolved. A virtual public comment meeting was held on August 5 and the public comment period ended on August 13, 2020, resulting in the document being available for 163 days to comment upon.

Despite the extended timeframe, only a handful of comments and questions were received until the public meeting, of which 18 were taken from the approximately 40 people who attended. An additional 134 comments were then received between the meeting and end of the comment period. The vast majority of the comments were form responses, or variations of the form response. Primary objections were the plan's focus on hunting and the approach to bear and moose management. A number of the comments also addressed issues that were well-beyond the scope of this document, such as trapping and department governance. Comments received on the plan as well as responses from the department, are included in the Appendix B and C of this document.

As a result of the comments, some language was clarified in the final plan and additional content on hunting bears with the use of hounds was added.

## **Overarching Management Issues of Significant Concern**

### **1. Declining Hunter Numbers**

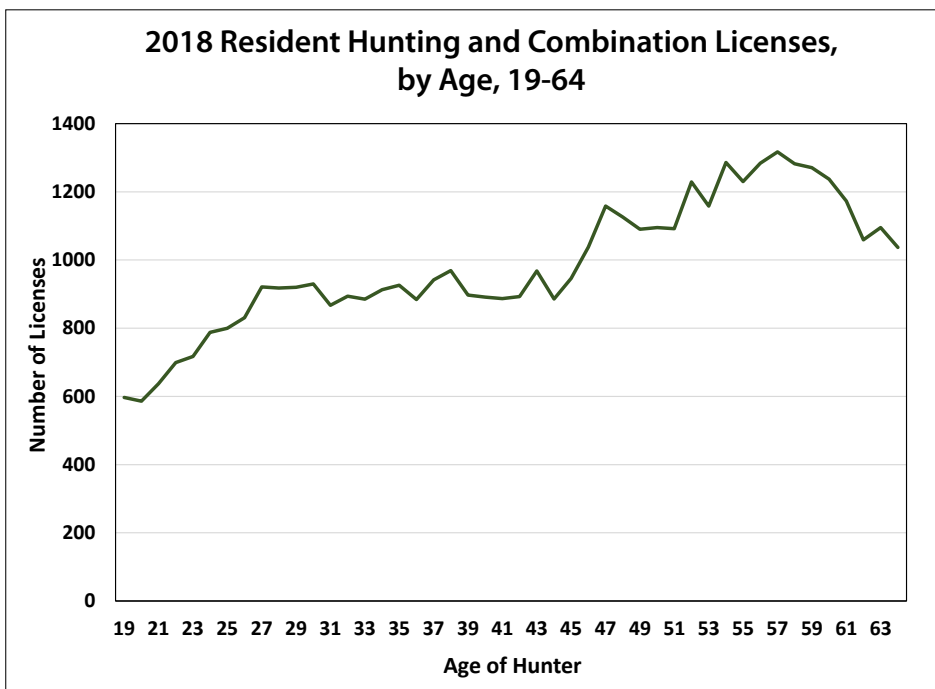
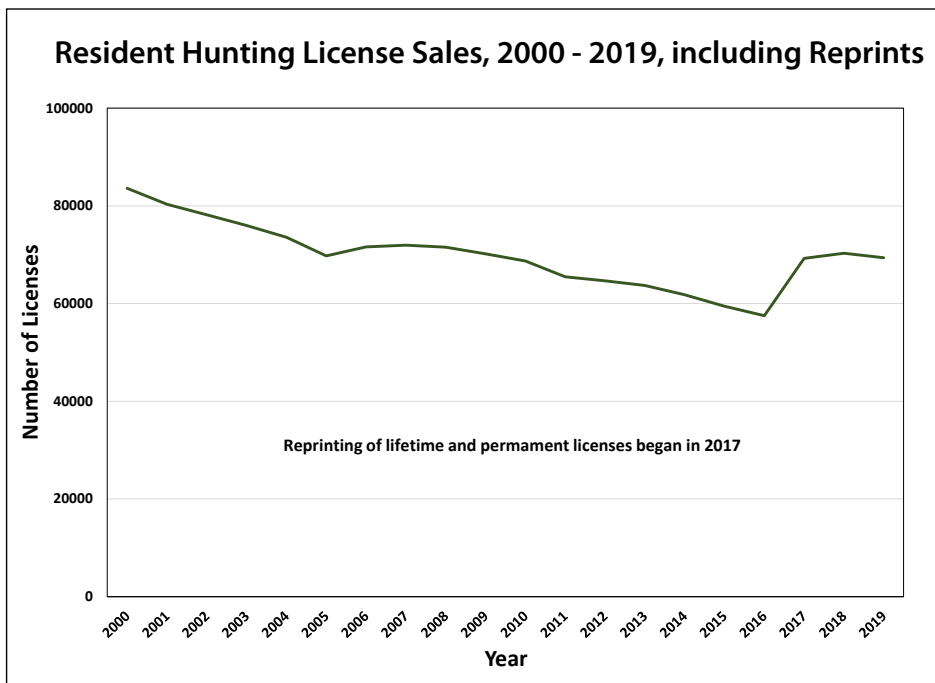
Vermont's hunters reflect the state's aging demographics. The median hunter age, 44 years-old, is nearly identical to Vermont's general population and there is both a declining number of young hunters and young people across the state. As older hunters become eligible for permanent licenses and then age-out completely, there are fewer people to take their

place. This has contributed to a steady decline of 2-3 % per year in resident hunting and combination hunting/fishing license sales over the last two decades. Yearly license sales are not, however, the same as the number of hunters in the field. Resident landowners, and nonresident landowners who do not post their property, do not need licenses to hunt on their own land, and, more importantly, many resident hunters hold permanent and lifetime licenses. These license types are not considered sales after the first year of purchase, and the department has only been able to require yearly ‘reprints’ from those planning to hunt since 2017. When 2018 and 2019 reprints are added to license sales, the totals show a much smaller (less than 1%) decline in hunting participation than sales alone suggested. More years of reprint data are needed but, in the end, the number of permanent licenses and the majority of reprints, are directly related to the state’s demographics. Their percent share of total hunter numbers will increase during the plan’s timeline although they can only decrease in absolute numbers.

Until recently, hunting participation rates among most age groups in Vermont have remained steady, even if the number of people in those age groups have declined. Starting in 2013, a noticeable drop in participation among 20 to 24-year-olds was noted and it appears to have continued in younger cohorts since then. Although, this is complicated

by lifetime licenses and older 2010 census data. Youth deer weekend permit numbers seem to confirm this trend. Between 2015, when the department was first able to accurately track youth deer weekend participation and 2018, there was an 18% decline in the issuance of these no-cost tags.

Using estimated demographic and participation trends, a predictive model by the department estimates total hunting and combination hunting/fishing license sales of approximately 36,000 by 2030. This represents a 25% decline from 2017, raising legitimate concerns that the department will eventually struggle to meet big game population objectives through hunter harvest and accurately monitor wildlife population indices with hunter derived data alone. More analysis is needed to fully understand the ramifications, as the model utilizes older (2010) census data and doesn’t include youth sales as well as lifetime and permanent license reprints.



While declining hunter numbers represent a significant challenge to achieving the department’s mission, it is worth noting that Vermont’s hunting tradition is far from diminished. Today’s hunters are more avid than previous generations. Despite declining base license sales, big game add-on licenses (archery, muzzleloader, turkey, and early bear) are stable; 50% of hunters buy at least an archery or muzzleloader tag, and a quarter of hunters purchase both archery and muzzleloader tags. Also, as of 2018, one in four resident Vermont males is a hunter, female participation has increased, and the state’s total hunting participation rate is approximately 14%. This remains one of the highest rates east of the Mississippi River, comparable to Wisconsin, West Virginia and Maine, and well above the national average of 4%.

## 2. Suburbanization and Support for Hunting

The Big Game Survey reinforced what every previous study had found: the vast majority (86%) of Vermonters support regulated, legal hunting; however, sustaining this level of support from residents in the coming decade could prove challenging. Despite Vermont’s stagnant population growth, an increasing number of residents, and almost all new immigrants to the state, are moving into urban and suburban greater Chittenden County. In 2018, 35% of the state’s population is estimated to reside in the (U.S. Census Bureau) Burlington metropolitan area, up from 30% in 1990 and 33% in 2000, and that percentage is expected to continue to steadily increase in the next decade.

If national trends hold, suburbanization will likely lead to less knowledge about wildlife, lower exposure to hunters, hunting and hunting as a tool for managing wildlife populations, more emotional and familial feelings towards individual animals, and less hunting and fishing participation. These factors have generally been associated with less understanding and support for regulated hunting. The 2018 Vermont Fish and Wildlife Department Media and Communications Survey suggests this may already be occurring. It found support for hunting is still very high in greater Chittenden County (82%) but that support tended to be more moderate versus the strong support seen in the rest of Vermont. Support for and, most importantly, understanding of the value of hunting and fishing to successful wildlife and habitat conservation is vital because hunting and fishing are intricately tied to human-wildlife conflict management as well as fish, wildlife and habitat

### The Full Values of Hunting

Hunting is both an essential management tool and a Vermont tradition. It keeps wildlife populations, particularly big game, in line with what Vermont’s fields and forests can support and at levels Vermonters will tolerate. It serves as the financial backbone of funding for wildlife conservation and generates millions of dollars in revenue, particularly in rural communities, outside of the tourist season. And, for hunters and their families, hunting provides hundreds of thousands of pounds of local, organic, sustainable meat. These benefits are easy to grasp, however the values of hunting go well beyond the measurable or tangible:

#### Full Immersion in Nature

Getting outside and being in nature is a top reason why people hunt. However, this goes much deeper than just ‘being outside’. The sights, smells and sounds a hunter experiences when they are participating *as part of nature* rather than just observing it can be a key element.

#### Physical and Mental Health

Numerous studies in the U.S. and around the world are exploring the health benefits of spending time outside

in nature. This includes hunting. Hunting and personal health are inseparable, particularly with Vermont’s landscape. Scouting is crucial for success and many hunters’ workouts begin long before the seasons open. Real, quantifiable results from hunting have included a wide range of outcomes from reductions in stress and blood pressure to improvements in focus and mood.

#### Identity

While hunter numbers are declining, 14% of Vermonters still hunt, including one in four males. These hunters all have family and close friends which means most of the state still has a close connection with hunting and almost every Vermonter knows when it’s deer season because of the resultant sales, breakfasts, and craft fairs. Hunting defines the Vermont character for many people. It is deeply rooted and woven into the rich cultural heritage and belonging that people feel with the outdoors and other members of their community.

conservation funding and research. The department will continue to emphasize this value by focusing on strategies that increase our understanding and use of hunters and anglers as a resource, while also seeking strategies that increase access to hunting and fishing, and to the diverse values of wildlife and habitat in general.

### 3. Climate Change

Vermont continues to experience the effects of a changing climate. Storms are more intense and frequent. Winters on average are trending milder and shorter. There have also been dramatic increases in tickborne diseases, invasive species and other environmental changes that are a result of long-term changes in Vermont's climate. As the climate changes, so too do the habitats that big game animals depend upon. Fortunately, unlike many of Vermont's wildlife, deer, bear and wild turkeys are highly adaptable to the current challenges of climate change in Vermont. Unfortunately, moose are struggling due to winter ticks.

Wider extremes in weather patterns may cause more dramatic shifts in natural food abundance. Examples of this would be spring vegetation and hard/soft mast like berries, apples, acorns, and beechnuts that can be significantly influenced by early and late frosts as well as droughts. This will likely increase conflicts with humans and could result in wider population swings.

What actions can the department take to prepare for climate change? Land and habitat management. The department's newly created Vermont Conservation Design, a vision and guide to a healthy forested landscape, is a conservation tool that prioritizes key habitat blocks and movement corridors that maximize the ecological function of landscapes, habitats, and their species. Maintaining forests and connections between them for wildlife to move, will ensure proper habitat for moose, deer, bear, and turkey in the future. In addition, collaborations with researchers to better understand climate change effects on wildlife that occupy large ranges in these priority habitat blocks are also vital to identifying and implementing climate change adaptation strategies.

### 4. Promoting Utilization

National surveys have found hunting for meat has surpassed simply getting outdoors as the primary motivation for hunting. In Vermont, long held traditions of community game suppers and the department's very popular game processing seminars help support hunting as a sustainable local food source. However, as hunter numbers decline, bag limits may need to increase, particularly to sustain healthy wildlife populations in areas with high human-wildlife conflict or where habitat damage occurs from overabundant wildlife. Even if individual success rates rise too, there are limits to how much deer,

### Hunting with Non-Lead Ammunition

Hunting with non-lead ammunition is good for humans and for wildlife:

- Lead is a naturally occurring element with many beneficial uses, but it is also a toxin that has been removed from many products including water pipes, paint and gasoline.
- Lead shot and bullet fragments in meat may be eaten by people, and fragments in gut piles and meat can be ingested by wildlife scavengers such as fox and eagles.
- If ingested, lead can be toxic. Toxicity depends on the level and frequency of exposure.
- Although regional research has shown that hunting with lead ammunition has no significant population level effect on wildlife species in Vermont, lead ammunition is a well-defined pathway for toxicity to animals that ingest it.
- Lead particles in game meat are often too small to detect by sight, feel or taste. Using non-lead alternatives can prevent lead exposure to people and wildlife.
- Non-lead ammunition is becoming widely available and reasonably priced and may offer better performance than lead.
  - Non-fragmenting solid copper and copper alloy bullets are loaded in most popular big game hunting calibers, including for muzzleloaders.
  - Highly frangible, non-lead small caliber bullets (compressed copper or tin powder) are available in both centerfire and rimfire cartridges.
  - Non-lead shot (steel, tungsten, bismuth and other alloys) is widely available.
- To learn more about switching to non-lead ammunition and tips to finding the right non-lead ammunition for your firearm visit [www.huntingwithnonlead.org](http://www.huntingwithnonlead.org) and [www.nonleadeducation.com](http://www.nonleadeducation.com).

bear and turkey meat hunters and their families can consume. The department will continue to explore creative programs, like recent seminar series involving Vermont's pioneering local food movement and partnering with local food donation organizations to promote and expand the use of this important local food resource.

## **5. Habitat Loss**

Despite some regulatory protections and sluggish human population growth, the loss of critical habitat remains a serious threat to the long-term viability of all Vermont's fish, wildlife, and plant species. Among the new, more urgent challenges is the need to maintain an adequate supply of quality, inter-connected habitats that can allow for the safe movement of wildlife across an increasingly fragmented landscape. As mentioned in the Climate Change section, Vermont Conservation Design provides a multi-scale spatial identification of high priority lands and waters essential to maximizing ecological integrity. Together, they comprise a connected landscape of large and intact forested habitat, healthy aquatic and riparian systems and a full range of physical features on which plant and animal communities depend. The department will continue to address this issue of habitat loss with a focus on understanding and addressing climate change effects, conserving wildlife movement corridors and priority habitat and integrating information across departments and disciplines aimed at increasing the resiliency and viability of all wildlife species, which includes deer, bear, turkey, and moose.

## **6. Access to Land**

Public support for hunting, liberal seasons and proactive population objectives is still unlikely to achieve healthy populations of big game species if hunters are severely limited by where they can hunt. The amount of legally posted property in Vermont has been relatively stable over the past decade, representing just 4% - 5% of the state's private acreage. However, the highest rates of legally posted land overlap largely with areas of high deer densities. Antlerless muzzleloader deer permits are a key tool used to manage the deer population in Vermont. However, permit sales have fallen very short of management objectives in many areas with high-density deer populations, and sales were so far below allocations in some WMUs that the department stopped basing permit allocations on actual harvest objectives. The amount of legally posted land also fails to give an indication of the amount of informally posted property or the amount of once-huntable land now lost to development. Posting, of course, does not always preclude hunting. The Big Game Survey found 35% of all hunters have permission to hunt legally posted land. However, reduced land access and posting can create significant challenges for wildlife managers and hunters alike and are always top concerns voiced by the public at deer hearings, particularly in Franklin and Rutland counties, which have the highest posting rates. Access to land for hunting is a major issue of concern for the department because it hinders the ability to achieve a healthy deer population, particularly in areas where overpopulated deer are negatively affecting wildlife habitat quality and overall ecosystem health.

Public lands open to hunting are widely distributed across Vermont with more than 800,000 acres under state or federal management and thousands more managed by municipalities. The Vermont Agency of Natural Resources manages more than 333,000 acres of this total as wildlife management areas, state forests and state parks and holds easements on over 123,000 acres of conserved commercial forestlands that guarantee public access. The Green Mountain National Forest and Silvio Conte National Wildlife Refuge comprise most of the federally owned public lands in the state.

Nevertheless, with the exception of department and USFWS lands, hunting access to public lands and easements may change in the future as interest in other outdoor recreation grows. Along with increasing pressure towards suburbanization, diverse recreational values are spurring a competition for space, particularly on town forests and new acquisitions and easements. Research on how these recreational values intersect is a somewhat new field, particularly in Vermont, and the department has a large knowledge gap on future consequences of growing diverse recreational interests and how to balance these uses to best achieve wildlife conservation objectives. Access to land for hunting remains an important tool in achieving these conservation objectives, particularly for sustaining healthy populations of big game species. The department will continue to maintain access to land and explore ways to better understand diverse recreational users to best achieve big game species objectives.

## **7. Human - Wildlife Conflicts**

Increasing development in and around deer, turkey and bear habitat is already leading to increased conflicts with humans. This is likely to increase over the next ten years. Read individual plans for detailed explanations. The department addresses big game issues in accordance with the following principles that are guided by legislation and human safety: 1) protection



of human health and safety comes first; and 2) the animal must be handled responsibly and humanely in the cases where it must be confronted, displaced/removed or euthanized. Monitoring the number, extent, and type of conflicts, as much as possible, will remain an integral component of the department's wildlife conflict management strategy. The department will also promote actions to avoid or limit the possibility for conflict, such as providing guidance materials, information resources, communication with towns, and coordination with game wardens to collect valuable data that inform strategic planning to address locations where a high number of conflicts occur.

## **8. Collection of Biological Data**

Big Game Reporting Stations perform a vital data collection service for the department and provide convenience to hunters to legally register their game. Most check stations are located at general stores and small-town businesses. Many of these businesses are struggling to survive and, every year, some don't make it. So far, replacement stations have been found, but proposals, such as increasing the per-animal reimbursement may help encourage these businesses to keep working with the department in the near term. However, long-term strategies are needed to ensure the department can continue to collect valuable information from harvested species. These strategies will focus on employing technological advances that allow for remote or automated data collection and continuing to maximize electronic data input mechanisms for all projects.

## **Overarching Management Strategies**

1. Maximize opportunity for big game hunters, including expanding season lengths and bag limits, where possible, to meet big game population objectives.
2. Recruit new hunters with the primary purpose of introducing new, diverse audiences to, and maintaining support for, hunting. This strategy will include involvement of big game project staff.
3. Encourage the responsible utilization of big game species. This is part of the traditional Vermont hunting ethic, and fostering this will help maintain support for, and promote an understanding of, hunting while encouraging more bear and antlerless deer harvest, if needed. This could include increasing the amount of utilization-related content on the website and reviewing the current statutory window to sell big game carcasses during the open season and 20 days thereafter to connect the public to hunting and wild game.
4. Use Vermont Conservation Design to identify priority big game habitat for conservation, and to guide big game climate change adaptation strategies.
5. Continue to provide outreach on the impacts of climate change on big game species.
6. Advocate for public hunting access to lands enrolled in the Use Value Appraisal Program (Current Use) and conserved lands.
7. Continue outreach to private landowners, municipalities, non-profits and other landowners on the value of allowing hunting access.
8. Develop a single, comprehensive database to track and record human-wildlife conflicts, including those involving big game species.
9. Maintain mandatory big game reporting but investigate ways to make it easier for hunters to check their game in, particularly with the use of technology.

### Introduction

It is difficult to overstate the importance of white-tailed deer to Vermont. There is a white-tailed buck atop the state seal, on the state flag and immortalized in stained glass at the Vermont state house. They are pursued by almost all (96%) of the state's hunters and the regular 16-day November deer season is synonymous with 'hunting', leading to scores of hunting breakfasts and hunting sales each November.

White-tailed deer, common throughout Vermont, are the most abundant large mammal in North America, and they may be the most studied large mammal in the world. They are highly adaptable and can thrive in a variety of habitats, including developed suburban and exurban areas.

Deer management remains an important issue for many Vermonters. Though not nearly as contentious as the "deer wars" of the 60s, 70s and 80s, when the department struggled to manage an often overabundant deer herd in the face of severe winters and a "buck-only" mindset, the well-attended deer regulation change hearings in 2019 proved that deer hunting is still a valued tradition in Vermont, and there are still as many opinions on deer management as there are deer hunters.

### 2010 - 2020 Plan Accomplishments

#### ISSUE 1. Habitat Loss and Assessment

- 1.1 Regularly updated the deer wintering area dataset through routine fieldwork associated with regulatory and chip harvest reviews, as well as a targeted effort surveilling all deer wintering areas in several central Vermont towns.
- 1.2 Conducted outreach to various segments of the public stressing the importance of habitat conservation.
- 1.3 Worked closely with foresters and entomologists to prevent, manage, and reduce the threat of the hemlock woolly adelgid.

#### ISSUE 2. Population Goals

- 2.1 Maintained and evaluated regional population goals, based on deer densities, that recognized a lower limit that was unsatisfactory to the public and an upper limit that was ecologically unsustainable.
- 2.2 Monitored deer herd health by collecting body condition data from hunter-harvested and road-killed deer.
- 2.3 Established habitat suitability criteria to define areas of suitable deer habitat within WMUs so that consistent and reliable density estimates could be made while allowing for habitat area estimate updates as new land-cover maps became available.
- 2.4 Evaluated bowhunter surveys to better estimate regional buck:doe and fawn:doe ratios.
- 2.5 Continued re-mapping and surveying deer wintering areas.
- 2.6 Worked with foresters to identify and address issues associated with locally overabundant deer. This included convening a working group on this topic during 2011-2012.
- 2.7 Provided outreach to landowners regarding methods that may minimize damage and encourage reduction in locally overabundant deer. Developed the Landowner-Hunter Connect program to connect hunters with landowners to address locally overabundant deer.
- 2.8 Maintained a consistent number of big game reporting stations to make big game reporting convenient for hunters.
- 2.9 Realigned WMU boundaries to better match habitat conditions and facilitate more effective management of deer and other big game species.

#### ISSUE 3. Hunter Satisfaction and Antler Point Restrictions

- 3.1 Collected biological data from yearling bucks harvested during the youth season to assess changes in the buck population resulting from the antler-point restriction and evaluate biologically acceptable alternatives.
- 3.2 Reviewed literature and developed a model to examine the likelihood of selective harvest altering the genetic diversity of the buck population via the current antler restriction.

## 2010 - 2020 Plan Accomplishments (*continued*)

- 3.3 Informed the hunting public about deer management issues and the effects of the antler point restriction, and gathered input concerning deer management and hunter satisfaction.

### **ISSUE 4. Bag Limits**

- 4.1 Provided the public with ample opportunity to harvest white-tailed deer for food and other utilitarian purposes.
- 4.2 Advocated for an appropriate deer bag limit that would allow maximum hunter opportunity while achieving deer population management goals.

### **ISSUE 5. Muzzleloader and Archery Season Modifications**

- 5.1 Evaluated options to expand antlerless deer-only hunting opportunities prior to the regular rifle season. Regulation changes for 2020 include an early, antlerless-only muzzleloader season, a longer archery season, and increased archery bag limits.
- 5.2 Surveyed public opinion on the various management options to achieve antlerless deer harvest objectives prior to the rifle season and developed a proposal of recommended hunting season changes for the Vermont Fish and Wildlife Board.

### **ISSUE 6. Captive Deer Hunting/ Deer Farming/ Cervid Importation**

- 6.1 Both existing captive hunting facilities were closed.
- 6.2 Continued to work with the Agency of Agriculture, Food, and Markets and the deer farming industry to promote and enforce appropriate disease prevention practices.

### **ISSUE 7. Disease Surveillance and Management**

- 7.1 Worked with associated branches of government (for example, Agency of Agriculture, Department of Health) to monitor disease agents and the deer population.
- 7.2 Monitored for CWD through targeted surveillance of suspect cervids.
- 7.3 Monitored the progress of Hemorrhagic Disease as it moves toward the Vermont border.
- 7.4 Worked with the Agency of Agriculture to ensure dairy farms and domestic deer farms maintain their tuberculosis-free status.
- 7.5 Prohibited the use of deer-urine-based scent lures and implemented a public informational effort on the justification.
- 7.6 Conducted outreach to Vermonters about the seriousness of CWD and the repercussions if it is found in Vermont.

### **ISSUE 8. Locally Overabundant Deer**

- 8.1 Demonstrate the effectiveness of archery hunting to reduce locally overabundant deer in Vermont's suburban environments.
- 8.2 Provided communities with up-to-date and comprehensive information on deer overabundance and considered community views when deciding on how to best manage deer problems in developed areas.
- 8.3 Encouraged communication and cooperation between deer hunters and landowners seeking relief from locally overabundant deer. Developed the Landowner-Hunter Connect program to facilitate that connection.

### **ISSUE 9. Two-year Regulation Cycle**

- 9.1 Provided outreach to legislators, Board members, and hunters to develop an understanding of the rationale behind deer management and proposed actions to improve management.
- 9.2 Evaluated the benefits and deficiencies of implementing a two-year regulation cycle for deer season recommendations. Unfortunately, simplification of the process by which the Board allocates antlerless permits negated many of the benefits of a two-year cycle.

## ISSUE 1. Disease

### GOAL: Maintain an abundant and healthy deer population

#### Chronic Wasting Disease

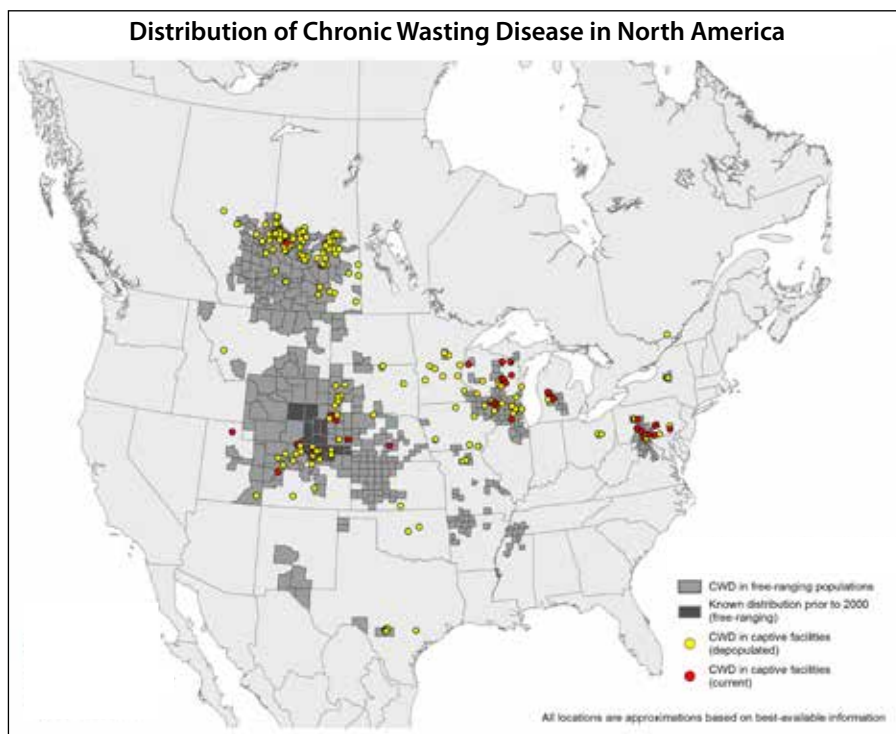
White-tailed deer are susceptible to many diseases, ranging from common but unsightly skin growths (fibromas) to very rare, but always fatal viruses (rabies). However, until chronic wasting disease (CWD), no disease had ever included the specter of widespread and permanent population decline.

CWD is an incurable, always fatal disease of the brain and nervous system that affects most members of the cervid (deer) family, including white-tailed deer and moose. It causes significant and persistent population declines, reduces life expectancy and disproportionately impacts mature males. At worst, some models suggest eventual extinction. CWD is an unprecedented threat to deer and deer hunting in Vermont, and it's getting closer to Vermont's borders. Since the last Big Game Plan in 2010, an additional twelve states and provinces have been added to the CWD positive list, including Eastern states and provinces such as West Virginia, Virginia, Pennsylvania, and Quebec.

CWD belongs to the family of diseases called "transmissible spongiform encephalopathies" (TSEs). Other TSEs include scrapie in goats and sheep, bovine spongiform encephalopathy ("mad cow disease") in cattle and Creutzfeldt-Jacob disease in humans. While CWD is related to these diseases, it has a uniquely shaped prion that, under natural conditions, is only known to infect members of the deer family. Unlike mad cow disease, there are no known cases of CWD in humans. However, prion diseases are difficult to diagnose, and it is possible that CWD prions could eventually transform or evolve into a shape that is transmissible to humans. Currently, both the Centers for Disease Control and World Health Organization recommend that animals infected with any prion disease not be consumed.

Keeping CWD out of Vermont is Vermont's best chance of avoiding the impacts of this disease. That's because the abnormally shaped proteins called prions that cause the disease are virtually indestructible and can persist in the environment for at least 16 years (Georgsson et al. 2006). Infected animals shed CWD prions through saliva, urine and feces and healthy animals can pick up the disease by direct contact with the infected body fluids or consuming contaminated food or water. The prions invade the animal, and, over time, convert existing healthy cellular proteins into diseased mis-folded proteins. This process can take as little as a few months to as long as few years, but the results are the same: emaciation, disorientation, loss of bodily functions, and finally death.

A significant vector of the spread of CWD has been the importation and transportation of live captive cervids and certain parts of infected animal carcasses. The current, scattered distribution of CWD across North America clearly demonstrates this. CWD could potentially be brought into Vermont by deer farmers importing live animals or even an unsuspecting hunter bringing home a legally harvested deer or elk carcass from a CWD-infected area. As a result, the State has established laws and regulations governing the transportation and importation of live deer, the importation of deer and other cervid carcasses from states and provinces where CWD is known to occur, and the use of lures containing deer urine or other bodily fluids. The department must continue to work with the Agency of Agriculture to ensure the regulations and testing requirements related to captive cervids (the most likely means of CWD introduction) are being followed and pursue additional regulations, if necessary.



Educating the public on the risks of CWD is also a priority. The Vermont Big Game Survey found that only a third of hunters thought there was a high or medium risk of CWD in Vermont, while almost half thought there was only low risk or no risk at all. In addition, a fairly large percentage simply did not know about it and 16% thought urine-based lures were still legal. There is clearly room for improvement in communicating the risks of CWD.

If CWD were found in Vermont, it would require an enormous amount of time and money to control, if it is even possible. A diseased herd would result in exorbitant financial and intrinsic losses of over time, potentially devastating the herd and a way of life enjoyed by Vermonters for generations. Prevention is the only option.

### **Hemorrhagic Disease**

Hemorrhagic Disease (HD) in white-tailed deer also deserves attention. Common in the Southeast, Midwest and some western states, HD is spread by tiny biting flies and caused by two closely related viruses, epizootic hemorrhagic disease (EHD) and bluetongue virus. Because the signs and symptoms produced by these two viruses are indistinguishable, the general term, hemorrhagic disease, is usually used. Many infected deer appear normal or show only mild signs of illness. However, the symptoms change as the disease progresses. Initially, animals may be depressed, feverish, have difficulty breathing or have a swollen head, neck, tongue, or eyelids. With highly virulent strains of the virus, deer may die within 1 to 3 days. More often, deer survive longer and become lame, inactive and/or lose their appetite. Dead or dying deer found near water in late summer or early fall are classic signs (Howerth et al. 2001).

HD is well-understood, but not readily managed. Although deer often survive, it can cause localized, periodic and sometimes heavy mortality. Recently, its geographic range has been expanding northward, presumably related to climate change. Deer in northerly states experience HD more sporadically than in southern areas, but outbreaks tend to be more severe. The department will continue monitoring for this disease as climate change will likely result in continued northward expansion.

### **Management Objectives and Strategies**

- 1.1 Enhance the department's disease surveillance, particularly for CWD.
- 1.2 Continue to emphasize, improve, and monitor CWD prevention efforts.
- 1.3 Consider improving restrictions on importation of cervids.
- 1.4 Develop a CWD response plan, including all necessary approvals and authorities.
- 1.5 Increase public outreach regarding CWD.
- 1.6 Continue monitoring other diseases with potential to impact deer the population.

## **ISSUE 2. Deer Wintering Areas**

**GOAL: Maintain adequate quantity and quality of deer wintering areas (DWAs) to sustain regionally established population objectives.**

Vermont is near the northern limit of white-tail deer range. Deer regularly cope with severe winter conditions including extended periods of low temperatures, deep snow and limited mobility. Consequently, winter is often identified as the primary limiting factor determining the size of northern deer populations, with survival primarily influenced by winter severity and the availability of winter habitat. The disproportionate importance of deer wintering areas (DWAs) is underscored by the fact that they typically account for just 5-15% of total deer range yet are often used for more than 25% of the year. Further, deer often migrate long distances from summer range to DWAs and demonstrate strong fidelity to DWAs that may be used by generations of offspring (Verme 1973, Tierson et al. 1985).

While winter severity is generally declining over time, severe winters remain relatively common, particularly in the Northeast Kingdom. Even in areas that only occasionally experience severe winter conditions, quality winter habitat remains critical to deer survival during those periods. Even a relatively mild Vermont winter is challenging for deer. As a result, DWAs remain vital to the long-term viability of Vermont's deer population. The department, like many state and provincial agencies, has taken measures to protect DWAs, including the development of specific regulatory guidelines backed, under some circumstances, by enforcement actions.

Despite attentive management, pressures from development, logging and natural ecological processes continue to affect the amount and condition of DWAs. While some traditional DWAs have been used for many decades, many others have been abandoned or experienced reduced use within a relatively short timeframe (one to two decades). This impermanence, coupled with increasing human encroachment, makes identification of active DWAs, as well as potential new areas, a management priority.

DWAs were last mapped statewide in the early 1980s. This mapping dataset is sporadically updated, and recent work indicates that many active DWAs have not been identified. Efforts to improve the accuracy of this dataset must continue so DWAs can be protected from development and managers can better understand the availability of these habitats when setting population objectives. New technologies also allow potential wintering habitat to be identified remotely from available GIS datasets. While potentially less accurate than mapping based on field observations, it would facilitate more frequent updates as new datasets become available and may capture more ephemeral DWAs than field observations. This may be particularly useful in areas that experience infrequent severe winter conditions, as the sporadic use of these areas by concentrations of deer can complicate interpretation of field observations.

Valuable DWAs are lost each year to development and timber harvesting. Unfortunately, the department is only able to review larger developments which fall under Act 250 (Vermont's land use and development control law) or Section 248 (utility development), and a small subset of timber harvests that sell chips to Burlington Electric Department and Ryegate Power Station. This means most development and timber harvest in DWAs are unregulated. It may be necessary to pursue additional means of protecting DWAs, including increased outreach and working with landowners through the Use Value Appraisal (Current Use) program.

Another important consideration regarding DWAs and winter survival of deer is the growing interest in various forms of winter recreation. As Vermont continues to experience growth in both the level of public participation as well as the diversity of winter activities Vermonters engage in, it will be important to understand how to balance the needs of wintering deer and other wildlife with the interests and desires of the public. Human activities affect deer behavior which is particularly important during winter months when deer are most vulnerable to stress. Winter is an inherently stressful and challenging time for deer, and it is imperative that deer have access to functional winter habitat with limited additive stress. It will be increasingly important over the next 10 years to continue to educate the public, partners, and the spectrum of outdoor recreation interests on the effects of human activities on deer winter survival.

In addition to other pressures, DWAs in southern Vermont may also be threatened by the advance of hemlock woolly adelgid (HWA; *Adelges tsugae*), an exotic insect that defoliates and kills eastern hemlock. HWA-related mortality of hemlock and associated salvage logging could pose a major threat to DWAs in central and southern Vermont where hemlock comprises a majority of softwood cover. Moreover, studies have found that, following the decline of hemlock, canopy dominance shifts to hardwoods, suggesting no long-term replacement in cover appropriate for deer wintering. So far, HWA has been located primarily in Windham County, with small populations in Bennington and southern Windsor Counties.

## Management Objectives and Strategies

- 2.1 Continue to protect DWAs through regulatory review.
- 2.2 Continue to update the department's inventory of DWAs opportunistically.
- 2.3 Develop a remote sensing approach to aid in identification of unknown or unmapped DWAs.
- 2.4 Conduct outreach to landowners, land managers and partner state and federal agencies / organizations about the importance of DWA conservation.
- 2.5 Continue to work with the Vermont Department of Forest Park and Recreation (FPR) and foresters to ensure that habitat is adequately managed under the UVA program.
- 2.6 Work with FPR to develop guidelines for the management of hemlock DWAs given the potential impacts of hemlock woolly adelgid.
- 2.7 Continue to work with conservation partners that own or manage conserved land to ensure that DWAs and other habitats are properly managed.

### ISSUE 3. Population Objectives

**GOAL: Maintain the deer population at levels that are socially acceptable and ecologically sustainable.**

The foremost charge of deer management is codified by Vermont statute: “An abundant, healthy deer herd is a primary goal of fish and wildlife management.” Keeping a deer herd healthy means preventing overabundance. Keeping a deer herd abundant is complicated and subjective. It requires keeping the deer population at levels that are ecologically sustainable and minimizes human conflict.

#### Public Satisfaction

Different stakeholders want different deer densities for different reasons. These reasons range from individual preferences and recreation to economic and environmental concerns. Some people want more deer for hunting or viewing, but too many deer can cause conflicts such as damage to landscaping, agricultural and forestry losses, deer-vehicle collisions, and an increased incidence of tick-borne diseases. Deer management attempts to maintain deer densities at a level that most of the public feels is neither too few nor too many.

The Big Game Survey assessed deer abundance preferences. A majority of Vermonters were generally satisfied with the number of deer in their county, while 20% wanted the population increased and 10% wanted it decreased. This suggests Vermonters are generally content with current deer densities. While more people wanted the population increased than wanted it decreased, there was a notable shift from the similar survey conducted in 2007 (Figure 1). Interestingly, the number of deer in Vermont in 2018 was very similar to the number in 2007, suggesting the shift may be due to increasing deer numbers in developed areas where they have more interaction with people and cause more conflicts.

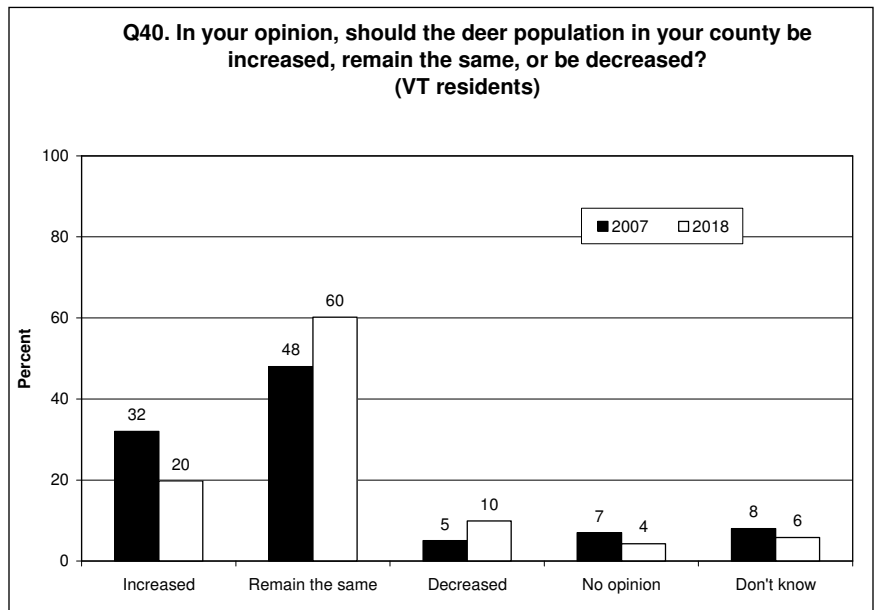


Figure 1. Deer Abundance Preferences Comparison

#### Ecologically Sustainable

Deer require a specific amount of food and cover to survive and reproduce. The available habitat provides a limited amount of these resources. At low numbers, each deer has access to quality food and cover, but as numbers increase so too does competition for these resources. Insufficient quality or quantity of food results in lower body weights, smaller antlers and fewer fawns. Additionally, poor physical condition predisposes deer to disease and starvation. At the same time, as deer compete for available forage, preferred browse species can be reduced or eliminated, and forest regeneration is negatively affected. This, in turn, impacts the ecosystem and reduces the number of deer and other wildlife that the habitat can support.

Habitat and the number of deer it can support varies across the landscape and over time. Different age forests can support different numbers of deer. Young forests support the most, middle-aged (poletimber) stands support very few, and older forests support moderate numbers of deer. In addition to the variability related to different forest ages, mast crops (acorns and beechnuts) can provide a valuable but sporadic food source. Alternative food sources, such

#### Big Game Survey Deer Population Preferences

The Big Game Survey suggests the upper limit of social acceptance has not been reached in most areas. However, in many areas, the deer population has exceeded the ecological carrying capacity. This means the number of deer desired by the public, or that they are willing to tolerate, is greater than the habitat can currently support. Responsible deer management dictates that the deer herd’s relation to its habitat must be considered before the public preferences. If not, it would be impossible to achieve the statutory requirement of a healthy deer herd.

as agricultural lands, also contribute. As forests age, new areas of young forest are created by timber harvests or natural disturbance, their composition is altered by pests, disease, and proliferation of invasive species, and parcels are lost to development. Some of these events increase habitat quality for deer, while others have the opposite effect. Deer themselves can be the primary driver of the change when overabundance degrades habitat.

In northern climates, like Vermont, the onset of snow and colder temperatures force deer to vacate their larger summer and fall ranges and concentrate in higher densities in DWAs. As a result, quantity and quality of winter habitat has a disproportionate effect on the number of deer a region can sustain and the impact those deer have on forest ecosystems. Areas that regularly experience severe winters support fewer deer, regardless of the quantity or quality of habitat available during other seasons.

Estimating the maximum number of animals an environment can support requires an enormous amount of time and monetary resources, and, because estimates look at a small area at a single point in time, they have limited utility for statewide management planning. Fortunately, research on the impact deer have on forest ecosystems is extensive and shows some general patterns. In most cases, long-term deer densities exceeding 20 deer per square mile are capable of altering forest plant communities, threatening endangered plant species, reducing ground-level hiding cover and forage for other wildlife species and reducing abundance of nesting birds (McShea and Rappole 2000, McGraw and Furedi 2005, Côté et al., 2006, deCalesta 1994). In some cases, negative impacts were observed at densities as low as 13 deer per square mile (deCalesta 1994, Marquis et al. 1992). In degraded habitats with limited available forage, negative impacts may occur at even lower densities.

Setting specific deer density objectives helps guide antlerless harvest recommendations and makes them more transparent for public discussion. These objectives, however, are based on estimates. It is also important to continually monitor metrics on both deer and forest ecosystem health. The department tracks deer body weights, antler size and fawn production, and it also utilizes observations from foresters, ecologists, state game wardens, and biologists for forest health indices. Forest ecosystems are variable and complex, which complicates interpretation of any simple measurement. To improve understanding, the department should pursue empirical data on deer impacts to forests with its partners to develop specific measurements of forest health that could inform deer management at the WMU level.

### Current Status

As a result of historical land use practices, many of Vermont’s forests are of similar age. Importantly, the amount of young forest habitat (less than 20 years old), which provides substantial forage for deer, has declined substantially in recent decades. The lack of young forest habitat combined with the proliferation of invasive plants and impacts of historically overabundant deer in some areas means Vermont’s forest habitat can support fewer deer today than it could in the past.

This conclusion is supported by observations of deer impacts on forests and trends in the physical condition of deer over time. Antler beam diameters of yearling bucks have been steadily declining for the past 20-30 years (Figure 2), and it appears that fawn weights may also be declining (Figure 3).

While annual antlerless harvest recommendations will be based on deer density objectives for each WMU,

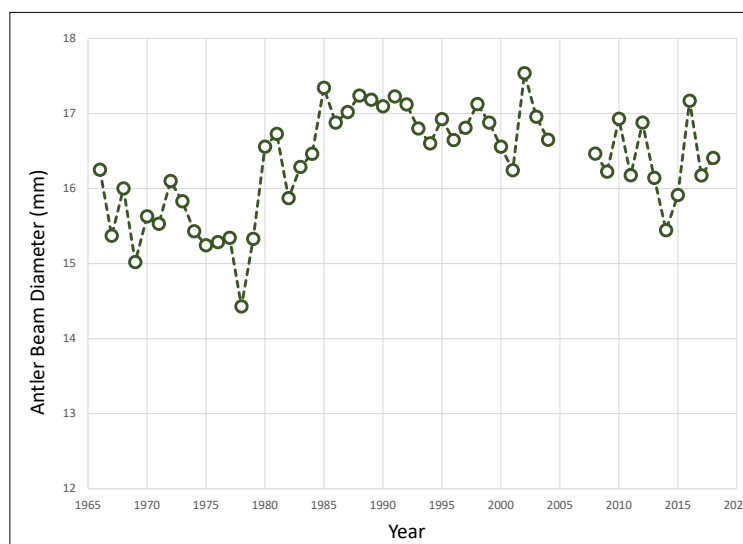


Figure 2. Antler Beam Diameters

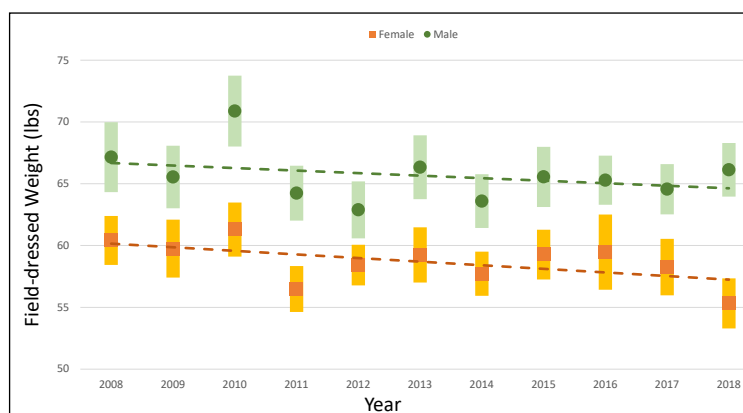


Figure 3. Fawn Weights



**Table 1 Population Objectives by WMU**

WMU	Deer Habitat (mi2)	Density Objective (deer/mi2)	Population Objective	2014-2018 Average Density	Forested Habitat (mi2)	Deer/mi2 Forest at Objective
A	71	18	1,300	30	15	84
B	616	18	11,100	25	352	32
C	386	15	5,800	15	339	17
D1	570	15	8,500	21	410	21
D2	387	12	4,600	14	332	14
E1	315	<10	2,500	6	284	9
E2	334	<10	2,700	7	302	9
F1	316	15	4,700	14	84	56
F2	268	18	4,800	16	124	39
G	388	12	4,700	14	354	13
H	518	15	7,800	15	447	17
I	424	12	5,100	11	396	13
J1	528	15	7,900	19	454	17
J2	705	15	10,600	20	613	17
K	438	18	7,900	23	324	24
L	365	12	4,400	13	323	14
M	451	12	5,400	10	418	13
N	323	18	5,800	25	261	22
O	548	15	8,200	16	464	18
P	455	12	5,500	10	418	13
Q	233	12	2,800	12	214	13
<b>STATE</b>	<b>8,638</b>		<b>122,100</b>		<b>6,930</b>	

physical condition thresholds will serve as the primary indicator that a population is in balance with its habitat. These metrics include the following: 1) yearling male body weight; 2) antler beam diameter; 3) fawn weight; and 4) adult doe reproductive rate. Many states monitor these characteristics to track population health. Tracking changes in the body condition of deer provides a way of recognizing when there is a need to reduce a deer population, but it is usually after damage to habitat has already occurred. Changes in body condition also do not indicate how many deer should be harvested.

In the long run, if deer harvests are tailored to ensure that body condition remains good, deer will weigh more and winterkill will be reduced during severe winters. Maintaining Vermont’s deer population at ecologically sustainable levels is the only way to ensure the health of the deer and their forest habitats.

**Achieving Population Objectives**

Harvesting adequate numbers of antlerless deer is critical to effectively managing the deer population. Managers must also be able to tailor antlerless harvest to specific areas and adjust harvest in response to extrinsic factors (i.e. winter mortality, disease). Lessons from deer managers throughout the northeast and decades of managing deer in Vermont show that around 20% of does may need to be removed when winters are mild just to

**Table 2. Physical Condition Thresholds by WMU**

WMU	Yearling ABD (mm)	Yearling Male Weight (lbs)	Fawn Weight (lbs)	Birth Rate (fawns/doe)
A	17	120	60	1.60
B	17	120	60	1.60
C	17	120	60	1.60
D1	17	120	60	1.60
D2	17	120	60	1.60
E1	17	120	60	1.60
E2	17	120	60	1.60
F1	17	120	60	1.60
F2	17	120	60	1.60
G	16.5	115	60	1.60
H	16	115	60	1.60
I	16.5	115	60	1.60
J1	16	115	60	1.60
J2	16	115	60	1.60
K	16.5	115	60	1.60
L	16.5	110	60	1.60
M	16.5	110	60	1.60
N	16.5	110	60	1.60
O	16	110	60	1.60
P	16.5	110	60	1.60
Q	16.5	110	60	1.60

stabilize population growth. Conversely, severe winters have resulted in population declines of 20% or more in some areas. Because deer have such high potential population growth rates, yet are subject to substantial and variable winter mortality, efforts to manage deer numbers, whether to increase them or decrease, must be gradual.

Currently, antlerless deer can be harvested during the archery, youth, antlerless, and muzzleloader seasons. The archery and youth season antlerless harvest is not limited (except by individual bag limits), but is predictable, relatively consistent and generally concentrated in areas of higher deer density. Antlerless harvest during the antlerless and muzzleloader seasons is controlled through a limited permit system and is the department's primary means of adjusting the total antlerless harvest in each WMU.

Previously (prior to 2020 regulation changes), this approach was an effective means of controlling antlerless harvest in most WMUs and the department was able to accurately predict antlerless harvests. However, in the last decade, low permit fill rates during the muzzleloader season resulted in the department not being able to distribute all available permits, and therefore, not achieving harvest objectives in some WMUs. Low fill rates allow more permits to be available and provide more hunters with an opportunity to harvest an antlerless deer, but the number of permits required to achieve harvest objectives exceeded the number of muzzleloader hunters in some areas.



Recent changes to hunting regulations, particularly the increased length of the archery season, liberalization of crossbow use for all archery hunters, and the new, four-day antlerless season should improve the department's ability to increase the antlerless harvest when and where necessary, while maintaining the ability to limit antlerless harvest where appropriate.

Archery hunters tend to hunt in areas with higher deer densities, therefore, antlerless harvest during this season comes from the areas where it is most needed. Archers are also more effective at harvesting deer in more developed landscapes where firearm hunting may be prohibited by local ordinances, less tolerated by the public, or simply not the experience most hunters are looking for. Thus, maintaining and promoting the harvest of antlerless deer during the archery season is, and will continue to be, a key component of deer management in Vermont.

The new antlerless season in late October will result in higher fill rates for antlerless permits. The weather will be more favorable to most hunters, which should increase hunter effort and encourage more hunters to participate. Holding this season prior to the rifle season also means that deer will be less pressured, they will not have adjusted their behavior to avoid hunters, and they will be less concentrated in areas hunters don't have access to. Additionally, many firearm hunters will be able to harvest an antlerless deer for meat before the buck-only rifle season, effectively shifting some hunting pressure from bucks to antlerless deer.

### **Locally Overabundant Deer**

Deer densities may be considerably higher or lower in smaller local areas than in larger WMU's, particularly where legal harvest is unable to control populations or where the effects of legal hunting or other mortality exceeds averages. These local variations in deer density have significant influence on hunter and public opinion but can be very difficult to address from a deer management perspective.

As the quality of Vermont's forest habitat has declined, an increasing proportion of the deer population is now found in areas with more agriculture or human development. This increases the potential for conflicts and makes hunting access more challenging. In these areas, hunting can be limited by local ordinances, less tolerated by landowners and may simply not provide the experience many hunters are looking for. Winters are typically milder in these valley areas too. Thus, the deer population in these areas is prone to grow quickly and become overabundant.

There are a variety of lethal and non-lethal options for managing overabundant deer in developed areas. Non-lethal options include actions designed to reduce vulnerability to the impacts of overabundant deer (e.g., fencing to protect plants, outreach and education to reduce deer vehicle collisions or the risk of tick-borne diseases), and direct methods to reduce the deer population through fertility control (e.g. sterilization and birth control).

To date, fertility control has failed to achieve population-wide reductions except on small, isolated populations in enclosures or on islands. Furthermore, current methods remain costly and require direct contact with each individual animal. Even if more effective and efficient fertility control is developed, it would still be a poor way to reduce the immediate impacts of an over-abundant deer population. It just keeps the current population from growing. As deer can live to be 20 years old, population reduction would happen slowly, if at all, and most deaths would be from vehicle collisions.

Lethal options include the use of professional sharpshooters and a variety of hunting strategies. Hunting is the lowest cost option and is effective if implemented proactively. Recent regulation changes will improve the department's ability to target antlerless harvests to specific areas. Archery hunters have proven to be effective in this regard, as they tend to hunt in areas with higher deer densities. As a result, the antlerless harvest during this season comes from the areas where it is most needed and has little impact on lower density areas. Archers are also more effective at harvesting deer in more developed landscapes where firearm hunting is prohibited by local ordinances or less tolerated by the public. The longer archery season and liberalized use of crossbows should facilitate additional archery antlerless harvest. Additionally, the department now has the authority to designate expanded archery zones where two additional weeks of antlerless-only archery hunting would be allowed prior to the regular archery season. The department will need to work with affected communities prior to establishing these zones but hopes to make full use of this new tool as soon as possible.

The department will continue to promote hunting as a critical deer management tool and for the myriad other benefits it provides. This will become increasingly important as hunter numbers decline and fewer people have a connection to hunting. Outreach to landowners and land managers will be integral in communicating how hunting is, and will continue to be, a key part of deer management.

The department developed the *Landowner-Hunter Connection* program to help match landowners seeking help controlling deer damage with hunters. To date, participation by landowners has been limited. Increased promotion of this program targeted specifically to landowners and land managers may help improve management of locally overabundant deer.

### **Future Considerations**

The first half of this 10-year planning period will focus on evaluating the effects of the recent regulation changes on the antlerless harvest and the department's ability to achieve deer population objectives. However, declining hunter numbers, changing demographics and the effects of climate change may necessitate additional substantial changes to deer management approaches by 2030. Any new approach will be more effective if implemented proactively, and it makes sense to continuously consider and evaluate potential future tools over the course of this planning period.

If the new regulations are unable to achieve adequate antlerless harvests, the simplest means of increasing the antlerless harvest would be to allow the use of modern firearms (i.e., rifles, shotguns) during the antlerless season. Not only are these implements more effective than muzzleloaders, but this change would open this season to the substantial portion of hunters who currently only hunt during the regular firearm (rifle) season. This creates a larger pool of hunters and allows more permits to be distributed. This would likely allow for effective management of deer at the WMU level well into the future, but it would do little to address locally overabundant deer, particularly in developed areas or where hunter access is limited.

Many states use Deer Management Assistance Programs (DMAP) to help landowners address deer impacts on their properties. These site-specific programs increase options for landowners by allowing more liberal antlerless kills than could be obtained under the standard hunting regulations. A DMAP program can help manage locally overabundant deer, but it also has the potential to encourage privatization of access to deer. Nonetheless, this tool is relatively simple to develop and implement, and if needed, it should be pursued in appropriate circumstances.

It may also become necessary to encourage individual hunters to harvest more deer. This will be particularly true in developed areas, where fewer hunters are interested in hunting yet more deer often need to be harvested. Venison donation

programs allow hunters to provide wild game to charities or food banks. While the department encourages these programs, opportunities for hunters to easily donate harvested venison is currently limited. New regulations could help, but without the extreme deer densities found in parts of other states, these programs must draw from a large area and are difficult to sustain. Allowing hunters to sell their harvested deer has the potential to create an incentive to harvest additional animals, and a market for local venison could create a connection between many non-hunters and the deer population. Vermont hunters can already sell their legally harvested deer during the season and for 20 days thereafter, but only by private sale (i.e. to a neighbor) and that meat cannot be resold. There are many hurdles (including philosophical and historical) to developing a market for wild-harvested venison, but, if necessary, to meeting population goals, this warrants investigation.

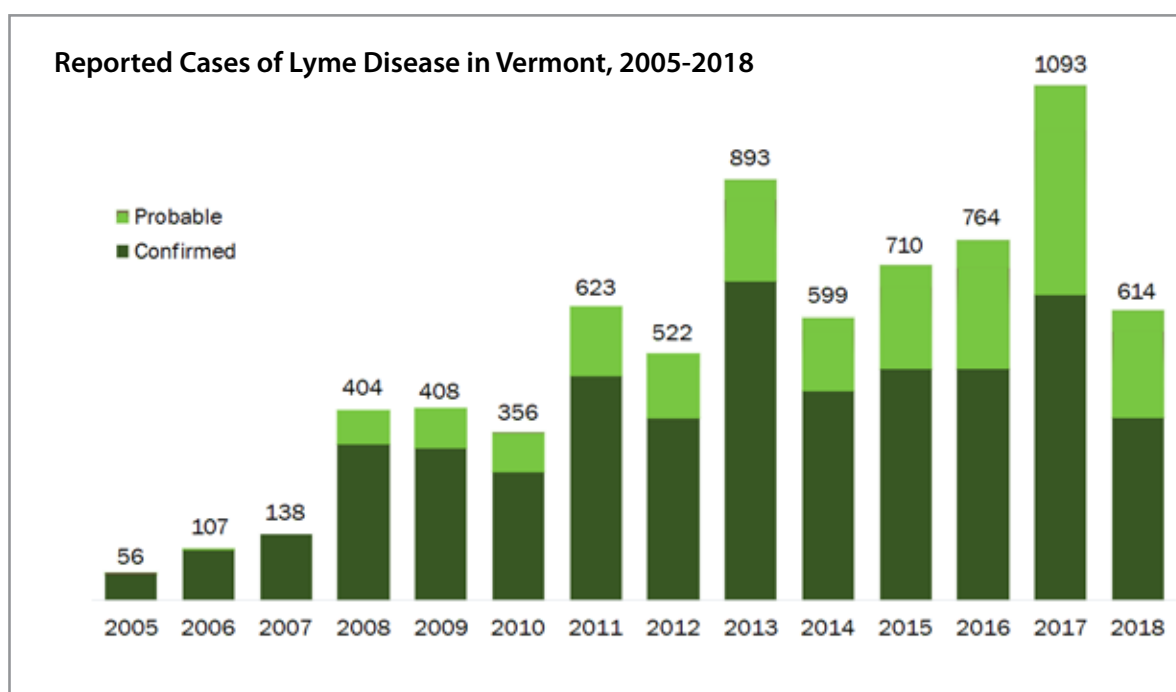
### Management Objectives and Strategies

- 3.1 Manage deer densities using WMU-specific density and physical condition objectives.
- 3.2 Monitor characteristics of deer and habitat that can change in response to deer abundance.
- 3.3 Continue to collect physical condition data including yearling antler beam diameter, fawn and yearling body weight and reproductive data.
  - Consider collecting data on fawn recruitment to better inform population models.
  - Work with foresters to monitor deer impacts to forest health.
- 3.4 Work with landowners and land managers to encourage hunting and inform them about the need to manage deer abundance.
- 3.5 Adjust antlerless deer harvests as necessary to achieve density and physical condition objectives.
  - Monitor the effects of recent changes to deer hunting regulations on the antlerless harvest.
  - Consider additional liberalization of antlerless harvest, if necessary, to achieve annual harvest objectives.

### ISSUE 4. Deer–Human Conflicts

#### GOAL: Minimize the number of deer-human conflicts.

Unlike most eastern states, significant deer-human conflicts are uncommon in Vermont. The state remains one of the most rural in the country and, as a result, much of the landscape is hunted. Unfortunately, conflicts are likely to increase, and damage to agricultural crops and residential plantings, over-browsing of forests, deer-vehicle collisions, and tick-borne diseases are already becoming more common.



There is no more dramatic example than Lyme disease. In 2007, the year the previous plan was drafted, there were just 138 confirmed cases of the Lyme disease in Vermont. A decade later, in 2017, that number had increased almost 10-fold to 1,092 confirmed and probable cases (Vermont Department of Health 2019). Only Maine has a higher incidence of the disease. In keeping with this, no problem associated with a high deer population generated more concern among residents in the Big Game Survey than an increased number of ticks, with 76% of respondents being very to somewhat concerned. The link between deer abundance and Lyme disease is not straightforward; however, studies have shown a relationship between deer density and the number of black-legged ticks (deer ticks), the disease vector, on the landscape (Kilpatrick et al. 2014). Milder winters are not just benefiting deer; they're also allowing black-legged ticks to expand their range northward and into higher elevations.

Additional evidence of an increase in deer-human conflicts may be indicated by the shift in the deer population preferences in the most recent Big Game Survey. In 2007, 32% of Vermonters wanted the deer population in their county to increase. In 2018, it had dropped to 20%. Similarly, 60% wanted the population to remain the same in 2018, which was up from 48% in 2007. Those who wanted the population decreased also increased from 5% in 2007 to 10% in 2018. Deer-vehicle collisions were, by far, the top reason people wanted the population to decrease. However, of the 35% of Vermonters who had experienced some form of wildlife damage in the last five years, almost half were related to deer damaging gardens, landscaping and ornamentals.

Locally abundant deer in urban and suburban environments present unique management challenges. Some urban cores simply cannot be hunted, some communities restrict hunting activities through firearm discharge ordinances, and some people in communities are opposed to lethal control of deer regardless of the circumstances. While these situations remain rare in Vermont, deer management issues are emerging in some developed areas around larger cities and towns, including Montpelier, Rutland and the greater Burlington area

For more on potential management options, see “Locally Overabundant Deer” in the Population Objectives section.

### **Management Objectives and Strategies**

- 4.1 Maintain the deer population to meet hunter satisfaction and minimize landowner and human complaints.
- 4.2 Demonstrate the effectiveness of archery hunting to reduce locally overabundant deer in developed areas.
- 4.3 Work with communities to address locally overabundant deer in developed areas, including establishment of expanded archery zones.
- 4.4 Encourage communication and cooperation between antlerless deer hunters and landowners seeking relief from deer damage.

## **ISSUE 5. Hunter Satisfaction**

### **GOAL: Provide a quality deer hunting experience for as many hunters as possible.**

Hunting is an important tradition that provides an intimate connection to nature, a source of local food and an opportunity to get away from the hustle and bustle of everyday life. It also contributes greatly to rural economies, is the primary source of funding for wildlife conservation, and is the most effective tool the department has for managing deer. Maintaining high levels of satisfaction helps retain existing hunters, recruit new hunters and ensures that hunting continues to provide these benefits.

Opinions and satisfaction will always vary widely among hunters, but their observations and views are important to deer management. The department collects this information through five annual public meetings held in the spring as well as through interactions with hunters at reporting stations, sporting shows, game clubs and various other venues. The department also conducts periodic surveys that provide both general and specific feedback on current issues.

The single greatest influence on hunter satisfaction is how many, and how often, deer are seen. The amount of time hunters can spend afield is important as is a growing interest in opportunities to see and harvest older, larger-antlered bucks. The Big Game Survey found that 74% of Vermont hunters are interested in managing for older, larger deer. Furthermore, the most important drivers of hunter satisfaction, after “just going deer hunting,” were “harvesting an older, larger-antlered buck” and “the amount of buck sign in the woods.” For these reasons, maintaining an appropriate buck age structure is an important management consideration.

Given trends in hunter interest, hunter numbers and recent changes to hunting regulations, buck age structure objectives have been established. These objectives will assist with the evaluation of the new regulations and provide a basis for any future regulation changes.

The overarching objective is to maintain at least the 2018 proportion of mature bucks (3+ years old) in the population in each WMU. Population age structure can be difficult to estimate in some WMUs due to small sample sizes and biases associated with the bucks that hunters can legally harvest. Therefore, the simplest way to ensure the proportion of mature bucks is maintained or improved upon is to ensure that yearling bucks don't exceed 50% of the total buck harvest.

### Evaluating Recent Changes

The recent changes to deer hunting regulations that took effect in 2020 are intended to maximize hunter satisfaction by providing additional hunting opportunity, improving management of buck age structure and allowing additional deer harvest opportunities. It will take several years for hunters to adjust to these changes and for buck age structure to stabilize. As a result, much of the period covered by this plan will be focused on evaluating the effects of these changes. Ideally, no additional changes would be made for five years. After that, further changes will be considered if objectives are not being met or if new opportunities arise.

### Management Objectives and Strategies

- 5.1 Maximize hunting opportunity by providing longer hunting seasons and opportunities to hunt multiple seasons.
- 5.3 Maximize opportunity to harvest a deer.
- 5.3 Ensure there are enough older bucks on the landscape to provide hunters a reasonable chance of seeing one.
- 5.4 Ensure that the proportion of yearlings in the total buck harvest not exceed 50% in any WMU.
- 5.5 Continue to regularly survey hunters and involve them in the rule-making process.
- 5.6 Maximize the accessibility of hunting to recruit, retain, and reactivate new and existing hunters.



## Chapter 3: Black Bear

### Introduction

Historical accounts suggest Vermont had an abundant bear population when the first European settlers arrived. However, bears require large tracts of forestland, and, with their axes, the settlers cut their farms out of the forests and whittled away bear habitat – confining bears to the most mountainous areas that were too steep or rocky to farm.

Habitat loss was only one reason for the bear population decline. Vermont's rapidly growing human population hunted bears without restrictions and labeled them as vermin due to crop losses and livestock depredation. In 1831, the Vermont Legislature codified the bear's lowly status by imposing a bounty on them. Over the next 110 years, 1,295 bounty claims were paid out (Willey 1978).

It was habitat, however, more than changes in the bounty laws, that saved Vermont's bears from extinction. After the Civil War, large number of farmers headed West, leading to large-scale reforestation that vastly improved bear habitat. Sentiment towards black bears also began to change. Perhaps echoing the conservation views championed by Teddy Roosevelt, Vermonters began to view bears and other wildlife as important natural resources. In 1941, the bear bounty was repealed, and a bear season was established that only allowed hunting from June 1 to December 31.

Laws and regulations affecting bear management during the twentieth century became more frequent as Vermont's human population continued to grow. Beginning in 1955, the reporting of harvested bears was required. In 1961, the season was shortened to 91 days (September 1 - November 30). Other changes included the prohibition of trapping bears (1967), limiting the harvest to one bear per season (1968), a prohibition on baiting, and requiring bear houndsmen to hold a special permit (1972), reducing the season length twice (1974 and again in 1990), and then lengthening the season and requiring an early bear season tag (2013).

Compared to 100 years ago, bears are secure, not only via strict hunting regulations but also due to strong habitat protection laws. The population has responded, growing from an estimated 2,000 bears in 1975 to approximately 5,500 in 2018. With the exception of the Champlain islands, they are now common in Vermont from the Massachusetts border to Canada.

### 2010 - 2020 Plan Accomplishments

#### ISSUE 1. Bear Population Size and Distribution

- 1.2 Achieved population objective between 4,500 and 6,000 bears.
- 1.2 Increased bear tooth submission rates from successful hunters to improve population estimation.

#### ISSUE 2. Maintain no-net-loss of function and value of existing bear habitat

- 2.1 Protected thousands of acres of important bear habitat through the regulatory review process.
- 2.1 Established a voluntary habitat stamp to help fund the purchase of vital wildlife habitat.
- 2.2 Revised and updated Landowner Habitat Guidelines to include habitat recommendations for black bears.

#### ISSUE 3. Bear-Human Conflicts

- 3.1 Wrote a Bear Response Plan as a statewide policy for handling specific bear-human conflicts, outlining issues requiring further action, and recommending options for improving response and reducing bear-human conflicts.
- 3.1 Enacted new regulations clarifying when a bear doing damage can and can't be killed.
- 3.1 Enacted new regulations making it illegal to feed bears.
- 3.3 Worked with FPR and USDA Wildlife Services to reduce conflicts with bears at Vermont State Park campgrounds.
- 3.3 Created a conflict database and increased department efforts at responding to requests for assistance with human-bear conflicts.

#### ISSUE 4. Bear Management Strategies and Season Structure

- 4.1 Established a special, early-season bear tag that allows hunters to hunt bears prior to the rifle deer season.
- 4.1 Began survey of bear hunters for hunter effort and sighting rates by WMU.
- 4.1 Increased the bear hunting season length by four days to stabilize population growth.
- 4.1 Significantly increased hunter satisfaction with the bear management program.
- 4.2 Worked with the Vermont Bearhound Association to improve the regulations on bear management including the hunting of bears with hounds.

## ISSUE 1. Bear–Human Conflicts

**GOAL: Minimize the total number of negative interactions occurring between bears and humans to achieve acceptable levels of human safety.**

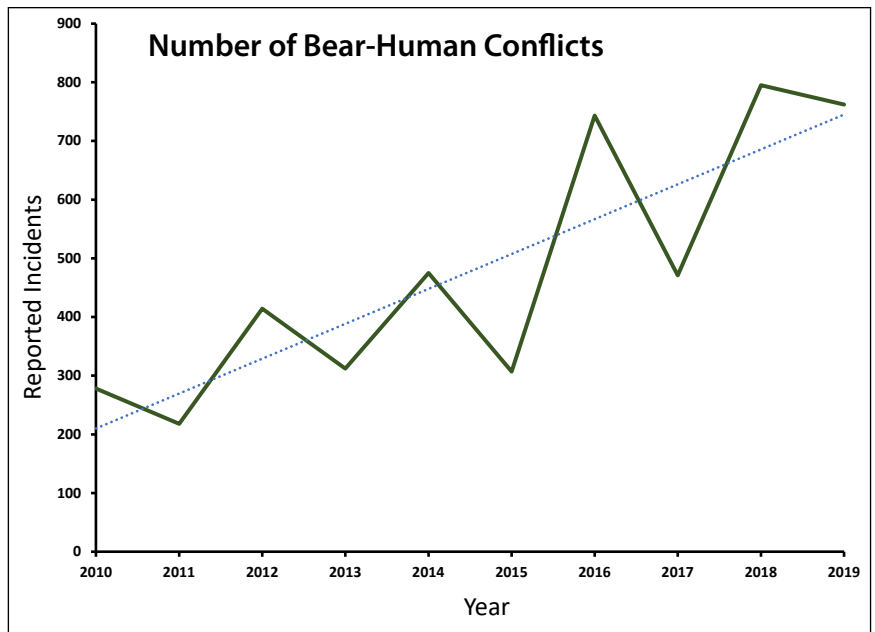
In Vermont, black bears are more limited by social, rather than biological carrying capacity. This social, or cultural carrying capacity is the maximum number of bears that humans will tolerate. Bears are large animals capable of causing extensive property damage and even human injury, and, unlike deer or turkeys, the public is often poorly prepared to interact with them.

Although the department’s bear population model suggests bear population growth slowed in recent years, the number of reported human/bear conflicts has continued to climb. Indeed, the increase in conflicts appears spectacularly out of proportion to bear numbers. While bear numbers appear to have roughly doubled since 1990, the number reports of bears causing damage and being killed by means other than hunting has increased 20 to 30-fold. In 1990, for instance, the department received just 24 bear complaints and 8 bears were counted as incidental mortalities. In 2016, staff addressed 866 bear complaints with 203 incidental mortalities, 158 of which were killed in automobile collisions.

The reasons for the dramatic increase in conflicts is more complex than just a result of rising bear numbers and seasonal or yearly natural food shortage. Although these contribute, bears have also increased their distribution throughout Vermont. They now occupy nearly twice as many towns as a few decades ago, mostly expanding into areas of the state with higher densities of people. Bear habitat has also changed with a lower proportion of young forest habitat, which provides important food sources to bear. Finally, human demographics have also shifted in Vermont with increased urbanization and visitation to some areas. As a result of all these changes, interactions between bears and people are now more commonplace.

The record number of bear-human interactions is taxing the department beyond its capacity to provide direct and effective assistance. This has led to greater coordination with other organizations, such as USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services, for assistance and, more importantly, increased public outreach to prevent bear-human conflicts.

This outreach effort has included presentations focused on advice about living with bears, increased website content, press releases, as well as television and radio spots. Results of the Big Game Survey suggest this is working. The majority of residents knew it was illegal to feed bears and could identify the behaviors, such as bird feeding when bears are active and not securing garbage, that led to bear problems. The majority also supported actions that could prevent or reduce problems, ranging from increased monetary fines for people caught feeding bears, to local ordinances on garbage storage and bird feeding, to increased hunting opportunities.



Increased knowledge, however, has yet to result in a measurable decrease in complaints. In fact, the department believes bear-human conflicts will likely remain high into the foreseeable future. Bears will continue their range expansion into towns and neighborhoods that, until recently, had no bears or history of living with them since early settlement. Additionally, a mandated composting law (Act 148) which took effect in 2020 could, at least temporarily, increase problems statewide without proactive measures aimed at bear-human conflict reduction.

As part of a first-in-the-nation universal recycling law, Vermont’s residential food scraps will be banned from landfills starting 2020. For a fee, haulers will collect the food scraps for those who can’t or don’t want to compost, and those who do but don’t want to compost all their scraps (i.e. meat, bones). However, the law has no requirement for bear-proof food



scrap containers. In addition, while the majority of Vermonters already compost, many more will likely start to avoid fees. The Department of Environmental Conservation (DEC) Waste Management Program is already promoting backyard composting and there has already been an increase in reports of bears damaging compost structures. In the past three years, there have been over one hundred such reports and this number will likely only rise as more Vermonters attempt backyard composting. The challenge for the department and DEC is educating the public on techniques that do not attract bears and other wildlife. Doing this might entail providing answers to specific composting questions related to wildlife, looking into funding opportunities to help subsidize composting resources in communities experiencing a lot of bear conflicts and monitoring composting bear conflict issues and communicating those to DEC and waste management companies.

### **Management Objectives and Strategies**

- 1.1 Continue to work with partners to increase public awareness of the factors that lead to bear-human conflicts and the legal and appropriate actions to take to avoid negative interactions.
- 1.2 Continue outreach and education efforts that include improving the bear section of the department web page and posting additional “how to” videos to help reach a larger segment of the public.
- 1.3 Better define and clarify existing bear feeding regulations; provide clear guidelines on the appropriate actions to take when encountering a bear; reinforce the department’s position on relocating bears; and specify when it is appropriate to euthanize a bear that has caused extensive property damage or is a threat to human safety.
- 1.4 “Raise the bar” on getting the public to take more responsibility for addressing local bear-human conflicts rather than depending on department staff to address all problems.
- 1.5 Assist communities experiencing the greatest number of conflicts with creative ways to address bear-human conflicts.
- 1.6 Continue to work with DEC to improve outreach on universal recycling of food scraps to reduce conflicts with bear.

## **ISSUE 2. Bear Population Size and Distribution**

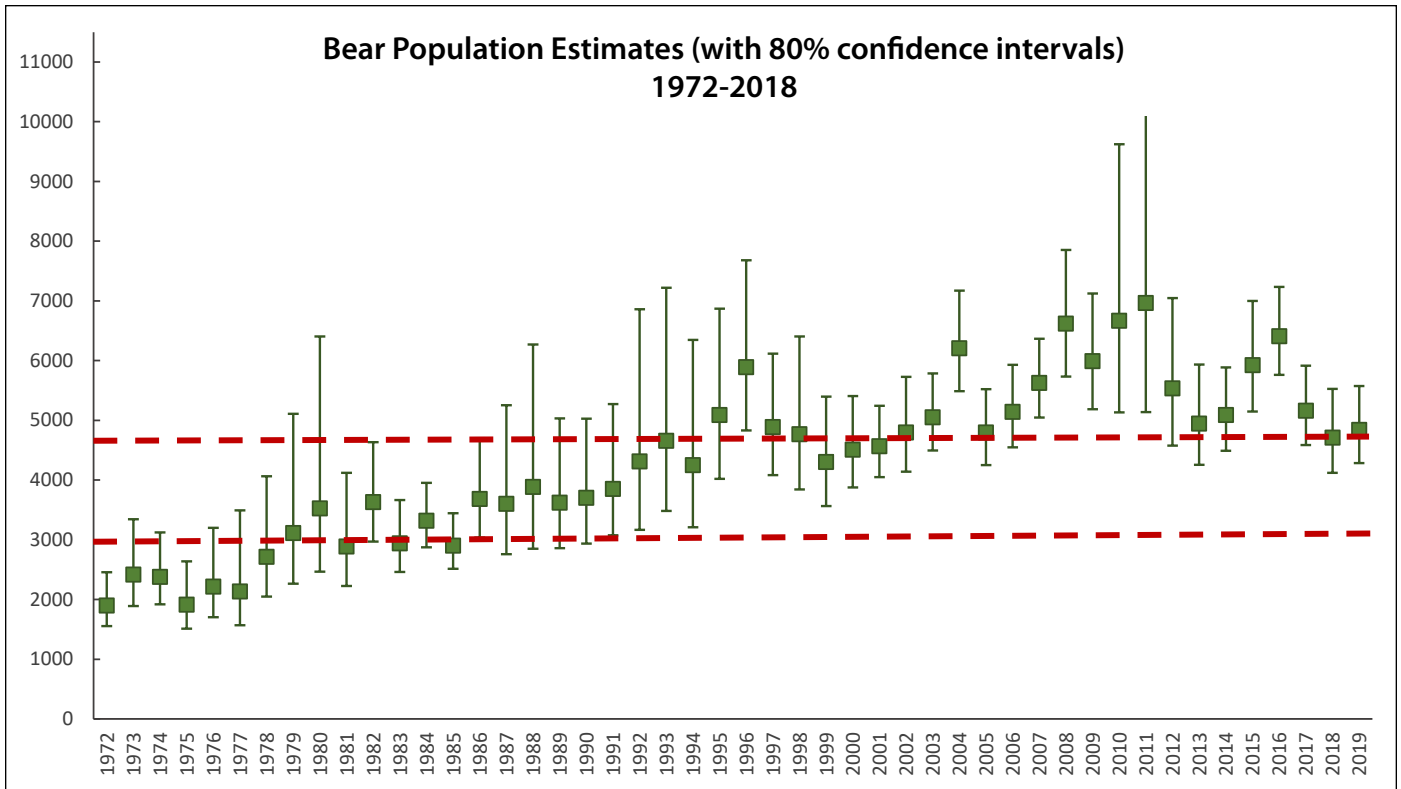
### **GOAL: Maintain the bear population ecologically sustainable levels, while minimizing human conflicts.**

In the previous 2010-2020 Big Game Plan period, the department took steps to stabilize the population within a range 4,500 to 6,000 bears. Population modeling was indicating a growing bear population, and this range aimed to ensure the viability of a free-ranging bear population while also meeting public expectations including hunting opportunity and public tolerance for conflicts. Following several years of high bear harvests, population estimates indicated that the bear population may have even climbed above 6,000 at the beginning of the planning period but is now thought to be well within the population objective.

Despite a recent spike in bear-human conflicts, the big game survey found the majority (64%) of residents want the bear population to remain the same in their county. Not surprisingly, there was a slight increase overall in the percentage of people wanting bear numbers to decrease and some regional differences that reflected where bear-human conflicts were highest, but these differences were not enough to warrant significant changes in the population objective.

However, more accurate and complete data have improved the department’s bear population model since the last plan, leading to slightly different population trajectories, with higher fluctuations in annual population estimates and confidence levels in those estimates. These fluctuations are reflective of variable natural mortality and birth rates that are driven mostly by food availability.

Increasing global temperatures and climate disruptions will likely exacerbate these fluctuations. Regional analyses indicate that average summer temperatures in the northeast will increase 2-5°C by 2100. The forecasted combination of increasing summer temperatures and wide variations in summer precipitation levels will cause more frequent droughts, likely having a negative effect on the summer soft mast crops like berries and other wild fruits as well as acorn and beechnut production. These natural foods are important summer and fall forage for black bears. Periodic disruptions in food availability will result in higher mortality and changes in distribution as bears expand their travel ranges in search of alternative foods. This expansion of hungry bears will likely increase human-bear conflicts including collisions with automobiles.



Range expansion of bears is evident from department data. Although they continue to be widespread throughout Vermont, with the greatest densities occurring along the spine of the Green Mountains and in the Northeast Kingdom, bear sightings and harvest numbers are increasing in lower elevation towns in the Connecticut River Valley, Taconic Range and towns along the Massachusetts and New York borders. As a result, more people who have never encountered bears in their town and are not accustomed to living in “bear country” are now regularly seeing bears around town and in their own backyards.

**Management Objectives and Strategies**

- 2.1 Maintain a bear population of between 3,500 and 5,500, allowing for wider fluctuations in the annual population and confidence intervals resulting from improvements to the population model.
- 2.2 Continue to use hunting season length, especially during the overlap with the November deer season, as the primary method of adjusting the bear population.
- 2.3 Consider managing bears regionally rather than statewide to address conflicts and more specifically manage bears in areas where they are expanding their range beyond forested habitat.

**ISSUE 3. Bear Habitat Conservation**

**GOAL: Maintain no-net-loss of function and value of existing bear habitat.**

Vermont is a national leader in black bear habitat conservation. The department uses a long-term strategy focused on conserving large blocks of interconnected forestland and critical bear habitat in line with Vermont Conservation Design’s focus on increasing resiliency to human-driven climate and habitat-change. Department personnel expend considerable effort protecting black bear habitat through Act 250, Section 248, wood-to-energy harvest review, land acquisition and working with town and regional planning commissions. Through these and other conservation methods, tens of thousands of acres of significant black bear habitat have been conserved -- conservation efforts that will continue to be a priority for Vermont’s black bear program.

Recently, the department reviewed plans for several large industrial wind projects that could potentially impact large areas of significant bear habitat. The lack of information on the effects of wind generation projects on black bears spurred the department to implement a 10-year study from 2011-2021 on this issue in southern Vermont within the Deerfield Wind Project area. To date, dozens of bears have been fitted with GPS collars to monitor their movements and habitat use before

and after wind turbine installation. Results from this study will contribute valuable scientific information on wind generation effects on bears and their habitat use, identify the most important habitats for protection in the study area, and direct some mitigation funds to conserving additional mast production habitat.

### Management Objectives and Strategies

- 3.1 Continue to work with Vermont’s regulatory process to conserve important bear habitat threatened by commercial and residential development.
- 3.2 Update the Black Bear Habitat Mitigation Guidelines reflecting advances in habitat mitigation strategies as a result of recent research.
- 3.3 Work with Vermont Conservation Design to prioritize the protection of bear travel corridors and linkage habitat while also working to increase the amount of young forest habitat throughout the state.

## ISSUE 4. Bear Management Strategies and Season Structure

**GOAL: Optimize hunting opportunity for the utilization of bears for food and other uses, ensure hunter satisfaction within biologically sustainable regulations, and continue to use hunting to meet black bear population objectives.**

### Season Length and Structure

Vermont is fortunate to have a strong bear hunting culture that serves as an important tool in bear management, keeping the population within a socially acceptable range and annually providing nearly 200,000 meals of meat. A quarter of Vermont hunters indicate they hunt bears, at least incidentally, and, in 2018, almost 11,000 hunters purchased an early season bear tag. Vermont’s bear hunting season, one of the longest in the nation, runs from September 1st through the first nine days of the November deer rifle season. The number of days that the bear season is open during the November deer rifle season often has the greatest effect on the total harvest, especially during years of high natural food abundance when bears continue to feed instead of denning.

Vermont’s bear season was shortened by four days in November in 1990 in response to a desire to increase the population. Two decades later, the season was lengthened by the same four days to curtail population growth. These changes were followed by intended population growths and declines, illustrating that season length adjustments are an effective method for maintaining the bear population within socially accepted ranges in Vermont, and will thus continue to be used as a primary management method in the future over other hunting strategies employed elsewhere such as the use of bait, spring hunting and allowing multiple bears on a single license.

No changes to existing bear season regulations are anticipated until the impacts of the recent changes to Vermont’s deer season structure have been assessed. More opportunities and longer seasons for deer, such as the early antlerless muzzleloader season, could result in higher bear harvests.

### Regional Management

Black bear management continues to be conducted on a statewide basis because of a lack of data to allow fine-scale management and because it is a less complex hunting regulation structure than regional management. Additional data on hunter numbers, hunter effort and success rates have been collected since 2013 through the issuance of a separate bear

### Black Bears and Wind Energy

Since 2011, the department has been looking at the impacts of a large wind energy project on black bears in southern Vermont. This is the first industrial sized wind project on United States Forest Service (USFS) lands and the only research project investigating the potential impacts of a wind energy project on black bears.

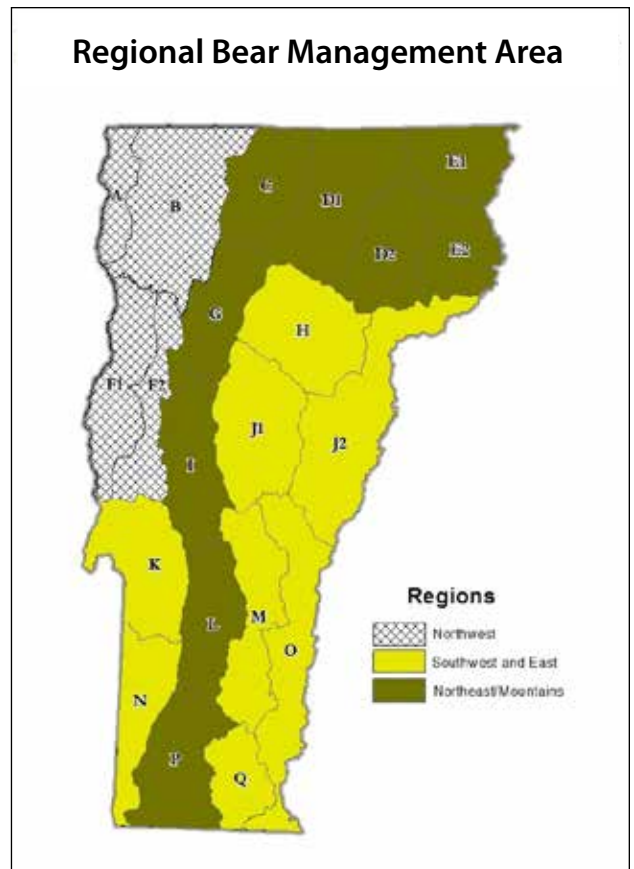
The primary objective of this study is to determine how bears respond to disturbances associated with the construction and operation of the turbines and to document any changes in their responses over time. The research area includes extensive beech stands that are used seasonally by large numbers of bears for food. To date, forty-six bears have been captured and fitted with satellite GPS collars to track their movements and habitat use in relation to the wind project. This will allow the department to document the extent of indirect effects and to quantify any displacement or avoidance of the area. Additional data, including research on uncollared bears, are being collected with a number of wildlife trail cameras that are located throughout the study area.

Field work should be completed in 2020 and a final report available in 2022.

license to address this data gap. In addition, the Deer Hunting Survey was amended starting in 2016 to collect data on bear sighting rates by hunters in each WMU. The department has also increased bear tooth collection (now a mandatory requirement for hunters) which will improve population model estimates and, when combined with hunter effort data, will allow for regional estimates of bear numbers in the future. Tailoring hunting season regulations to regions with different bear densities, hunting pressure, number of nuisance complaints, and development pressures would be particularly beneficial in regions such as the northwest where recent changes in the bear population and its distribution are increasing the potential for rising conflicts (primarily for agriculture) in the near future.

### Hunting Bears with Hounds

Bear hunting with hounds can be controversial. The department recognizes this and acknowledges the issues that sometimes result from their use, including hounds on private property, a heavy reliance on GPS collars (which can provide hunters with an advantage of tracking bears easier and faster) and the length of the training season. Nevertheless, the department continues to support bear hunting with hounds as a legitimate and biologically sound technique that keeps bears wild and reduces conflicts. Vermont game wardens routinely recommend the use of permitted bearhounds to property owners who are dealing with



### Bear Hounds in Vermont

The department recognizes that bear hunting with hounds is controversial and understands that there are issues with public perception such as hounds on private property, the use of telemetry and the length of the training season that contribute to this controversy. However, hunting bears with dogs is also a highly regulated, legal hunting method that contributes towards meeting department population goals for bears in Vermont, particularly keeping bears wild and minimizing conflicts with humans.

Without the use of bear hounds for hunting and with the current length of bear hunting season, Vermont would struggle to maintain black bear harvests and the population at appropriate levels.

Vermont game wardens routinely recommend bear hounds to property owners who are dealing with nuisance bears, including farmers experiencing significant financial losses due to bears in corn, apple orchards and beehives. In many instances, chasing these bears away actually prevents their death at the hands of property owners. In cases where a problem bear poses a threat to human safety, bear hounds are sometimes used to locate the offending bear.

Decades of experience also confirm the department's belief that the pursuing of bears with hounds is humane. Wildlife biologists in Vermont and throughout North America use hounds to capture black bears humanely for vital research projects. They have documented no adverse effects to the study animals while using this capture method.

All bear hound hunters are required to have a permit to train and hunt with their dogs. Recent law changes enacted by the Vermont Fish & Wildlife Board on bear management have improved enforcement efforts by State Game Wardens and have placed greater restrictions on the ownership and residency of both the hunters and the dogs. The number of nonresident bear hound hunters is limited to 10% of the resident permit numbers and total permit numbers are low, with fewer than 100 permits issued each year. The number of bears taken with hounds is also low, representing only about 10-15% of the total bear kill. However, the public benefits of hunting bears with dogs is significant. The department will continue to support the use of bear hounds and address any issues that arise from the use of hounds or other methods for hunting bears in Vermont.

nuisance bears and farmers with problem bears in their corn, apple orchards and beehives. In many cases, the intervention works, chasing the bear away and preventing it from being euthanized.

Hunters are required to have a permit to train and hunt bear with dogs, and the number of nonresident Bear-Dog permits is limited to 10% of the resident numbers. Recent law changes also have placed greater restrictions on the ownership and residency of the dogs permitted to run on the resident Bear-Dog permits.

The number of bears taken with hounds is only about 10-15% of the total bear harvest, so bear hunting with dogs is not critical for maintaining population objectives. Albeit, the benefits of hunting bears with dogs to solve nuisance issues remains an important tool for aversive conditioning. The department will continue to work closely with the Vermont Bear Hound Association (VBHA) to discuss and understand how they can best contribute to reducing bear-human conflicts as they arise in concert with other aversive conditioning methods as dictated by specific circumstances related to the type of conflict.

### **Hunter Numbers**

The decline in hunter numbers poses many challenges for wildlife managers who rely heavily on data derived from hunters and hunter harvest to manage wildlife populations and conserve their habitat. Vermont's resident hunter population is expected to drop to 36,000 within the next decade, and the department expects many resulting hunting season and regulation changes. Proactive communication and outreach to promote discussions about bear hunting in a context of bear-human conflicts and bear habitat conservation will be essential. Actions such as bear hunting seminars for new hunters, working in close coordination with existing hunting groups such as the VBHA and the Vermont Bowhunters Association, as well as diversifying department communication strategies to increase accessibility of hunting to a wider audience will help maintain hunting as an important management tool into the future.

### **Management Objectives and Strategies**

- 4.1 Use hunter effort surveys and harvest data collected at a regional scale to inform regional bear population management.
- 4.2 Continue to promote the hunting of bears for food and increase outreach efforts to improve accessibility of bear hunting to a wider audience.
- 4.3 Continue to work with the VBHA to implement effective deterrent methods that reduce bear-human conflicts.
- 4.4 Begin outreach that describes how declining hunter participation will likely necessitate changes in bear season structure and overall bear management.
- 4.5 Evaluate and monitor impacts the new deer season structure may have on the bear harvest and population size.

### **Bears as Predators of White-tailed Deer and Moose**

Deer hunters are increasingly voicing concern at public hearings that bears may be taking large numbers of deer fawns and moose calves and perhaps even limiting local deer numbers. Fawns and calves are prey for black bears. Predator-prey studies conducted throughout North America show that bears can account for substantial levels of fawn and calf mortality, often higher than that from coyotes or wolves. Some managers have responded to this research by attempting to reduce predation by removing black bears lethally or translocating them and even through diversionary feeding programs. However, most of these actions have proven to be cost prohibitive with only short-term benefits to cervid populations.

The department recognizes that bears take fawns and moose calves and consequentially accounts for this in population modelling and management decisions. Predation may, however, eventually reduce the tolerance that hunters and other residents have for high numbers of bears and thus could influence population objectives in future Big Game Plans.

### Introduction

Moose were abundant and widely distributed when Vermont was first settled by Europeans in the 1700s. At that time, Vermont was 95% forested and neither Native Americans nor the early European settlers likely had much impact on the population. As Vermont's European settler population grew, unregulated, year-round hunting undoubtedly took its toll. However, it was the loss of moose habitat from excessive clearing of forests that ultimately led to extirpation. This clearing began around 1800 and had peaked by 1880 after which only 37% of the state remained forested. By the late nineteenth century, moose had become so rare that when a young bull was shot in March 1899 in Wenlock (now Ferdinand), newspaper reports called it "a strange animal" and "the last moose in Vermont."

During the twentieth century, forests gradually returned and, as they did, moose began to reappear; immigrants from New Hampshire and Maine. By the 1960s, 25 moose were thought to exist in Essex County. By 1980, forests covered 80% of the land area of the state, and moose numbers had increased to a point where they were regularly seen in Essex County. The absence of hunting or significant predation allowed rapid moose population growth. Moose started showing up in neighboring counties and eventually re-occupied appropriate habitat statewide.

Vermont's first modern moose season was a three-day hunt held in 1993 in WMU E. Continued, rapid growth eventually resulted in 78% of the state being open to either-sex moose hunting. By the early 2000s, the moose density in Essex county was estimated at more than 4 moose per square mile, which had exceeded biological carrying capacity and was causing significant damage to forest regeneration. This was detrimental to the moose population and also negatively affected other wildlife species that depend on low growing trees and shrubs for food and cover such as ground nesting birds like woodcock, grouse and various songbirds. Landowners too, especially large industrial forestland owners whose livelihood and investment depend on healthy forests, started expressing concern. Moose-vehicle collisions were increasing and, perhaps most telling, the 2007 Vermont Species Management Survey found a third of all Northeast Kingdom residents wanted the moose population to decrease.

### 2010-2020 Plan Accomplishments

#### ISSUE 1. Regional Population Goals

- 1.1 Maintenance of at least 25% of adult moose in age class 4 or greater was achieved every year (generally around 45%), as was the adult sex ratio goal of at least 40 bulls per 100 adults.

#### ISSUE 2. Moose Human Conflicts

- 2.1 Developed and implemented a policy for staff response to moose/human conflicts, including appointment of response teams, training on wildlife immobilization and relocations techniques, and acquisition of some equipment. Three moose that presented a risk to human safety were successfully chemically immobilized and relocated.
- 2.2 Continued to issue annual press releases to remind motorists during seasons of increased moose movements and continued to work with Vermont Agency of Transportation (VTRANS) to advise on road crossings where new signs were warranted or where old signs should be maintained.
- 2.3 Worked with VTRANS to develop a new standard for new bridges that allows for a more even walking surface under bridges. This change will positively impact moose and deer by allowing for easier under-the-road passage for all bridges built from here on out.

#### ISSUE 3. Moose Hunting Opportunities

- 3.1 Quality hunting opportunities continued in all WMUs, where feasible, and a separate early archery season with its own lottery system was instituted in 2011. The "bonus point" system of awarding an extra lottery chance to previous year non-winners, instituted in 2006, was continued until the low number of overall permits available in 2018 resulted in the suspension of the open lottery altogether.
- 3.2 Hunter access on large landholdings was widespread.
- 3.3 The department continued to provide information in each moose hunter's guidebook on how to donate moose meat to the *Hunter's Sharing the Harvest* program and/or local food shelves.
- 3.4 Significant outreach was conducted prior to the expected reduction in moose hunting permits as the planned density reduction was achieved in 2011. The hunting and general public seemed informed and annual proposals to issue reduced permits were well-received.

In response, the department initiated an effort to reduce the population in Essex and parts of Caledonia Counties (WMUs E and D2) and stabilize the population or allow for slow growth in the rest of the state. To accomplish this, the number of moose hunting permits doubled in 2004, increased to over 1,000 the following year, and it remained above 1,000 over the next four years. A separate antlerless-only season was also added.

Density reductions in WMU E to 1.75 moose per square mile and in WMU D2 to 1.0 moose per square mile were achieved by 2011. Permit numbers were subsequently reduced but population estimates indicated moose numbers were continuing to decline. Similarly, the management strategies intended to allow slow growth in WMUs I, L, P, and Q, and stabilize them in other WMUs were not having the intended effect. A widespread decline was occurring which was being driven by something other than permit levels.

Winter tick infestations in the Northeast Kingdom and a higher incidence of brainworm are increasing the mortality rate, particularly in calves, and reducing reproduction. Both are linked, in part, to climate change, and both continue to significantly impact the moose population. As a result, by 2016, the statewide population estimate had dropped below 3,000 moose. By November 2018, the population was estimated at just under 2,000 moose.

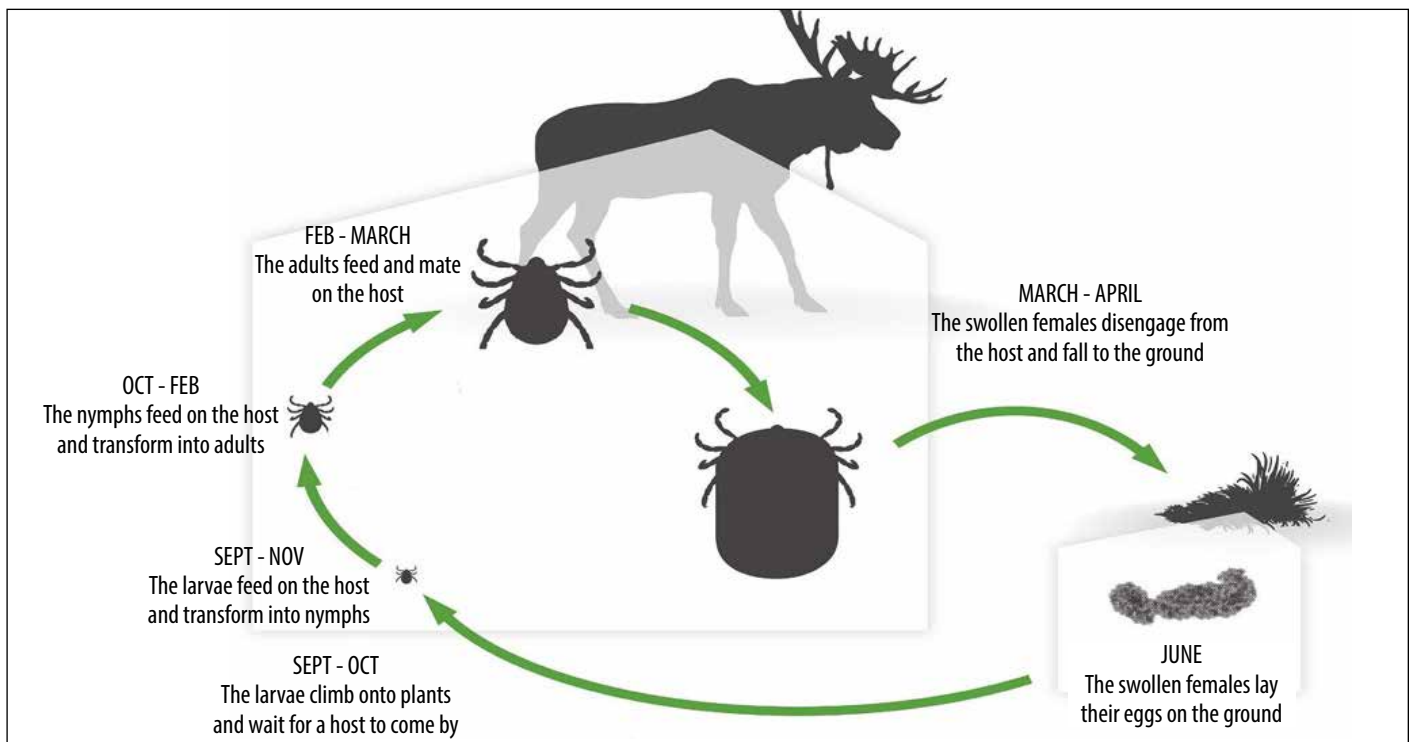
## 2010-2020 Plan Accomplishments *(continued)*

### ISSUE 4. Moose Viewing

- 4.1 One moose observation tower was constructed in 2010 on department-owned land in Ferdinand, overlooking a road-side salt lick on Vermont Route 105.
- 4.2 The department's website notes other locations around the state where people are more likely to spot a moose.

### ISSUE 5. Moose Habitat

- 5.1 The department assisted the University of New Hampshire with a graduate thesis investigating the impact of moose browsing on forest regeneration in WMU E1 (Andreozzi et al. 2014). Field work consisted of browse measurements in 37 regenerating clearcuts in three age classes.
- 5.1 The department is currently cooperating with the University of Vermont to explore the use of recent (2017) lidar data, collared moose GPS locations, and winter tick indices to modify the Koitzsch Habitat Suitability Index (HIS) model (Koitzsch 2000) for application to WMUs E1 and E2. The resulting new model may be applicable to additional WMUs outside of the study area.
- 5.3 Moose habitat management guidelines for landowners and professional land managers were updated in 2014 and made available on the department's website.



## ISSUE 1. Regional Population Goals

### GOAL: Maintain a healthy moose population in Vermont's moose management regions.

Vermont's moose population has declined significantly since 2007, the last year a survey was conducted to assess public desire for regional population levels (fewer, stable, or more). This question was not asked in the 2019 Big Game Survey, as it was clear from recent public input that most Vermonters want to increase the moose population above the current level. Instead, the public was asked questions to gauge their awareness of the issues facing moose. This included winter ticks, brainworm, the overall moose population decrease and climate change. In general, a majority of residents knew at least a little about these issues. Almost half knew a moderate amount to a great deal about the impact of winter ticks, while only a quarter said they knew a moderate amount to a great deal about brainworm with 41% knowing nothing at all. Compared to brainworm, winter ticks are a recent phenomenon but have been subject to intense department outreach as well as local and regional media coverage in the years prior to the survey. In addition, a strong majority (65%) of survey respondents also supported maintaining a smaller moose population through hunting if that reduced the number of moose that would die each year from winter ticks and reduce the number of winter ticks.

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In 2018, 65% of residents strongly or moderately supported maintaining a smaller moose population through hunting, if it reduces the number of moose that die each year from winter ticks and reduces the number of winter ticks overall. Only 15% opposed. The remainder either didn't know (8%) or neither supported nor opposed (12%).

Sample size: 600 residents

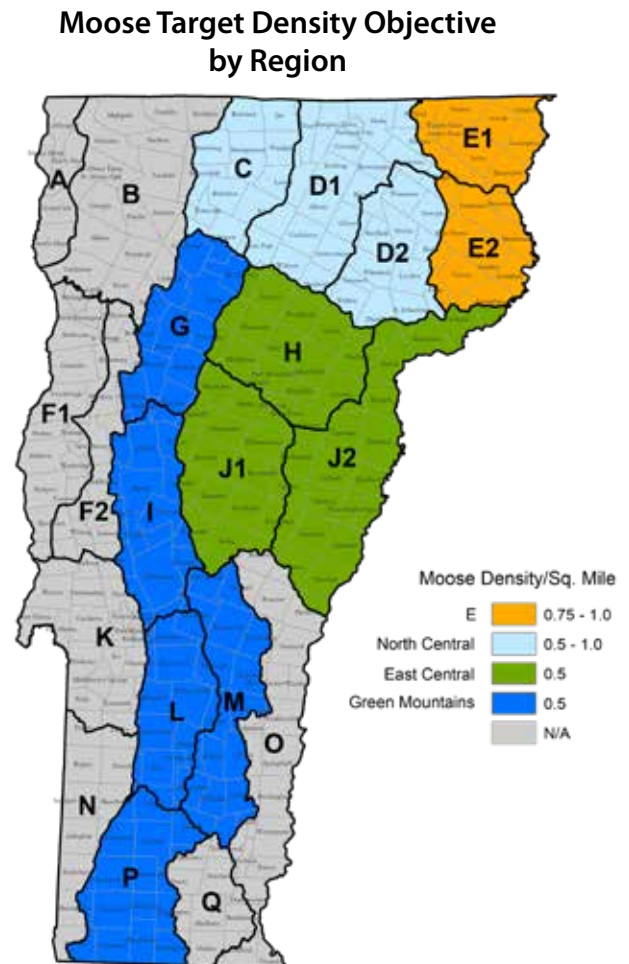
Source: Vermont Residents' and Hunters' Attitudes Toward Big Game Hunting and Management, 2019

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The department informally adjusted the target moose density for Region E (WMUs E1 and E2) from 1.75 to 1.0 moose per square mile to reflect the current reality of increasing frequency of winter tick epizootics. Previous research in New Hampshire and Maine, and more recent studies in Vermont, indicate that moose densities likely need to be no higher than 1.0 moose per square mile, and possibly less than 0.75 moose per square mile, to avoid further population declines caused by high winter tick infestations. If the climate in northeastern Vermont continues to warm, winter ticks may persist at high levels even if their host (moose) remains at lower densities. This plan formalizes the new target for Region E and WMU D2 at 0.75 to 1.0 moose per square mile while recognizing that these targets may need to be lowered if tick levels remain high over the next few years. Target densities throughout the rest of occupied moose range in Vermont remain at 0.5 moose per square mile.

### Management Objectives and Strategies

- 1.1 Maintain target densities in North Central, East Central and Green Mountain moose management regions.
- 1.2 Provide quality hunting opportunity in all WMUs when appropriate.
- 1.3 Improve current and explore new population monitoring methods. They may include expanding annual deer hunter effort surveys, developing a camera trap network and monitoring snow urine (urea nitrogen/creatinine ratio) to gauge the impact of winter ticks on moose health.





## ISSUE 2. Hunting Permit Thresholds

**GOAL: Establish moose density thresholds in Wildlife Management Units that would dictate hunting closures or re-openings.**

Density thresholds should be established where moose hunting in management regions and/or individual WMUs would be shut down or re-opened. Hunt thresholds have already been created by the New Hampshire Fish & Game Department and have been well-received by their citizens. Due to the average confidence interval of population estimates, it is recommended that no hunting permits should be issued for any Region or WMU in which the moose population estimate falls below 75% of the target density for 2 consecutive years. Conversely, if the population estimate grows to within 25% of the target for 2 consecutive years, hunting permits could again be proposed.

### Management Objectives and Strategies

#### 2.1 Hunting Permit Thresholds

- No permits if less than 75% of target density for 2 consecutive years.
- Resume permits if within 25% of target density for 2 consecutive years.

## ISSUE 3. Disease

**GOAL: Better understand and address the impacts of parasites and disease on the long-term viability of moose in Vermont**

Recent moose studies in New England and the Midwest have documented a number of diseases and parasites, including lungworm, tapeworm and liver flukes (Jones et al. 2019, Murray 2006). The most serious diseases in New England appear to be two parasites, winter tick and brainworm. White-tailed deer are the normal hosts for these parasites, and land-use changes after European settlement allowed deer to spread north, bringing them into contact with moose. Moose, however, are abnormal hosts, and, unlike deer, are not well adapted to dealing with these parasites and are severely affected when infected with them. As climate change continues to increase average seasonal temperatures and reduce winter severity, deer abundance will likely be higher, even in northeastern Vermont. This will increase moose exposure to brainworm.

### Winter Tick

The winter tick (*Dermacentor albipictus*) attaches to moose in the autumn as a tiny larva but soon molts into a nymph and then again into an adult. The adult female grows to the size of a small grape as they feed on moose blood during the winter before dropping off in the spring to lay their eggs in soil. With 30,000 or more winter ticks on one moose, they can cause extreme stress, reduced food intake, and cause anemia due to blood loss. In an often-futile attempt to dislodge the irritating ticks, moose will scratch with their rear hooves and rub against trees, breaking off their long winter guard hairs in the process. For calves especially, even if total blood loss isn't high enough to directly cause death, loss of their winter coat may cause death by exposure (Samuel and Barker 1979). Tick density can be quite variable from year to year, with prolonged severe outbreaks causing widespread mortality observed when moose densities are relatively high. Longer snow-free periods (shorter winters) also lead to higher tick numbers. The autumn questing period for larvae can be extended many weeks if the first snowfall is late, and fecund female ticks dropping off moose onto bare ground in April have higher survival rates (Samuel 2007).

Collared moose studies in New Hampshire and Maine have indicated epizootic levels of winter ticks several times over the past 15 years, resulting in winter calf mortality as high as 74% in New Hampshire (2015). Tick counts conducted on harvested bull moose in Vermont, initiated in 2013, had often been 1/2 to 1/3 of identical counts in New Hampshire and Maine. The proportion of yearlings in Vermont's harvest (19 to 25 percent of adults) also suggested satisfactory winter survival of calves over the past decade. However, the percentage of yearlings in the 2016 harvest dropped to an all-time low of 7%. This suggested that calf mortality in the winter of 2015-16 may have been well above what had been experienced in the preceding decade, or that there was poor calf production in 2015. Although sample sizes have been small in recent years due to fewer hunting permits, average body weight and productivity of Vermont cows has continued to decline, a trend also being observed in New Hampshire and parts of Maine and attributed primarily to winter tick epizootics.

Vermont initiated its own mortality/recruitment study in January 2017, when 30 calves and 30 cows were radio-collared in Moose Management Region E. The study continued for three consecutive years, with an additional 30 calves collared in

both 2018 and 2019. Data from this study, combined with past and concurrent research in neighboring states, will provide further insight into the host (moose) density at which parasite (winter tick) density can be reduced and maintained below epizootic levels. Final results were compiled and evaluated in 2020. However, the average overwinter survival rate was 90% for cows but just 48% for calves. Typical overwinter calf survival in the absence of severe winter tick infestation is around 85% (Keech et al. 2000, Testa 2004, Ballard et al. 1991, Gasaway et al. 1992). The moose density in Region E has been estimated at roughly 1 moose/mi<sup>2</sup> throughout the study, suggesting it may be necessary to lower moose densities further to reduce winter ticks to levels that do not cause epizootic mortality.

## Brainworm

A small nematode (*Parelaphostrongylus tenuis*), commonly referred to as brainworm, can also be fatal to moose. Brainworm is a two (2)-host parasite, living their larval stages in land snails and adult stages in herbivorous mammals. It is commonly carried by white-tailed deer, but with limited negative effects. When deer and moose ranges overlap, however, brainworm can infect moose. It travels along the spinal cord to the brain, causing inflammation and tissue damage along the way. The moose will usually show symptoms such as loss of balance, circling, lack of fear, blindness, and paralysis. The parasite, which often causes the eventual death of moose, has been linked to population declines in several studies, especially in areas where deer density exceeds 10/mi<sup>2</sup> (Whitlaw and Lankester 1994).

The first moose death attributed to brainworm in Vermont occurred in 1984, and over the next quarter-century 233, or 5%, of all known incidental mortalities were from suspected brainworm. Although it didn't have a significant impact on population growth for the two decades following the first case, Vermont's deer population is now larger due to some of the mildest winters on record and occur in higher densities in habitat previously more suitable for moose. The increasing overlap between moose and deer is thought to be causing more cases of brainworm. Over the past 8 years, the portion of incidental mortalities attributed to brainworm has averaged 16%, or 3 times the previous average.

Most suspected brainworm cases in moose occur in central and southern Vermont. Moose densities are much lower in these areas and deer densities are markedly higher. However, it is worth noting that the proportional growth of the state's deer population is lower than the observed increase in suspected brainworm cases. This suggests the warmer and wetter weather caused by climate change may also be increasing density of land snails, the intermediate host. It is also possible that a portion of the suspected brainworm cases are actually from some other disease-causing encephalitis. Host-parasite disease dynamics are complex and related to larger factors such as climate and habitat change as well as wildlife distribution and movement. As a result, changes in the occurrence of brainworm cases are difficult to tie to single factors. Therefore, the department is focused on monitoring the presence of brainworm, particularly where there are influencing factors that the department can manage such as high deer densities or habitat in which deer concentrate.

The department attempts to confirm the presence of brainworm when it is suspected, especially when a moose requires euthanasia. A less complicated blood "ELISA" is under development and research is underway which should make confirmations of brainworm in moose simpler, less expensive and less labor intensive.

One option for addressing impacts to moose from winter ticks is to address the tick population directly. There are many possible options for controlling ticks directly, either by treating the landscape or by treating the moose (as one would treat a pet or livestock). There are many logistical challenges as well as ethical and environmental considerations to treating wild animals across a large, natural landscape, but this option should not be ignored. The department will continue to support research into the development and application of biopesticides that could help control winter tick density.

Continued monitoring of the impact of winter tick-related mortality on moose will be important. In the absence of radio-collared animals, it will be necessary to find alternative means of detecting and assessing the impacts of winter ticks. One potential option is using urine collected from snow to determine the physical condition of moose in winter, which is related to the severity of tick infestation.

## Management Objectives and Strategies

- 3.1 Implement a density goal of 1 moose per square mile, or lower, for any WMU where winter ticks persist at epizootic levels or are driving population decline by lowering calf survival to an unsustainable level.
- 3.2 Support research into biopesticides for application to free ranging moose.
- 3.3 Explore the use of snow urine to monitor nutritional status.

- 3.4 Monitor tick load and hair loss on all incidentally or legally killed moose, when available, and consider other options, such as assessing hair loss via salt-lick camera traps, when appropriate.
- 3.5 Evaluate methods to supplement and improve population model estimates. These could entail using camera traps, comparing trends in deer hunter moose sighting rates, assessing calf-cow ratios, using genetic information to estimate population trends, and considering various trend estimation time frames (i.e. yearly, every three years, etc.).
- 3.6 Submit blood serum from euthanized sick-acting moose for ELISA testing, and consider the same from all incidental moose mortalities and harvested moose for brainworm screening.
- 3.7 Evaluate the need and feasibility of field necropsies of all incidental moose mortalities.
- 3.8 Maintain WMU E1 and E2 deer density at 10 per square mile or fewer.

## **ISSUE 4. Moose–Human Conflicts**

### **GOAL: Minimize motor vehicle/moose collisions and other forms of damage caused by moose.**

Even at low population densities, moose can cause big problems. In Vermont, the most common include motor vehicle collisions, over-browsing of commercially valuable trees and damage to Christmas tree plantations, livestock fencing and maple sap tubing. They can also pose a threat to human safety when they linger in farmyards, backyards, urban settings, or near highways, sometimes due to brainworm infection.

The frequency of moose/human conflicts has declined with the moose population. The number of motor vehicle collisions, for example, has dropped over 50% from the peak in 2004 - 2007 when the state was averaging 200 accidents annually. Regardless of how uncommon they are now, each moose collision has the potential to be catastrophic for those involved. Compared to hitting a deer, there is a much greater chance of a severe injury, and 19 human fatalities have occurred in moose-vehicle collisions in Vermont since 1985. Consequently, the department must continue to work with the Vermont Agency of Transportation to identify moose crossings and alert the public of peak times for collisions.

During years of greater abundance, killing a moose doing damage or euthanizing one as a safety risk was generally accepted by the public. With the current herd, there is more interest internally, and likely externally, to revisit the Board rule regarding moose doing damage that allows landowners to kill moose that continue to substantially damage sap tubing, livestock fencing and Christmas tree plantations. In addition, the department's approach to moose lingering in developed areas has also changed. A revised moose/human conflict protocol now calls for tranquilizing and relocating moose that are healthy (i.e., not infected with brainworm or some other serious malady) but posing a risk to human safety. This includes training, staffing and equipment necessary to relocate moose under certain circumstances.

### **Management Objectives and Strategies**

- 4.1 Continue to improve the protocol for responding to moose/human conflicts.
- 4.2 Consider revising the moose doing damage rule in the light of the declining moose population (i.e. sap tubing damage only during sugaring season).
- 4.3 Continue to work with VTRANS to erect and maintain warning signs at traditional moose highway crossings.
- 4.4 Continue to work with VTRANS in implementing roadside brush-clearing projects to improve visibility at the most dangerous moose crossings, when feasible.
- 4.5 Cooperate with VTRANS to investigate the use of new technology that may help reduce moose/vehicle collisions.
- 4.6 Cooperate with VTRANS on the installation of wildlife crossing culverts or travel lanes during interstate and Vermont highway bridge replacements when feasible.
- 4.7 Issue annual press releases to remind motorists of moose hazards during seasons of increased moose movement.

## ISSUE 5. Moose Habitat and Carrying Capacity

### **GOAL: Maintain necessary habitat to support regional moose density objectives.**

Moose are a forest-dwelling species and research suggests their biological carrying capacity, as determined by food resources, is maximized when 40-50% of their range is comprised of young, regenerating forests (0 to 20 years old). Throughout most of Vermont, where public desire calls for maintaining moose density below the biological carrying capacity, adequate browse can be provided, for deer and moose combined, with 10-15% of young forest. Currently, winter ticks and brainworm, and perhaps other parasites and diseases along with a warming climate, are likely the limiting factors for moose across much of the state. Still, the percent of young forests in Vermont has declined over recent decades, and improvement in habitat suitability could help moose better sustain moderate levels of winter tick infestation, while also improving growth and productivity of moose in areas of the state (central and southern Vermont) where ticks do not currently occur at harmful levels.

However, regional studies, including Vermont's collared moose study, could indicate that winter tick epizootics can only be avoided, or at least minimized, by managing for moose densities well below what the habitat can support. As a result, a revised definition of the biological carrying capacity, regardless of habitat quality, would have to include the impact of parasite loads so that moose can simply exist on the landscape. These new, sustainable densities may be so low that moose hunting opportunity might be very limited, but at least some moose viewing opportunity, which surveys have shown is very important to many Vermont residents, could continue, and moose would still play some role, however minor, in the ecological systems of Vermont's forests and wetlands.

Analysis of data from Vermont's moose study is ongoing and the department will continue to learn from this as well as other ongoing studies in the region. If research indicates that lowering moose density further is the best option, any adjustments to moose population objectives will be discussed at length among department staff and with the public before being implemented.

### **Management Objectives and Strategies**

- 5.1 Enhance moose habitat on State and Federal lands, especially in regions where young forest comprises less than 10% of forestland.
- 5.2 Support and monitor research into moose and parasite dynamics.



### Introduction

Like all of Vermont's big game species, wild turkeys fell victim to the massive loss of forestland and unregulated market hunting that characterized the settlement era and they were effectively extirpated by the mid-19th century. Today's population of more than 45,000 birds directly descends from 31 New York turkeys that were released by the department in the late 1960s as part of a restoration effort. Although successful reintroduction was initially expected to be limited to the part of the state reported to be historical turkey range (i.e. south of US Route 4), these hardy birds have far exceeded expectations. An established, sustainable population now occurs throughout the state, including Essex County.

The first, modern wild turkey hunting season was held in parts of Addison, Bennington, and Rutland Counties in the spring of 1973 and, by 2004, the entire state was open to hunting. Average annual combined spring and fall harvest of turkeys is now in excess of 7,000 birds per year. Like hunting, viewing opportunities have also expanded tremendously for Vermonters who simply enjoy viewing these unique birds in their natural setting.

Ideal Eastern wild turkey habitat includes a diverse mix of habitat types, forest succession stages and open land. Forests, of course, are important, especially when they consist of mature oak, beech and pine stands that produce abundant hard mast crops and provide large roosting trees. Clearings and openings are also vital. Whether created as farm pastures, hay fields or natural openings within the forest, the herbaceous plants they promote such as grasses and clover provide critical habitat for turkey broods. These open areas also have abundant insects on which young turkeys rely during early growth. Hens nest on the ground and prefer locations with ample lateral cover provided by herbaceous plants and shrubs, such as recent clear cuts and thinned timber stands.

Short-term turkey population fluctuations are common and result from combinations of random environmental conditions, such as high rainfall and prolonged stretches of cold temperatures that can affect nesting success, poult survival and adult winter survival. Long-term trends, however, are primarily influenced by changes in habitat quantity

### 2010-2020 Plan Accomplishments

#### ISSUE 1. Turkey Population

- 1.1 Continued collecting and assessing turkey harvest data throughout the planning period for use in directing turkey management decisions.
- 1.2 Conducted the annual public and staff summer/fall turkey brood surveys.
- 1.3 Completed investigation into the genetic variability and structure of Vermont's turkey population (Romano et al. 2007).

#### ISSUE 2. Public Satisfaction with Current Population Levels

- 2.1 Continued providing statewide spring bearded-bird-only and limited fall either-sex hunting opportunities.
- 2.2 Continued prioritizing high quality spring hunting over fall harvest opportunities:
  - Maintained high hunter satisfaction throughout planning period (92% very or somewhat satisfied in 2007 and 94% in 2018).
  - Four of the five highest spring turkey harvests ever recorded occurred within the 2010-2020 Big Game Plan period.
  - Expanded shooting hours for youth turkey hunting season from noon to 5PM in 2017.
- 2.3 Continued managing fall turkey hunting opportunities in accordance with spring harvest densities with the goal of maintaining/maximizing quality spring hunting.

#### ISSUE 3. Fall Turkey Hunting

- 3.1 Continued providing public opportunity to harvest wild turkeys throughout the planning period.
- 3.2 Continued managing fall turkey hunting opportunities in accordance with spring harvest densities with the goal of maintaining/maximizing quality spring hunting.
- 3.3 The threshold for fall hunting in new WMUs was reduced from 1 bird per square mile to .75 birds per square mile starting 2011.
- 3.4 The fall shotgun season was extended from seven to nine days starting 2011.
- 3.5 The fall shotgun season was expanded to include WMUs HI (Now H), D1, D2 and B with a nine-day shotgun season starting 2011.
- 3.6 The fall archery turkey season was expanded statewide and set to coincide with the opening of archery deer season starting 2011.

and quality. Because active agricultural practices can enhance turkey habitat, trends in agriculture today may affect the distribution and abundance of turkeys in the future (Timmins 1994). As the number of Vermont farms continues to decline while reforestation rates and forest age increase, the availability of open land may become a limiting factor for turkey production in the future.

## ISSUE 1. Turkey Population Objectives

### GOAL: Maintain a healthy, sustainable turkey population in Vermont.

With their recovery and expansion, turkeys are once again an integral part of the state's ecological and cultural landscape. They are important prey species for many carnivores and provide excellent hunting and viewing opportunities for wildlife watchers. As a reflection of this, the 2019 Big Game Survey found that 62% of Vermonters want the turkey population to remain the same and almost all (94%) hunters are satisfied with the state's turkey hunting, with most (67%) being very satisfied.

While all measures indicate a thriving population here in Vermont, concern is growing for the species nationally. After initial peaks in the 1990s and early 2000s, significant population declines are worrying and confounding biologists across the bird's range, particularly in the Southeast, Midwest and Mid-Atlantic (Casalena et al. 2016; Eriksen, et al. 2015). Potential contributing factors include increases in mammalian and avian predator populations, disease, habitat quality and availability and the influence of the "pioneer effect" -- a population boom that can occur when a new species becomes established in unoccupied habitat. However, no conclusions have been made.

Regardless of the cause, these declines illustrate the need to implement effective population monitoring in coordination with regional partners. At a minimum, the recent declines reported from mid-Atlantic states serve as a stark reminder of the importance of collecting quality population data in accordance with accepted protocols. The ability to analyze comparable data across jurisdictions strengthens the interpretive value of such datasets and allows managers to better understand the "bigger picture" issues that may be driving population trends. A recent study

## 2010-2020 Plan Accomplishments (*continued*)

### ISSUE 4. Wild Turkey/Human Conflicts

- 4.1 Continued working primarily through game wardens to provide direct landowner assistance with nuisance turkey issues throughout the planning period.
- 4.2 Continued working through the USDA Wildlife Services and game wardens to conduct follow-up visits to complaint sites and to provide hazing equipment as necessary.
- 4.5 Compiled and assessed annual nuisance turkey complaint reports to document problems, management approaches and results.
- 4.6 Contributed to the Northeast Upland Game Bird Technical Committee's effort to create a database of wild turkey nuisance abatement strategies and informational resources.

### ISSUE 5. Turkey Habitat Management and Conservation

- 5.1 Continued to advocate for and implement management practices that are beneficial to wild turkeys on department-owned Wildlife Management Areas (WMAs) and other public lands.
  - From 2014- 2018, nearly 2,000 apple trees were released, 3,444 acres of grasslands maintained, and 330 acres of early successional habitat created on department-owned WMAs.
  - Supported the National Wild Turkey Federation's (NWTF) membership-based habitat management activities (i.e. apple tree release, alder regeneration, food plots, etc.) on state-owned lands through a Memorandum of Understanding.
- 5.2 Provided technical information and assistance regarding turkey habitat management to private landowners, town planning commissions and other land managers:
  - Supported the NWTF's outreach and education efforts to promote habitat management on private lands through a Memorandum of Understanding.
- 5.3 "A Landowner's Guide - Wildlife Habitat Management for Lands in Vermont" was updated in 2015 to include a turkey-related section.
- 5.5 Continued the department's close partnership with the NWTF throughout the planning period.

### ISSUE 7. Developing and Maintaining an Informed Public

- 7.1 Continued disseminating wild turkey project related information to the public throughout the planning period through presentations, wildlife-based festivals, press releases, media interviews, big game reporting stations, workshops, and the routine use of various forms of correspondence.

of northeastern turkey populations (Klopfer 2017), for example, outlined recommendations for consistent long-term monitoring across the region including:

1. The collection of all turkey monitoring data at the county scale to facilitate data comparisons across the region;
2. The monitoring of turkey harvest per land area to provide insight into the greatest source of mortality affecting the population;
3. The monitoring of turkeys per unit of effort (i.e. turkeys seen per mile driven, turkeys harvested per days hunted, etc.) with sufficient spatial coverage and sample size; and
4. The monitoring of proxies for turkey productivity such as temperature/precipitation, winter flock surveys, etc.

To be clear, a string of recent record harvests indicates that Vermont's turkey population remains abundant and healthy. Indeed, harvest numbers suggest that some parts of the state may still be experiencing a pioneer effect as turkey continue to expand into available habitat. Nonetheless, the department must remain vigilant in its efforts to monitor the population and be prepared for a timely and informed response to any unexpected and/or drastic population change. Consequently, the department should continue to preemptively evaluate its turkey monitoring and management strategies to enhance the department's ability to confidently detect changes in the turkey population and enable an effective response to such changes as needed. Thorough assessments of turkey harvest, various biological indices and public opinion per WMU will likely be required to inform these strategies and thresholds. The partnership with National Wild Turkey Federation through a long-term Memorandum of Understanding will provide access to many turkey hunters who can provide critical feedback for surveys and other efforts determined necessary by the department for meeting these objectives.

### **Management Objectives and Strategies**

- 1.1 Annually collect and assess turkey harvest data to monitor disease, health and population trends.
- 1.2 Continue conducting turkey brood surveys to assess annual poult production using regionally accepted protocols.
- 1.3 Evaluate and implement new population monitoring methods (i.e. winter flock surveys, hunter sighting surveys, population models, hunter effort surveys) to effectively detect trends in the turkey population and manage it accordingly.
- 1.4 Improve the regional approach to managing turkeys using appropriate population thresholds and indices (i.e. spring toms harvested per square mile of habitat, turkeys harvested per unit of hunter effort, turkeys harvested per number of licensed hunters per WMU, etc.) evaluated at the WMU scale.

## **ISSUE 2. Turkey Management Strategies and Season Structure**

**GOAL: Maximize the ecological and social benefits derived from Vermont's wild turkey population by administering biologically appropriate and sustainable harvest regulations.**

Regulated hunting is the principal tool for wild turkey management. In addition to providing the bulk of the data necessary for monitoring and assessing distribution and abundance, it also serves as the sole mechanism for managing turkeys in accordance with their biological and cultural carrying capacities. In recent years, hunters have routinely achieved success rates in excess of 25%, resulting in a harvest of between 6,000 to 7,000 turkeys a year. Approximately 15,000 hunters purchase turkey tags each year to participate in at least one of the Vermont seasons: spring youth weekend; the month-long spring shotgun season; and the fall shotgun and archery seasons. Despite the general decline in hunter numbers, turkey tag sales have remained remarkably stable over the last decade. But this trend is not likely to continue. A 15% decline observed in youth turkey weekend permits sold since 2015, for example, provides an indication of where participation is likely headed. With this anticipated decline, though, comes an opportunity to liberalize harvest strategies especially where doing so is necessary for effectively managing the turkey population with fewer hunters.

The 2010-2020 Big Game Plan prioritized quality spring hunting over increased opportunities for fall hunting. Hunter support for this strategy was high (68%) in 2007 and remained at 63% in 2019. Indeed, almost half of all tag holders only hunt turkeys in the spring while only 10% solely hunt them in fall. Fall hunting is known to influence abundance in the following spring, thus fall regulations should be conservative and account for any potential population changes (McGhee et al. 2008).

The strong preference for spring hunting did not preclude an increase in fall hunting opportunity during the last plan period. This included the opening of the statewide fall archery season, the expansion of the fall shotgun season from seven to nine days and the lowering of the threshold for considering the expansion of fall harvest opportunities (Healy and Powell 1999) from 1 to .75 spring toms harvested per square mile of forested habitat which resulted in the opening of four additional WMUs to fall shotgun hunting. Importantly, there has been no discernable impact on the turkey population resulting from these expansions or any measurable diminishment of the quality spring hunting experience.

Despite this liberalization, there continues to be an interest among hunters to further expand fall opportunities. When asked about their opinions on the liberalization of various turkey hunting seasons, for example, respondents to the 2019 Big Game Survey expressed more support for expansion of fall opportunities (66% in favor of longer fall season and 62% in favor of increased fall bag limit) than for similar expansions of spring opportunities (54% in favor of all-day spring hunt) indicating an increasing interest in fall turkey hunting. Furthermore, as hunter numbers decline, the standard for quality spring hunts may be overshadowed by the need to control increasing turkey densities that are exceeding cultural and/or biological carrying capacities through the expansion of fall opportunities.

Designing and implementing effective management strategies that preserve the long-term health of the turkey population while balancing the various competing public interests, particularly hunter preferences, remains the principal challenge. This requires continuous monitoring of the population and habitat conditions, regular assessments of season structure and public preferences, and evaluating this information in a way that results in the informed implementation of fall harvest regulations.

In an effort to slow or reverse the decline in hunter numbers, wildlife agencies across the country have invested considerable resources into recruiting new hunters and Vermont is no exception. Turkeys are a key species in this effort. New hunters often find them less intimidating than larger game like deer, turkey hunters enjoy a much a higher success rate and the weather is generally more favorable.

In addition to supporting R3 (recruit, retain and reactivate) initiatives, the department should also strategically consider how turkey hunting can be effectively promoted to attract new hunters. At a minimum, the creation of a novice turkey hunting season like that recently implemented for deer would be a logical first step. However, support for this was only marginally favorable among hunters responding to the 2019 Big Game Survey (37% strong support and 16% moderate support) -- a clear indication that the department hasn't effectively emphasized the seriousness of the decline in hunter numbers to hunters themselves.

Of more minor consideration, but of increasing interest among hunters, is the current regulation restricting turkey hunters to shot sizes between 2 and 8. In recent years, the development of non-lead shot suitable for turkey hunting has prompted many states to liberalize their regulations. These alternatives often offer greater efficiency and performance in the field, are lead-free, and allow the use of 28 gauge and .410 shotguns which are known to be less intimidating to prospective hunters and friendlier to older hunters. It is important to note that the current regulations were originally adopted out of concern for public safety at a time when turkey hunting was still new. Today, after decades of turkey hunting and mandatory hunter education efforts, turkey hunting is very safe and hunting-related accidents are rare.

## **Management Objectives and Strategies**

- 2.1 Continue prioritizing quality spring hunting over fall hunting.
- 2.2 Consider liberalizing fall hunting opportunities when it is sustainable and in accordance with public preference.
- 2.3 Evaluate and implement methods for using turkey hunting to recruit new hunters such as, but not limited to, the creation of a "novice season" for turkeys similar to the recently adopted deer novice season.
- 2.4 Liberalize and simplify shot size regulations including the use of non-lead, tungsten shot.



## ISSUE 3. Diseases

**GOAL: Safeguard the health of Vermont’s wild turkey population through the effective surveillance of, and response to, disease outbreaks.**

Biologists around the country are monitoring several diseases believed to have the potential for widespread impacts on wild turkeys. Most notably, the list includes lymphoproliferative disease virus, avian influenza, salmonellosis, avian pox and histoplasmosis (a.k.a. “blackhead disease”). Although the cause, transmission, significance and management of these diseases varies considerably, all are capable of producing rapid illness and mortality. While no outbreaks having population level implications have been documented in Vermont to date, each of these diseases have been previously diagnosed in the state. For example, department staff annually receive several reports of presumed avian pox infected turkeys and, in 2013, 70% of apparently healthy, hunter-harvested turkeys submitted for disease screening (20 of 28 samples) tested positive for lymphoproliferative disease virus (Thomas et al. 2015), suggesting these diseases have been present in the state for some time.

Beyond the currently recognized disease threats to turkeys, one doesn’t need to look far to find examples of previously unknown pathogens exerting their influence on wildlife populations. West Nile Virus in grouse and winter ticks in moose, for example, are just a few of the more recently documented noteworthy cases. As a result, the ever-present risk of both known and unknown pathogens demands managing wildlife disease proactively.

The department’s approach involves four main elements:

### 1) Preparedness

In recent years, the department has taken a number of steps to increase disease response preparedness including joining the Northeast Wildlife Disease Cooperative, entering into a contractual agreement with a local wildlife veterinarian, and establishing a Wildlife Response Team. These actions were specifically taken to improve preparedness through the training of key staff, the dissemination of pertinent information, the establishment of diagnostic and consultation services, the procurement of necessary equipment, and the development of response protocols.

### 2) Protocols

In 2017, the department implemented its first Avian Disease Surveillance Plan which established priority species and thresholds for response. In addition, the plan also serves as a guide for the Wildlife Response Team including specific protocols regarding sample collection and diagnostics, partner organization roles and assistance, and public outreach.

### 3) Surveillance

The department utilizes both passive (i.e. investigations of morbidity and mortality events) and active (i.e. preemptive collection of samples) surveillance techniques as part of its disease response strategy.

### 4) Collaboration

The department partners with various NGOs such as the National Wild Turkey Federation and state/federal agencies (i.e. USDA Wildlife Services, Vermont Department of Health, etc.) to ensure that work is coordinated with regional efforts and ensure an efficient response to any disease outbreak.

While the department is in a better position to respond to an outbreak since the last Big Game Plan, the rising prevalence of disease in turkeys across their range demands a more active approach to evaluating disease risk beyond simply responding to cases of morbidity and mortality. In particular, the department should proactively participate in regional research projects designed to help identify, assess and mitigate disease risks. This would help to ensure that the implications of these diseases are better understood and enhance the ability to respond to any such outbreak. While an effective response is reliant upon a comprehensive understanding of risk, it is equally reliant upon the timely awareness of the occurrence of a disease in the state. In this regard, the public offers the best potential for being able to detect turkey diseases across the state simply due to the sheer number of people out-and-about on the landscape. However, in the absence of a readily accessible and well-designed system for reporting their observations, many of the cases observed by the public are likely never reported or are not effectively routed to the proper staff. Thus, one significant improvement the department can make with respect to disease preparedness for turkeys, and indeed for all wildlife, is the development of an online disease reporting system.

## Management Objectives and Strategies

- 3.1 Participate in regional studies designed to facilitate the understanding of wild turkey disease distribution and significance.
- 3.2 Implement a disease reporting system (i.e. online report form) designed to facilitate the effective monitoring of and response to disease outbreaks in wild turkeys.

## ISSUE 4. Turkey–Human Conflict

**GOAL: Maintain public support for wild turkey conservation by providing technical assistance when conflicts arise and by maintaining the turkey population within its cultural carrying capacity limits.**

The majority of Vermont’s wild turkey conflicts and damage-related complaints are associated with the loss of agricultural products -- primarily silage and garden crops (Tefft et al. 2005; Gregonis et al. 2011). This can occur through direct consumption by turkeys or from spoilage by contamination with their feces and most often occurs in the winter, when deep snow limits turkey mobility and restricts access to natural foods. The problem is further exacerbated because turkeys form large winter flocks and it can be difficult to discourage them once they have established a regular feeding pattern.

Human-turkey conflicts are handled on a case-by-case basis. Complaints are often resolved by simply providing over-the-phone technical assistance about turkey behavior and the various methods that can be used to prevent or minimize turkey-related damage. For the more persistent or extensive problems, however, control methods such as hazing and/or fencing are attempted with the assistance of game wardens, department biologists and the USDA Wildlife Services. Lethal control by shooting is the last option; however, farmers are sometimes granted permission by game wardens to eliminate offending birds in accordance with regulations when all other preventive and deterrence efforts have failed. In the past five years, lethal control was permitted in only five cases.

While the frequency of conflicts appears to be low, the reality is likely more complicated. It is believed that many people, particularly farmers, never report conflicts to the department but instead address conflicts on their own. Furthermore, it is important to note that Vermont’s experience with turkey-related conflicts contrasts sharply with much of the Northeast where conflicts are far more frequent and mostly occur in urban and suburban settings. Especially when coupled with higher densities resulting from milder winters and declining hunter participation, continued suburbanization of the state will likely lead to an increase in conflicts as well as a shift in the distribution and nature of these problems (Miller et al. 2000).

The 2019 Big Game Survey found most Vermont residents (62%) felt the turkey population should remain the same. There were regional differences among survey respondents, however, with over a quarter (26%) of central Vermont residents wanting the population to decrease compared to just 15% overall. This region, which includes Addison, Lamoille, Orange, and Washington counties, is also home to some of the most visible and robust densities of birds in the state. Of those who wanted the population to decrease, 58% cited conflicts with humans and/or agricultural damage as the primary reason.

The collection and assessment of accurate conflict data will be essential for informing the development of an effective conflict mitigation strategy in the coming years. The ability to continually assess the frequency and distribution of turkey-related conflicts will provide the fundamental data required for identifying where critical resources need to be applied, and inform the development of effective outreach and technical assistance and appropriate harvest management. Addressing and minimizing turkey conflicts will help to maintain a positive public appreciation for turkeys which will, in turn, foster an enduring public desire to conserve this species and their habitat through the future.

## Management Objectives and Strategies

- 4.1 Develop standardized protocols for guiding staff response to conflicts caused by wild turkeys.
- 4.2 Develop and disseminate educational materials designed to inform citizens/farmers about techniques for minimizing conflicts.
- 4.3 Strengthen outreach efforts aimed at increasing the public’s awareness of the importance of reporting conflicts with turkeys:

- Develop and implement an online turkey conflict reporting database designed to facilitate the collection, assessment and archiving of conflict data.
- Annually compile and evaluate conflict reports to document problems and inform management decisions.

4.4 Pursue a regional harvest management strategy that strives to minimize conflicts caused by wild turkeys.

## ISSUE 5. Habitat Changes and Conservation

**GOAL: Maintain the productivity of Vermont’s landscape for wild turkeys by working to identify, protect, and enhance key habitats.**

While wild turkeys thrive in a mosaic of habitat types common to Vermont – a patchwork of fields, forests and farmland -- several specific habitat types warrant close consideration. Brood-rearing habitat, for example, is comprised of forest openings where the availability of nutritious herbaceous forage and abundant insect life promotes rapid poult development in the late spring and early summer. And, similarly, soft/hard mast stands provide high caloric food that help prepare the birds for Vermont’s long winter. Also important is the availability of early successional and young forest habitats that offer productive nesting, foraging and protective cover.

A shared trait of these habitats is that they all require active management. Without deliberate and active intervention, their availability on the landscape wanes over time. Unfortunately, that is exactly what is occurring. The US Forest Service’s National Forest Inventory and Analysis Program found that from 1997 to 2015 the percent of Vermont’s forests that are less than 20 years old dropped from 9.5% to 2.0%. This indicates the continued maturation of the state’s forest and the loss of important early successional habitats (USDA Forest Service 2019). Similarly, the Vermont Agency of Agriculture reported the closure of 63 Vermont dairy farms in 2018 leaving the state with only 750 active farms (Vermont Agency of Agriculture, unpublished data). The continued decline of agriculture and the high-quality habitat it supports will surely have a measurable impact on the Vermont turkey population as will the loss of approximately 3,500 acres per year to residential/commercial development (Vermont Agency of Natural Resources, unpublished data). Given these trends and the fundamental importance of habitat to the persistence of turkeys, an effective strategy for ensuring the long-term health, abundance and sustainability of wild turkeys in the state must include habitat conservation and management approaches.

### Management Objectives and Strategies

- 5.1 Develop and maintain habitat demonstration sites designed to promote beneficial commercial and non-commercial land management practices.
- 5.2 Provide information and technical assistance to private landowners and other land managers regarding turkey habitat management.
- 5.3 Collaborate with key partners (i.e. NWTf, GMNF, etc.) to promote turkey habitat management and conservation.

### Competition Between Turkeys and Deer

As wild turkeys have expanded their range and numbers, so too has concern that turkeys are competing with deer.

Anecdotally, the most common belief seems to be that turkeys out-compete deer for hard mast such as acorns or beech nuts. While it’s true that both deer and turkeys concentrate on mast during years of abundance, so do bears, squirrels, grouse, blue jays and many small mammal species. Of these, turkeys often leave the most evidence, but it’s highly unlikely that their feeding comes at a detriment to deer. Autumn is the period of greatest food abundance, including wild apples, corn and other agricultural crops, grasses and forbs, berries and seeds of all kinds used by both species. In fact, a Pennsylvania researcher used fencing to determine that of all the wildlife feeding on red oak acorns, deer consume the greatest proportion of crop (Steiner 1995). Similarly, a Michigan researcher (Rosemier 2005) found that in non-mast years, rodents take the bulk of the beechnut crop. When you consider the fact that two 150-pound deer equal the biomass of a flock of 30 juvenile turkeys (or 15 large adults), it’s easy to see how a few deer could easily consume considerably more mast.

Contrary to high turkey densities having a significant negative impact upon deer numbers, high deer densities have been documented to have a harmful impact upon turkeys, ruffed grouse, and other forest birds because their excessive browsing of shrubs reduces protective cover, food sources, and nesting sites (Witmer and DeCalesta 1991).

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## Appendix A

### Agencies and Organizations Invited to Participate in the Development of the 2020-2030 Big Game Plan

*Note: Not all could or chose to participate*

#### Hunting Organizations

Backcountry Hunters and Anglers  
Hunters, Anglers and Trappers of Vermont  
Lake Champlain Longbeards  
Lamoille Valley Longbeards  
National Wild Turkey Federation  
North Country Longspurs  
Northeast Kingdom Longbeards  
Ruffed Grouse Society  
Southern Vermont Limbhangers  
Turkey and Young Guns  
Upper Valley Longbeards  
Vermont Bear Houndsmen Association  
Vermont Bowhunters  
Vermont Federation of Sportsmen's Clubs  
Vermont Hunters/QDMA  
Vermont Traditions Coalition  
Vermont Trapper Association  
Vermont Whitetails Unlimited

#### Fish and Game Clubs

Barre Fish & Game Club  
Caledonia Forest & Stream  
Chittenden County Fish and Game Club  
Lamoille Valley Fish and Game Club  
Manchester Rod & Gun Club  
Mendon Fish and Game Club  
Poultney Fish and Game Club  
Precision Valley Fish and Game Club  
Randolph Fish and Game Club  
Sportsman's Club of Franklin County  
Sportsmen Inc  
Vermont Fish and Wildlife Conservation Group  
Williamstown Fish and Game

#### Retailers

R&L Archery  
Wright's Sport Shop

#### Agencies

Agency of Agriculture, Food, and Markets  
Vermont Forests, Parks and Recreation  
VTrans  
United State Fish & Wildlife Service: Missisquoi Refuge  
United State Fish & Wildlife Service: Silvio O. Conte National Wildlife Refuge - Nulhegan Unit  
United State Fish & Wildlife Service  
United States Forest Service: Green Mountain National Forest  
Natural Resources Conservation Service  
USDA APHIS - Wildlife Services  
Vermont Department of Health  
Vermont Natural Resources Board  
Vermont Department of Tourism & Marketing

#### Organizations

Associated Industries of Vermont  
Audubon Vermont  
Consulting Forester Association  
Green Mountain Animal Defenders  
Green Mountain Club  
Humane Society of United States Vermont  
Northeast Deer & Elk Farmers. Inc - Vermont  
Northeast Organic Farming Association of Vermont  
Protect Our Wildlife  
Society of American Foresters - Vermont Chapter  
The Nature Conservancy - Vermont  
Vermont Alliance of Independent Country Stores  
Vermont Association of Planning & Development Agencies  
Vermont Beekeepers Association  
Vermont Coverts  
Vermont Farm Bureau  
Vermont Forest Products Association  
Vermont Horse Council  
Vermont Insurance Agents Associations  
Vermont Land Trust  
Vermont Natural Resource Council  
Vermont Outdoor Guide Association  
Vermont Retail and Grocers Association  
Vermont Sugar Makers' Association  
Vermont Woodlands Association  
VT Wildlife Coalition

### *2020 – 2030 DRAFT Big Game Plan Public Comment Meeting - August 5, 2020*

#### *Public Comments and Questions and Department Responses*

*Note: Some questions and comments have been edited for clarity and length.*

#### **General Questions/Comments**

**Public Comment:** The department says the plan is not just about hunting but, in the over-arching issues, six of the nine strategies involve hunting. How can the public have input in a plan that is driven for hunting? How can the department trust that public studies aren't being skewed for hunting driven agenda?

**Fish & Wildlife Response:** Habitat is, and will always be, the primary focus of the department. Moreover, the department is statutorily required to manage fish and wildlife species. Deer, bear, moose and wild turkey are, by legal definition, game, and hunting is, without question, the most effective tool ensuring their population management goals are met. Many of the overarching issues reflect a serious concern about hunting participation over the next decade. In contrast, the individual species plans focus more on habitat, conflict and disease. A high majority of Vermonters support (86% in 2018) hunting, but without a sufficient number of hunters, human-wildlife conflicts will increase. Public support for bear, deer, moose, and turkeys could erode, and, in the case of deer, this will also come with ecological and economic cost to Vermont. You might disagree with the right of a person to choose to hunt or the plan's population goals but it's imperative that the department retains hunting effectiveness as a management tool.

It is important to note that the two-year planning process included input from a large number of 'non-hunting' stakeholders. The list of participants included environmental and conservation organizations, representatives from agriculture and forestry, and also animal welfare groups.

The large public survey that informed the 2020-2030 Big Game Plan was conducted by Responsive Management Inc., a highly respected firm specializing in public surveys on natural resources. Besides state and federal agencies, their list of clients includes the Wildlife Conservation Society, Ocean Conservancy, Sierra Club, TRAFFIC and the Environmental Defense Fund. All questions were pre-tested to ensure comprehension and impartiality, and the survey was conducted independently of the department. In addition, many of the questions were repeats from two previous surveys to detect trends.

**Public Comment:** You say continuing outreach to landowners [in the over-arching issues]. Have you asked why landowners post their land? Plenty of my friends post because of poor hunting behavior, all-year coyote hunting and unrestricted bearhounds.

**Fish & Wildlife Response:** Over the last few years, the department has partnered with Vermont Land Trust and Vermont Coverts to conduct hunting access seminars to landowners who are either new to Vermont or have no background in hunting. These seminars include an honest, open discussion about past problems and reasons why they may currently post. While poor hunter behavior is sometimes cited, unauthorized off-road vehicle use is, without question, their number one concern and the primary reason they post or are considering it, even though Vermont law always requires landowner permission. The department did commission a landowner survey in 2004 that among many issues, looked at the reasons for posting. At the time, it found the main reasons for posting were not wanting others hunting on their land (i.e. competition), privacy and liability issues.

**Public Comment:** Zoom worked a lot better. I am fairly tech savvy but Teams didn't work well.

**Fish & Wildlife Response:** Thank you for the comment and we will consider Zoom, if allowed by State guidelines, for subsequent public meetings.

**Public Comment:** Vermont has a huge hunting tradition. Despite what people are saying, most sportsmen follow the rules and are ethical people. Unfortunately, there is more suburbanization and folks coming from out-of-state. I have no problem with this, but we need to educate suburbanites on the long-term benefit of hunting and wildlife. Access is also going down with suburbanization. We need more incentives to leave land open for hunting.

## Deer-Related Questions/Comments

**Public Comment** (*Read during meeting and subsequently emailed afterwards*): My name is Steve Weber and I live in Panton. In way of an introduction I have a Master's Degree in wildlife management from UNH where I worked on Deer yards in the WMNF. I was deer project leader for 7 years in New Hampshire, I then supervised all game management programs for 6 years before becoming the Chief of Wildlife for 13 years before I retired. I've held a hunting license in VT every year for the last 35 years, and call me crazy but I moved from tax free New Hampshire to Vermont 2 years ago, obviously I love this state.

I'd like to focus my comments on the population management section of the deer chapter, but would like to start with my concern over the opening statements in that chapter. In the lead sentence the draft plan states that "It is difficult to overstate the importance of white-tailed deer to Vermont." Yet, in the very next paragraph it states "there's no longer anything unique about them here or anywhere else." Well, there's never been anything unique about the species white-tailed deer here in Vermont, but to me that statement implies the department thinks there's nothing special about deer in Vermont, and I don't believe that's an appropriate perspective for the agency charged with managing the deer resource. And hearing Mark Scott refer to them as pests in the beginning of this meeting reinforces that belief. Regardless of localized over-populations they remain an iconic species in Vermont and should be thought of and referred to in that light. Dealing with localized over-populations is always a struggle, but managing down the population in the entire WMU is definitely not the right approach.

Relative to the Population Objectives section, the plan acknowledges that twice as many VT residents would like to see more deer rather than fewer deer based on a scientific survey of the public, yet there is no recommendation to move the deer herd in that direction anywhere in the state. It then states that in many areas deer have exceeded the ecological carrying capacity. There is no definition of what that is or how it's measured, it states the department depends on anecdotal observations to make that assessment, and then makes lots of recommendations to reduce the deer population based on that concern. If ecological carrying capacity is a major driver in developing population objectives, there needs to be data to support those concerns, there needs to be specific goals you are trying to achieve, and there needs to be data to support that lower deer densities will positively influence ecological health and move you towards achieving those goals. Otherwise, you're implementing a strategy in search of an objective looking for a goal that can't be realistically attained!

I'm concerned that the Current Status section is misleading. The draft plan states that "many of Vermont's forests are of similar age." It then goes on to state that "Currently, these forests are in the second growth (pole-timber) stage, which provides little forage for deer. While it is true many of Vermont's forest are in the pole stage, it implies that pole-timber is the predominant age class, when in fact only about 23% of Vermont forestland is in pole-timber age classes (age 21 – 60). That coupled with more than 74% being in sawtimber and over-mature age classes, only leaves about 2.5% in young forest (Table 1.). My main point here is that with the age structure of Vermont's forests, trying to reduce deer densities to the point where impacts on understory forest ecology are minimal, would mean those densities would very likely be socially unacceptable. My recommendation is that the department focus on special zones, seasons and programs like DMAP in areas of high deer density, rather than reducing populations across entire WMU's in an effort to increase forest health, which, depending on what the goal is, may not be feasible, or even possible. The department should be working aggressively with your partnering agencies and NGO's to increase the young forest age class across the state.

The second thing that is misleading is the general impression given that deer health in Vermont is poor or declining. Declining of course is a relative term, but I disagree that deer herd health is poor, or even of concern in any general sense. The best measure of herd health is yearling antler beam diameter (YABD). Measurement of that attribute is somewhat compromised here in Vermont because of the spike-horn restriction and past management, but even so, YABD's in the 16mm range are widely thought of as targets for management to achieve Maximum Sustained Yield, a concept present in the previous plan but is somehow missing from this one, in northern forested ecosystems. It is not on as thresholds of poor health as they are used in this plan.

Finally, I don't believe the tracking metric used by the department is particularly accurate or WMU sensitive. I am far from and expert on population models, but my understanding is that they require huge amounts of data annually to be



reliable. They use multiple inputs, all of which can have significant sampling errors. In a phrase they are data hogs. Given the amount of data available in each WMU each year here in Vermont, those sampling errors compound on one another significantly to the end result of unreliable estimates. The fact the department uses 5 different models to develop their antlerless recommendations and the fact they don't seem to have a defined system to incorporate the various inputs from those models compounds my concern. There are better, simpler, more WMU sensitive systems available that are not being used.

Thanks for the opportunity to provide input.

For anyone reading this input, I'd like you to know that I did not enjoy providing this input in a public forum. I have been trying for more than 2 years to discuss this in a substantive way with the department and have not been able to get your attention. I was asked not to become involved in the public process associated with this plan, but rather provide input through review of early drafts and private discussions. Well, those opportunities somehow were never afforded so I felt I had no choice but to speak up. I think your whole population management section ought to be re-thought and re-written with much more consideration given to deer, deer hunters, wildlife watchers and the general public, rather than this unquantified concept of ecological health. Don't get me wrong, I am sensitive to those issues, but you have not done your homework on that issue well enough to base a 10 year management plan off it.

Table 1. U.S. Forest Service Forest Inventory and Analysis data from the most recent 5-year period. Data is in acres.

Stand age 20 yr classes (0 to 100 plus)

State code	Total	0-20 years	21-40 years	41-60 years	61-80 years	81-100 years	100+ years
Total	4,523,089	116,518	281,672	761,306	1,737,281	1,306,977	319,336
50 Vermont	100%	2.6%	6.2%	16.8%	38.4%	28.9%	7.1%
			-----23.1%-----			-----36.0%-----	
					-----74.4%-----		

**Fish & Wildlife Response:** The department acknowledges the commenter's qualifications and experience in wildlife management in New England and appreciates his passion for deer, deer hunting, and a successful wildlife management program in Vermont. The commenter has highlighted a number of questions and concerns with the current draft Big Game Management Plan which will be addressed in the following sections.

**Comments regarding the opening statements of the deer population management section**

Some parts of the document will be reworded to better reflect the department's message with regards to deer densities and population management. Word changes will be made to better reflect our opinion that deer are as follows: 1) both socially and ecologically important; 2) are adaptable and ubiquitous in different habitats throughout Vermont; and, thus, 3) require management strategies that are complex and highly scrutinized. White-tailed deer are an iconic species in Vermont and are referred to accordingly. As such, a main goal of deer population management in Vermont is to ensure deer persists as an important big game species. To accomplish this, deer densities must be maintained at an appropriate level to safeguard the high public regard the species enjoys here in Vermont. Unfortunately, in some areas of the United States, deer densities have exceeded cultural and ecological carrying capacity to the point that the species is increasingly viewed in a negative light – a transition of public opinion which only further diminishes a state fish and wildlife agency's ability to implement appropriate and effective deer management strategies. Luckily, this has not yet occurred in Vermont due in part to deer management strategies that strive to maintain population at levels that are both culturally acceptable and ecologically sustainable.

**Comments regarding the Population Objectives section**

The department manages deer for the people of Vermont, which includes both current and future generations. With very few exceptions, there will usually be more hunters that want more deer than want fewer deer – that is true even in places with far more deer and deer conflicts than Vermont. However, that doesn't mean increasing deer numbers is a responsible, sustainable, appropriate, or even feasible, management decision. This question is asked on surveys primarily to gauge how people's opinion of deer has changed over time. The department does not want to get to a point where most people want fewer deer – that would be a management failure. If the deer population was allowed to increase today, future generations would pay for it. In some ways, in some areas, Vermont is still dealing with the consequences of overabundant deer decades ago. There are few areas in Vermont, and no entire WMUs, where the

habitat can sustainably support more healthy deer than currently exist. This isn't ideal, and certainly not the position the department would like to be managing from, but it is reality.

The term ecological carrying capacity can be better defined. As used in this plan, it refers to how most people intuitively understand carrying capacity. That is the population at which deer begin to negatively impact their ecosystem (i.e., habitat). Ecological carrying capacity should not be confused with biological carrying capacity, a more commonly used term in wildlife science, but not particularly meaningful in natural systems. For those familiar with density-dependent population dynamics, ecological carrying capacity is essentially the inflection point on the logistic growth curve – near what has traditionally been referred to as maximum sustained yield. The reason population growth begins to slow above this level is because deer have damaged their habitat to the point that each individual no longer has access to as much or as high quality food, thus their physical condition begins to decline, mortality increases, and they produce fewer young. Over time, the condition of the habitat is also degraded as preferred foods are over browsed and replaced by less desirable, less nutritious species. Deer are capable of persisting above ecological carrying capacity for many years, perhaps decades depending on the specific habitat conditions and available food sources, but eventually the bill comes due. The department believes that deer populations must be maintained at or below ecological carrying capacity to maximize long-term health and abundance.

Anecdotal observations by biologists, foresters, and other natural resources professionals of deer impacts on their habitat are very useful in assessing the relationship between deer and their habitat, but they are not the primary source of information the department uses. Rather, as stated in the plan, the department relies primarily on the physical condition of deer to determine when deer have exceeded ecological carrying capacity. The department uses biologic metrics, including yearling antler beam diameter (YABD), yearling and fawn body weights, and reproductive rates. Department data indicates a decline in these measures, providing solid evidence that the number of deer has exceeded what the habitat can support long-term.

### **Comments regarding deer health in Vermont**

The department will consider the use of another word to replace the term “poor” to describe deer health in Vermont. That said, deer health metrics, including YABD, are lower than they have been in the past and much lower than other northeast states and provinces (see figure below). YABDs of 16mm may have been an acceptable target decades ago, or perhaps in more southerly states with smaller deer, but they are well below normal in the northeast today. The department’s objective is focused on maximizing health. When compared to past data from Vermont or to other northeast states, there is clearly room for improvement. The department does not want to pass these problems on to future generations of hunters.

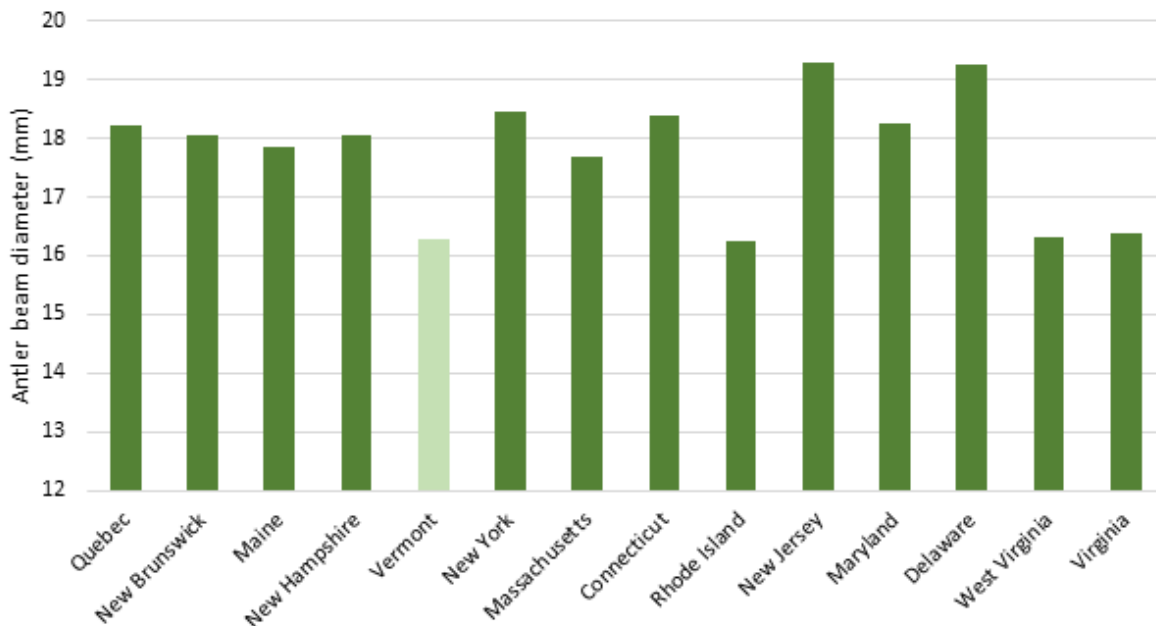


Figure1. Mean yearling antler beam diameter in northeast states and provinces, 2011-2018.

### ***Comments regarding the age structure of Vermont's forest relative to deer management***

Statements about forest age structure can be clearer. The point of emphasis, as noted, is that there is little young forest in Vermont and this age class provides a lot of forage for deer and has significant influence on how many deer an area can support. It is important to remember that the current condition of Vermont's forestland is a direct result of trends, both past and present, in the agricultural and forest products industry – trends which the department has little ability to influence. To further complicate the issue, the vast majority (>80%) of forestland in Vermont is privately owned making it even more difficult for the department to change the trajectory of forest maturation over time. These challenges aside, the department continues to focus much of its resources on supporting and championing active forest management in the state including the creation of young forest habitat. The department is making progress in this respect influencing 1,000's of acres and 100's of landowners annually through its active involvement in the management of state owned lands (e.g. wildlife management areas, state forest, state parks, etc.) to its various technical assistance, outreach and cost share programs on private lands (e.g. EQIP, Habitat Stamp, UVA, CWP, etc.), and active work with the Green Mountain National Forest.. Despite this progress, the department must manage deer for the habitat present today, not the habitat that Vermont hopes to have in the future.

To be clear, the department has no intention of attempting to reduce deer densities to levels that would eliminate deer browsing in forests. Deer and Vermont forests have co-evolved together. Deer will have varying effects on forests health. Importantly, there are no WMUs that require such significant deer reductions. There are, however, some urban areas, where the department would like to see a significant reduction in deer numbers. The proposed reductions in this big game plan are relatively minor in most cases and may not even be detectable to most people. The department will continue to rely primarily on the aforementioned health metrics and allow for population increases when those metrics are improved to levels indicative of healthier populations. As mentioned in the plan, the department will be working toward more targeted management on smaller scales during the next 10 years to better address locally overabundant deer and deer conflicts. However, it is important to note that overabundance is not always limited to small local areas or individual properties and population reductions at the WMU level are warranted in all cases where they are recommended.

### ***Comments regarding deer population modeling***

Issues with the department's deer population modeling and management system appear to stem from disagreement between the department and the commenter's overall management approach. The department's population models were developed in consultation with statistical experts in multiple states, who the department continues to communicate and coordinate with on population assessment strategies. The department is very interested in any new approaches that can help refine deer management in Vermont; however, the department is not aware of any better options at this time.

As the commenter mentions, the department utilizes several population models to develop deer management recommendations. The reason the department utilizes multiple models is to verify current population models ; if one population model yields a suspect population estimate, the department can rely on the other models to study the data more before making management recommendations.

Perhaps more importantly, Vermont's deer population objectives and general management recommendations (decrease, stabilize, increase) are based primarily on physical health condition metrics, with a couple exceptions in areas with abundant agriculture. Even if a new population model suggests fewer deer are present compared to current models, this does not change the declining and/or already low physical condition and habitat impacts observed. While the department does occasionally struggle to obtain adequate physical condition data in some WMUs with low deer numbers, these data can be pooled across years and, in most cases, these aren't the areas where the department has major concerns with deer health. Importantly, these data are not significant inputs into any population model, most of which rely primarily on harvest data (e.g., number and age of deer killed, hunting effort, etc.) which is more than adequate in all areas. As such, the department will continue to make management recommendations utilizing the best available science to successfully manage Vermont's deer population.

### ***Comments regarding the opportunity to provide public input***

The commenter asserts that their ability to provide public input on deer management and the big game plan has been hindered. The department disagrees with this statement as the commenter has had multiple conversations with department staff through phone calls, written correspondence, and has also provided public comment in other

public meetings such as the deer public hearings that were conducted in May 2020. It appears that the commenter has not been limited in their ability to provide feedback on the department's approach to deer management but rather that this feedback has not resulted in the outcome they desired. Regardless, the department appreciates the feedback, concern, and input on this important document, and respectfully disagrees with some of the comments provided. Some of the commentators comments were helpful and incorporated in the final plan draft.

**Public Comment:** I am a lifelong hunter. Turkeys and coyotes are everywhere. Turkeys clean out all the acorns. Do you account for that with the deer population estimates?

**Fish & Wildlife Response:** Yes, competition with other species is accounted for in deer population objectives and management recommendations. Deer in Vermont are primarily limited by the availability of winter cover and food. The availability of mast crops in the fall, while certainly beneficial to deer, is not a major factor limiting the size of deer populations in Vermont. Oak and other mast trees are relatively uncommon in much of Vermont, including areas with high numbers of deer and turkey.

## Bear-Related Questions/Comments

**Public Question:** The plan states that the majority of Vermonters supported actions that could prevent or reduce problems, ranging from increased monetary fines for people caught feeding bears to local ordinances on garbage and bird feeding. What are the actions that have been taken or proposed in the plan to more actively engage legal intervention in case of conflicts where people have been fined but there has been little-to-no follow-up, especially in the case of repeat offenders?

**Fish & Wildlife Response:** Experience has been that changing human behavior is much more difficult than working with the bears themselves. After the big game public survey indicated the public is willing to support actions to prevent and reduce bear-human conflicts, the department began working with fish and wildlife law enforcement officers to issue more written warnings and citations to people who are intentionally and unintentionally feeding. The department is also working with towns to assist with the development of local ordinances that address intentional bear feeding, securing garbage and prohibiting bird feeding during the time periods when bears are active. Ordinances have more success of being passed and effectively implemented when initiated by locals, so to that end, the department has been communicating with groups in towns to actively engage and empower them in legal interventions.

**Public Question:** The plan states the department is considering regional bear management. Is no bear hunting in some areas being considered? Does is ever consider no hunting?

**Fish & Wildlife Response:** Although a regional bear management model would consider no hunting for bears, at this time bear hunting would likely occur in every region because every region encompasses large areas of bear habitat and has a bear population and volume of human bear conflicts that warrants bear hunting at this time. The department has prohibitions on hunting some game species, for example moose, in areas where population estimates indicate their populations are not large enough to sustain additional mortality. This is not, however, the case for Vermont's bear population. A regional bear management approach would allow the department to fine-tune harvest management strategies more locally to address the factors driving population trends and conflicts, including range expansions, human development and habitat disturbance, and increased competition among individual bears.

**Public Question:** Connecticut is actually smaller in land mass and has more people and more bears but no hunting season. Why do you allowing hunting and other state's that don't do fine without it?

**Fish & Wildlife Response:** This is incorrect. While the Connecticut DEEP Wildlife Division received approximately 7,300 bear sightings in 2019, multiple sightings can represent one bear as it moves through a landscape, particularly in suburban areas. In 2019, the Connecticut DEEP biologists estimated there were approximately 800 bears in their state. In contrast, department's bear population model estimated a range of 4,286 and 5,575 bears in Vermont in 2019. Looking at it from a density perspective, it can be calculated that Connecticut has roughly 25-30% of the density of bears that Vermont has. Simply put, the statement outlined in the question is incorrect and Vermont has a

higher density of bears than Connecticut regardless of the difference in land mass between both states and hunting is a necessary management tool in Vermont for bears.

Connecticut wildlife officials spend an inordinate amount of time and other resources responding to bear-human conflicts. They are concerned that the number of human-bear conflicts and public safety issues will only increase because they have no way of slowing the growth of their bear population. For instance, in 2018 and 2019, bears entered more than two dozen homes in Connecticut. In 2020, that number was already up to 25 by June, with the number on track to be triple the average of 2018 and 2019.

Changing human behavior is one component of reducing bear conflicts, but so is having fewer bears in densely human populated areas and ensuring bears retain their fear of humans. Bear hunting accomplishes this. It is effective, reduces conflicts, increases public tolerance, and provides meat for hunters and others.

**Public Question:** You state that only 12-14% of the Vermont population hunts. The majority don't hunt. I have a small herd of rescue equines that look like bears. I live down the road from bearhounds. They have gotten out before and terrorized others' animals and attacked hikers. I post my land and am concerned about my rights as a landowner. How do I protect my animals from hounds? You say that hounds can't read posted signs.

**Fish & Wildlife Response:** To the department's knowledge, Vermont has never had a case of a bear hunter mistaking a horses, burros, or rescue equine for a bear, but receives many reports of bears injuring livestock and pets each year. You have a far greater chance of your rescue equines being injured by bears than by bear hounds. While unsettling, the recent incident in Ripton that involved hounds, a pet dog and one of the pet's owners is the only such case the department has documented. The owner of the hounds was charged by the department for not having their hounds under control.

**Public Comment:** I am a conservation biologist. I feel bear hound hunting is unethical and toxic to the ecosystem. It drives bears into urban and suburban areas and causes more conflict.

**Fish & Wildlife Response:** Although we respect your training as a conservation biologist, hunting with the use of hounds is viewed as ethical and valid in wildlife management. Bear hound and other hunters play an important role in Vermont. They provide tens of thousands of meals of game meat each year, help keep the bear population within levels desired by the general public, and reduce the number of bear-human conflicts, particularly by keeping bears out of farmers' corn fields. Damage complaints often occur outside of the hunting season and the use of hounds to scare bears actually leads to fewer bears being killed by landowners legally protecting their crops and property.

Bears have been hunted with hounds since before Vermont became a state and there is no indication that the activity has anything to do with the recent increase in the number of bear-human conflicts nor that it is responsible for bears living now in closer proximity to humans. Instead, management efforts have allowed the bear population to gradually increase and occupy habitat into lower elevation forests where there is a higher density of people and development. The current bear population lives in closer proximity to people than ever before with a resulting increase in bear-human interactions that has nothing to do with the hunting of bears with hounds.

**Public Comment:** My land is unposted and I welcome houndsmen anytime. It's an honorable tradition and the department is doing a great job.

**Public Question:** Why does the department allow training on June 1st when animal babies are being born? Why don't you wait until later in the year? You say trained animals aren't a threat, but these are untrained dogs.

**Fish & Wildlife Response:** The training season is well-regulated, legal, and requires permits with many restrictions. Any violations from hunters pursuing bears during the training season are enforced. Additionally, bear hound hunters invest a substantial amount of time and money into acquiring, training, and using their dogs. Bearhound hunters are typically the last people who want to lose their permit and most care greatly for bears and certainly do not want their dogs to cause harm to bear cubs or pursue other non-target animals. The success of their hunting experience depends on a healthy population of bears, including bear cubs that can grow up to be adults.

It should also be noted that the act of training bearhounds typically occurs by having a younger, inexperienced

hound accompanying experienced ones. By following this type of training, inexperienced hounds are learning from experienced ones the proper scents, trails, and techniques to track bears. This minimizes issues with hounds pursuing non-target animals.

The department has worked with the owners of bear hounds for over fifty years to live capture bears for many important studies. They are vital for research and the department knows firsthand, as have wildlife researchers throughout North America, that the bearhounds do not harm cubs or other wildlife during the chases. Bears especially cubs, have an amazing ability to climb trees, and do so when threatened by any other animal or human.

**Public Question:** I didn't see anything about baiting. I know it's not popular with the antis, but it's an effective management tool. Can you look at baiting?

**Fish & Wildlife Response:** Vermont prohibited baiting in 1972. At the time, this was done to limit the number of bears taken in any one year as the department focused on increasing the population. Hunting over bait is a very effective hunting method. Maine allows baiting for bear hunting to harvest more bears, but they are so concerned with high population that they are even considering a spring bear hunting season. Vermont hunters, on the other hand, are currently taking enough bears, and even if an increase in the bear harvest was needed, the department would likely consider other options. Most states that allow baiting have to implement a permit system to limit the number of people and enact other controls to ensure spacing between baits. This essentially causes conflicts between hunter groups (e.g. hunters who would hunt over bait and hunters who would not) regarding the access of bear hunting to all. In addition, some bait items such as chocolate are toxic to the bears. In short, although an effective management tool to reduce bear numbers, bear baiting is not being considered in Vermont at this time as harvest objectives are being met with the current management strategies in place.

**Public Comment:** The bear population is a good record and you are doing a good job.

**Public Comment:** Hounds change bear behavior. This is good for apiaries and getting bears out of corn.

## Moose-Related Questions/Comments

**Public Question:** The plan states that the majority of the public supports moose hunting if it reduces the number of moose that die each year of winter ticks. What will the department's response to the public be when the herd is depleted to a population below 1 per square mile but the tick population is not correspondingly reduced?

**Fish & Wildlife Response:** Extensive research has clearly demonstrated a density dependent relationship between moose and winter ticks. The studies listed below indicate that at densities above 1 moose per square mile, moose occupying the southern edges of their range (such Vermont) experience frequent epizootic events where more than 50% of calves die during the winter whereas populations at lower densities in the same range do not. The department acknowledges that there is a degree of uncertainty in the department's moose population estimates, as with any wildlife population estimates, and that the relationship between moose and ticks may be affected by climatic fluctuations. Thus, the department is taking a conservative approach and will be closely monitoring moose population density, health, and tick loads. The department will adapt our management approach accordingly as new information becomes available.

Furthermore, the Big Game Plan establishes population thresholds below which the department will not issue hunting permits. Most of Vermont is currently below these thresholds, which is why there are no hunting permits in those areas. It is important to emphasize that the moose density in wildlife management units E1 and E2 (basically Essex county) is much higher than anywhere else in Vermont. The following scientific literature provides more detailed information about moose and winter ticks.

- DelGuidice, G.D., R.O. Peterson, and W.M. Samuel. 1997. *Trends of winter nutritional restrictions, ticks, and numbers of moose on Isle Royale*. Journal of Wildlife Management. 61:895-903.
- Samuel, W.M. 2004. *White as a ghost: winter ticks and moose*. Natural History Series, Volume 1. Federation of Alberta Naturalists, Edmonton, Alberta, Canada.
- Samuel, W.M. 2007. *Factors affecting epizootics of winter ticks and mortality of moose*. Alces. 43:39-48.

- Kantar, L.E., and R.E. Cumberland. 2013. *Using a double-count aerial survey to estimate moose abundance in Maine*. *Alces* 49: 29-37.
- Jones, H. et al. 2019. *Mortality assessment of moose (*Alces alces*) calves during successive years of winter tick (*Dermacentor albipictus*) epizootics in New Hampshire and Maine (USA)*. – *Can. J. Zool.* 97: 22–30.
- DeBow, J. R. 2020. *Effects Of Winter Ticks And Internal Parasites On Moose Survival And Fecundity In Vermont, USA*. MSc Thesis. University of Vermont, Burlington, Vermont. <https://scholarworks.uvm.edu/graddis/1196>
- Ellingwood, D., Pekins, P. J., Jones, H., and Musante, A. R. (2020). *Evaluating moose (*Alces alces*) population response to infestation level of winter ticks (*Dermacentor albipictus*)*. *Wildl. Biol.* doi: 10.2981/wlb.00619

**Public Question:** The plans says Vermont’s climate continues to warm and the state predicts that winter ticks may persist, and the state’s own research predicts a continued warming trend. I am sure hunting can’t be your only tool and you are finally mentioning other strategies, like biopesticides, why are you allowing this moose density theory to continue and allowing moose hunting in 2020.

**Fish & Wildlife Response:** The studies listed above clearly demonstrated a density dependent relationship between moose and winter ticks. No scientific research studies, in contrast, have documented frequent tick epizootics at low moose densities. This is clear in southern Vermont and New England, where the climate is warmer than more traditional moose range in the region. The moose density is lower and, as a result, they carry fewer winter ticks and experience little impacts from them. Furthermore, while winter ticks may benefit from shorter winters, numerous climatic factors can negatively affect winter tick populations. Changes in wind patterns and speed, humidity, precipitation, amount and density of snowpack, snowmelt, and temperature all affect winter tick populations differently. Thus, a warming trend may not, in and of itself, cause an increase in winter tick populations, particularly if that trend includes more frequent dry periods that reduce the survival of tick eggs and larvae. However, research does suggest climate change will likely cause an increase in the frequency of winter tick epizootics for higher density moose populations across New England.

Moose are not pets or livestock; they are wild animals. Reducing winter tick populations directly, either by treating moose or the landscape with some form of acaricide (a pesticide specifically for ticks) or fungal pathogen (there are some naturally occurring fungi that can kill ticks), is not currently a viable option. The department is collaborating with University of Vermont researchers working on this and continues to communicate with other researchers looking at these approaches. While there is some promise in small, controlled settings, the realities of treating an entire landscape or a sufficient portion of the moose population make it unlikely that this will be a practical option soon. Furthermore, treating ticks will fail to kill all of them and could promote adaptation and resistance to treatment. As long as there is a high density of moose on the landscape, tick numbers will simply increase again when treatments stop or when the ticks become immune to them.

## Wild Turkey-Related Questions/Comments

None

# 2020 – 2030 Big Game Plan Public Comment Emails Comments and Questions and Department Responses Guidance Document

## General Comments/Questions

### Overall

**Public Comment:** I would like to see more equitable representation with respect to how the department operates. Move towards an inclusive model, taking all stakeholders into account, not a hunter-centric model as evidenced in your Plan.

**Fish & Wildlife Response:** Habitat is, and will always be, the highest priority of the department. Moreover, the department is statutorily required to manage fish and wildlife species. Deer, bear, moose, and wild turkey are, by legal definition, game, and hunting is, without question, the most effective tool ensuring their population management goals are met. Many of the overarching issues in this plan reflect a serious concern about hunter numbers over the next decade. While the actual participation rate is not expected to change significantly, the state is getting older and so are Vermont's hunters.

Without enough hunters, the department's ability to manage these species will be compromised. Public support for bear, deer and turkeys could erode, as has been in the case in many more urbanized states, and, in the case of deer, this would also come with costs to both their health and the landscape. It is imperative that the department retains hunting effectiveness as a management tool. Also, if members of the public review the individual species plans, they will know they focused more on habitat, conflict, and disease.

Some people might disagree with right of a person to choose to hunt, but a very high majority of Vermonters support (86% in 2018) hunting. It is also important to note that the two-year planning process included input from a large number of 'non-hunting' stakeholders. The list of participants included environmental and conservation organizations, representatives from agriculture and forestry and animal welfare groups.

**Public Comment:** The department is relying on biased studies to achieve a predetermined goal to liberalize hunting seasons and increase bag limits based on studies funded by organizations who want their members to have unsustainable unfettered opportunities to exterminate our wildlife, such as Safari Club International. This is a major conflict of interest.

**Fish & Wildlife Response:** Liberalizing hunting seasons and increasing bag limits are not goals of the 2020 – 2030 Big Game Plan. Rather they are listed as strategies that may be needed in the next decade to achieve population goals. These population goals are, first and foremost, focused on promoting healthy, abundant wildlife populations within ecological limits and the bounds of public tolerance. Furthermore, the strategies that include liberalized season and bags limits are almost entirely related to deer. Deer are benefiting from climate change, have a high potential for impacting their habitat and that of other wildlife species and plants, and are most likely to cause conflicts with Vermonters, including public health and safety. You might disagree with right of a person to choose to hunt or the plan's population goals, but it is imperative that the department retains the effectiveness of hunting as a management tool.

Note also that the two-year planning process included input from many 'non-hunting' stakeholders. The list of participants included environmental and conservation organizations, representatives from agriculture and forestry, and animal welfare groups. Deer management was a concern articulated by many conservation and forestry groups.

The department's funding contract for the moose research project did not have anything to do with "unfettered opportunities to exterminate our wildlife." Rather, the agreement with Safari Club International clearly states that the objective was to estimate moose survival and fecundity and study the factors that influence them to better understand the effects of winter ticks on moose in Vermont. Furthermore, the club's contribution represented only 25% of the cost of the study. It was match for the remaining 75% of the funding came from U.S Fish and Wildlife Service. As a result, the proposal and results were vetted through their USFWS scientists. The actual research was coordinated



through the University of Vermont, conducted by their students, and overseen by their faculty. Identical projects also occurred in New Hampshire, Maine, and New York. All the results have been peer-reviewed by moose experts and papers are being prepared for publication in scientific journals. In the end, this was vital research to ensure the long-term survival of moose and the department could not have afforded it without assistance.

**Public Comment:** My primary concern with the big game plan is the lack of peer reviewed research and science that was used to develop it. Steve Weber, on the call last night, went through several, very specific concerns he had with the method used for white tailed deer and it was disappointing that there was no discussion of his points. There were at least 3 wildlife biologists (not associated with VFWD) on the call and not one of their questions were answered so that everyone on the call could hear the response.

**Fish & Wildlife Response:** The department strongly disagrees with your assertion that the plan is not based on peer-reviewed research. In the interest of simplicity and readability, most citations involving long-or well accepted wildlife management principles were omitted. department biologists work in close collaboration with regional, national, provincial, and federal biologists to ensure jurisdictions are operating with the best and latest science. Data is shared, regional studies are conducted, and individual management goals, objectives and strategies are reviewed. The department's science is further supported by an in-house biometrician with a doctorate in statistics. Furthermore, as stated at the beginning of the meeting and previous announcements, it was made clear that department staff would only be taking comments on the plan, not responding to them. The department's response to Mr. Weber is attached. The department only responded during the public meeting when they felt a response could be short, simple, and help move the public input of the process along smoothly.

**Public Comment:** The lack of discussion and science around the impact of climate change was also concerning. Its directly impacting every species in the plan and there is no recommended method for addressing it or adapting your recommendations as climate change continues to decimate the landscape and food sources, increasing parasites and diseases. All of which wildlife is struggling to handle in addition to hunting, hounding, and trapping. Where is your science? Hunter surveys are qualitative and so can't be considered scientific.

**Fish & Wildlife Response:** Climate change is listed as an overarching concern and referenced continually throughout the draft plan. As the plan clearly notes: 1) deer and turkey populations will (and already are) benefit from milder winters and this will likely require additional management strategies, 2) black bears occur as far south as Florida and Mexico, but extreme weather will likely cause food disruptions and lead to more conflicts with people, and 3) moose will continue to suffer from high parasite loads unless moose densities are lowered to reflect the reality of a changing climate. The plan also states many times that protecting and enhancing high-quality habitat and travel corridors is most essential. In addition, deer, bear, and turkey populations remain abundant and above historic levels. The department is, however, extremely concerned with the long-term viability of a number of boreal plants and wildlife species and the threat posed by invasive species that previously could not gain a foothold due to Vermont's climate. In addition, data derived from hunter surveys and harvest has long been documented by peer-reviewed research as valuable, quantitative data to support population modeling.

**Public Comment:** In the short term, the plan should be revisited with input from experts who do not have a financial interest in promoting hunting. There are also systemic changes required in order to reflect the will of the population of Vermont. The Fish and Wildlife Board should include a majority of non-hunters reflecting the approximate 80/20 split of interests in preserving wildlife. The board should represent the majority view, not the special interests of a minority. Board members should include experts in wildlife biology. No research should be considered as credible that is funded by special interest groups. A commissioner should be appointed who will facilitate policy that, again, reflects the majority view.

**Fish & Wildlife Response:** The two-year planning process included input from many 'non-hunting' stakeholders. The list of participants included environmental and conservation organizations, representatives from agriculture and forestry, and animal welfare groups.

The 2020-2030 Big Game Plan does not address the Fish and Wildlife Board. The Board's creation and purview is state statute. However, it is worth noting that the Board only has authority over the regulations regarding the take

of certain fish and wildlife species. Outside of setting regulations on fishing, hunting and trapping, the Board has no influence on department operations including habitat work, natural heritage inventory, land acquisition and endangered species. Please visit the department's website at [www.vtfishandwildlife.com](http://www.vtfishandwildlife.com) to learn about the full breadth of all the Fish & Wildlife Department's work. The department also disagrees with your assertion that the Board does not reflect the interest of Vermonters. A very high majority of Vermonters support legal, regulated hunting; a number that has changed little in the last 30 years. In addition, surveys have repeatedly shown that a high majority of residents also support the department and its work. Finally, the percentage of Vermonters who hunt and fish is far larger than license sales in any one year would suggest. Many people are not required to purchase a license and work and family obligations can make yearly participation difficult.

**Public Comment:** Having studied the proposed plan, I find it very disappointing that rather than "managing" wildlife this plan is about harvesting wildlife. There are no provisions for studying and discovering strategies to sustain healthy wildlife populations. In a rapidly changing world of climate and population stressors I feel Vermont should take some responsibility for improving rather than decimating its valuable wildlife resource.

**Fish & Wildlife Response:** Your statement is incorrect. The plan clearly states, from the beginning, that its sole purpose is to ensure the long-term health and sustainability of Vermont's deer, bear, moose, and turkey populations. This does involve hunting, which remains a Vermonter's constitutional right and a choice in Vermont and the primary tool for meeting population objections. However, if all the hunting-related content were removed, Vermonters would still be left with a considerable document that emphasizes habitat, outlines research needs and calls for enhanced public outreach.

## Comments Against Hunting

**Public Comment:** It is time to reevaluate our relationship to wildlife in general and learn to live with them instead of exterminating them at will.

**Fish & Wildlife Response:** The department has not, and will not, ever advocate for the extermination of native wildlife species. The plan clearly states, from the beginning, that its purpose is to ensure the long-term health and sustainability of Vermont's deer, bear, moose, and turkey populations. Accomplishing this goal requires hunting but also includes habitat conservation, research, and public outreach.

**Public Comment:** Wildlife belongs to all the residents of the state, not just those who think killing them is a lot of fun. They are killing the wildlife the rest of us value highly. In the face of climate change, wildlife is under increasing stress to begin with, and does not need people killing them for frivolous reasons.

**Fish & Wildlife Response:** Hunting is the most effective management tool that the department has to ensure big game species populations meet population goals. You might disagree with those goals or even the concept of wildlife management through the use of hunting, but the department is mandated to ensure the health and sustainability of big game populations.

Surveys have repeatedly shown all Vermonters highly value wildlife. This includes hunters, despite your assertion. Nor does high value for wildlife translate into opposition for hunting. The vast majority of Vermonters support legal, regulated hunting. However, attitudes towards wildlife is closely linked with tolerance. The high value that Vermonters place on wildlife is directly related to population goals that take conflicts, such property and agricultural losses and car collisions, into consideration.

**Public Comment:** I have to say that it is quite disappointing to see the overly heavy emphasis on hunting as a means of "managing" wildlife and as outdoor "recreation." While hunters will defend their tradition with their dying breaths, it is, in fact, a dying tradition. It was certainly necessary in its time, but that's not where we are today. So campaigning to shovel as many people into that pursuit as you possibly can looks, frankly, a little desperate. Furthermore, hunting is not science. The use of "data" from the observations of hunters who, let's face it, are focused on other things is not a substitute for the data that should be coming from a raft of wildlife specialists with a range of expertise, experience, and knowledge.

**Fish & Wildlife Response:** Hunting is not a dying tradition; participation rates are stable across most age groups. Instead its being impacted by the same aging demographics that also threatens Vermont's educational system and economy. The median hunter age (44 years-old) is nearly identical to Vermont's general population and there is both a declining number of young hunters and young people across the state. As older hunters become eligible for permanent licenses and then age-out completely, there are fewer people to take their place.

Hunting is the most effective management tool that the department has to ensure big game species populations meet population goals. You might disagree with those goals or even the concept of wildlife management through regulated hunting, but the department is mandated to ensure the health and sustainability of big game populations for all Vermonters. In addition, data derived from hunter surveys and harvest has long been documented by peer-reviewed research as valuable, quantitative data to support population modeling.

**Public Comment:** As a veterinarian, I condemn the hunting of any animal other than for the purpose of obtaining food. It is abundantly clear that much of the hunting occurring in Vermont is for non-food purposes. Hunters comprise a small minority of the Vermont population. It is high time the Fish and Wildlife department allowed non-hunters onto its board so that the views of Vermonters could be represented fairly.

**Fish & Wildlife Response:** You provide no evidence to support your claim that much of the hunting occurring in Vermont is not related to food. National studies have shown meat is in the primary motivation for hunting and deer, bear, moose, and wild turkey are all known for being exceptional and sustainable table fare. If this were not the case, the department would receive numerous reports of dumped or abandoned carcasses that had previously been checked-in at reporting stations.

The 2020-2030 Big Game Plan does not address the Fish and Wildlife Board. The Board's creation and purview is state statute. However, it is worth noting that the Board only has authority over the regulations regarding the take of certain fish and wildlife species. The Board has no influence on most department operations including habitat work, land acquisition and endangered species. If you are unfamiliar with this work, consider reviewing our Website or request our annual report to legislature. The department also disagrees with your assertion that the Board does not reflect the interest of Vermonters. A very high majority of Vermonters support legal, regulated hunting; a number that has changed little in the last 30 years. In addition, surveys have repeatedly shown that a high majority of residents also support the department and its work.

**Public Comment:** Setting up Vermont's wildlands and wildlife only for hunters is wrong as we pay taxes also.

**Fish & Wildlife Response:** With exception of some seasonally closed parcels on a handful of state and federal properties, there is no land in Vermont that is open to hunters that is not also open to all Vermonters. Conversely, there are number of lands, both public and private, that are closed to hunting while being open to other uses even though the lack of hunting on those lands can contribute to ecosystem problems resulting from big game species overabundance (i.e. overbrowse of vegetation from deer).

**Public Comment:** I should not have to be afraid of being shot on own land or anywhere else for that matter.

**Fish & Wildlife Response:** Hunting is very safe. There have only been two shooting incidents involving non-hunters in the past 40 years. Neither of these incidents occurred on private property, neither occurred in the past decade, and one was minor. To put your risk in perspective, since 1985, nineteen people have died in Vermont from vehicle collision with moose. Statistically speaking, you are nearly 10 times more likely to DIE from a collision with a moose in Vermont than you are to be injured by a shooting incident from hunting.

**Public Comment:** I do not oppose hunting in a humane way, but only if the hunters use the meat. I do not believe that an animal should die merely to allow a hunter to have a trophy for their wall. That is a glorification of killing and a waste of a beautiful creature's life.

**Fish & Wildlife Response:** National studies have shown meat is in the primary motivation for hunting and deer, bear, moose, and wild turkey are all known for being exceptional and sustainable table fare. If this were not the case, the department would receive numerous reports of dumped or abandoned carcasses that had previously been checked-in at reporting stations.

**Public Comment:** We have seriously encroached on their habitat! Let's re-think our position and take responsibility for them now as we have basically caused this problem. They were here before any of us and we have a duty to protect and preserve wilderness and the creatures that live in it not kill them.

**Fish & Wildlife Response:** The department agrees that habitat is vital. If the department removed all the hunting-related content from the plan, it would still be a sizeable document that emphasizes habitat, outlines research needs and calls for enhanced public outreach. In addition, Hunting is the most effective management tool that the department has to ensure big game species populations meet population goals and promote ecosystem health for all wildlife. You might disagree with those goals or even the concept of wildlife management through regulated hunting, but the department is mandated to ensure the health and sustainability of big game populations.

**Public Comment:** I would like to see hunting and trapping eliminated/prohibited and restrict human access to wild lands. Also designate 3/4ths of land to wildlife and 1/4th to human development. Wetland and old growth forests should be prohibited from development and if roads are to be built wildlife corridors should be built for every two miles of road.

**Fish & Wildlife Response:** Public opinion surveys routinely show that Vermont residents strongly support conservation and highly value wildlife, the state's rural character and working forests and farms. Habitat loss and fragmentation, non-native species, and a rapidly changing climate all pose grave threats to our environment and wildlife. As a result, the department pursues conservation in all its forms, including acquiring valuable habitat and working with partners to ensure vital travel corridors are protected. Rather than restricting access, the department maintains the opportunity for all Vermonters to connect with the land, including hunting, to maintain the support for conservation that will be needed to overcome looming challenges.

## Posting

**Public Comment:** Respect landowners' rights to post their property. Also, it is important for the department to understand why people are choosing to post their land: open season on coyotes, bear and coyote hounding, wildlife killing contests, and other unethical practices.

**Fish & Wildlife Response:** The department fully respects landowners' rights to post their property. However, the wildlife that use private property belong to all Vermonters, not just the landowners, and the department is responsible for management of those animals, just like animals on public land. Limited hunter access to private property greatly limits the department's ability to manage some species, particularly white-tailed deer. This often results in overabundance and damage to habitat and other species, including habitat on neighboring land.

The department has no interest or intention of preventing landowners from posting or otherwise restricting access to their property. Rather, the department is interested in programs and incentives that might encourage landowners to allow access to their land.

There are countless reasons why landowners choose to post their property, and while poor hunter behavior is a factor for some landowners, it is certainly not the primary reason. A 2006 survey of Vermont landowners found the most common reason landowners post is because they hunt the property and want to limit the number of other hunters. This was followed by privacy and liability concerns. More recently, the department has partnered with the Vermont Land Trust and Vermont Coverts to conduct a number of seminars across the state on hunting access to landowners who are new to state, unfamiliar with hunting or are having access issues. While some cited poor hunting behavior, the primary concern, without question, was illegal off-road vehicle use.

Finally, for clarification, please be aware that contests that involved coyote hunting were banned several years ago.

## Nonlead Ammunition

**Public Comment:** Ban lead ammunition for hunting in Vermont. Lead shatters upon impact with the target animal and gut piles threaten by many species of wildlife. A fragment of lead the size of a grain of rice is enough to kill bald eagles in a horrifically painful and cruel death. Children in hunting families have blood lead levels much higher than children from non-hunting families. Hunters are harming the health of their children by refusing to use alternatives to lead bullets, which are widely available in places including stores such as Walmart.

**Fish & Wildlife Response:** This topic is addressed in the Big Game Plan. While there are scientific studies that examine the impacts of commonly used, lead-based big game hunting ammunition on the potential for exposure and poisoning of wildlife and its potential effects on human health, the department is unaware of any that show population level effects on wildlife species in Vermont or that have found strong links with human health impacts anywhere in United States. Lead based big game hunting ammunition has certainly been shown to impact populations of scavenging bird species, such as California condors, in the southwest. However this has not been observed in Vermont's scavenging birds, likely due to differences in environmental conditions (i.e. forested vs open desert) and bird behavior. On the contrary, Vermont's population of bald eagles, a scavenging bird species known to be affected by lead poisoning in other states, has grown considerably over the last decade, to the point that it most likely will be removed soon from the state's endangered species list. It is also important to note that when population impacts with hunting ammunition are demonstrated, the department will act. Such was the case in 1991, when lead waterfowl shot was banned.

It has been well documented that lead based big game hunting ammunition is a clearly defined pathway linked to lead exposure in individual animals. While not rising to the category of a population level wildlife effect to necessitate a ban on lead-based hunting ammunition, the department acknowledges that there are non-lead alternatives to lead-based hunting ammunition. Big game hunters consider a number of factors when choosing what ammunition to use. Some key considerations include the cost, availability, and its overall efficacy to deliver a clean, ethical kill in addition to the impact to other animals. As such, the department is working with other fish and wildlife agencies and partners to develop and implement outreach materials and events to educate hunters on the benefits of voluntarily switching to non-lead ammunition. Previous work on voluntary efforts from other agencies in areas like Arizona's Kaibab Plateau and Oregon's Zumwalt Wildlife Preserve, have shown that measures and incentives promoting the use of nonlead hunting ammunition are effective in empowering hunters to switch to nonlead alternatives as opposed to an all-out ban on lead based big game hunting ammunition.

Simply put, the department does not support a ban on commonly used, lead-based hunting ammunition for a variety of reasons but rather feels that outreach to hunters to voluntarily switch will prove a far more effective tool.

**Public Comment:** ...this makes it all the more disappointing to see the department heading toward support for non-lead bullets when traditional ammunition arguably outperforms non-lead in terms of expansion and energy transfer. The fervor against lead bullets, while not entirely hyperbole, is certainly heavily overstated. To see such things in an official document seems no more than a soft nod to the anti-hunting crowd. The reality is that these folks do not have a bottom. For them the end will come at the end of hunting, trapping, and quite frankly fishing. While this is not a regulation setting document, it is a policy setting document and any acquiescence to the positions of these agenda driven folks are poorly thought out at best. We know that access can sometimes be a barrier to recruitment, let's ensure that cost and or disappointing experiences do not become a further barrier.

**Fish & Wildlife Response:** Hunters, anglers, and trappers have been the primary supporters of wildlife conservation in North America since the early 1900's. Collaboration with hunters, industry, conservation organizations, and shooting-sports interests is therefore essential to the continued protection of wildlife resources and hunting's conservation heritage. State fish and wildlife agencies, including Vermont Fish and Wildlife Department have primary responsibility for managing fish and wildlife resources and using the best science available to implement focused wildlife manage policy. Educating the public about wildlife issues is part of the department's key objectives. Non-lead ammunition is becoming more widely available and reasonably priced. Using non-lead alternatives can prevent lead exposure to human and wildlife without a loss in harvest efficacy when used appropriately.

The department has not and does not support a ban on lead-based hunting ammunition for big game. Furthermore, scientific studies have shown that there is no significant performance advantage in the efficacy of conventional lead-core hunting ammunition over non-lead ammunition for harvesting big game (e.g. Gremse et al. 2014, Martin et al. 2017, Trinogga et al. 2012). Many times, anecdotal experiences from hunters are noted. Like the use of steel shot compared to lead shot for waterfowl hunting, an educational learning curve is expected. Shooting #5 lead shot is not the same as shooting #5 steel shot at a flying target as is the same comparison between shooting a 150-grain lead bullet vs. a 150-grain non-lead bullet at a whitetail. All said, there are a number of personal choices and decisions a hunter must make to voluntarily switch to non-lead ammunition for big game hunting. As such, the department is working to provide hunters with the information, materials, and perspective so they can make an informed decision as to whether or not they would like to voluntarily switch to non-lead hunting ammunition for big game.

As mentioned in a previous response, traditional hunting ammunition has been well documented as a clearly defined pathway to individual animal health of some scavenging birds. While not rising to the classification of a population level wildlife effect to necessitate a ban on traditional hunting ammunition, the department acknowledges that there are non-lead alternatives to traditional hunting ammunition. There are a number of factors hunters consider when choosing what kind of ammunition to use for hunting big game. Some of those key considerations include the cost of the ammunition and its overall efficacy to deliver a clean, ethical kill in addition to the impact to other animals. As such, the department is working with other fish and wildlife agencies and partners to develop and implement outreach materials and events to educate hunters on the benefits to switching to non-lead ammunition. Previous work from other agencies in other areas have shown that measures to promote the use of nonlead hunting ammunition are effective in empowering hunters to switch to nonlead alternatives as opposed to an all-out ban on traditional hunting ammunition.

Although some special interest groups might have a desire for a ban on traditional hunting ammunition, the department does not and would not support that for the aforementioned reasons. The department believes that hunters should be aware of the potential unintended consequences to non-hunted species and should be able to choose whether to switch to non-lead ammunition. Hunters can weigh the factors and make an informed decision that is mutually beneficial for themselves, the species they pursue, and the wildlife that are impacted by them.

- Gremse F, Krone O, Thamm M, Kiessling F, Tolba RH, et al. (2014) *Performance of Lead-Free versus Lead-Based Hunting Ammunition in Ballistic Soap*. PLoS ONE 9(7): e102015. doi:10.1371/journal.pone.0102015
- Martin A, Gremse C, Selhorst T, Bandick N, Müller-Graf C, Greiner M, et al. (2017) *Hunting of roe deer and wild boar in Germany: Is non-lead ammunition suitable for hunting?* PLoS ONE 12(9):e0185029. <https://doi.org/10.1371/journal.pone.0185029>
- Trinogga A, Fritsch G, Hofer H, Krone, O. (2012) *Are lead-free hunting rifle bullets as effective at killing wildlife as conventional lead bullets? A comparison based on wound size and morphology*. Science of the Total Environment 443 (2013) 226-232.

## Miscellaneous Comments

**Public Comment:** Is there a plan or thought to create a F&W app for mobile phones? Something that is personalized to the hunter's conservation ID number. In it you can potentially report game harvests, report daily hunt observations such as how many deer you observed and in which WMA...or any other wildlife observations that Dept biologists would like to track. Tracking it on the mailed-out cards to hunters is antiquated and probably not that efficient and more people would be apt to complete observation sightings or fish data by phone app. It seems like the data would be able to be used more efficiently since it's already in digital format versus ball point pen comments on paper. Through the app you can also do license purchases. Hunters are on phones all the time utilizing mapping software and such. Myself I'd be more inclined to conduct business or surveys quickly by app than navigating through the website...even though the website also does not give options to report all that crucial data for biologists.

**Fish & Wildlife Response:** Yes, there is a plan and effort underway to develop a department app for mobile phones to modernize the many items you mention. If all goes well, it will be released later this fall / winter with subsequent releases into 2021.

**Public Comment:** What are the management guidelines for DWA's (deer wintering areas) specific to private land under the Use Value Appraisal (Current Use) program? Are snowmobile trails or cross-country ski trails allowed?

**Fish & Wildlife Response:** Deer wintering areas (DWA) must be considered in forest management plans that are required for land enrolled in the Use Value Appraisal program. Essentially, any forest management must be appropriate to maintain the function of the DWA. There are no restrictions on trails in DWAs under the Use Value Appraisal program; however, the department generally recommends minimizing any human activity in DWAs areas during the winter. Human activity will alter deer behavior and may cause them to lose their energy reserves making it more difficult to survive the winter.

**Public Comment:** I'm a Vermont resident and I'd like to comment on the section where Vermont F&W is requesting public access be allowed on residents' property in the Current Use Program. Why? What reason did the department come

up with to rest yet another assault on property owners? For a department that is trying to gain access to residents' good side so they can hunt on the resident's property you are going about it the wrong way. The disrespect shown to residents that own property (that hunters utilize to bag the big buck), is pretty fierce from my end of it. We do not hunt, but we've allowed hunters to walk our property for the last 30 years. If the October season goes through, we will not allow hunters for that particular season. Just one more reason to add to our list to post our property. Not our scene. We'd rather not post.

**Fish & Wildlife Response:** The department fully respects landowners' rights to post their property. However, the wildlife which utilize private property belong to all Vermonters and the department is responsible for management of those animals just as animals on public land. Limited hunter access to private property greatly limits the department's ability to manage some species, particularly white-tailed deer, which often results in overabundance and damage to habitat, including habitat on neighboring land.

The department has no interest or intention of preventing landowners from posting or otherwise restricting access to their property. Rather, the department is interested in programs (including the Use Value Appraisal program) or other incentives that might encourage landowners to allow access to their land. Several other states' Use Value programs provide additional incentives (e.g., greater tax reduction) to landowners who keep their land open for recreation.

**Public Comment:** Very well written and informative document. Please let USDA, Wildlife Service - VT know if we can assist your department in any way carrying out your defined goals. Best of luck to you and your staff over the next ten years.

**Fish & Wildlife Response:** Thank you. The department appreciates the longstanding partnership with USDA, Wildlife Services to help protect and conserve Vermont's wildlife and their habitats for all Vermonters.

**Public Comment:** I do not believe wild animals "belong" to the people of Vermont. I believe that they are entrusted to us by nature for care and stewardship.

**Fish & Wildlife Response:** Vermont law entrusts the stewardship of the state's fish and wildlife to the department in accordance with the Public Trust Doctrine. The Public Trust Doctrine, based on Roman civil and English common law, and affirmed by the United States Supreme Court, is the principle that natural resources, including wildlife, are owned by the public and held in trust by the government for the benefit of current and future generations. Wildlife does not belong to private property owners or the government. Nor can individuals possess live wild animals as a commodity or as pets or farm animals. Instead, wildlife is a resource that must be conserved and protected for public benefit by state and federal management.

**Public Comment:** Please consider adding a ban to live action trail cameras during open big game hunting seasons.

**Fish & Wildlife Response:** Thank you for sharing your thoughts on this. The department decided not to include it in the 2020-2030 plan. However, the issue will be monitored, and if warranted to accomplish big game management objectives, the department would work with the state's hunting groups to consider guidelines regarding the use of live action trail cameras during big game hunting seasons.

## Deer-Related Comments/Questions

**Public Comment:** See NJ Save the Deer

## Bear-Related Comments/Questions

### General

**Public Comment:** Employ a science-based, not hunter-centric based, policy towards bear management. Other states that have less land mass and more bears have no hunting season at all, yet Vermont has one of the longest hunting seasons in the country.

**Fish & Wildlife Response:** Like the vast majority of states with healthy bear populations, Vermont's bear management is based on sound science that uses hunters as the means of controlling the size of the bear population.

There is no one “best” management strategy for bears. Different jurisdictions employ different methods depending on several factors including the bear population size and desires of the hunting public. In Vermont, baiting for bears and spring hunting is prohibited. Instead, Vermont only allows fall hunting and the use of bear hounds; two methods that combined have a lower success rate for hunters. This allows for a longer hunting season and increased opportunities for all hunters to hunt for bears if they desire to do so.

**Public Comment:** Extending the bear season is disgusting. It was too long as it is. Once again - it’s for hunters, period, the hell with science and the animal population.

**Fish & Wildlife Response:** The 2020-2030 Big Game Plan does not recommend extending the bear hunting season. Historically, Vermont has used the length of the hunting season to adjust the size of the bear harvest and has found this management technique to be the most efficient and widely accepted means of keeping the population within management objectives.

**Public Comment:** Based on the adverse effects of climate change, existing already and becoming vitally important in the next ten years, including warmer, shorter winters and drought-caused natural food scarcities, amend the Bear rules to:

1) More actively address enforcement of fines for people who continue to ignore the reality of leaving food such as bird feeders, compost, garbage, and outdoor pet food for the bears to find. Legal action is especially important in repeat-offender cases. Education on resolving human-bear conflicts was a consensus high-priority need derived from the break-out group on bears at last September’s Plan meeting.

**Fish & Wildlife Response:** Current bear regulations already contain language for the enforcement of rules pertaining to the feeding of bears. The department fully expects to see more enforcement actions if the level of negative human-bear interactions continues to increase. Education and outreach to resolve human-bear conflicts was a high priority identified in the planning process and is the top priority in the bear section of the 2020 – 2030 Big Game Plan. It is already the department’s number one bear management priority and the efforts in this area are expected to increase over the period of this Plan.

2) Shorten the bear hunting season and eliminate the training for and the hounding of bears by dog packs. Quite often, the almost-constant harassment of bears in the woods simply drives them into human-populated areas thereby exacerbating human-bear conflicts.

**Fish & Wildlife Response:** Most states with bears carry out monitoring and research projects and none of them have reported study animals switching their home ranges to more urban areas due to hunting. Instead, state bear biologists believe bears have expanded their range to include more urban habitats and that they have found easy sources of food in these areas due to the amount of bird seed and unsecured garbage that they encounter.

3) Bear populations in Vermont should be driven by the tolerance level of humans, in addition to the carrying capacity of their natural habitats. Their management should be based on science, rather than on the interests of the hunting community.

**Fish & Wildlife Response:** As stated in the Big Game Plan, the department’s foremost bear management goal is to minimize the number of negative interactions occurring between bears and humans to ensure long-term public tolerance. The population objective of 3,500 to 5,500 bears is based on this, rather than number of bears desired by hunters. If the number of bears exceeds what the public as a whole will tolerate, there is a risk of people devaluing them as a species. This has already occurred with deer and resident Canada geese in more suburban states.

**Public Comment:** Increase the population limit on black bears. Vermont currently can support at least double the current population of black bears. We have more habitat than other New England states, such as Connecticut, that have far larger black bear populations than we do, without major human-bear conflicts. There is no reason why Fish and Wildlife should seek a reduction in black bear populations, when clearly there is broad popular support in Vermont for people to see more bears in the wild. The hunting season should be curtailed, not lengthened, in order to increase black bear populations.

**Fish & Wildlife Response:** The department is not seeking a reduction in the bear population. Instead, the population objective range is being fine-tuned to 1) reflect improvements in the science of population estimates,



2) account for natural fluctuations in the population; and 3) better include confidence intervals in the population model. The plan clearly states that the department sees no need to change management strategies to either increase or decrease the population because the current population is well within the population objectives. In addition, the comment on the bear population in the State of Connecticut is incorrect. In 2019, the Connecticut DEEP biologists estimated there were approximately 800 bears in their state. In contrast, the Vermont Fish and Wildlife department's bear population model estimated a range of 4,286 and 5,575 bears in Vermont in 2019. Looking at it from a density perspective, Connecticut has only 25-30% of the density of bears that Vermont has. Thus, the statement that Connecticut has a higher population or density of black bears compared to Vermont is incorrect.

## Hounding

**Public Comment:** Ban bear hounding

**Fish & Wildlife Response:** There is no need to ban bear hounding currently. The department views bear hunting as an important bear management tool and the use of hounds plays a large role in reducing human-bear conflicts, particularly related to agriculture. Hounds actually save the lives of many bears by chasing animals away from agricultural areas that would otherwise be shot legally by people defending their crops.

**Public Comment:** Contrary to the current justifications, it is viciously cruel to both the animals being hounded and the hounds themselves. And landowners should absolutely not have to put up with a terrorized bear or rabbit or coyote or raccoon or whatever running for its life across their property while being chased by a pack of crazed dogs with the hunter comfortably in a truck who knows how far away.

**Fish & Wildlife Response:** The department's experience, based on many decades of bear research, is that pursuing bears with hounds is neither cruel to the dogs nor the animals pursued. Besides hunting, hounds are used nationwide as tool to capture bears for a variety of scientific studies. There is absolutely no scientific evidence that suggests this method harms the bears, nor impacts their longevity.

**Public Comment:** You talk about bear hounding and how wonderful the dogs are in intimidating evil bears. I have nothing against dogs. I do have a problem with their owners sitting on their butts in air-conditioned trucks while their dogs chase and harass anything they sniff out for four months every summer. I could respect a hounder if he was in the woods, sans electronics, working his dogs. People scream at me about Vermont Tradition... 20 years ago there was no GPS - this is not a tradition. This would be like allowing hunters to hunt with armed drones! Hyperbole aside, you must change the hound training season, so it is not a harassment for mother animals and their young. I expect you to clean up this unsportsmanlike activity.

**Fish & Wildlife Response:** Prior to the general use of GPS collars, bear hounds could be lost for days and sometimes struck by cars on highways. Thus GPS collars actually improve hound safety by allowing rapid retrieval. They also reduce the chance of dogs chasing an animal other than the target bear by allowing a hunter to quickly identify and retrieve a dog that is pursuing a non-target animal. Additionally, the ability of hunters to control their hounds better likely cuts down on the number of negative interactions with landowners. The department's general observations of bear hunters that utilize hounds has been that there is a significant amount of field time and physical work that goes into hunting bears with hounds and the statement regarding physical ease of bear hunting with hounds is inaccurate.

**Public Comment:** Obviously, bear hounds cannot read posted signs, so there is simply no way for this specific form of hunting to comply with the law. Currently, Fish and Wildlife dept. simply tells landowners to deal with trespassing bearhounds as these violations occur, but these violations SHOULD NOT OCCUR in the first place! This is the expectation for all other forms of hunting.

**Fish & Wildlife Response:** The department encourages hound owners to reduce the chance of their hounds entering lands posted against hunting by only releasing their dogs on public land or on large tracts of private lands that is open to hunting.

**Public Comment:** Bearhounds violate local leash laws, and, in addition, bearhound hunters are allowed an especially long hunting season, as their “training” season (which is effectively the same as hunting activity) runs from June to start of hunting season in September. Either Fish and Wildlife should require these hounds to be leashed, or the activity should not be licensed at all. If Fish and Wildlife refuses to regulate this activity, it will be subject to legal challenge in the courts.

**Fish & Wildlife Response:** Vermont does not have a statewide leash law for dogs. “Leash laws” are ordinances enacted at the municipal level per 24 V.S.A. §2295. The assertion that the department does not regulate the use of bear hounds is incorrect. The use of hounds for hunting bears is heavily regulated under 10 App. V.S.A. §7 to ensure that bearhound hunters have their dogs under control while pursuing bears.

## Baiting

**Public Comment:** Other states and Provençe’s that have healthy black bear populations allow for baited hunts. Currently, the only reliable method of hunting Black Bear in VT is hounds, which have recently caused much controversy as bears and hounds do not respect property lines, and further, very few hunters have bear hounds. I propose VT allow hunters to purchase a bear baiting permit (see Maine) to control bear population, allow much more successful hunting opportunities, raise funds for the department, and control the population.

**Fish & Wildlife Response:** Any form of hunting that increases hunter success comes with additional issues. Baiting is no exception, and it would entail additional regulations, costs, and controversy, including trying to separate the practice from our current regulations against the feeding of bears. Vermont prohibited baiting in 1972. At the time, this was done to limit the number of bears taken in any one year as the department focused on increasing the population. Hunting with hounds and baiting are, separately, very effective hunting methods. As a result, most states do not allow both methods due to the potential of over harvest. In the east, Maine and New Hampshire are the only exceptions. Maine has a high bear population and need every possible method to take enough bears, to the point that they are even considering a spring bear hunting season in addition to what is already being done. New Hampshire, on the other hand, must closely monitor their harvest throughout the season. Vermont hunters are currently taking enough bears, and even if an increase the bear harvest was needed, the department would likely not consider it. Most states that allow baiting must implement a permit system to limit the number of people and enact other controls to ensure spacing between baits. This can cause conflicts between hunter groups (e.g. hunters who would hunt over bait and hunters who would not) regarding the access of bear hunting to all. In addition, some bait items such as chocolate are toxic to the bears. In short, although an effective management tool, bear baiting is not being considered at this time as harvest objectives are being met with the current management strategies in place.

## Moose-Related Comments/Questions

**Public Comment:** Rather than killing moose to save moose, invest in reducing winter tick populations directly, either by treating moose or the landscape with some form of acaricide or fungal pathogen.

**Fish & Wildlife Response:** This topic was addressed in a Frequently Asked Questions document about moose management and winter ticks that the department developed in spring 2020. In fact, this statement appears to be taken from that document:

### ***Can’t moose or their habitat be treated to kill winter ticks?***

*This is a logical question that usually stems from us treating our pets for ticks. Moose are not pets or livestock, they are wild animals.*

*Reducing winter tick populations directly, either by treating moose or the landscape with some form of acaricide (a pesticide specifically for ticks) or fungal pathogen (there are some naturally occurring fungi that can kill ticks), is not currently a viable option. Research in this area is ongoing, but the realities of treating an entire landscape or a sufficient portion of the moose population make it unlikely that this will be a practical option in the near future.*

*Further, treating ticks does not kill all of them and provides them an opportunity to adapt to the treatment and develop resistance. As long as there is a high density of moose on the landscape, tick numbers will simply increase again when treatments stop or when the ticks become immune to them.*

*Introducing animals that consume ticks (e.g., guinea fowl or opossums) is also not a viable option. Aside from the potential consequences from introducing a new animal into an area, and the fact that they could not survive the winter in that part of*

*Vermont, they simply would not be effective at reducing winter tick numbers. The life cycle of winter ticks results in minimal opportunity for them to be predated. Adult ticks essentially only occur on the host, not on vegetation, and larval ticks are very small and either in the leaf litter or relatively high up on vegetation.*

*Lastly, people may dislike ticks because they find them unsightly or are concerned about diseases they may carry (remember, winter ticks do not carry those diseases), but people must remember that they are a native species just like moose. The appropriate balance between winter ticks and moose must be maintained.*

**Public Comment:** Hunting of moose should be sharply curtailed or temporarily suspended.

**Fish & Wildlife Response:** It has been. Moose hunting in Vermont has been significantly reduced in recent years and is now limited to a small number of permits in the northeastern corner of the state. Importantly, moose density in the area where hunting is currently allowed is much greater than anywhere else in Vermont, and high enough to support high numbers of winter ticks that are negatively effecting moose health.

Most of Vermont currently has moose densities that are below the hunting threshold established in this draft plan, and therefore no moose hunting permits have been issued in those areas.

**Public Comment:** Moose do not need to be shot to save them from ticks! This past winter shows that ticks can be reduced by weather and moose calves survived at a greater rate.

**Fish & Wildlife Response:** The department is not aware of any scientific evidence that suggests winter tick numbers were reduced or that calves survived at a higher rate during this past winter. The department's moose survival study concluded in 2019, and no calves were collared in 2020.

While winter tick populations are susceptible to variations in weather, including the timing of first snowfall in the fall, snowmelt in the spring, late summer drought, and other factors, the primary factor that allows winter tick population to reach levels that are harmful to moose is high moose density. Moose are the primary host of winter ticks, carrying far more ticks than any other species, and the abundance of winter ticks is directly related to the number of available hosts (moose). Reducing moose density is the only currently viable option to reduce the impact of winter ticks on the moose population.

## Wild Turkey-Related Comments/Questions

**Public Comment:** As you know spring wild turkey hunting has become a popular pastime and important part of VT Fish and Wildlife Big Game programs. Along with this popularity, this has evoked predictable hunter to hunter competition and conflict. What I suggest is a management tool what several states with many years of experience with healthy turkey populations impose: simply limiting hunters to a single bird harvested the first 7 days of the season. This both eases intense hunting pressure and allows more hunters to experience a successful hunt, given the harvest decreases significantly by day after the first week and the "easy" birds are taken -and often two at once,

**Fish & Wildlife Response:** No comments were received indicating problems with turkey hunter competition and conflict during the process of drafting the 2020-2030 Big Game Plan. On the contrary, a randomized telephone survey of 600 resident hunters conducted in 2018 found that 67% of hunters were very satisfied and 27% somewhat satisfied by their turkey hunting experiences in Vermont over the past five years. When compared to the results of a similar survey conducted in 2007 (57% very satisfied and 35% somewhat satisfied), it becomes readily apparent that turkey hunting satisfaction in Vermont has remained high for a long time. Given the lack of complaints received in this regard coupled with high and sustained hunter satisfaction, implementing the suggested measures to "ease intense hunting pressure and allow more hunters to experience a successful hunt" is unwarranted. However, the department recognizes the merits and utility of this suggestion and would consider adopting such measures in the future should the need arise.

**Public Comment:** I think a phone in system is a horrible idea, ripe for abuse. I think the check in station is both useful (data collection) and an important way to keep people abiding by laws. I hunted in NY where they check in (or did then) by phone and heard stories of people taking advantage of it. I also personally love the tradition around it - I also think the public face of it is important to continue - VT's citizens should see the deer that people take home for the freezer!

**Fish & Wildlife Response:** In other jurisdictions where online reporting or other alternatives to in-person reporting have been considered or adopted, similar concerns for non-compliance and data quality have been expressed. After years of experience now with these alternative reporting techniques, though, evidence of increased non-compliance or diminished data quality has not been observed by these jurisdictions leading the department to conclude these concerns are unfounded. In fact, results from a 2017 Northeast Upland Game Bird Technical Committee survey of regional biologists indicated that reporting rates may have actually increased as a result of adopting such alternative reporting options and no significant declines in data quality were observed. At the time of this survey, Connecticut, Maryland, Massachusetts, New York, Pennsylvania and Virginia all allowed online reporting of big game and all survey respondents from these states expressed satisfaction with and confidence in the data these alternative harvest reporting systems provided. Nationwide, Vermont is only one of three states that only have an in-person option for reporting all big game species.

The department is committed to monitoring the quality and accuracy of the harvest data it collects using these reporting alternatives through the future. In this manner, the department can draw upon decades of previous experience and compiled data to assess these datasets and identify any potential data quality concerns resulting from erroneous data entry and/or non-compliance with reporting requirements. For example, a comparison of the daily harvest totals for the 2020 spring turkey season, during which all harvest data were collected via online reporting, to the average daily harvest totals for the previous five-year period (Figure 1) reveals daily harvest trends for this past spring season which reflect the normal distribution indicating accurate and complete harvest reporting. Furthermore, the data entry controls afforded by these well-developed, sophisticated online reporting tools allows the department to minimize the potential for inadvertent data entry mistakes that are inherent with all data collection processes. Data controls such as value lookups, dropdown lists, validations, and range of value limitations can all be integrated into the data entry form to ensure data integrity. From limiting the Wildlife Management Units to the correct choices for the selected town of harvest to providing a drop down list of date choices for a particular hunting season, the use of this technology to collect harvest data in this way both increases hunter convenience and safeguards data integrity.

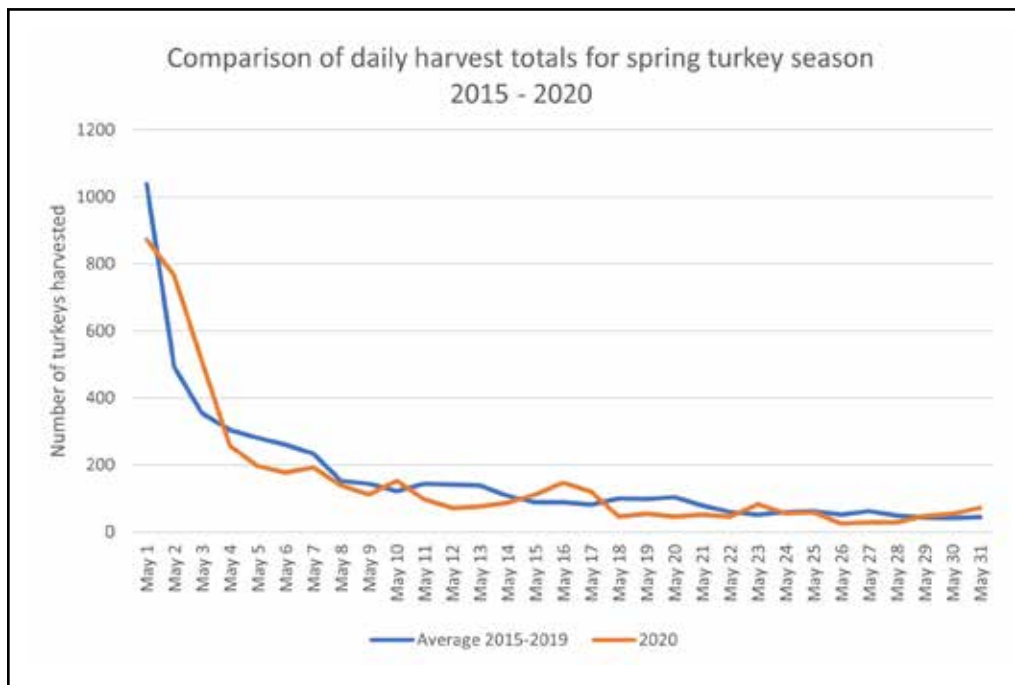


Figure 1. A comparison of the 2020 spring turkey season daily harvest totals to the average daily harvest totals for the previous five years.

With respect to hunter compliance, it is also important to note that the department employs 36 specially trained and skilled Game Wardens who are highly motivated to safeguard the integrity of the department’s data collection processes, to maintain high public regard for hunters and hunting by curtailing miscreant behavior, and to protect and conserve Vermont’s shared wildlife resources. While the department recognize that the vast majority of hunters

share these motivations and will continue to report their harvest with due diligence, there will always be a few who will not and it is these few who become the unenviable focus of department wardens. Indeed, it is these few who have always been the focus of the wardens as they have been just as unlikely to report their harvest in-person to a check station as we would expect them to be with online reporting. Beyond the fact that the increased conveniences gained through online harvest reporting are expected to actually improve reporting rates (i.e. reduce non-compliance), online reporting will also benefit wardens in their efforts to detect and root out criminal behavior by providing readily accessible, real-time data upon which to build their cases and act in a timely fashion.

**Public Comment:** A turkey novice season sounds great!

**Fish & Wildlife Response:** Thank you for your support.