Vermont Fish and Wildlife Board

Meeting Minutes

Wednesday, April 22, 2020

The Vermont Fish and Wildlife Board held a meeting beginning at 5:00 p.m. on Wednesday, April 22, 2020 via Zoom Video Conference and via conference call at: 929-436-2866; Meeting ID: 967-9931-1368.

Board Members in Attendance: Tim Biebel (Board Chair), Brian Bailey, Wendy Butler, Mike Kolsun, Marty Van Buren, Bill Pickens, Dennis Mewes, Cheryl Frank Sullivan, Bryan McCarthy, Mike Bancroft, Jay Sweeny, David Robillard, and David Fielding.

Department Staff in Attendance: Louis Porter, Commissioner; Mark Scott, Wildlife Director; Col. Jason Batchelder, Law Enforcement Director; Catherine Gjessing, General Counsel; Will Duane, Executive Assistant; Adam Miller, Big Game Project Leader; Nick Fortin, Deer and Moose Project Leader; and Dr. Katy Gieder, Department Research Coordinator and Biometrician.

Members of the Public Calling in: State Representative Kari Dolan, Waitsfield, VT; Stanton Upson, Cedar City, UT.

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The Meeting was Called to Order by the Chair at 5:03 PM

Approval of the Previous Meeting Minutes (April 1, and April 13, 2020)

Motion: David Robillard moved to accept the April 1 draft meeting minutes. Brian Bailey seconded the motion.

Discussion: Dennis Mewes offered a typographical correction to the April 1 meeting minutes on page 2. The draft minutes stated that the original proposal for the 2020 season for scaup was a 60-day season with a two-bird limit. The original proposal offered at the February 19th meeting was a 60-day season with a *one-bird* limit.

Vote: Unanimous roll-call vote to accept the April 1st meeting minutes as amended.

Motion: Brian Bailey moved to accept the April 13th emergency meeting draft minutes. Bryan McCarthy seconded the motion.

Discussion: Michael Bancroft offered a typographical correction to the April 13th meeting minutes, correcting the start time and the date in one instance.

Vote: Unanimous roll-call vote to accept the April 13th meeting minutes as amended.

Public Comment

Representative Kari Dolan from Waitsfield introduced herself to the Board. Rep. Dolan sits on the House Committee on Fish, Wildlife, and Natural Resources. She is glad for the opportunity to listen in and hoping to be more engaged and participate when available. She is available to help with any questions.

Board Chair Tim Biebel thanked Representative Dolan for joining the meeting.

2020 Moose Hunting Season Permit Recommendation – Board Procedural Vote

Commission Porter began the discussion, noting that the Department had conducted three successful virtual hearings the prior week. Attendance at the virtual hearings was similar to the numbers normally seen at the in-person public hearings. Thank you to the Department staff and Board Members who attended and made those possible.

Wildlife Director Mark Scott reiterated that the three hearings had great turnout and each hearing had seven to ten Board Members attending. Director Scott recapped the process for setting the annual moose permit numbers thus far. The Department made its recommendation to the Board at the February 19th meeting, the public comment period has been open from Feb 20th through April 19th. The Department counted 244 people participating in the three virtual hearings. Most people were very appreciative of the Department and the Board conducting the hearings in this way and offering the ability to comment during the pandemic.

Other comments received:

- The Department received 36 email comments via the email address set up to collect public comments.
- 9 voicemails were recorded on the voicemailbox set up to collect public comments.

The Department's understanding from the hearings and the comment period is that the public generally supports the proposal. There was some opposition which seemed to come from people who were opposed to moose hunting generally. Department staff spent significant time responding to questions about the moose and tick relationship. These responses can be found in the comment response documents attached to these minutes. Some people expressed concern about lack of moose habitat in Vermont as a result of less commercial timber activity statewide. Several people were curious about other methods to reduce the tick population, like an insecticide, rather than management of the host population densities.

Given these considerations, the Department did not offer any changes to its original recommendation presented at the February meeting. Director Scott, on behalf of the Department, requested that the Board take a final vote to approve:

- 55 total moose hunting permits for this fall in Wildlife Management Units E1 and E2
- 39 lottery permits for the regular season with 5 of those being set aside for veterans.
    - These 39 regular season permits will be allocated between the two zones with 24 permits issued for E1 and 15 permits issued for E2.
- 10 lottery permits for the archery season, which precedes the regular season, with 6 permits issued for E1 and 4 permits issued for E2
- 3 permits for auction. The auction permit winners may select which WMU they prefer to hunt in and which season.
- 3 permits for special opportunity hunters with a life threatening disease or illness. Special opportunity hunters also have their choice of which season and WMU they prefer to hunt.

Director Scott asked the Board to support the unchanged, original proposal. Department staff will be available to answer any further questions. Board Chair Biebel thanked the Department and all of those involved in putting together the proposal, the research, and the work.

Bryan Bailey asked about the severity of the tick densities and whether the moose permit number should be increased. If it is a slow process of up to 4 years to determine if there's been an impact to the tick densities, would it shorten that timeline if we increased the number of permits issued? Director Scott responded that the Department would not support increasing the number of permits at this time. One basis of wildlife management is to take a conservative approach to population management. In the moose presentations the Department acknowledged that if we wanted to be very aggressive, we'd be recommending more permits. Right now, the Department is more comfortable with a more conservative approach. We'll see what data we get this fall from harvested moose and we'll come back to the board to discuss what we've learned from this fall's harvest. Good question, and thank you for picking up on the relationship between moose density, health and tick abundance.

David Robillard asked if any of the regular season veteran tags or archery tags are open to non-residents. If the drawing is held in the summer, how are we going to distribute these tags if the current stay-at-home orders are in place. Will any of the tags issued to non-residents be reissued to residents if needed? Director Scott responded that up to 10 percent of the permits will be available for non-residents. The Department is currently planning to issue 4 total non-resident lottery permits. Veteran lottery permits are issued only for Vermont resident veterans. July 8 will be the cutoff date for people to apply for the lottery **[note: during the meeting, the deadline was stated as June 8th, July 8th is correct.]**. The Department does want to make sure that these permits are issued this year in order to meet our management goals.

Commissioner Porter added that the current stay-at-home order limits travel into Vermont to only essential people for essential purposes. The Department will make it clear to non-resident applicants that there are currently restrictions in place. The Department will need to wait and see what restrictions are in place at the time of the lottery drawing and reevaluate the issuance of moose permits to non-residents if necessary. General Counsel Catherine Gjessing also noted that Board rules state that up to

10% of the total permits issued may be issued to non-residents.

Motion: David Robillard moved to approve the 2020 moose season recommendation and permit allocation as presented by the Department. Bill Pickens seconded the motion.

Discussion: No further discussion

Vote: Unanimous roll-call vote to approve the 2020 moose season recommendation and permit allocation as presented by the Department.

Department Recommendations for 2020 Antlerless Deer Hunting Muzzleloader Permits, Archery Antlerless Deer Hunting, and Youth Hunting Weekend

Director Scott summarized for the Board what goes into the annual recommendation for the youth, antlerless, and muzzleloader seasons. He thanked the current and former Board Members for all their hard work the last few years in developing an understanding of deer herd management. Without that hard work from Board members working with our staff, the Department would be concerned about the state of the deer herd in Vermont and the health of the herd. When Dir. Scott started in 1982, there were concerns with the health of the deer herd. Antlerless deer hunting controlled numbers in most regions of the state and the deer herd's health rebounded. However, biological data is showing signs similar to the 1970s and early 1980s. The concerns are health of the herd, and most likely related to land-use change and development. The forests are aging, and there is a reluctance to create early successional habitat. People prefer forests to be more park-like with older trees. These same concerns are shared by wildlife agencies across New England. While we might not have the ability to fully manage the habitat, we do have the ability to manage the deer herd.

Thanks to the big game team and especially Nick Fortin for his hard work on the proposal in front of you. The Big Game Team reviewed the current proposal. After initial review by some of the Department's Management staff, Nick expanded the initial proposal to elaborate on Vermont's deer herd health indices by comparing Vermont health data historically, and to other neighboring states. When we look at the data on deer health across wildlife management units (WMUs), we notice that the health is declining. I am concerned about this trend; we need to turn it around. I am not concerned about overharvesting Vermont's' deer population from this proposal. The Department wants to hear from the Board tonight if there are concerns. With all that the Board has learned and studied in the last few years; the Department needs your feedback.

Deer and moose project leader Nick Fortin presented the Department's proposal to the Board. The proposal and the slides from the presentation are attached to these minutes. A video recording of the presentation and the questions from the Board Members can be found on the Department's website at www.vtfishandwildlife.com. The presentation covered topics like population objectives, new regulations and seasons, deer herd health metrics, management objectives by regions, and new harvest assumptions. Certain WMUs were highlighted as examples of significant deviations from past management efforts.

The Department asked the Board for a straw vote to gauge their support for the 2020 muzzleloader antlerless deer hunting permits, archery antlerless deer hunting permits, and the youth & novice hunting weekend proposals.

Vote: Via informal straw votes, the Board unanimously supported the Department's proposals for the 2020 muzzleloader antlerless deer hunting permits, archery antlerless deer hunting permits, and the youth & novice hunting weekend. The Department will review and summarize the comments received during the public comment period and will report back to the Board with summaries and any proposed changes to the recommendations prior to the May 20th Board meeting. There will be two virtual hearings on May 11th and 12th. The public comment period runs until May 16th.

Commissioner's Update

Commissioner Porter thanked the Department's big game team staff for their hard work on the deer and moose proposals, the public hearings, and the online turkey reporting system.

The House Committee on Fish, Wildlife, and Natural Resources asked the Department to testify on the emergency turkey rule approved by the Board at its April 13th emergency meeting. Vermont Legislative Council offered a two-word amendment to the rule to improve clarity. The Commissioner and the Department General Counsel do not believe that the Board needs to re-vote on the proposal as the intent and effect of the emergency rule are unchanged. General Counsel Catherine Gjessing described the changes to the Board, noting the placement of the word "notwithstanding" and the creation of a new temporary subsection within the rule. The emergency rule, as passed, and the amendment from Legislative Council are attached to these minutes.

Quick Updates:

- The next Board meeting will be on May 20th.
- May 11th and 12th are the proposed dates for the remaining deer hearings.
- Trout stocking is underway and on-schedule.
- All staff are working from home, though some field work is starting up again under the restrictions that the governor has put in place.
- There has been an uptick in license sales. We are not sure if this is an increase in new and/or lapsed hunters and anglers or just an adjustment of when annual license holders are buying their licenses.
- Spring turkey tags will likely be below the high seen in 2010 but are up compared to recent years.
- The Department is monitoring fluctuations in firearms and ammunition sales, and gas tax receipts during the pandemic to gauge their impact on federal funding for the Department derived from these outdoor recreation activities.
- The Legislature is working exclusively on issues related to COVID 19 and the budget. It seems unlikely that they will take up any legislation regarding the Department or wildlife, but it is a very fluid situation.

- This is the last meeting for Cheryl Sullivan and Johanna Laggis. Thank you both for your service to the state. We wish you all the best.
- The Governor is expected to appoint Dean Nancy Matthews from the UVM Rubenstein School of Natural Resources to the Chittenden County Board seat.

The Meeting was Adjourned at 7:05 PM

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The mission of the Vermont Fish and Wildlife Department is the conservation of all species of fish, wildlife and plants and their habitats for the people of Vermont.

Attachment 1

Fish and Wildlife Board
Meeting Agenda

Wednesday, April 22, 2020

Please note the meeting will begin at 5:00 p.m.

The Vermont Fish and Wildlife Board will hold a meeting beginning at 5:00 p.m. on Wednesday, April 22, 2020. The meeting will be held via Zoom Video Conference. To listen to the meeting please call **929-436-2866**; Meeting ID: **967-9931-1368.**

Agenda:

1) Approval of Previous Meeting(s) Minutes
    - April 1, 2020
    - April 13, 2020 Emergency Meeting
2) Public Comments (Limited to 2 minutes per speaker)
3) 2020 Moose Hunting Season Permit Recommendation – Board Procedural Vote
4) Department Recommendations for 2020 Antlerless Deer Hunting Muzzleloader Permits, Archery Antlerless Deer Hunting, and Youth Hunting Weekend.
5) Commissioner's Update
6) Roundtable Discussion

The mission of the Vermont Fish and Wildlife Department is the conservation of all species of fish, wildlife and plants and their habitats for the people of Vermont.

Attachment 2

2020
Moose Season Recommendation

to the
Vermont Fish and Wildlife Board

Vermont Fish and Wildlife Department
Agency of Natural Resources
1 National Life Drive, Davis 2
Montpelier, VT 05620-3208
802-828-1000

The Department recommends issuing either sex moose hunting permits in WMUs E1 and E2 to reduce the moose population. This will improve the health of moose in this region by reducing winter tick numbers and their impacts on moose health, survival, and birth rate.

The current number of moose in WMU E has been sufficient to sustain winter ticks at high levels that are negatively affecting moose health and survival. Winter ticks are a host-dependent parasite with moose being the primary host responsible for major fluctuations in winter tick densities. Therefore, reduction in moose density decreases the number of available hosts which in turn decreases the number of winter ticks on the landscape. Moose population reduction will be necessary to break the winter tick cycle and improve the health of moose in this region.

Taking no management action will perpetuate the current, unhealthy state of the moose population in WMU E for decades and would be inconsistent with the Department's established objective of managing for healthy moose populations. Importantly, 65% of Vermont residents support maintaining a smaller moose population through hunting if it reduces the number of moose that die each year from winter ticks. Only 15% oppose this approach (Responsive Management 2019).

Although winter ticks can be found on moose throughout the northeast, they do not impact moose populations across the more-peripheral parts of their range, including the rest of Vermont, due to lower moose densities that limit tick abundance.

Summary of Key Points

- Permits are recommended for WMU E (E1 & E2) to reduce the moose population and thereby reduce the impacts of winter ticks on the health of moose.

- Moose density in WMU E remains above 1 moose/square mile.
    - No WMU outside of the Northeast Kingdom ever had a moose density of 1/mi^2.
    - Moose densities greater than 1/mi^2 support high numbers of winter ticks that impact the health of moose.
    - Moose densities below 0.75/mi^2 support relatively few winter ticks that do not impact moose populations. This is the case in most of Vermont – winter ticks are present, but do not cause population level impacts.

- Results of moose research in WMU E indicate health of moose is very poor in that region.
    - Adult survival remains relatively good but impacts of winter ticks have caused birth rates to be very low.
    - About half of moose calves die each winter, primarily due to heavy winter tick loads.

- No permits are recommended for the remaining 19 WMUs, which cover 93% of Vermont.

Goals

This recommendation aims to improve the health of moose in WMUs E1 and E2 by reducing the impact of winter ticks and to achieve moose population objectives established in the *2020-2030 Big Game Management Plan* (Table 1).

Management Objectives

Moose population objectives are established in Vermont's *2020-2030 Big Game Management Plan*. These objectives aim to maintain healthy regional moose populations at levels that are socially acceptable and ecologically sustainable.

In WMUs D2, E1, and E2, density objectives reflect the increasing impact of winter ticks on the size and health of the region's moose population. Research has found reduced frequency of tick epizootics (where more than 50% of calves die from winter tick infestations) at moose densities below 1.06/mi^2 and no tick epizootics at densities below 0.75/mi^2 (Samuel 2007, Jones 2016). The Department will initially try to maintain moose densities below 1/mi^2 to reduce winter tick abundance and the frequency of epizootics, and improve the health of the moose population. However, if tick impacts are not reduced, the moose density may need to be reduced to 0.75/mi^2. Ultimately, the goal is to have healthy moose, with fewer individuals dying each year from heavy winter tick loads.

Moose density objectives throughout the rest of moose range in Vermont have been set at 0.5 moose/mi^2. This lower objective reflects ecological limitations on moose densities in these regions due to limited young forest habitat, higher deer densities, and a warming climate. Moose densities in these WMUs have never reached 1/mi^2.

Hunting thresholds have also been established for each WMU at 75% of the density objective. The Department will only consider hunting moose when densities exceed this threshold. This ensures that the other values of moose are maximized at these lower densities.

Population Status

Regional Perspective

Moose populations have been declining across the southern portion of their geographic range in North America. While the specific causes of this decline vary regionally, all are at least partly related to climate change. In northern Vermont and other northeastern states this decline has been attributed to increased parasitism resulting in increased mortality and decreased birth rates. Recent studies in Vermont, New Hampshire, and Maine have concluded that winter ticks are the primary cause of moose mortality across their core range in New England (Musante et al. 2007, 2010, Bergeron et al. 2013, Dunfey-Ball 2017, Jones et al. 2017, Ellingwood et al. 2019, Jones et al. 2019, DeBow 2020), with some moose hosting an astonishingly high number of ticks (>50,000/individual; Jones et al. 2019).

Importantly, population-level effects of winter ticks have only been observed in the region's core moose range (Figure 1), where moose densities have been high enough to support large numbers of winter ticks. Winter ticks are a host density dependent parasite and thrive during times of elevated host populations (Samuel 2004). Core moose range (continuous red area in Figure 1) in New England has a colder climate with longer winters, low deer densities, large blocks of forest, and an abundance of young forest created by commercial timber management which allows it to sustain higher densities of moose than more peripheral parts of their range. In Vermont, core moose range is primarily found in WMU E, located in the northeast corner of the state.

Although winter ticks can be found on moose throughout the region, they are not impacting moose populations across the more-peripheral parts of their range in the northeast, including the rest of Vermont, due to lower moose densities limiting tick abundance. Moose numbers in other parts of Vermont outside of the Northeast Kingdom have declined, but the main cause of this decline is not winter ticks. Rather, this decline is likely due to a combination of increased parasite loads (particularly brainworm linked to increasing deer populations), declining quantity of young forest, and fewer moose in core moose range to migrate out to these other regions.

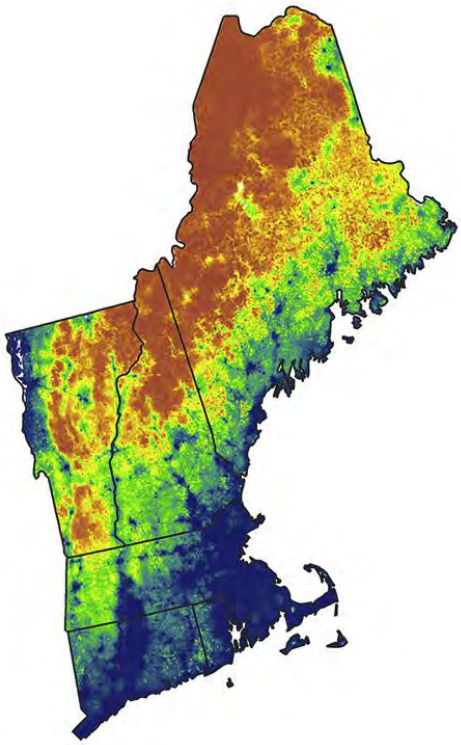

Figure 1. Estimated probability of occurrence of moose in the New England region from Pearman-Gilman et al. 2020.

Population Health

Many factors affect the health of individual moose and the overall population. These include diseases and parasites (e.g., winter ticks and brainworm), habitat quality, and environmental conditions. Ultimately, how fast a population is able to grow and how resilient it is to additional sources of mortality is determined by how long individuals can be expected to live (i.e, the survival rate) and how many new individuals are added to the population each year (i.e., the birth rate).

During 2017–2019, 126 moose (36 adult cows and 90 calves) were fitted with GPS radio collars in WMU E to monitor survival and birth rates. Results of this research clearly show that chronic, high winter tick loads have caused the health of moose in WMU E to be poor. Birth rates were low and overwinter calf survival was poor (48%). Although observed adult female survival remained relatively good, it was lower than expected for a population without major predators (Table 1). Survival of breeding age females has significant influence on population trends in long-lived species like moose.

Survival and birth rates observed during 2017–2019 from collared moose were lower than those observed in WMU E during 2004–2010 (Table 1). At that time, the Department was actively reducing the moose population in this area amid concerns about reduced physical condition due to over browsing of habitat caused by overabundant moose. In a healthy moose population both survival and birth rates would be even higher.

Table 1. Moose survival and birth rates during 2004–2010 and during 2017–2019 in WMU E. Numbers from 2004–2010 were derived from biological data collected from harvested moose. Numbers from 2017–2019 were observed from radio-marked study animals.

	2004–2010	2017–2019
Birth rates		
Yearling	0.12	0.08
2+ years old	0.86	0.67
1st year calf survival	0.63	0.34
Adult female survival	0.78 (≥0.85[1])	0.85

[1] *Estimated adult survival in the absence of hunting. Average of 130 adult females harvested annually during this period.*

Moose are not currently limited by habitat in this region (Dunfey-Ball 2017). There is no evidence that moose are currently over browsing their habitat, and there is enough available habitat to support the current population. Based on comparable research in New Hampshire and Maine during 2013–2017, it is possible that Vermont moose experienced epizootic years in 5 out of the last 6 years. Multiple years of heavy parasitism may have weakened the overall health of adults in the Vermont population and thus made them – and their calves – more susceptible to the effects of parasitism.

Population Estimates

Regional moose densities in Vermont are estimated from moose sighting rates reported by deer hunters during the November rifle season. This approach was originally developed by the New Hampshire Fish and Game Department by relating sighting rates to moose densities determined by aerial surveys. Aerial surveys conducted in Vermont allowed this model to be modified to fit Vermont sighting data. Sighting rates often vary from year to year due to factors other than the number of moose (e.g., weather conditions), so a 3-year rolling average is used to smooth out some of this variation.

Based on moose sighting rates by deer hunters, the 2019 (2017–2019 rolling average) density estimates for WMUs E1 and E2 are 1.99 and 1.70 moose/mi^2, respectively, which are above the upper density objectives established in the *2020-2030 Big Game Management Plan* (1 moose/mi^2). Populations in all other WMUs remain below established hunting thresholds (Table 2).

Sighting rates have been notably higher during the past two years in WMU E, resulting in an increase in population estimates (Figure 2). It is unlikely that the moose population in that region is actually increasing. Over the longer term, sighting rate trends indicate the population has likely remained relatively stable over the past 8 or 9 years (Figure 2).

Based on the ratio of collared moose to non-collared moose observed by researchers during the past 3 years, the Department is confident that the current moose density in WMU E is at least 1 moose/mi^2, and likely higher.

Table 2. Moose density estimates based on sighting rates by deer hunters and density objectives and hunting thresholds established in the *2020-2030 Big Game Management Plan*, by WMU. Density estimates are based on average sighting rates during 2017–2019.

WMU	Habitat (mi^2)	Moose Density (moose/mi^2)			Population Estimate	
		Objective	Hunting Threshold	Current Estimate	N	(80% CI)
A	35	n/a	n/a	0.04	1	(1–2)
B	420	n/a	n/a	0.07	30	(23–37)
C	351	0.5	0.38	0.33	116	(93–138)
D1	449	0.5	0.38	0.25	111	(90–131)
D2	346	0.75-1	0.56	0.43	147	(123–172)
E1	306	0.75-1	0.56	1.99	609	(543–675)
E2	326	0.75-1	0.56	1.70	554	(484–623)
F1	108	n/a	n/a	0.08	8	(4–12)
F2	158	n/a	n/a	0.04	7	(4–10)
G	363	0.5	0.38	0.05	20	(14–25)
H	466	0.5	0.38	0.33	152	(127–177)
I	407	0.5	0.38	0.23	92	(72–113)
J1	464	0.5	0.38	0.17	77	(62–93)
J2	633	0.5	0.38	0.18	114	(90–137)
K	359	n/a	n/a	0.02	8	(7–9)
L	346	0.5	0.38	0.24	82	(52–111)
M	424	0.5	0.38	0.27	115	(82–147)
N	275	n/a	n/a	0.03	7	(5–9)
O	478	n/a	n/a	0.03	16	(12–20)
P	447	0.5	0.38	0.13	56	(38–75)
Q	219	n/a	n/a	0.03	7	(5–10)
STATE	**7380**				**2329**	**(1931–2726)**

The results of the moose study clearly show that the current density of moose in WMU E has been sufficient to sustain winter ticks at high levels that are negatively affecting moose health and survival. Winter ticks are a host dependent parasite with moose being the primary host responsible for major fluctuations in winter tick densities. Therefore, reduction in moose density decreases the number of available hosts which in turn decreases the number of winter ticks on the landscape. Moose population reduction will be necessary to break the winter tick cycle and improve the health of moose in this region.

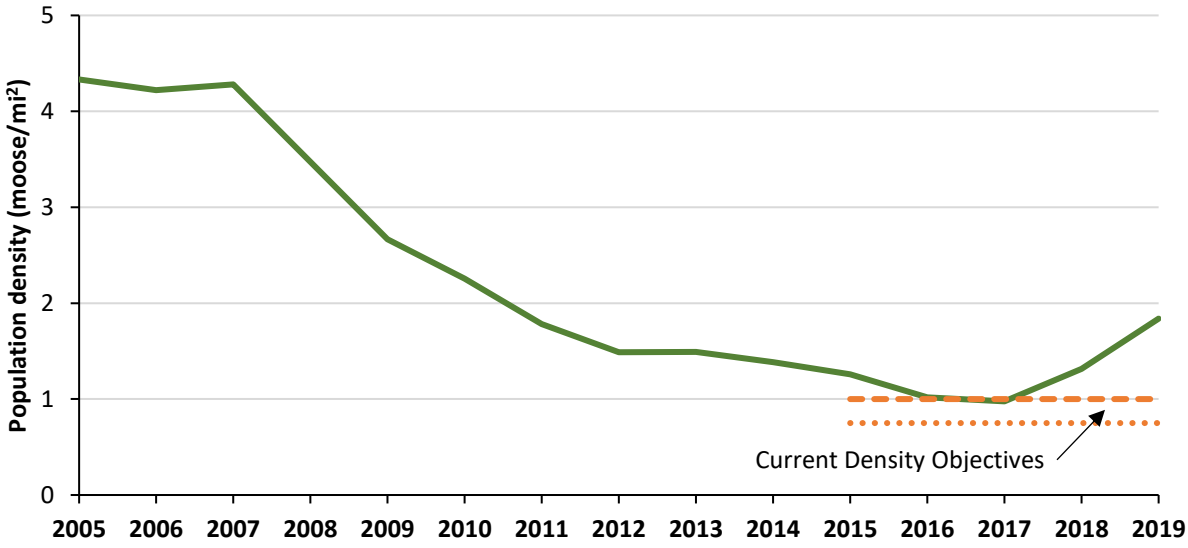

Figure 2. Moose density estimates in WMU E during 2005–2019. Estimates are based on 3-year average moose sighting rates reported by deer hunters.

Population projections using survival and birth rates from the Vermont moose study indicate the population in WMU E should decline by 4-5% per year over the next decade in the absence of hunting (Figure 3). These estimates are based on 3 consecutive years of the heavy tick infestations, and, therefore, presumably represent a worst-case scenario. The observed population trend, based on moose sighting rates by deer hunters, suggests the population is not currently declining, or is declining much slower than 4-5% per year.

Without intervention to reduce the moose population, high tick loads will continue to impact the health of moose in WMU E for the next decade and beyond. The resulting chronic stress, low birth rates, and high calf mortality may cause the population to decline over time on its own from the effects of winter ticks. However, uncertainty surrounding how often, and heavy, future tick infestations would be means that the moose population in WMU E might not decline over the next decade. Tick infestations are not only dependent on moose densities, but also on climate, including temperature, wind, snow, and ice. If climate conditions produce a few years where moose get a reprieve from high tick infestations, then moose populations could remain stable or even increase over time. In this way, the moose population could linger at densities that perpetuate heavy tick loads and unhealthy moose for the foreseeable future.

To account for notably higher sighting rates in 2018 and 2019 that could be due to environmental factors such as weather, population projections and this harvest recommendation are based on a more conservative population estimate using a 5-year average. Using this 2014–2019 average population estimate of 830 moose (1.3 moose/mi^2), survival and birth rates obtained from collared moose, and continued high tick loads every year, tick-induced population declines would take 7 years to reach 1 moose/mi^2 and 13 years to reach 0.75 moose/mi^2 (Fig. 3). This presumably represents a worst-case scenario, and the fastest tick-induced declines we could expect. Further, detrimental effects on moose health will remain for several years after moose densities are reduced to levels that no longer support high tick loads. Even under this worst-case scenario, taking no management action will perpetuate the

current, unhealthy state of the moose population in WMU E for many years and would be inconsistent with the Department's established objective of managing for a healthy moose population. Importantly, 65% of Vermont residents support maintaining a smaller moose population through hunting if it reduces the number of moose that die each year from winter ticks. Only 15% oppose this approach (Responsive Management 2019).

Reducing winter tick populations directly, either by treating moose or the landscape with some form of acaricide or fungal pathogen, 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.

Harvest Recommendation

The Department recommends issuing 55 either sex hunting permits in WMU E for the 2020 hunting seasons. This is expected to result in the harvest of 33 moose (21 bulls, 10 cows, 2 calves). Approximately 60% of permits are recommended to be allocated to WMU E1 due to higher moose densities. Allocations to the auction, special opportunity, and veterans are set by statute. Approximately 20% of permits are allocated to the archery season, based on the percentage of total applications that were for this season in recent years. Permit breakdown by WMU, season, and special allocation is provided in Table 3.

Table 3. Recommended 2020 moose hunting permit allocations by season and WMU.

	Total	E1	E2
Regular Season	34	24	15
Veteran[1]	5		
Archery Season	10	6	4
Auction[2]	3	choice	
Special Opportunity[3]	3	choice	
TOTAL	**55**	**30-36**	**19-25**

[1] *Veteran permits are for the regular season.*

[2] *Auction permit winners have choice of season and WMU.*

[3] *Special Opportunity Permits allow choice of season and WMU.*

Using the more conservative 2014–2019 average estimated population of 830 moose in WMU E (E1 and E2 combined), this permit allocation would reduce the population below 1 moose/mi^2 in 4 years and reach 0.75 moose/mi^2 in 7 years, assuming the same permit allocation and hunter success rates each year and no improvement from the current observed birth rates and survival rates (Fig. 3). At the minimum population estimate of 632 moose (1 moose/mi^2) in WMU E, it would take 4 years at this permit allocation to reduce the population to the lower density objective of 0.75 moose/mi^2.

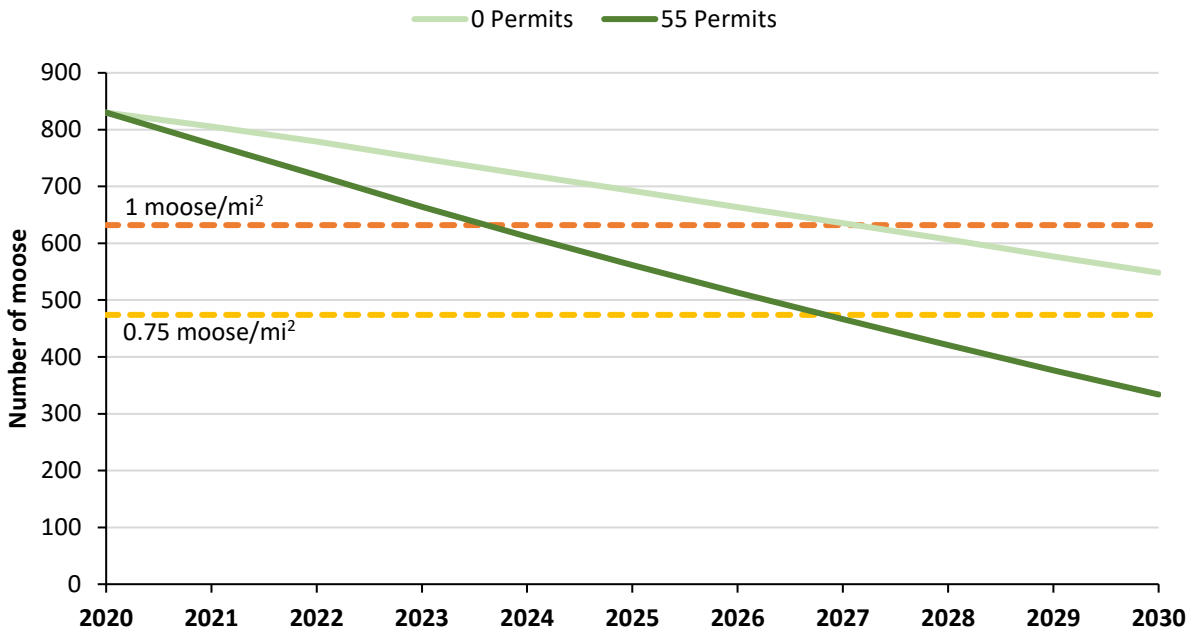

Figure 3. Moose population projections in WMU E based on the 2014–2019 average population estimate and survival and birth rates from radio-marked moose, with 0 permits and with 55 permits. Projections assume consistent harvest every year and no improvement in survival or birth rates.

This permit recommendation represents a significant change from very low permit numbers in recent years and a general declining trend in permit numbers over the past decade. Lower permit numbers during the past 3 years were reflective of lower population estimates at the time and the Department's desire to take a very conservative approach until results of our moose survival study were available. It now appears that moose densities in WMU E are greater than they were believed to be in recent years, and the results of the moose study clearly demonstrate that moose in WMU E are in poor health and identify the cause as winter ticks. It is now clear that reducing the moose population to reduce the number of winter ticks is our best option to improve the health of moose in that region.

This permit recommendation is a conservative first step to addressing winter tick impacts on moose in WMU E. Given the poor health of the moose population and a clearly identified cause, some action to address this issue is warranted. Ideally, moose health should be improved as quickly as possible. However, low survival and birth rates observed from Vermont moose, and broader, regional declines in moose populations justify a cautious approach at this time. Management of moose in WMU E and throughout Vermont must continue to be adaptive and respond to new information as it becomes available. If continued monitoring indicates that health, survival, and birth rates remain poor, and the moose population in WMU E remains above the objective, a more aggressive approach may be necessary to improve the health of the region's moose.

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Deer & Moose Online Public Meetings
Comments, Questions & Responses

April 13, 2020

Moose Questions:

Any consideration to open up moose hunting in the green mountains (other WMUs) to reduce moose densities?
Yes, this was considered. However, moose densities in all WMUs except E are currently below hunting thresholds (75% of the density objective) established in the *2020-2030 Big Game Management Plan*.

Has using hunting as management been considered in regard to the brainworm that affects moose and deer?
Yes. The best, and perhaps only way to reduce the risk of brainworm infection in moose is to reduce deer density. Deer are the normal carriers of brainworm but are unaffected because they evolved with the parasite. As a result, higher deer density results in more brainworm on the landscape and a greater chance of moose becoming infected. Research has shown that moose populations can decline from brainworm-related mortality when deer density exceeds 10 deer per square mile. This was an important consideration for setting deer density objectives in several WMUs.

What is the projected success rate/harvest of the 55 moose permits?
The expected success rate is 65 percent, based on past success rates in WMU E. The Department expects approximately 33 moose will be harvested in 2020.

Moose Comments:

Would like to see veterans have the choice to hunt moose during the regular or archery season.
Current Fish and Wildlife Board rule (10 App. V.S.A. § 33) states: *"…eligible Vermont veterans will receive special priority drawing in the regular moose season lottery drawing."*

Deer Questions:

Why is the Fish & Wildlife Department proposing a 4-deer limit? If there is such a small number of hunters taking 3 deer, why increase it to 4? This change is intended to allow a few effective hunters, who are interested in harvesting additional antlerless deer, to do so in the areas where it is most needed. While this change may only have a small impact on the overall deer harvest, the Department does not see a need to limit individual hunters willing to harvest more antlerless deer when more deer need to be harvested in some areas.

This change is also intended to work with the new Expanded Archery Zones in developed areas around Vermont's major cities and towns. While none of these zones have been established yet, the

Department is currently working on this. The increased bag limit will encourage additional archery antlerless harvest in these areas.

Was there any consideration to allow elderly hunters to hunt youth/novice weekend? Yes, this was considered. The Department is interested in providing opportunities to keep older hunters hunting as long as they can. This and other changes to help older hunters will be important considerations for future regulation changes.

Deer Comments:

A note on comments about the deer rule changes – these changes were passed by the Fish & Wildlife Board in 2019. The Department and Board agreed to make no additional changes to deer hunting regulations for at least 5 years. Any comments on these changes will be considered, as appropriate, during development of future regulation changes.

Opposed to the new 1-buck limit.

Would like to see the data published that led to all the new changes for the deer season. The *Comprehensive Deer Management Evaluation Final Report* is available on the Department website and covers most of the data and analyses that informed development of the deer rule changes.

Likes the idea of moving youth weekend up and pairing it with novice season but wants to see youth weekend moved back one week later.

Likes that youth weekend was moved up but does not agree with having the novice season the same weekend as youth weekend, wants those to be separate seasons.

Would like to see the youth and novice deer hunting weekend together and not allow elderly deer hunters during this weekend.

Concerned about how many antlerless deer will be harvested with the extra antlerless season and does not agree with all of the archery season modifications. See note in next comment

Afraid of how many does will be killed with the new antlerless season and increased opportunities/expand archery season, crossbow use, etc. The Department is currently developing the 2020 antlerless harvest recommendation and is planning on increased antlerless harvest during archery season. One of the primary reasons behind some of the rule changes is to allow for increased antlerless harvest when and where it is needed. This is a common and understandable concern. However, the primary factor limiting the archery harvest is the number of hunters, not the length of the season or the bag limit. Crossbow adoption among younger hunters is likely to be slow and will have only a minor impact on the harvest from slightly higher success rates. The recruitment of new archery hunters, or reactivation of former hunters, will have a greater impact on the harvest, but is likely to occur over several years, not all at once. Importantly, the Department still controls the total antlerless harvest by limiting the number of antlerless permits that are available. Given the current status of the deer

population in most areas and the many realities of deer hunting in Vermont, the risk of overharvesting antlerless deer is almost zero.

Noticed an increase of coyotes in his area (Hyde Park).

No mention of predators and their effect on deer and moose populations.
Biologists and managers are more interested in total annual mortality (i.e., what percentage of animals die each year), than each individual cause of mortality. Total mortality is relatively easy to measure or estimate from age structure data and can then be easily divided into hunting and non-hunting causes. It is very difficult to determine how much of that non-hunting mortality is from predation or any other single cause (e.g., roadkill, starvation, disease, poaching, etc.), and it's not necessary to manage populations. That said, below is a synopsis of what is known, based on our data as well as research from other states.

For moose, adult moose in the northeast essentially do not have major predators. We have documented a black bear killing an adult moose, but this is extremely rare. Black bears are a known predator of moose calves, but this does not regulate the moose population. An adult cow moose can often fend off a bear attack and effectively defend her calf, and the risk is enough to deter most bears from even trying.

For deer, research has shown that about half of fawns will die during the first couple months of their life. This is true in areas with or without predators. The difference is whether most of them die of starvation or predation. In other words, fawn predation is compensatory – that is, it does not add to total mortality but instead replaces other causes.

Recent research is finding that this is also true of coyote predation on adult deer, particularly during the winter. Predation increases during severe winters, when deep snow limits deer movement, but it has essentially replaced starvation as the primary cause of death. In mild winters, predation of adult deer is minimal. In the end, the non-hunting portion of mortality (from predation and all other causes) in Vermont is strongly related to winter severity and is therefore predictable and accounted for in management decisions.

To be clear, predators can occasionally impact local deer herds, but they do not limit deer populations at larger scales like a wildlife management unit.

Would like to see the Department provide information on habitat/forest management and how it benefits not only big game, but also birds and small game.
The lack of young forest habitat is a major factor limiting populations of many wildlife species, both game and non-game. While the Department is responsible for managing those species, 85 percent of Vermont land (the habitat for those species) is privately owned. Because of this, the Department devotes a substantial amount of time and resources to helping private landowners manage wildlife habitat on their property. Much information on this and other topics of interest to landowners is available on the Department website at the link below:
https://vtfishandwildlife.com/learn-more/landowner-resources

April 15, 2020

Moose Public Comments / Questions

Comment: Thanks for making this meeting work. A few years ago, I drew a moose permit and was unsuccessful. I see a loss of habitat in the Northeast Kingdom and the impact on moose is concerning.

Question: Can active forest management in the Northeast Kingdom (or the lack of) as well as large scale commercial maple production have a declining effect on the moose population when habitat is so important? Wardens have been dispatched to kill moose entangled in sap lines.
Forest management is an important factor that affects the quality of moose habitat, and it has an important role in the story of moose in WMU E. In the 1980s and 90s, the region was intensively logged. Much of this was focused on softwood stands impacted by a spruce budworm outbreak in the 1980s. This logging created abundant young forest habitat and led to a substantial increase in the moose population. When ownership of the land changed in the late 1990s, and with much of the merchantable timber removed, forest management activity slowed considerably over the next 10-15 years. Habitat quality declined as the young forests matured, but the moose population was still increasing. This resulted in moose causing significant damage to their habitat by overbrowsing their diminishing food supply. This damage, and the declining physical condition of moose, are why the Department intentionally reduced the moose population in WMU E in the late 2000s. With more merchantable timber on the landscape, forest management activity has increased substantially in WMU E over the past 5 years, and habitat quality is not believed to be a major factor currently limiting the moose population.

With the high-density moose population came an increase in winter ticks. Indeed, the high tick loads and their impact on moose today is largely an artifact of past high moose density. Moose density simply has not been reduced enough to break the cycle of heavy tick loads.

The Department is concerned about the potential impacts of large-scale maple sugaring operations on moose as well as other wildlife. Current statutes do allow sugar makers to kill moose doing damage to sap lines, but this must be reported to a Game Warden. Only one such case been reported since 2015.

Question: What are the milestones for whether a moose hunting strategy is working?
The Department will monitor several metrics to determine if tick impacts have been reduced, and, more importantly, if moose health is improving. This will include monitoring the number of calves per cow in the summer by directly observing collared cows while collars are still functioning and most likely the use of trail cameras. It will also include monitoring ovulation rates, body weights, and tick counts on harvested moose. These measures have been collected by the Department for many years, and therefore provide important long-term trend information and allow for comparison to previous years.

How will the public know it is working?
The Department will report on these measures annually.

When will you close moose hunting?
Moose hunting thresholds have been established in the 2020-2030 Big Game Management Plan at 75% of the density objective in each WMU. If the estimated moose density is below that threshold for 2 consecutive years, no moose hunting permits will be issued. Similarly, density must exceed that threshold for 2 consecutive years before the Department will consider issuing permits. In WMU E, this threshold is 0.56 moose per square mile (75% of 0.75). All other WMUs have moose densities that are currently below their respective hunting thresholds, which is why the Department is not recommending any permits in those areas.

Are you concerned that hunting kills healthy moose and may deplete the population?
Most moose are relatively healthy in October, during the moose hunting season. While it might be helpful to target individuals with the highest tick loads, this is not possible to determine visually. This is particularly true in October because the ticks are just getting on the moose at that time. Additionally, nearly all moose in WMU E will end up carrying large numbers of winter ticks. The only practical way to reduce winter tick abundance is to reduce the number of hosts (moose) on the landscape. Moose health will not improve until winter tick abundance is reduced.

Question: I appreciate the presentation and understand the study but have a question about the correlation between density of moose and the impact on moose mortality? If winters ticks are a single host parasite how is that working against the moose?
Winter ticks are a single-host tick, meaning they complete their entire life cycle on a single host. This is different from the ticks people are most familiar with (black-legged ticks and American dog ticks), which drop off their host after a blood meal and infect multiple hosts over the course of their life cycle. Winter ticks find a host in the fall and spend the winter on the animal before dropping off in the spring – hence the common name, winter tick.

Winter ticks kill or weaken moose by sheer numbers. A single moose can carry tens of thousands of ticks. The irritation from all those ticks causes moose to rub their hair off in an attempt to dislodge the ticks, which can lead to hypothermia. More importantly, the blood loss caused by such high numbers of ticks causes anemia and often death in smaller individuals like calves.

While winter ticks can be found on other animals, those animals are better groomers and may only carry a few dozen ticks. Moose are notoriously poor groomers, presumably because they did not evolve with external parasites like ticks. Since moose can carry so many more winter ticks than other potential hosts, the density of moose on the landscape is the primary factor affecting winter tick numbers.

At lower moose densities, fewer female ticks are deposited on the landscape to lay eggs, resulting in fewer tick larvae the next fall. Additionally, the likelihood that a moose will wander by a waiting (questing) tick larvae is reduced. The larvae that fail to find a host die and each moose carries fewer ticks, which maintains lower tick numbers in subsequent years. Lower moose density results in lower tick loads, which results in healthier moose and less mortality.

Additional information on winter ticks and moose can be found in the Moose Management FAQ document on the Department website.

Comment: I am a lifelong Vermonter and now see bears frequently. I am not pleased with the current bear season.

Question: Has anyone done research on bears and if the increased bear population has an impact on moose calf mortality?
Please see response below on black bear predation of moose.

Comment: I appreciate the Department hosting a zoom meeting and think that even though these are being done as a result of COVID-19, we might want to do these as a regular course as a way to get access for people around the state given weather, availability, etc.

I have a camp in Brunswick and have noticed a definite decline in the moose population. We haven't seen too many tick infested moose but are seeing more bears.

Question: Could it be the combination of bears and tick impacts that are killing moose?
Adult moose in the northeast essentially do not have major predators. We have documented a black bear killing an adult moose, but this is extremely rare. Black bears are a known predator of newborn moose calves, but this does not regulate the moose population. An adult cow moose can often fend off a bear attack and effectively defend her calf, and the risk is enough to deter most bears from even trying. Additionally, while bear numbers have increased in areas where more people live, numbers have remained much more stable in the more remote, mountainous, heavily forested regions of the state where moose are most common.

Question: Does the Department give any consideration to elderly hunters in their 70's and 80's that have applied for years and never received a moose permit? Can we give elderly people more opportunity to draw a moose permit?
Since 2006, the Department has used a bonus point system, where hunters accrue additional chances for each consecutive year they apply for a permit. The Department and Fish and Wildlife Board will consider this suggestion if changes to the lottery process are made.

Comment: I really appreciate this meeting and it sounds like a lot of info informing the moose population is from hunter surveys. I work for VELCO and in the last 3-4 aerial patrols we have not seen moose or sign of moose.

Question: How is the population data collected for moose? Where is that data coming from and how accurate is it?
Moose densities in Vermont are estimated using a model that is based on moose sighting rates by rifle season deer hunters. Since sighting rates can fluctuate from year to year for reasons other than changes in moose density (e.g., weather), each year's density estimate is based on a 3-year rolling average of moose sighting rates. The model (regression equation) that converts a moose sighting rate into a density estimate was originally developed in New Hampshire by relating sighting rates by deer hunters to moose density estimates obtained from aerial surveys. Aerial infrared surveys conducted in Vermont in WMUs E1, E2, and D2 during 2011-2014, allowed the Department to modify the model to better fit Vermont data.

Biologists are most interested in population trends, and this model appears to provide an accurate index of population trends. While there is a bit more uncertainty around the exact density estimates provided by the model, biologists in both Vermont and New Hampshire believe it produces reasonably accurate estimates as long as samples sizes for deer hunter sighting rates are adequate.

For WMU E specifically, in addition to this model and past aerial surveys, we can also draw inferences from the collared moose research. Estimating moose density was not a focus of this study, but researchers spent significant time in the area over several years while monitoring moose on a daily basis. Based on the observations of field researchers and Department staff involved in this project regarding the proportion of moose in WMU E that were collared, the Department is confident that the moose density in WMU E is at least 1 moose per square mile.

Deer Public Comments / Questions

Comment: I have concerns with one buck with regards to the potential of abuse (i.e. people hunting on other people's tags).

Question: Given the small number of hunters who take more than one buck why does it matter to go a one buck limit?
The one buck annual limit will reduce the buck harvest rate and promote more older bucks. In addition to the bucks that are directly saved because hunters can't shoot two anymore, a one buck limit will encourage many hunters to pass on opportunities to harvest young bucks early in the season because they don't want to be done buck hunting. In some WMUs this reduced buck harvest will eliminate the need for an antler restriction, and in other areas it will allow for further increases in the number of older bucks.

The one buck annual limit also encourages hunters to harvest antlerless deer instead of bucks. Vermont hunters are much more focused on bucks than hunters from most other states, which creates some challenges for deer management. While there are many valid reasons for the focus on bucks, shifting some of it to antlerless deer is a necessary part of deer management in a future with fewer hunters.

Comment: My wife and I relocated to Vermont from New Jersey last fall. I just completed hunter education program and am trying to learn hunting for the first time. As a new hunter I'm excited to participate in novice weekend and would like to see youth and novice weekend continue to be reserved for just youth and novice hunters.

Question: Are there any mentor match ups systems the Department has in place to connect new hunters with mentors?
Not currently. Unfortunately, there are liability issues which complicate the Department providing such a service. This is a great idea, and the Department is looking into the best ways to match new hunters with experienced mentors.

Comment: Thanks to the Department for doing what they are doing including the Zoom meeting. It's greatly appreciated. I live on the border of WMU N and P, own an archery shop, and am a big game reporting station.

Question: How is the Department going to deal with people shooting deer in one zone and reporting it in another when there is a difference between regulations with different units?
Hunters are now required to return to the kill site with a warden upon request. Ultimately, it is impossible to completely prevent bad behavior and the Department must rely on the fact that the vast majority of hunters are honest and ethical and will follow the rules. Hunters also need to police themselves. If you know of or suspect a violation, report it to a warden.

Is the Department planning on offering a crossbow course in Vermont like archery and rifle training?
There is now an increased emphasis on crossbows in the bowhunter education course.

Comment: I commend the Department on the new deer rule changes. I have a concern that there are so many changes at one time that it will be hard to tell what the benefit of each change is.

Question: How can we tell what elements of the rule changes are working and what aren't?
Deer hunting regulations work collectively, with each individual season or regulation affected by every other one. The effect of any one regulation by itself, if it could be implemented separately from everything else, may be very different from the effect of that same regulation working in combination with others. What matters most is how all the regulations work together. While it may not be possible to determine how much of the increase in the archery harvest is due to the longer season, versus the allowance of crossbows, versus the increased bag limit, that is okay. What matters is the total change. That said, by analyzing harvest and license data the Department should be able to infer which changes had the greatest impacts and which had only minor impacts. Importantly, the Department is confident it will be able to identify any significant issues that may need to be addressed.

Question: Does the Department think timber harvesting in the national forest will help moose and deer?
Yes. Lack of young forest is a major factor reducing habitat quality for these and many other species across most of Vermont, particularly in the southern green mountains.

Comment: I hunt in Chittenden County near the Northeast corner and have noticed a big coyote increase in the 75 acres that I hunt.

Question: Are there any studies on the mortality of fawns and calves from coyotes? I realize they probably would not take down a healthy adult, but they could affect the young.
For deer, research has shown that about half of fawns will die during the first couple months of their life. This is true in areas with or without predators. The difference is whether most of them die of starvation or predation. In other words, fawn predation is compensatory – that is, it does not add to total mortality but instead replaces other causes.

Coyote predation of moose calves is rare due to maternal aggression by cow moose and the relatively large size of moose calves.

Question: With the loss of license revenue from lower hunter numbers would the Department consider an "earn a buck" tag if you harvest a doe first?
Yes. This was considered during development of the new deer hunting regulations, but it was decided that it would be too complex at this time amid all the other changes. It will be considered in the future.

Comment: I hunt all three deer seasons and I have concern with the one buck limit. If I take a buck in archery, I would not be able to hunt rifle season. That is a problem for me. I realize I have a choice to take a doe, but want an opportunity to be able to shoot two bucks in this state.

April 16, 2020

Moose Public Comments / Questions

Comments: Thanks for all of the work and for the data. It's obvious we are at southern end of moose territory and I support the implements to reduce the moose population given the winter tick research results. I have no additional strategies and suggest increasing moose habitat. I used to work for fish and wildlife and the forest service in Colorado and when I moved back to Vermont there were plenty of moose and permits and I'm upset to see tick impact. Anything we can do to lower the current moose population would be best.

Comments: Thanks for doing this meeting and for all of the work. This is my second session. I tuned in last night as well and have had a chance to think about the proposal and talk with others. I am not a moose hunter.

Question: With the proposal of reducing the moose population through issuing permits to make fewer moose for ticks will there remain more ticks for fewer moose and the problem get worse?
No. Winter ticks are a single-host tick, meaning they complete their entire life cycle on a single host. This is different from the ticks people are most familiar with (black-legged ticks and American dog ticks), which drop off their host after a blood meal and infect multiple hosts over the course of their life cycle. Winter ticks find a host in the fall and spend the winter on the animal before dropping off in the spring – hence the common name, winter tick.

While winter ticks can be found on other animals, those animals are better groomers and only a few ticks will make it through their entire lifecycle without being dislodged from the host and dying. Moose are notoriously poor groomers, presumably because they did not evolve with external parasites like ticks. As a result, moose can carry far more winter ticks than other potential hosts, and the density of moose on the landscape is the primary factor affecting winter tick numbers.

Questions: How does the lower density of moose improve moose breeding and genetics?
Throughout most of their range, moose exist at densities well below the current density in WMU E. They are very efficient at finding mates that are sparsely distributed over large areas. It is important to maintain enough bulls to ensure that all cows can be bred during their first estrus cycle. The ratio of bulls to cows is currently well above the level that would be concerning. It would take very intensive bull-only hunting to skew the sex ratio enough to impact breeding.

Genetic diversity is an important consideration in moose management. Moose in the northeast and throughout North America have relatively low genetic diversity. This is a reason the Department is recommending reducing the moose population over several years, rather than all at once. This helps to minimize the risk of unforeseen impacts to genetics or breeding ecology.

Question: Why does the Department allow predator hunting in Vermont when predators are more efficient at killing sick and injured animals while hunters kill healthy animals?

The Department takes its mission of fish and wildlife stewardship very seriously and staff are driven by our overall Mission: The conservation of fish, wildlife, plants, and their habitats for the people of Vermont. We strive to manage all wildlife species, including predator species, according to these overarching principles, as well as, our regulatory and statutory guidance. To that end, the Department values the role predators play in maintaining healthy and dynamic ecosystems and endeavors to promote management strategies for these species that fosters a broad public understanding of, and appreciation for, their intrinsic values while ensuring the sustainability and health of their populations. Deer and other prey evolved with predators and as such, we neither regard predators as undesirable, nor do we view them as a significant threat to healthy game populations.

We attempt to manage predators for all the values they can provide to society, from hunting and the use of their pelts to intrinsic values such as the viewing of them hunting field mice or simply hearing the night time yips and howls of coyotes. This requires balancing the interests and needs across a wide cross-section of the public while maintaining the health, sustainability, and ecological role of the population in question.

The fact that coyotes and bears for example, are animals that can easily become habituated to humans also justifies the need to manage to minimize negative interactions with people. It is unlikely that the current regulated hunting or trapping seasons will have a long-term negative effect on predator populations as many such as coyotes, respond by an increase in reproductive rates. In the end, although counterintuitive, the hunting of some of these species may actually contribute to the saving of them given that negative wildlife/human interactions influence public support for maintaining these animals on the landscape. In addition, enhancing the public's positive connection to the out-of-doors is vital to the future of conservation.

Most importantly, from a biological perspective, the Department does not feel that the current level of hunting has had a long-term negative effect on our predator populations; if we did, we would very strongly advocate for change. We focus much of our efforts on the protection of habitat as, we believe, habitat quality and abundance determines the long term sustainability of these populations. Simply put, we try to balance the wide cross-section of public values while working to ensure that the current hunting or trapping season structure does not impact the important ecological role that predators play on the Vermont landscape.

How much funding did Safari Club International contribute to the moose study?
Safari Club International Foundation contributed $124,000 to the moose study over 3 years.

Question: If we reduce the moose density to 0.5 moose/mi2. does that reduce tick density?
Yes. The density of winter ticks is directly related to the density of moose. Research has shown that winter ticks only reach problematic levels (where they have significant impacts on moose health and survival) when moose density is above 0.75 moose per square mile. Those impacts become increasingly common and severe as moose density increases above that level.

Comment: I haven't hunted moose and am not sure I'll ever get a chance.

Questions: What is going on with New Hampshire and Maine on moose as winter ticks are so close there to Vermont moose?
Moose throughout the northeast are experiencing the same issues as here in Vermont. Moose managers and researchers in this region collaborate regularly. Moose populations in northern New Hampshire and much of Maine have been similarly impacted by winter ticks, and those states are working on management approaches to deal with the issue. Importantly, while moose do regularly cross state borders, there is very little risk of moose from New Hampshire bringing large numbers of winter ticks to Vermont. Moose don't typically disperse or make large movements during the winter months when they are carrying winter ticks.

Question: With the 2020 moose permit allocation, are there going to be either sex tags or will some of the tags be bull and some cow tags?
All 55 permits will be for moose of either sex.

Deer Public Comments / Questions

Comments: I think the deer proposals are good and follows other states in expanding archery and simplifying things to one buck. Thank you. I think we will see an increase in harvest the week before rifle season starts as a result. What seems to muddy the waters is the separate seasons for youth and novice hunters.

Question: Why do we need novice or youth seasons? The current seasons offer enough opportunity already for all in my opinion. If you want to take someone hunting, go ahead and take them out. We do not need rifle and muzzleloader distinctions as there are lots of different seasons going on.
The Department is strongly committed to recruiting new hunters into Vermont's deer hunting heritage. Having these seasons provides these hunters additional opportunity to harvest a deer, which research has shown is important to maintain continued interest. Importantly, having separate seasons ensures that most experienced hunters are available to mentor these new hunters without having to give up their own hunting opportunity.

While modern muzzleloaders are far more advanced than the muzzleloaders of a few decades ago, they still have limitations compared to most rifles. The ballistics are still quite different in most cases, and, perhaps most importantly, they are single-shot. The limitations of muzzleloaders and resulting lower success rate, and the lower number of hunters, are why additional seasons and hunting opportunity can be offered without risk of overharvesting.

Comments: Back in the 60's the idea of taking four antlerless deer in the old days, people would go nuts. I trust the professionals and as a hunter I think "wow, have I seen four deer". I'm concerned landowner support will dwindle if hunters are harvesting that many deer on their land at that rate. Also, are the new regulations creating a nightmare for game wardens understanding the new

regulations (like the regulation complexity for fishing). I prefer a two-buck limit. If I take a buck in archery I don't want to miss rifle hunting.

Question: The other night a gentleman mentioned giving older hunters a better chance at drawing and hunting for moose. What about having a senior season for deer hunting; perhaps earlier before the weather gets bad? Or perhaps with the youth and novice season to give senior hunters the opportunity to go out when weather is nicer?
This was considered, but ultimately left out of the recent rule changes. The Department is interested in providing opportunities to keep older hunters hunting as long as they can. This and other changes to help older hunters will be important considerations for future regulation changes.

Questions: What is the reasoning for structuring the spikehorn law differently in different zones?
The regional antler point restriction (APR) reflects regional differences in deer density, hunting pressure, habitat, winter severity, and a variety of other factors. In areas of the state with many deer and higher hunting pressure, an APR ensures more bucks survive to older ages. In regions with fewer deer, lower hunting pressure, and large blocks of forest, many bucks escape hunters regardless and an APR is unnecessary. Having no APR in these areas allows hunters the opportunity to take what may be the only buck they see, and the one buck limit ensures that bucks still have some protection.

More information on this topic is available in the Deer Regulation Changes FAQ document.

Is the novice weekend a separate tag on a new hunter's license or is a novice hunter using a mentor tag?
This is a separate license and tag, just like the youth season.

Comment: Thank you for doing this meeting online. It's very convenient and hopefully the Department will continue it in the future. The last time I attended a bear dog hearing I had to drive to Rutland. In WMU J2 the deer population is out of balance. There are many does and fewer bucks. Anything to bring the population into balance is good.

Question: For the antlerless permit four-day season is it an additional season with same permit as late muzzleloader?
Yes. The antlerless season (antlerless-only, muzzleloader season in late October) is a separate season from the December muzzleloader season. However, the same antlerless permit can be used during either season. Each permit can only be used once, so if a hunter is successful in the early antlerless season, their permit is no longer valid and cannot be used in the December muzzleloader season.

Comment: I like the new muzzleloader season. The Department needs to do more to get less posted land by making it so landowners give permission.

Question: For archery season, if I shoot a buck I'm done. What if a change was made that if I got an 8-pointer, I could shoot another 8-pointer in rifle so I can continue to hunt in rifle season?
This is a form of earn-a-buck that was considered during development of the rule changes. Some way of allowing hunters to earn an opportunity to harvest a second buck will be considered in the future.

In Wisconsin, if DNR is short on meeting harvest quotas they will add time to the season. Is this an option?
Yes, but there are many better options. The primary issue with this approach, at this time, is that harvest reporting is not immediate because many stations still take paper reports. As a result, the Department does not know if harvest objectives have been met until well after the season is closed. The Department is hopeful that the suite of new hunting regulations will now allow antlerless harvest objectives to be achieved in every WMU.

Comment: Vermont has a real predator problem (coyotes and bears) with fawn mortality. Within two weeks of having fawns does are alone again.

Question: It used to be that if a landowner left their property open they could take one deer. Does that still exist?
10 V.S.A. § 4253 states:
"(a)A resident owner of lands, his or her spouse, and their minor children may, without procuring a license under this chapter, take fish from the waters therein, shoot pickerel, and take wild animals or wild birds therein subject to the provisions of this part.
(b) A nonresident owner of lands, his or her spouse, and their minor children, may without procuring a license under this chapter, take fish from the waters therein, shoot pickerel, and take wild animals or wild birds thereon subject to the provisions of this part, except if the lands are posted under provisions other than section 4710 of this title.
(c) As used in this section, "post" means any signage that would lead a reasonable person to believe that hunting is prohibited on the land."
Landowners hunting under these exceptions must follow all seasons, bag limits, and other restrictions. Importantly, this exception does not apply to muzzleloader antlerless permits. Landowners must obtain an antlerless permit to harvest an antlerless deer during the antlerless (early muzzleloader) or December muzzleloader seasons.

Comment: I appreciate the expertise and time that went into the presentations. I like it being online and think it works well. A suggestion would be to do it concurrent with a live meeting and do both. The Department may get more participation from the public. I really like the additional opportunity to go hunting and I need all the opportunity I can get. Although I don't see many bucks, I have been seeing bigger bucks and greater antlers. It appears that APRs are working; however, I never did consider the increase in the proportion of yearlings that are spikehorns. That's an interesting point. I'm happy about early muzzleloader as it's my favorite season; however, I am concerned about the number of does that may be harvested as a result of it. I'm happy with two does if I'm lucky enough to do that that but three might be too many.

Comment: People need to look at the information that the Department has already put out on these topics. A lot of this information is out there. Also, when there was a community land trust and there was a tax break, they could not post it. Now it is posted and deer stay on posted ground. The Department needs to help slow or stop posting of land.

Comment: I share the frustration on posted land in this state and it's occurred to me on several occasions when I find posted signs that it's hard to know the size of the posted property, what direction in runs in, and the legality of the posting. Many times, there are no names and dates on the signs and it's not legally posted but you don't want to be a bad hunter encroaching on someone's property. To remedy this we could have town clerks address this and they can determine how many signs would need to get all the borders and put stars on the borders of property so you know where you are on property. I have not posted but am a landowner and would provide more information and prevent calls to game wardens.

Comment: I live in WMU J2 and have problems with posted land. If the public helps to pay the taxes for someone then they should be able to use that land.

Question: Why can someone post their land and get a tax break?
The Use Value Appraisal program (also called "Current Use" or "Land Use") is designed to help maintain Vermont's working landscape and limit development of that land. Enrolled land is appraised for property taxes based on its value for forestry or agriculture, rather than its fair market (development) value. The primary objectives of the program are to keep Vermont's agricultural and forest land in production, help slow the development of these lands, and achieve greater equity in property taxation on undeveloped land.

In some states, this program includes a recreational component, providing a greater tax reduction if land is kept open for recreation, including hunting. The Fish and Wildlife Department has suggested a similar approach in Vermont, but Vermont's program does not currently include a recreational component. Therefore, landowners enrolled in the program may post their land without any tax implications.

Contrary to popular belief, other landowners in a town do not make up the reduced taxes paid from enrolled land. The State makes a payment to towns to cover the reduction.

Comment: I'm a forester and just tuned in and missed the presentations. Property owners are not paying property taxes for another landowner in current use. It comes out of state education funds.

(Later) I wasn't prepared when I spoke before. Thanks for all the Department has done to move forward and I hope the Department moves forward in how to train hunters to look for browse and what is happening in the woods. Hunters don't always know how to look for browse and what the impact is on the forest.

Question: When is Vermont going to allow antlerless rifle hunting? The forest is suffering.
The Department believes that recent changes to deer hunting regulations will allow for adequate antlerless harvests in all WMUs. If antlerless harvest objectives cannot be met under this new regulation structure, the Department will consider additional means of increasing the antlerless harvest. One potential option would be to allow the use of rifles during the new, early antlerless season.

Importantly, one of the biggest obstacles to managing locally overabundant deer is limited access to private land for hunters. Allowing antlerless harvest with rifles will not address that issue.

Comment: It is not a law that you have to wear blaze orange. Vermont Fish and Wildlife, please educate people that it doesn't harm your hunting or please make it a law to have at least a small amount of orange. Anything you can do to make that a requirement would be great.

Comment: Regarding the health of deer and moose, I would like to see more active habitat management. Not whole tree logging but old-fashioned logging. That would improve the health of both deer and moose and help them survive winter and predators and everything else.

Question: Every move of the new regulations is to increase the buck age harvested. What is the concrete goal for bucks / age goals? What's the quantitative benchmark we are trying to reach?
The Department's goal is to maintain or improve the opportunity to harvest a mature buck. The overarching objective is to maintain at least the 2018 proportion of mature bucks (3+ years old) in the population (not the harvest) 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. In other words, because of the antler restriction, the buck harvest is not representative of the buck population. Therefore, the simplest way to ensure the proportion of mature bucks is maintained or improved upon is to ensure that yearling bucks do not exceed 50% of the total buck harvest. That is the objective established in the *2020-2030 Big Game Management Plan.*

Comment: I appreciates the continued help to fix the technical issues so I can speak. I've been involved with dept for many years. I know and worked with many of the wardens and know Mark Scott. It was my idea for Operation Game Thief, and it took three commissioners to get it working. During Steve Wright's time there was a proclamation from Governor Madeleine Kunin that I want to share. I'll leave my cell phone number for someone to get ahold of me about this.

Attachment 4

Emails Related to the Proposed 2020 Moose Permit Allocation

Emails are generally listed in chronological order, except the emails from the same sender have been grouped together.

From: Matt Breton
Subject: Moose
Date: Saturday, February 22, 2020 8:11:16 AM

Good morning. I'm sure you're receiving all manner of emails about hunting moose. I'd like to applaud your efforts on this subject and voice my support for your recommendation to have a moose season.

Thank you,
Matt
Matthew Breton
Charleston, VT

From: Gary Mcallister
Subject: Moose
Date: Sunday, February 23, 2020 7:55:09 PM

Are you people for real? There are hardly any moose left? My god people give them a break? You put radio collars on them ,better start putting tick collars on them!!!!!!!

From: Greg Mikkelson
Subject: killing moose to save moose?
Date: Monday, February 24, 2020 8:05:16 AM

Dear ANR/FW:
You need to come up with a better solution: promoting the return of natural predators like the wolf, the cougar, and the lynx. Human hunting always has perverse effects: see attached

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From: Alice Eckles
Subject: Moose Herd and Winter Ticks
Date: Monday, February 24, 2020 8:53:39 AM

To Whom It May Concern,
We are surprised to learn of the proposal to cull the moose herd because of the high population of winter ticks. While we greatly appreciate legislature's concern for the health and well-being

of Vermont's moose population, we would like to suggest that we never save something by killing it! Please note, we are not against all hunting.

We humans have an amazing capacity to think we can control and manipulate the incredibly complex natural environment to our liking, and even though we have had a few minor successes, the current condition of the natural world strongly suggests we do not really understand the subtle complexities of nature and as a result we are just making a bigger mess of things. In reality, nature has an outstanding ability to heal itself without any human meddling. A great example is the DMZ between North and South Korea. The place was ravaged by war and is littered with land mines. As a result, people stay away from the area and over the decades wildlife has not only returned, but is thriving. In the past when we have tried killing off wildlife in an effort to solve a problem (coyote, etc.) we have simply tended to create other problems).

If you really want to save the moose herd, do everything possible to address the destabilization of the climate. Help Vermont to stop burning fossil fuels, stop building more fossil fuel infrastructure, and convert our agricultural industry to quickly adopt practices that are proven to sequester carbon back into the soil. Green House Gas emmissions are the reason the tick population is out of balance and the moose are suffering. The problem is NOT that we have too many moose. This proposed solution throws the baby out with the bath water and only addresses a symptom of a much larger issue that so far our legislature (and Governor) have failed to adequately address.

Sorry to come across so harshly, but you need to hear the truth about this situation. Plase do not sanction the slaughter of more moose. Instead double down on your efforts to start addressing out climate crisis.

Thank you for your time and consideration in is matter.

Ross Conrad and Alice Eckles
Middlebury, VT

From: Dean Percival
Subject: Ticks
Date: Tuesday, February 25, 2020 5:59:49 PM

Let’s see…eliminate the ticks to save the moose so you kill the moose to do that. Hmmmm.
Dean
New Haven, VT

From: Carol Pohlman
Subject: Moose Hunt

Date: Saturday, March 7, 2020 10:34:00 AM

We reside in Wheelock, VT. At this time we do not believe there should be any type of moose hunt available in Vermont. The reasoning for having the moose hunt does not seem plausible to us. We had moose for many years here on our property and in the area. Your reasoning for allowing a moose hunt to occur does not seem to be investigated thoroughly.
Jim and Carol Pohlman

From: Chey cArmaH
Subject: Vt moose
Date: Sunday, March 15, 2020 6:25:04 PM

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.
Hi, I am a vet tech from California that just moved to Vermont with my family and my female Western fence lizard. I live in the wooded area of Richmond and while reading about local wildlife I stumbled upon the tick issue. I am not sure if one Western fence lizard can help an entire area, but I thought I would reach out anyways. She obviously can not survive outside in this climate however she has been surprisingly Resilient to the weather without any heating devices. Please contact me if I can do anything to help.

Cheyenne Bogardus

From: Albert, Stephen D
Subject: deer season comments/questions
Date: Friday, March 27, 2020 9:28:35 AM

Please reopen the Vt. Moose season, every year.

From: Paul F. Noel
Subject: Moose Proposals
Date: Sunday, March 29, 2020 5:25:47 PM

Just watched the Deer/Moose presentations and wanted to say I fully support the recommended moose hunt for 2020.

Thank you for your time and effort in these regards
Paul
Irasburg

Note: this is a long email string.

From: Walter Medwid <wmedwid@gmail.com>
Sent: Tuesday, April 7, 2020 5:41 PM
To: Scott, Mark <Mark.Scott@vermont.gov>
Subject: Re: Moose question

Many thanks for this Mark…lots to process here. Thanks. Walter

On Tue, Apr 7, 2020 at 5:15 PM Scott, Mark <Mark.Scott@vermont.gov> wrote:
Walter

I asked Dr. Gieder, Vermont Fish & Wildlife Department's Research Coordinator, to respond to your questions. Dr. Gieder has been one of the key principle investigators working with the University of Vermont on our moose research project, as well as one of several research advisors to Graduate Student, Jake DeBow, who's Master's of Science thesis she references below. I hope you read his thesis when it is published.

Here is her response:

Detailed data on tick loads were collected through the 2017-2019 3 year moose research study at UVM by Jake DeBow. His thesis will be available in the coming weeks with full details and data on tick counts. For each moose that was captured and collared, ticks were counted along 4 x 10 cm transects on the shoulder and rump and summed as an index of total ticks on each animal. This included a total of 127 moose.

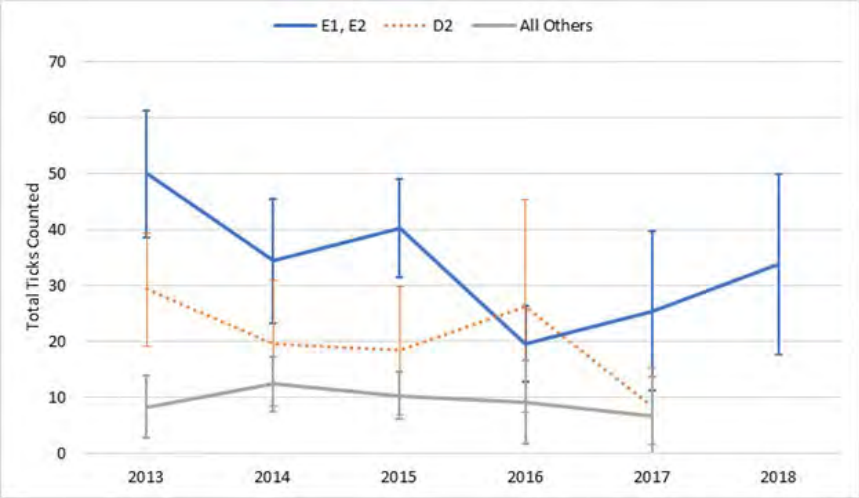
The moose research is focused on WMU E because heavy tick infestations are the main cause for population declines in that part of Vermont, and they are not the main cause of decline in the rest of Vermont because moose densities are too low to support tick infestations high enough to cause population decline. Jake's thesis clearly illustrates that winter ticks are the main cause of moose mortality in the study area. Our sighting rate data for moose indicate their densities in WMU E are much higher than any other part of the state. The density dependent relationship between moose and ticks (where high moose densities support high tick loads and lower moose densities support lower tick loads) is well supported by previous research studies:

- 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.
- Dodge, W.B. Jr., S.R. Winterstein, D.E. Beyer, Jr., and H. Campa III. 2004. Survival, reproduction and movements of moose in the western Upper Peninsula of Michigan. Alces 40: 71-85.
- Dunfey-Ball, K. R. 2017. Moose density, habitat, and winter tick epizootics in a changing climate. M. S. thesis. University of New Hampshire, Durham, New Hampshire, USA.
- Christine, H., P.J. Pekins, S. Atallah, and R.G. Congalton. 2020. Using agent-based models to inform the dynamics of winter tick parasitism of moose. Ecological Complexity 41:100813.

- Lenarz, M.S., M.E. Nelson, M.W. Schrage, and A.J. Edwards. 2009. Temperature Mediated Moose Survival in Northeastern Minnesota. Journal of Wildlife Management 73(4): 503–510.
- Lenarz, M.S., J. Fieberg, M.W. Schrage, and A.J. Edwards. 2010. Living on the edge: viability of moose in northwestern Minnesota. Journal of Wildlife Management 74(5): 1013-1023.
- 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.

The density dependent relationship between moose and ticks is modified by climate change and habitat quality, thus the thresholds of moose densities that increase the probability of heavy tick infestations vary regionally. However, moose densities outside of WMU E in Vermont are below densities that any other study has documented for significant tick-induced mortality.

Below is a chart of tick counts from harvested moose in the fall. These counts are an index of total tick loads in the spring. Error bars indicate 95% confidence intervals and sample sizes are low for D2 and all units since 2016 due to low numbers of harvested moose. D2 is right next to E1 and E2 so does sometimes have similar tick counts. All other units have consistently much lower tick counts.



We also have additional information on tick loads from spring hair loss surveys, and subjective assessments of tick loads from incidentally killed moose. Collectively, these pieces of information provide a good picture of temporal trends and regional variation in tick loads, particularly when combined with similar data collected by moose managers and researchers across the northeast.

Ultimately, our focus is not on tick loads per se, but rather the impact those tick loads have on moose – that is, increased mortality and reduced physical condition resulting in reduced productivity. As such, our focus moving forward will be to monitor physical condition and calf recruitment. If we have harvested moose to sample, that will provide valuable information on physical condition (e.g., body weights) and tick counts, both of which can be compared to past data to evaluate trends, as well as age data which we can use to estimate mortality and recruitment. Importantly, current research projects through UVM and UNH are looking at non-invasive methods of assessing tick impacts on moose in New

England. Some potential options include sampling snow urine to assess nutritional status or feces to assess stress levels. We are also discussing various options for monitoring calf recruitment, potentially using trail cameras.

Katy

Katherina Gieder
Biometrician and Research Coordinator, Vermont Fish & Wildlife, Rutland
Cell (802) 279-0335 | Office (802) 786-0055

Mark

Mark E. Scott
Director of Wildlife
Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702

802- 777-4217 – cell
802-828-1250 - fax
mark.scott@vermont.gov

From: Walter Medwid <wmedwid@gmail.com>
Sent: Friday, April 3, 2020 12:21 PM
To: Fortin, Nick <Nick.Fortin@vermont.gov>
Cc: Scott, Mark <Mark.Scott@vermont.gov>; Miller, Adam <Adam.Miller@vermont.gov>
Subject: Re: Moose question

In reviewing the proposal for a 2020 moose hunt, I am not finding data with regard to the tracking of tick loads on moose-i.e. the objective of the hunts. For example, what take-homes on tick load can be gathered from the moose in WMUs where hunting occurred recently. Specifically what were the loads in those units before the hunts and now with a couple of years under our belts, how have those loads changed?

How do tick loads in WMU E compare to the tick loads in the WMUs where hunting took place say in the 2015-2018 range?

And as far as current tick loads in WMU E, when were they last sampled to determine the average load, how many samples were examined, and what are the plans to sample, post season assuming a season is approved in order to determine the effectiveness of the 2020 season on load?

And in general what impacts have been gathered on moose vis a vis the trends in tick loads in those WMUs where the density is 1/mi sq or less? How has that data impacted the decision to open a season in 2020 in WMU E? Finally how are the degrees of loads quantified?

Many thanks for any information you can offer. Walter

On Thu, Apr 2, 2020 at 2:12 PM Fortin, Nick <Nick.Fortin@vermont.gov> wrote:
Hi Walter,

Mark forwarded your email to me for response.

In short, yes – we do get a few reports of incidentally killed moose during the fall/winter/spring with no winter ticks noted. The wardens handling these moose do look for ticks, but the fact that they find none does not necessarily mean there are none on the animal. Winter ticks are a common and widespread parasite, and we do assume that most moose will have some on them.

Best,
Nick

Nick Fortin
Deer and Moose Project Leader
Vermont Fish and Wildlife Department
271 North Main Street, Suite 215
Rutland, VT 05701
802-786-3860

From: Walter Medwid <wmedwid@gmail.com>
Sent: Thursday, April 2, 2020 8:40 AM
To: Scott, Mark <Mark.Scott@vermont.gov>
Subject: Moose question

Are there any reports of any moose not having any winter ticks on their body in Vermont? That is, is it understood that all moose will have some level of infestation? Thanks; be safe. Walter

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From: Walter Medwid <wmedwid@gmail.com>
Sent: Saturday, April 11, 2020 6:10 PM

To: Gieder, Katherina
Subject: Re: statewide moose population estimates

Many many thanks for the clarification...my reference to the foregone conclusion had nothing to do with the good work you and others are doing on these complex fronts but rather the kettle in which the good science enters a political process in which the science bumps head on with
a political process that is anything but a critical look at the data. The foregone conclusion only relates to the fact that the people who will decide this issue were selected by the department because they ascribe to the department's agenda. Would the department choose people to serve on the board that held diverse perspectives...the data clearly suggests not. At the end of the day your good work and that of others enters a process that is the ultimate antithesis of the science you bring to the table. And that is the ultimate futility in this process where public interests will not be represented at the table...only representatives of very narrow special interests will drive the day and public policy. That is the assault on democratic values in decision making on public assets that must serve the public...yet the public will be on the outside looking in as the board hearings enter a Kabuki theater process pretending to be representative of the diverse perspectives that may be held on any management issue. I've taken too much of your time ...thank you for your good work. The issue here is a wildlife governance process that is in conflict with the profession, the industry voice for agencies,DFW staff and the public. All of that has nothing to do with your work itself but rather the forum in which your work get evaluated and voted upon. The public is not at the table and the dfw is silent on that gross inequity despite its mission. Thank you again for helping me better understand the science behind this proposal.

On Sat, Apr 11, 2020 at 5:38 PM Gieder, Katherina <Katherina.Gieder@vermont.gov> wrote:
Hello Walter,

I just thought I'd quickly clarify, our population estimates are three year running averages so each year's estimate is based on 3 years. We also ensure that we consider the overall trend which incorporates 18 years of population data. I recognize the data are not perfect, no data is. That is why we really put a lot of effort into considering the overall trend, estimating yearly populations using 3 year averaged sighting rates, and incorporating confidence intervals.

I appreciate that you have concerns about spending time on a forgone conclusion. Having been a collaborator and coauthor on the UVM moose research and acting as a scientific advisor on the management decision process for 3 years, I can assure you that the harvest recommendations we presented to the Fish and Wildlife Board were a culmination of discussions that spanned several years within our department, with UVM researchers and graduate students, with moose biologists and research experts in other states, and moose researchers and biologists in other countries. This has been a discussion we have had for several years now with these collaborators and colleagues at professional wildlife research conferences, multi-state management meetings, among others. I just wanted to explain that this was not a recommendation we took lightly and consulted at great length with a wide breadth of moose experts. It's not easy to see this effort. I would be happy to elaborate on this further, and I hope it helps emphasize that this was not a foregone conclusion. Science does not provide 100% certain answers, it's complex and uncertain by nature. That is why we put so much effort into research and consultation with experts, considering our decisions within biological and social contexts, critical

thought and consideration for uncertainty, projecting different management scenarios, continuing monitoring of key factors, and recognizing that we may have to adapt our approaches according to what our continued monitoring and other ongoing research shows.

I hope this allays some of the concerns you outlined but if not, I am happy to discuss in more detail.

Best regards,

Katy Gieder

_____

From: Walter Medwid <wmedwid@gmail.com>
Sent: Saturday, April 11, 2020 4:23 PM
To: Gieder, Katherina
Subject: Re: statewide moose population estimates

Many thanks Dr. Gieder for sending this additional information. I look forward to digesting it. I continue to be concerned that we are using only one year's worth of data and that the data being used has to be on the low end of a reliability scale. Two years good; three years acceptable from the scientists I've contacted.

I did indicate to Mark that putting any more of my time into a process that has a foregone conclusion is not a good return on investment. Nonetheless I do appreciate the data you've sent and also pleased to see that there is some indicators that the population may be stabilizing if not ticking up.

Thanks and best regards. Walter

On Fri, Apr 10, 2020 at 3:22 PM Gieder, Katherina <Katherina.Gieder@vermont.gov> wrote:
Hello Mr. Medwid,

Nice to digitally meet you, we may have crossed paths at previous meetings, and I find myself more than ever these days wishing I could have these interesting discussions in person. Hopefully we will have that opportunity in the near future. In the meantime, I have provided some information below in response to one of your questions.

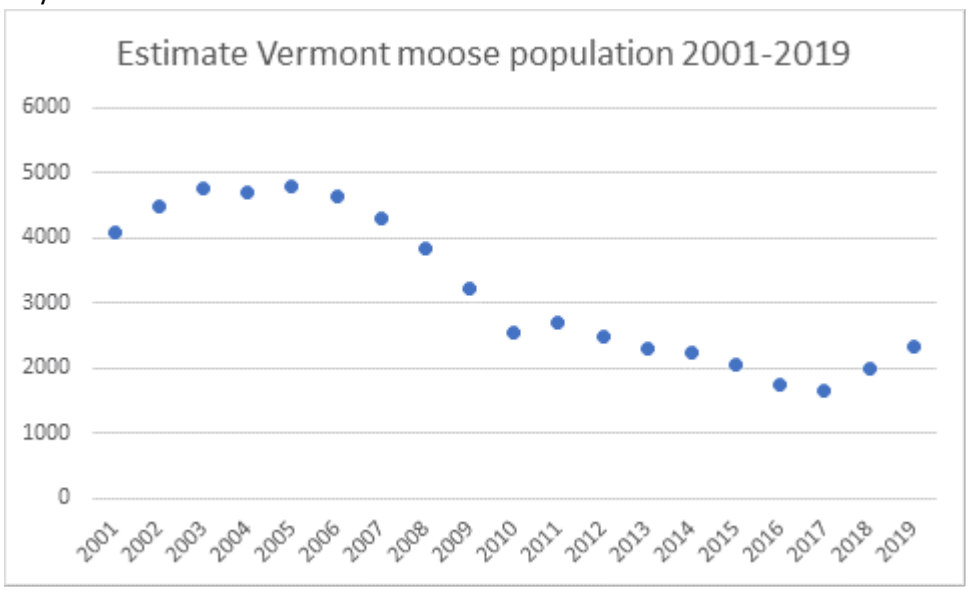
Nick Fortin let me know that you were interested to see statewide population estimates for moose. I have affixed a chart of moose population estimates from 2001-2019 below. These estimates are derived from deer hunter moose sighting rates with an adjustment based on aerial surveys. There is some uncertainty in these estimates because hunter sightings are not random samples. We incorporate a confidence interval in projecting effects of harvest options and our focus is on the population trend rather than single year estimates. Our goal in WMU E is to influence the population trend so that the density declines steadily and more rapidly than without any harvest. Because winter ticks primarily reduce calf survival and not cow survival, cows can continue to reproduce and produce more calves. However, as the research clearly shows, winter ticks cause cows to be in poor health, thus they have

fewer pregnancies and produce fewer calves. Because cows live a long time, they can reproduce enough to maintain or even slightly increase the population over a short time period. However, the calves they do produce are in poor health and thus less likely to survive past their first year. Poor health cows keep perpetuating the population in this way, and there is concern about how long carryover effects from this poor health last, with potential genetic ramifications for the entire population and generations of moose being produced in very poor health conditions. Our goal with populations are to maintain healthy populations. With reprieve from ticks in some years, it is possible for the population to fluctuate, sometimes increasing over a few years but over the long term poor health and continual stress from frequent bad tick years will cause the population to decrease. But most importantly, this population if allowed to decrease from winter tick affects alone, will be unhealthy and we are very concerned about how long it would take for population health to recover.

I hope this information provides some useful context that we are focused on the population trend and also population health. Please let me know if you have any additional questions.

Thank you,

Katy Gieder



Katherina Gieder
Biometrician and Research Coordinator, Vermont Fish & Wildlife, Rutland

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From: K Cameron
Subject: oppose moose hunt
Date: Saturday, April 11, 2020 8:48:08 AM

Dear Secretary Moore:
I oppose the moose hunt and ask the Fish & Wildlife Board to vote "no" on this proposal. The moose are struggling and there's no good reason to continue this hunt except to placate the Department of Fish & Wildlife's paying constituents aka hunters, trappers and anglers. (Nevermind, the fact that we all pay with our taxes, but only a select few get a real voice in the process and advocacy for their interests by Commissioner Porter directly.)

Thank you for your consideration,
Kristen Cameron
Burlington, Vermont

From: vtbuckrulrss
Subject: Moose recommendations
Date: Monday, April 13, 2020 9:12:46 AM

Hi guys,
My thoughts on a moose season? Hold one!! We know there are plenty of moose around, albeit most likely to be found now in pockets vs widespread as we used to find them.

Grow moose? Simple. Get rid of, or loosen, that damn clear cutting law of Dean's. It is your greatest hinderance towards a full recovery. Why do you think moose are doing better, not great but better, than Vermont because they haven't such a foolish law. It is time to stop screwing around, waiting for the sky to fall in regards to ticks. It isn't rocket science. Approach private landowners where moose winter. Put salt blocks out, laced with tick repellant out for the winter. Remove in April, before pollinators come out. It is so damn easy to fix, it hurts. And if you won't do, then I'll get it done myself, take your pick.

Regards,
Pat Rayta

From: Ross Saxton
Subject: Yes to proposed moose hunt in 2020
Date: Monday, April 13, 2020 1:06:44 PM

Hello,
I support the proposed moose hunt for 2020 in the NEK. I trust VT F&W's scientific judgement.

Sincerely,
Ross Saxton
Waitsfield, VT

From: Joann Vannek
Subject: Moose Hunt
Date: Monday, April 13, 2020 4:30:04 PM

Do not have a 2020 moose hunt. We are lucky to even have moose, it is rare to even see them anymore. NO HUNT!!!!!

Joann Parrick
Readsboro, Vermont

From: Stephanie Walker
Subject: 2020 Moose Hunt Public Comment
Date: Monday, April 13, 2020 6:45:17 PM

Dear Vermont Fish & Wildlife,
Do you seriously expect the general public to believe your very flimsy, weak and transparent nonsense that killing the moose will lighten their tick burdens? By extension then, should we simply wipe out the moose? and why not the deer while we are at it?

Your logic sounds like cutting down the forest to avoid forest fires. It's obscene and so insanely infantile as to be embarrassing for you.

Less moose will never make for less ticks. It will increase the ticks looking elsewhere for food, including humans and pets. Will you then suggest we start killing our pets?

You absolutely know for certain that there are plenty of options to help control ticks, healthy skunk and possum populations for starters and why not think about what is causing the ticks to thrive in the first place, namely global warming. How about spending time doing the studies and writing reports to the state and federal governments that outline the severe environmental threat to the different species as a result of global warming.

Have you ever heard of Allan Savory? He had a very successful career killing elephants in Africa, convinced that they were too stressful on the forest system, and ultimately causing so much deforestation that the continent turned to desert. Guess what repaired it? Returning the elephants.

We are not god nor should we be attempting to play god. Nature knows best her balance. You take something and spin it severely out of balance and things are going to go awry. Instead of understanding what the environment tries to tell us when weeds pop up, we spray them with chemicals. Mother nature sends us these weeds as indicators of what's out of balance. It's really simple. It's really straight forward. Fix the problem. Work toward eliminating the ticks. Instead you're suggesting to wipe out the population of a native species instead of the invasive.

I have a hard time that people who have made a career of studying wildlife truly believe that killing moose will solve or alleviate the tick problem. That backward logic wreaks of ulterior motive… wreaks. And it's disgusting.

Stephanie Walker
PO Box 1264
Waitsfield, VT 05673

From: tracy lopez-hasuga
Subject: 2020 Moose Hunt
Date: Monday, April 13, 2020 9:50:47 PM

I am asking that the hunting of moose be stopped.

Killing them in order to keep ticks under control does not make logical sense. Do we just keep killing animals until there are none left to host a tick? That really isn't how this should work.
I hope that an alternate, non lethal, method can be developed and deployed. Is there any research into treating the moose and deer, with some sort of medication to kill the ticks or bringing in opossums to eat the ticks, etc.
There must be other ways of dealing with this which reflect the wishes of the majority of Vermonters. I urge you to explore them, and please, stop the killing.

Sincerely,
Tracy Lopez
Burlington

From: Pat Howard
Subject: Moose
Date: Tuesday, April 14, 2020 6:49:12 PM

I am glad to see that you want to reopen the moose hunt. It appeared that moose hunting was shut down in a knee jerk way, but now that the study is done you are wanting to start hunting again without wasting any time. Very good. It appears that about all that can be done for the moose population is to be aggressive in killing more deer. After watching the moose and deer presentations online it would appear that you agree. I will be sending in my application as soon as you get the paperwork done!

From: went mail
Subject: 2020 moose hunt
Date: Thursday, April 16, 2020 9:37:38 AM

I don't think there should be a moose hunt based on the theory that it will keep them healthy from ticks.

Please do a more informed study to determine whether this will be an effective measure before approving killing an already reduced amount of these animals.
Wendy Tuller
Island Pond

Note: this is a long email string.

From: Protect Our Wildlife VT <info@protectourwildlifevt.org>
Sent: Monday, April 13, 2020 2:59 PM
To: Fortin, Nick <Nick.Fortin@vermont.gov>
Cc: Scott, Mark <Mark.Scott@vermont.gov>; Gieder, Katherina <Katherina.Gieder@vermont.gov>; Miller, Adam <Adam.Miller@vermont.gov>
Subject: Re: Moose

Hi Nick,
I looked at this quick bc I'm ready to jump on a call at 2 that I'm late for but this is important. So, F&W staff counted ticks on all moose from prior moose hunts from all WMUs going back to 2013? Was the methodology the same, meaning were ticks counted on all dead moose or were tick counts tallied on some dead and some alive moose (WMU E?) Wouldn't that impact the tick load? Unless the tick count occurs in all WMUs, in the same fashion, it's not reliable.

How heavily do winter ticks feed on deer? I didn't see a response to that.

Thanks and look forward to hearing back. I appreciate the time.

Brenna

Brenna Galdenzi
President
Protect Our Wildlife POW

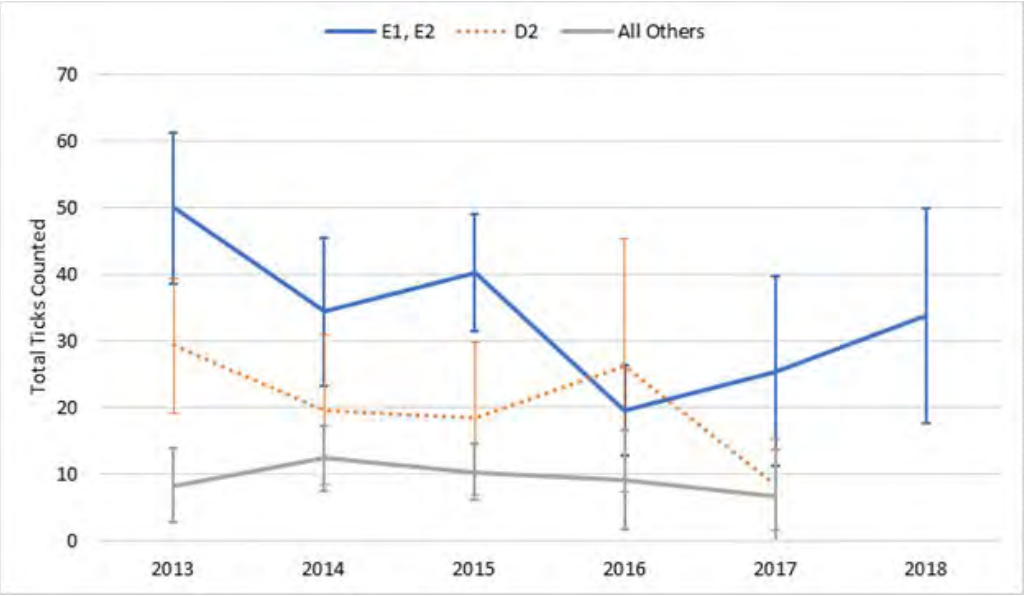
On Mon, Apr 13, 2020 at 1:46 PM Fortin, Nick <Nick.Fortin@vermont.gov> wrote:
Hi Brenna,

Mark forwarded your questions to me for response.

Regarding tick loads on moose in other WMUs…

Below is a chart of tick counts from harvested moose in the fall. For each moose, ticks were counted along four 10 cm transects in 4 different areas on the moose (shoulder, rump, ribs, and neck) and summed as an index of total ticks on each animal. Error bars indicate 95% confidence intervals and sample sizes are low for D2 and all units since 2016 due to low numbers of harvested moose. D2 is right

next to E1 and E2 and has higher moose densities than the rest of the state, and thus slightly higher tick counts. All other units have consistently much lower tick counts. This is a well-established method that is used throughout the northeast to assess tick loads on moose.



A reduced version of these same tick counts (looking at shoulder and rump only) was conducted on each moose that was captured and collared in WMU E. In a few cases, complete tick counts were conducted on hides of moose that died during the study – this is where estimates of total tick loads come from and it helps researchers understand the physiological impacts of such heavy tick loads.
The moose research is focused on WMU E because heavy tick infestations are the main cause for population declines in that part of Vermont, and they are not the main cause of decline in the rest of Vermont because moose densities are too low to support tick infestations high enough to cause population decline. The density dependent relationship between moose and ticks (where high moose densities support high tick loads and lower moose densities support lower tick loads) is well supported by a growing list of scientific literature. Moose densities outside of WMU E in Vermont are below densities that any other study has documented for significant tick-induced mortality.

We also have additional information on tick loads from spring hair loss surveys, and subjective assessments of tick loads from incidentally killed moose. Collectively, these pieces of information provide a good picture of temporal trends and regional variation in tick loads, particularly when combined with similar data collected by moose managers and researchers across the northeast.

Regarding previous statements about the moose population…

No one should have suggested that the moose population was too low to support a moose hunt in 2019. Rather, biologists indicated that the population in WMU E would likely not increase, even if no moose hunting permits were issued. Given previous low permit allocations, the Department felt it was important to fix regulations related to special permit allocations (i.e., auction, veteran lottery) so that, when permit were issued, everyone could have a chance of getting one.

Beginning in 2018, the Department began using hunting cutoff thresholds to maximize the other benefits of moose at lower population densities. This is the reason we have not recommended any permits outside of WMU E since that time. Nothing has changed in that regard. In WMU E, we have been attempting to manage for a moose density of 1 per square mile for several years now, in recognition of the impact of winter ticks. With estimated moose density at the time close to 1/sq. mile, and it seemingly unlikely that the population would increase, we were willing to forego permits in 2019 until regulations could be fixed.

Deer hunter sighting rates have been notably higher in WMU E during the past two years. We know that sighting rates vary from year to year for a variety of reasons, which is why we use a 3-year rolling average to estimate moose density. We are not currently suggesting the population is increasing, even though that would appear to be the case from sighting rates. Rather, we believe it has been relatively stable over the past 8 or 9 years. Most importantly, the results of the moose research in WMU E clearly indicate that the current moose density is high enough to support high tick loads that are negatively impacting the moose population. The final results of this study were not available in 2019 and are a major reason behind the 2020 recommendation.

Please let me know if any follow-up questions.

Best,
Nick

Nick Fortin
Deer and Moose Project Leader
Vermont Fish and Wildlife Department
271 North Main Street, Suite 215
Rutland, VT 05701
802-786-3860

From: Scott, Mark <Mark.Scott@vermont.gov>
Sent: Monday, April 13, 2020 11:58 AM
To: Fortin, Nick <Nick.Fortin@vermont.gov>
Cc: Gieder, Katherina <Katherina.Gieder@vermont.gov>; Miller, Adam <Adam.Miller@vermont.gov>
Subject: FW: Moose

Nick

Can you respond to her two questions? At end of email string.

Mark

Mark E. Scott
Director of Wildlife
Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702

802- 777-4217 – cell
802-828-1250 - fax
mark.scott@vermont.gov

From: Protect Our Wildlife VT <info@protectourwildlifevt.org>
Sent: Monday, April 13, 2020 12:47 PM
To: Scott, Mark <Mark.Scott@vermont.gov>
Subject: Re: Moose

Mark,
In the absence of a phone call, can you please answer my two questions?

Brenna Galdenzi
President
Protect Our Wildlife POW

On Fri, Apr 10, 2020 at 6:37 PM Protect Our Wildlife VT <info@protectourwildlifevt.org> wrote:
Sure, not a problem. My conference calls went over actually - animal shelters are dealing with COVID issues and how to handle intake / adoptions. Very stressful time for them. Can we talk Monday morning? Should take just 10 minutes. I do not want to send our member communication out until I have answers to our two main questions, but public comment is due by 4/19.

Brenna Galdenzi
President
Protect Our Wildlife POW

On Fri, Apr 10, 2020 at 5:00 PM Scott, Mark <Mark.Scott@vermont.gov> wrote:
Brenna,

I just finished my second afternoon meeting, which due to COVID 19, has consumed my day. Can we try to find some time to talk next week? I have other necessary work to do the remainder of the day given my responsibility for a large number of staff and it's time – report day for them.

Mark

Mark E. Scott
Director of Wildlife
Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702

802- 777-4217 – cell
802-828-1250 - fax
mark.scott@vermont.gov

From: Protect Our Wildlife VT <info@protectourwildlifevt.org>
Sent: Friday, April 10, 2020 11:09 AM
To: Scott, Mark <Mark.Scott@vermont.gov>
Subject: Re: Moose

I have two separate conference calls from noon until 3. Can you call me on my cell at 860-913-1021 at 330?

Brenna Galdenzi
President
Protect Our Wildlife POW

On Fri, Apr 10, 2020 at 9:57 AM Scott, Mark <Mark.Scott@vermont.gov> wrote:
Give me a number to call and Will later - in a meeting now until 12:30

Mark E. Scott
Director of Wildlife
Vermont Fish & Wildlife Department
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702

802- 777-4217 – cell
802-828-1250 - fax
mark.scott@vermont.gov

From: Protect Our Wildlife VT <info@protectourwildlifevt.org>
Sent: Friday, April 10, 2020 9:28 AM
To: Scott, Mark <Mark.Scott@vermont.gov>
Subject: Re: Moose

Can I call you?

Brenna Galdenzi
President
Protect Our Wildlife POW

On Thu, Apr 9, 2020 at 6:49 PM Protect Our Wildlife VT <info@protectourwildlifevt.org> wrote:
Hi again, Mark,
We are in the process of forming our position on this to communicate to our members and we have another question for you: are deer a host for winter ticks?

Brenna Galdenzi
President
Protect Our Wildlife POW

On Wed, Apr 8, 2020 at 4:58 PM Protect Our Wildlife VT <info@protectourwildlifevt.org> wrote:
Dear Mark:
We're just getting around to reviewing the material on F&W's 2020 moose hunt proposal and we have numerous concerns and questions, but we'd like to start with this one: if the researcher only studied tick load on radio collared moose in WMU E, then how do we know that moose in other parts of the state don't also have similar tick loads? Anecdotal observations of tick counts on road killed moose or on moose hunted from other WMUs does not offer the same level of scrutiny.

This is more of an observation, but F&W stated that the moose population was too low in 2019 for a moose hunt. But one year later, based on deer hunters' observations (?), the moose density is in fact too high? What do we believe?

Look forward to hearing from you,
Brenna

Brenna Galdenzi
President
Protect Our Wildlife POW

From: Protect Our Wildlife VT <info@protectourwildlifevt.org>
Sent: Monday, April 13, 2020 4:15 PM
To: Scott, Mark <Mark.Scott@vermont.gov>
Subject: Re: Moose

I hope that FWD has empirical tick load data available to share with the public now on moose from WMU E and then annually going forward. Assuming the hunt continues for 4 years (to get to your goal of 1 moose per sq mile), the public will expect to see a reduced tick load and healthier moose. If the tick load doesn't decrease, but you've killed moose, then I suspect a lot of folks will want answers. I know we'll be tracking this very closely.

Thank you,
Brenna

Brenna Galdenzi
President
Protect Our Wildlife POW

From: Brenna
Subject: Public Comment on Moose Hunt
Date: Thursday, April 16, 2020 9:37:55 AM

I am writing in opposition to a 2020 moose hunt even though I realize that my comment means little.

I have the following concerns:
1.) You are basing the moose density / tick load dilemma on moose population estimates derived from deer hunters during the rifle season! F&W stated that the moose population was too low in 2019 for a moose hunt. But one year later, based on deer hunters' observations, the moose density is in fact too high? You write, "It now appears that moose densities in WMU E are greater than they were believed to be in recent years." What do we believe? What happens if you're wrong?
2.) Rather than killing moose to save moose, why not invest in reducing winter tick populations directly, either by treating moose or the landscape with some form of acaricide or fungal pathogen?
3.) Unless the tick load study on moose in all WMUs was executed in the same fashion (e.g. using only dead moose with the same protocols), then the statewide tick load estimates on VT moose is unreliable. How do we know that moose in other parts of the state don't also have similar tick loads, even if their densities are below 1 moose per sq mile? Your report says the following, but how can you qualify the bolded statement below:
"Moose numbers in other parts of Vermont outside of the Northeast Kingdom have declined, but the main cause of this decline is not winter ticks. Rather, this decline is *likely* due to a combination of increased parasite loads (particularly brain worm linked to increasing deer populations), declining quantity of young forest, and fewer moose in core moose range to migrate out to these other regions."
4.) If you kill moose, then the winter tick will attach to another ungulate (deer), so moose are not the only host for this tick. You have no studies on winter tick load on white tailed deer. Maybe you need to kill more deer in that area?
5.) You stated that the hunt would reduce the population below 1 moose/mi2 (your desired population) in 4 years, so this moose hunt theory is only successful if a hunt is assumed to annually occur over the

next 4 years? What happens if we have consecutive years of harsh winters with heavy snow and presumably less ticks on moose? You'll still have a moose hunt?

I hope that FWD has empirical tick load data available to share with the public now on moose from WMU E and then annually going forward. Assuming the hunt continues for 4 years (to get to your goal of 1 moose per sq mile), the public will expect to see a reduced tick load and healthier moose. If the tick load doesn't decrease, but you've depleted the moose herd, then we suspect a lot of folks will want answers. I, and others, will be tracking this very closely.

Brenna Galdenzi, Stowe VT

From: Patrick Finnie
Subject: deer-moose hearings
Date: Thursday, April 16, 2020 11:17:46 AM

If as is suggested in your 30 minute presentation, Moose in the state of Vermont will always be a marginal population, and probably will never, and, or should never be allowed to reach the levels that they attained during the late 90s and early 2000s due to Vermont being on the edge of their preferred/needed environmental climate ideals, what's the chance of Vermont trying to restore Elk to the state ? Virginia, Kentucky, Tennessee, North Carolina, Missouri, Michigan, Wisconsin, and Arkansas are all involved in the restoration of Elk to their states, and they are doing well enough that they are being hunted again in most of these states. Elk have also spread on their own to West Virginia, and South Carolina. They were reestablished in Pennsylvania in the early 19teens. Of course you folks all know this, so I am not breaking any news to you, I only wish to inform those hunters, and other outdoor enthusiasts that restoration here of what once upon a time was a native species would be a highly probable success that could replace a failing effort to maintain a reasonably huntable moose herd here. Even if Elk never became as common as they once were here, wouldn't it be an inspiring, almost religious experience to be out in the woods in Vermont and hear Elk bugling ? Wow !
Sincerely,
Pat Finnie

From: Anne Jameson
Subject: 2020 WMU-E moose hunt proposal
Date: Saturday, April 18, 2020 3:23:08 PM

Dear Fish & Wildlife Board,
I'm a Vermonter writing to strongly oppose the proposed 2020 moose hunt in WMU-E, ostensibly to 'save' them from ticks. It's hard to comprehend how killing the moose will ease the tick population. Because of a lack of credible population estimates for moose, their numbers are based on estimates by deer hunters, who claim that densities above 1 moose per mile mean a higher tick population. Since winter ticks also feed on deer, if the moose are killed, there's still a host for the ticks and the moose

numbers have been decreased, even 'though deer populations are already much greater than moose. Somehow, this doesn't make logical sense.

So, if the tick load is reduced by the hunt and, supposedly, the moose are healthier, then some empirical data has been obtained. However, if the winter has been harsh and hence the tick load is already lower but the moose have been killed, then what has been gained? Fewer moose – for which I, as a person who loves wildlife and seeing them in their natural environment, would then assert that the end result did not justify the means.

I also find the fact that this proposed 'study' has been funded by SCI, an organization very suspect in its catering to trophy hunters around the world, very suspicious. Consequently, I oppose the moose hunt planned for the WMU-E next winter.

Please vote NO on this proposal!

Thank you for your consideration of my opinion.
Anne Jameson
Marshfield

From: Cassandra Burdyshaw
Subject: Comment Against Moose Hunting
Date: Saturday, April 18, 2020 6:51:39 PM

Vermont Fish & Wildlife,
I am opposed to the 2020 moose hunt proposed by Vermont Fish & Wildlife.

The biggest concern is that we do not have credible moose population estimates. I am also concerned that Safari Club International funded Vermont Fish & Wildlife's moose "study" with over $50,000. SCI caters to trophy hunters across the globe who pay tens of thousands of dollars to hunt exotic species like lions and elephants. I am concerned about a decreasing moose population and want moose to be enjoyed as wildlife, not trophies. Thank you for the opportunity to comment.

Cassie Burdyshaw
Resident of Warren, VT

From: Trish C
Cc: sharon@gmad.info; Protect Our Wildlife VT
Subject: deer-moose comment-question
Date: Sunday, April 19, 2020 8:57:59 AM

Hello!

As a Vermonter and animal lover I am appalled by the proposed moose hunt. I oppose this hunt strongly and ask the Fish and Wildlife board to vote NO on this proposal. I am not alone in this request. You are well aware that hunting is down exponentially in our state and the country. This is because times are changing and people are not hunting due to various reasons, ethical concerns chief among them. Please do the right thing by this majestic wildlife, and the majority of your constituents, and vote NO on this proposal. Your NO vote is critical especially given that the data that supports the proposed hunt is specious and improperly funded by pro-hunting lobbying groups. This is outrageous.

DO THE RIGHT THING! VOTE NO!

Patricia Carney
Corinth VT

From: Peggy Larson
Subject: deer-moose comment-question
Date: Saturday, April 18, 2020 6:00:44 PM

I oppose the moose hunt and Fish and Wildlife needs to vote no on this proposal. At one of the F&W meetings I attended, the moose hunting season was going to be cancelled because of the problems with ticks. Apparently 45,000 ticks were found on one dead calf.

We should be focusing on the tick problem and not adding to the deaths of these moose. And killing off the moose will not stop the ticks.

Peggy W Larson, DVM MS JD
Williston, VT

From: Jeannette DeCorpo
Subject: deer-moose comment-question
Date: Saturday, April 18, 2020 4:10:38 PM

As a resident of South Burlington,I oppose the moose hunt and ask the Fish & Wildlife Board to vote "NO" on this proposal.

Please just do the right thing!

Peace.
Jeannette DeCorpo

From: carol Bick
Subject: deer-moose comment-question

Date: Saturday, April 18, 2020 2:38:28 PM

I oppose the moose hunt and request that fish and wildlife say “no” to issuing licenses.
Respectfully,
Carol Bick

From: Rhonda Summer
Subject: deer-moose comment-question
Date: Saturday, April 18, 2020 1:54:59 PM

Dear Sir and/or Madam,
I oppose the moose hunt and ask the Fish & Wildlife Board to vote "NO" on this proposal.

In this time of Coronavirus and so much death, job loss & bad news it would be nice to think we are trying as a society to move forward with positivity. Let's please let our beautiful wildlife live their lives as nature intended them to.

Thank you,
Rhonda Summer
Burlington, VT

From: Tricia Griffith
Subject: deer-moose comment-question
Date: Sunday, April 19, 2020 12:51:21 PM

I OPPOSE the moose hunt and ask that the Fish and Wildlife Board vote NO! I also ask that Fish & Wildlife employ more fish & wildlife scientists and fewer hunters.

Our wildlife concerns us all.

Marian Patricia Griffith
South Burlington

From: Barbara
Subject: I OPPOSE the Moose Hunt
Date: Sunday, April 19, 2020 11:42:06 AM

Dear Fish and Wildlife Board,
I strongly OPPOSE the Moose hunt being proposed! I hope that you look into your hearts and make the right decision and vote NO on this proposal.

Thank you,
Barbara Mines
Burlington, VT

From: Steve MacNair
Subject: Moose Hunt Proposal
Date: Sunday, April 19, 2020 10:23:18 AM

To the ANR,
I oppose the moose hunt proposed by the VFWD and ask the Fish & Wildlife Board to vote "NO" on this proposal.

Thank you,
Steve MacNair
Shelburne, VT

From: Hannah Regier
Subject: moose hunting comment
Date: Saturday, April 18, 2020 1:05:36 PM

Dear Fish & Wildlife board,
As someone with deep interests in the state's natural communities, I oppose the moose hunt and urge the board to vote NO to the proposed hunting numbers.

Sincerely,
Hannah Regier

From: Lantz, Asher Dale
Subject: Moose Hunting
Date: Saturday, April 18, 2020 2:04:12 PM

Greetings!
Just emailing because I am concerned about the Moose hunt proposal.
I doesn't seem that reducing Moose population with hunting helps a considerable amount with the tick problem. I think we should look for alternate solutions. Or, if killing the animals is necessary, doing so selectively (not separating mothers from calves) and as painlessly as possible. Animals that are killed by hunters often suffer brutal, painful deaths. If population reduction is the goal, hunting should not be the solution. I understand it brings in funding, but not enough to justify the inhumane killing of animals that you're trying to help.

Thank you for your conservation efforts and I hope you're staying well.

Asher Lantz

From: Sharon Mac
Subject: Re: Comment on Moose Hunt Vote
Date: Sunday, April 19, 2020 9:44:15 AM

I am a long-time Vermonter (the past 40 years in Shelburne) and I OPPOSE the moose hunt proposed by the Dep't of F+W. I encourage all Board members to vote NO on the proposal to issue 55 either sex hunting permits in WMU E for the 2020 hunting seasons.

FYI: I also oppose any bow season on moose.

Thank you, in advance, for considering my concerns.

Respectfully,
Sharon MacNair
Shelburne

From: Gretchen Hidell
Subject: Say "NO" to a 2020 moose hunt!
Date: Friday, April 17, 2020 3:18:39 PM

Please say Say "NO" to a 2020 moose hunt!

Gretchen A. Hidell
Intuitive Astrologer, Psychic Medium, & Certified Life Coach
Burlington, VT

From: Kathee Ludwig
Subject: the proposed moose hunt
Date: Sunday, April 19, 2020 2:59:53 PM

To the ANR.
I oppose the moose hunt and ask the F&W Board to vote no on this

Thank you
K Ludwig
Essex Jct, VT

Attachment 5

Voicemails Related to the Proposed 2020 Moose Permit Allocation and Deer

Voicemails are listed in chronological order

4/15/20, 10:13 AM

Hello and good morning. My name is Don Muhammed. I live in Alburgh Vermont. I think you guys are doing a fine job with a deer and moose. My comment about moose. I was wondering if there's a project that combines tick medicine in a salt lick. There's a product out there, for example, that you could use for your pets. You could put a product, I bought a product and water that is a wormer for cats and dogs. For example, they drink the water and it kills the parasite inside of them and I was wondering if there's a product that combines the tick medicine inside of a salt lick so that if that's possible and you could just put them out all over the place. The moose would have a way of medicating themselves against the ticks. I did also comment one time before about where there's a lot of moose together, maybe you could shoot them with a dart with medicine and that might also help. But that doesn't seem to be too practical is what was explaining to me. But I think anything would help and I that was my suggestion. So, keep up the good work guys and love you guys. Bye.

4/16/20, 7:22 AM

Hi, Brian, Bartok, Fleetwood, Pennsylvania. Just a comment for the state to continue making money for your moose research. Why not offer a chance to buy a bonus point and maybe a one-time shot to backdate it to where the bonus points had not been offered maybe at a reduced rate. Do it for Resident and non-resident and then going forward whatever that may be, regular price, and just another opportunity for the state to keep bringing in money for research. I know I would look forward to doing it and I know it's an investment in your state and it's beautiful and I've been there a couple of times. I've got to be able to go and I hope to go again, you know, I'd like to keep investing money so the research can continue. I think other hunters would do the same so maybe look at that. All right. Thanks. Bye.

4/16/20, 7:23 AM

Yes, my name is Art Desanti. I live in Vermont and I don't like the one buck limit.

4/16/20, 7:29 AM

Hi, Brian, Bartok again, Fleetwood, Pennsylvania. I just wanted to call back on these winter ticks. I'm sure you're looking at it but is any research being done on a type of animal that really keys in on ticks and eats the ticks. You know, I heard guinea hens do a good job with ticks. I don't know, you know how the grouse do or pheasants but my thought was you know in Vietnam these cormorants would dive and catch fish and they can't swallow all the way down because they have like a rubber band around their gullet. Couldn't you do that with something on land that way you had taken guinea hens or something of that sort and do the same process with different animals to see which ones really key in and eat the most ticks. Just a thought. Bye.

4/16/20, 7:43 AM

My name is Stanley Robinson. I'm a Vermonter. I think we should be able to take two bucks during the regular season. Also, I think we got to let the spike horns live and also I think we got for archery season for anybody over 50 to have the right to use a crossbow. Thank you.

4/16/20, 10:23 AM

Hi, my name is Janice Madhwani. I live in Hinesburg Vermont. I'm leaving a comment on the proposed moose hunt for 2020. I am urging you to not have a hunt. I'm voting no on a hunt this year with this population already under incredible pressure. In addition to ticks, loss of habitat, prior hunting, we can't afford to kill anymore moose. We need to look at science-based evidence to address the tick population that is hurting the moose population. So, please do not have a moose hunt in 2020. Thank you.

4/16/20, 11:16 AM

Hi, my name is Henry Robear. I live in Colchester, Vermont. My comment on the film that I seen about the deer hunting coming this fall. I don't agree with the one buck limit. It kind of takes two seasons out if you kill one with a bow, then you're all done with rifle season, no muzzleloader season. That just does not make any sense to me whatsoever. I hunt mostly in Grand Isle County. I see several spikehorns every year, some trying to breed does. I think you have to get back to the old way of doing business and be real. We're never going to have the deer like they have in, Kansas. Thank you.

4/16/20, 3:47 PM

Hi, this is Bob Starsky. I live in Shrewsbury Vermont and I've hunted for many, many years. I'm seventy-three years old and I've look at the proposed calendars and it seems like you're looking to do some things with managing the deer that seemed to be okay. However, I don't know with a bow. I've hunted with rifle and a traditional muzzleloader in the past and I'm wondering why you can't consider having a traditional muzzleloader season. I don't know if that would include in-lines or maybe just a flintlock, or a cap lock rifle. Maybe even one week in October, like the second week of the month of October, to give the muzzleloader hunters a chance to hunt when the weather was relatively good. The weather in December for muzzleloader, especially if you're hunting with traditional where you can get your powder wet pretty easily is brutally cold, usually with snow, and to have one mild week. I think to even limit it with, you know, maybe only antlerless for one week I think with all the weeks you have in archery. I think one week of additional muzzleloader would be certainly beneficial for the hunters and encourage people to get into that phase of hunting and make for good sport and also to help meet the guidelines of managing the deer herd. Thank you very much. Bye

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4/16/20, 6:04 PM

Hi, my name is Holly Tippett. My residence is in Tampin and I'm calling because I don't understand why you would hunt and kill moose to reduce the tick population and why you wouldn't treat them the way that you are treating through your study with rabies vaccinations. In other words, put some kind of treatment on the landscape and / or treat the moose themselves to help them either combat the tick population or kill the ticks. It seems like a strange argument to say we're going to kill moose to save them from a tick issue and/or a parasite issue or any other parasite issue, You know, we have the technology, we have the brains, we have the smarts and I just can't believe it's that expensive to do it. So that is my comment. I completely oppose any kind of moose hunt. I think it's ridiculous given all of the climate change, habitat and other assorted pressure on the moose population in Vermont. Thank you, bye-bye.

4/16/20, 7:50 PM

Yes, this is Douglas Bent. I live in Braintree, Vermont and I believe there should be a one-deer limit for the entire season. I agree with your early muzzleloader hunt and also your youth season and your archery season, the length of it. I think that's all a good idea, but I do believe it only should be one deer per season and if you have areas where there's extra deer then have that by a lottery or something like that. But anyways, I think you have a very good handle on it, except I think it should be just a one deer. Okay. Thank you very much. Bye.

4/16/20, 8:11 PM

Yes, good evening. I apologize, my name is Bruce Spaulding and I was hoping to be able to talk on my computer here at your live session, but for some reason my computer is not functioning properly because I wanted to talk to Mark Scott because I've known him for fifty years. And the reason I'm calling is Mark probably remembered, I'm sure he will, I came back from Colorado about in eighty three or four, I brought back the Operation Game Thief idea from Colorado and that was myself and Eddie Demar Witman and we met with Commissionser Steve Wright I believe and we got that program started in 1985. It was officially started and what I want to know is I got a certificate here and it's an executive department proclamation and Madeleine Kunin signed it and I'd like to have that given to the right people to have it on their wall because it's when we made the program work. I went through two commissioners before Steve and I finally got him to believe in it. And I'm really proud of what we did and I just wanted you to know that I want to send that to someone. I really appreciate what the fish and wildlife have done for me. I taught hunter safety for about eighteen years, and I love it when the kids come back to me in their forties and fifties and "do you know Mr. Spaulding if it wasn't for you I probably wouldn't have done this" and it gives me a great pride and great satisfaction to have contributed to this great organization, which is also made me sane through the years with the number of years with the harvest I've done. I've hunted with Don Polland and Larry Benoit and different people like that. So I come from good stock, and I just wanted to thank you and congratulate you in all things that you do. Tell him I apologize for my inadequacy on the technology and like I say he can call me back. I'd like to mail this proclamation. It's framed and a nice frame signed by Governor Kunin. I think it should be on the wall somewhere down there in Waterbury, Montpelier, wherever you want to put it. Thank you very much, and thank you for allowing me to talk, bye-bye.

4/16/20, 8:33 PM

Hi, my name is Dave Zenica from Essex Junction. I watched two of the three Zoom sessions over the past week and I have a question. I didn't want to take more time on the Zoom session. Last year, Nick Fortin said we took 16,550 deer. 10,058 of those deer were bucks which was the second-highest total since 2002. My question is why are we trying to tweak the deer herd because it's deemed unhealthy or, if not unhealthy, we want to improve the health of it, by taking more doe. I guess I don't get that if we've had such a great buck kill, with good antlers, it seems like if things are going well, don't mess with it. And I'm just not sure as to the answer of how this will improve the health of the deer or what is unhealthy about the deer herd right now. The second point is an expanded archery season will happen sometime in the near future. I would recommend strongly some kind of a committee with a head that would deal with public landowner education, maybe a format like zooming for landowners or something, because it's going to take a lot of education, because landowners will now have people hunting on their land from mid-September until mid-December potentially. That's a lot of infiltration of people and they may be opposed to that; just having people around all the time. So something to

think about, but you guys are doing a great job and I support your expertise and professionalism. Thank you.

4/18/20, 4:47 PM

My name is Maria Madeline Moore at South Burlington Vermont. I oppose the moose hunt and would ask you vote no for this proposal. I think that animals should be allowed to do what I need to do. So vote no, please. Thank you.

4/18/20, 8:05 PM

Hi, my name is Mark Reilly. I live in Pomfret Vermont and I want to show my support for both the moose regulations and deer regulations as they were proposed. I appreciate the work of the department has done with both of these sectors and look forward to hunting them this fall. Thank you, bye-bye.

4/19/20, 8:13 AM

Hey, good morning. My name is Angela Dunbar Prince. I'm a Vermonter, lifelong. I currently live in the town of Woodstock and my partner and I am also own land in Chelsea, Vermont. I'm calling in regards to the moose hunt this year. I am opposed to all moose hunts. All of it. I never think a moose should be killed. There's never been a problem in my lifetime with a moose. I've never hit a moose. I've never had a problem with moose being invasive and I have been a lifelong avid hiker. I have them through the state from one side of the other. The moose are beautiful and wonderful creatures that deserve to have protection and not to be killed especially not when there's any kind of connection to a company called Safari Club International that has provided the Vermont Fish and Wildlife moose study with $50,000. That is hideous. I'm disgusted by that. Please do not kill our moose. Thank you. Also, I don't like shooting deer just to make money for the State of Vermont either. That is not okay. It's not a money-maker. Those are animals that deserve to live here. They don't deserve to be killed just so you can make a buck. There's got to be another way to make some business in this state. Thank you.

4/19/20, 6:30 PM

Hello, my name is John Burke. I live up in Grand Isle and just wanted to say that I oppose the moose hunt and ask that the Fish and Wildlife board vote no on this proposal. Thank you for taking my call. I appreciate it.

4/19/20, 7:59 PM

Hi, this is Travis Wilson from Chelsea Vermont. Lifetime Vermont resident, born and raised. I oppose the moose hunt. I think that we do a very terrible job here. I'm a bowhunter for deer and I think we do a really bad job in wildlife management. Um, I think we are killing the herd off for money. It seems like the state can never make enough money here, there, and everywhere and you know, just because moose, you know, are being killed off by ticks doesn't mean that we should interfere with nature. Once again, it's all we ever do is interfere with nature. So I'm against the moose hunt and I believe it should be one deer a year per person and no spike hunting. You know, I don't agree with spike hunting. And youth season, they shouldn't be shooting young yearling deer. They should learn how to shoot like we used to. Spike horns are bigger deer because that's the best reason, the best way to manage the population, and have good huntable animals and bring people to hunt here and vacation here to hunt. You know, where you got actually good racks. A lot of Vermonters I know

now hunt out of state because they say they can't even find a good-sized deer around here anymore. Thank you very much. Bye.

Attachment 6

2020 Antlerless Harvest and Youth Season Recommendation

to the
Vermont Fish and Wildlife Board

Vermont Fish and Wildlife Department
Agency of Natural Resources
1 National Life Drive, Davis 2
Montpelier, VT 05620-3208
802-828-1000

Summary of Key Points

- New deer density and physical condition objectives have been established for each WMU in the 2020-2030 Big Game Management Plan.

- New hunting regulations that will take effect in 2020 are expected to result in an increased antlerless harvest during the archery season and higher fill rates on antlerless permits. These new tools allow the Department to increase the antlerless harvest in certain WMUs to achieve population objectives.

- The winter of 2020 was relatively easy for deer throughout Vermont. However, minimal population growth is expected due to lingering effects of the more-severe winter of 2019. Both fawn and yearling age classes appeared to be smaller (fewer deer) than usual in 2019.

- Yearling antler beam diameters, fawn weights, and other physical condition metrics are declining or are below optimal levels in many areas, indicating that deer have exceeded the level their habitat can support long-term.

- Deer populations in 10 WMUs are projected to be above their respective upper population objectives in 2019. The recommended permit allocations are intended to reduce deer populations in these WMUs (78% of permits would be in these units).

- Populations in all other WMUs will be close to their respective population objectives and the recommended permit allocations are intended to stabilize populations and provide increased antlerless harvest opportunities.

- The recommended permit allocations are expected to result in the harvest of 6,385 antlerless deer during the antlerless (early muzzleloader) and December muzzleloader seasons. This would result in an estimated total harvest from all seasons of approximately 10,147 antlerless deer.

- The recommended antlerless harvest is conservative due to uncertainty about the effects of new hunting regulations. Ultimately, even greater antlerless harvests will be necessary in many WMUs to achieve density objectives.

Executive Summary

The Vermont Fish and Wildlife Department estimates there will be approximately 143,000 white-tailed deer on the Vermont landscape prior to the start of the 2020 deer hunting seasons. This represents an increase of 2 percent from the retrospective 2019 pre-hunt estimate. Deer populations in 10 Wildlife Management Units (WMU) are expected to be above their respective density objectives established in the *2020-2030 Big Game Management Plan*. All other WMUs will have deer densities close to their respective density objectives. Deer are not evenly distributed across Vermont. As a result, harvest management strategies that account for regional differences in deer density are essential to the health and proper management of Vermont's deer herd.

For deer to be healthy and productive, deer populations must be kept below the carrying capacity of the habitat through the regulated harvest of antlerless deer. Biological information collected annually by the Department, including reproductive data, fawn and yearling body weights, and yearling antler size, indicate that deer populations have exceeded the level the habitat can support long-term in some parts of Vermont. Deer populations must be reduced below the limits of their habitat or physical condition will continue to decline, habitat damage will increase, and populations will become unstable and susceptible to substantial winter mortality.

The winter of 2020 was relatively easy for deer throughout Vermont. However, lingering effects of the more severe winter of 2019 – primarily reduced fawn recruitment – are expected to limit deer population growth in most of Vermont. Importantly, this means deer densities in several WMUs will continue to be above objectives.

To achieve established density objectives, the Department recommends the harvest of 10,147 antlerless deer during the 2020 hunting seasons. The Department recommends that antlerless harvest be authorized during the archery and youth/novice seasons in all WMUs. After accounting for expected archery and youth/novice season harvests, the Department recommends that 6,385 antlerless deer be harvested, by permit, during the antlerless-only muzzleloader season in late October and the December muzzleloader season. Achieving this harvest requires the issuance of 23,000 WMU-specific antlerless permits distributed among 19 of Vermont's 21 WMUs. The recommendation of 23,000 permits is the same as the total number allotted in 2019. Most of the permits (18,000; 78 percent) are recommended for 10 WMUs where deer density will be above respective density objectives in 2020. Permit recommendations in these WMUs are intended to reduce deer densities.

New deer hunting regulations in 2020 are expected to have a substantial effect on antlerless deer harvests. This was an important reason behind several of these changes and will help the Department better manage overabundant deer in parts of Vermont. The total recommended antlerless harvest for 2020 is a substantial increase over recent antlerless harvests; however, recent antlerless harvests were limited by an inability to distribute more antlerless permits in some areas, so they did not represent desired harvest levels. Importantly, this recommendation is conservative due to uncertainty about the exact effects of the new regulations. Ultimately, even greater antlerless harvests may be necessary in many WMUs to achieve density objectives, particularly if winter severity continues to be low.

Three online public hearings were held April 13, 15, and 16, 2020 to gather hunters' comments on the deer herd. A summary of comments on the status of the deer herd is provided in Appendix B. Two additional online public hearings will be held in May, 2020.

2020 Muzzleloader Antlerless Harvest Recommendation

Pursuant to 10 V.S.A. §§4081, 4082 and 4084, and Appendix Chapter 1 §2c, hereafter is the Department's 2020 antlerless harvest and youth season recommendation. Based on population estimates, a harvest of 10,147 antlerless deer is recommended during the 2020 hunting seasons. This includes 3,762 antlerless deer harvested during the archery, youth, and novice seasons, and 6,385 antlerless deer harvested, by permit, during the antlerless (October muzzleloader) and December muzzleloader seasons. Adult females are typically 84 percent of the total antlerless deer harvest, so harvesting this number of antlerless deer would yield approximately 8,505 adult does.

Population Status

The 2019 deer hunting seasons saw a buck harvest 2 percent higher than the previous 3-year average and the highest in the past 17 years (see *2019 Vermont White-tailed Deer Harvest Report* for more information). Ten WMUs had retrospective population estimates in 2019 that exceeded their respective population objectives established in the *2020-2030 Big Game Management Plan*. The winter of 2020 was relatively easy for deer throughout the state and population increases are expected. However, lag effects of the relatively severe 2019 winter are expected to limit population growth.

Winter Severity 2020

The Department has long recognized the influence that winter weather can have on Vermont's deer herd and has been collecting winter severity data since 1970. Between December 1 and April 15, volunteers record one winter severity index (WSI) point for each day with at least 18 inches of snow on the ground, and one point for each day the temperature reaches 0°F or below. These data have proven useful to describe deer population dynamics; however, how well deer survive winter depends largely on three factors: 1) body condition of deer during late-autumn as winter begins, 2) availability of quality deer wintering habitats, and 3) the timing of snow in the fall and snowmelt in spring. Snow cover that remains late into spring can cause significant negative impacts by delaying spring green up and, consequently, reducing fawn survival.

The winter of 2020 was relatively easy for deer, with a state-wide average WSI of 22 points (Figure 1). This was considerably lower than the 30-year average of 45. Abundant mast crops in 2019 should have allowed deer to be in good condition entering the winter. Outside of the Northeast Kingdom, snow depths only exceeded 18 inches for very brief periods, if at all (Figure 2). Lack of any substantial snow cover across much of the state for much of the winter allowed deer to utilize habitats outside of traditional wintering areas and access the best available foods. As a result, overwinter mortality was minimal.

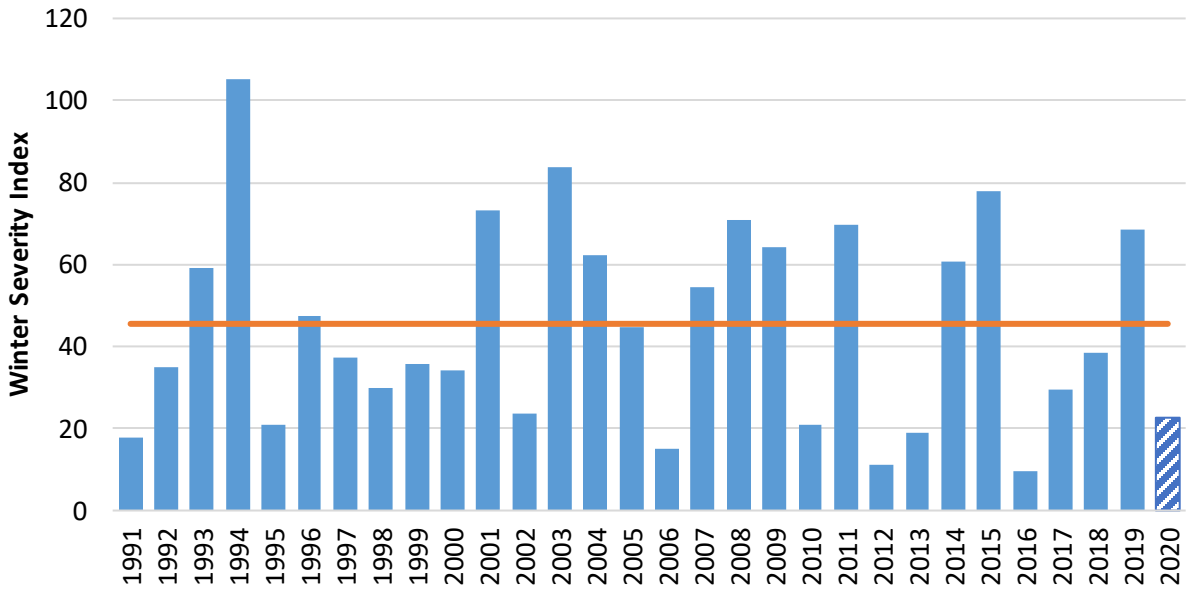


Figure 1. Statewide winter severity index (WSI), 1991–2020. The horizontal line shows the 30-year average WSI of 45.

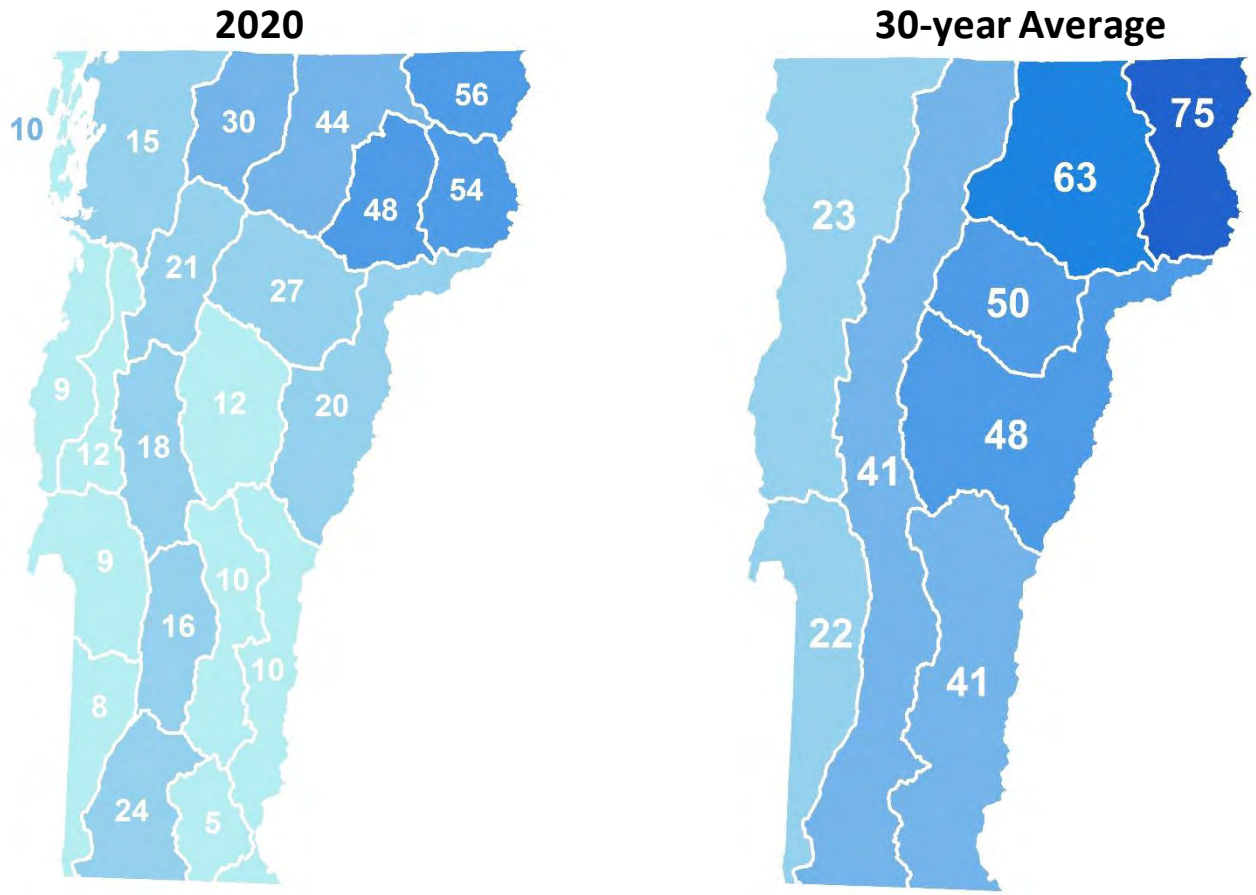


Figure 2. Regional winter severity index in 2020 and the 30-year average.

Population Health

Biological information collected annually by the Department, including reproductive data, fawn and yearling body weights, and yearling antler size, indicate that deer populations have exceeded the level the habitat can support long-term in some parts of Vermont (Figure 3, see Appendix A for individual WMU information). In many cases, this does not appear to be a new problem. Instead, this appears to be a subtle but chronic problem that may have occurred for decades in some areas but has only recently been detected through increased or improved data collection and analyses. Further, declines in measures like yearling antler beam diameter have been slow (Figure 3); therefore, it takes many years of data to separate the trend from normal annual variation.

Health concerns are most pronounced in central Vermont but are evident in most parts of the state (see Appendix A for more detail). In most cases, the Department believes the primary driver of declining physical condition is not a recent increase in deer abundance, but rather a slow, steady decline in the quality of deer habitat. Deer abundance has been relatively stable during the past 15 years, and, arguably, the past 30 years. However, Vermont's forests are aging and the amount of young forest (less than 20 years old), which provides critical forage for deer, is declining. Other factors, including hunter access to private land, proliferation of invasive plants, and climate change are also important, and make the problem and any solutions more complex. The simple result, however, is that the habitat cannot support the number of deer it used to, and it is likely that carrying capacity will continue to decline. Deer populations must be reduced below the limits of their habitat or physical condition will continue to decline, habitat damage will increase, and populations will become unstable and susceptible to substantial winter mortality.

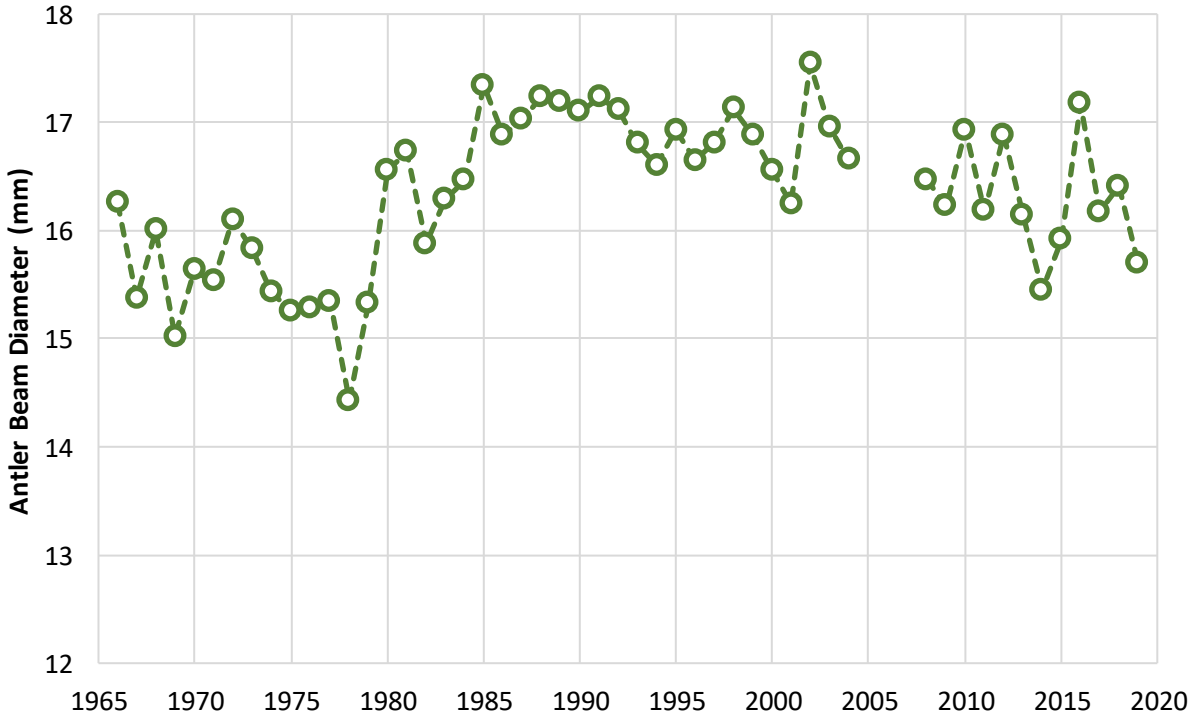


Figure 3. Antler beam diameter of yearling bucks in Vermont, 1965–2019. Data are from deer examined at biological check stations.

Population Projections and Management Objectives

Data collected from harvested deer and roadkill suggest that both the fawn and yearling age classes were relatively small in 2019. Severe winters can have significant impact on young deer and fawns born the following spring. However, they typically have less impact on adult deer, which is why the 2019 buck harvest actually increased. Due to the antler restriction, most of the buck harvest is 2 and 3-year old bucks. Both of those age classes were relatively large due to the string of mild winters from 2016-2018.

Although the winter of 2020 was relatively easy for deer, reduced recruitment due to the winter of 2019 and, to a lesser extent, increased antlerless harvests in recent years, will result in minimal population growth in most areas. Importantly, deer densities remain above population objectives in several WMUs and recent management efforts have been ineffective at reducing those populations. To provide healthy habitats and thereby keep deer healthy and productive, deer densities must be kept at established objectives (Figure 5). Maintaining a healthy deer herd is the best way to mitigate the potential effects of winter weather and provide a stable population over the long term.

Total antlerless harvest in 2019 (6,492) was 5 percent less than expected (6,839) given the number of antlerless permits distributed. This was primarily due to lower than expected permit fill rates during the muzzleloader season. Archery and youth season antlerless harvests were 1 percent less than expected.

Based on analysis of herd demographic data, hunter effort and sighting rate data, 2019 and 2020 winter severity information, and 2019 estimated deer populations at the WMU level, the Department expects the statewide deer population to increase 2 percent from the 2019 retrospective estimate of 140,000 deer to approximately 143,000 deer (Figure 4). Importantly, 10 WMUs will have deer densities that exceed their respective population objectives, and the Department's objective is to reduce deer densities in those areas (Figures 5 and 6). Other WMUs will have deer densities that are within 2 deer per square mile of their population objective and the intent is to stabilize those populations at or near their current level.

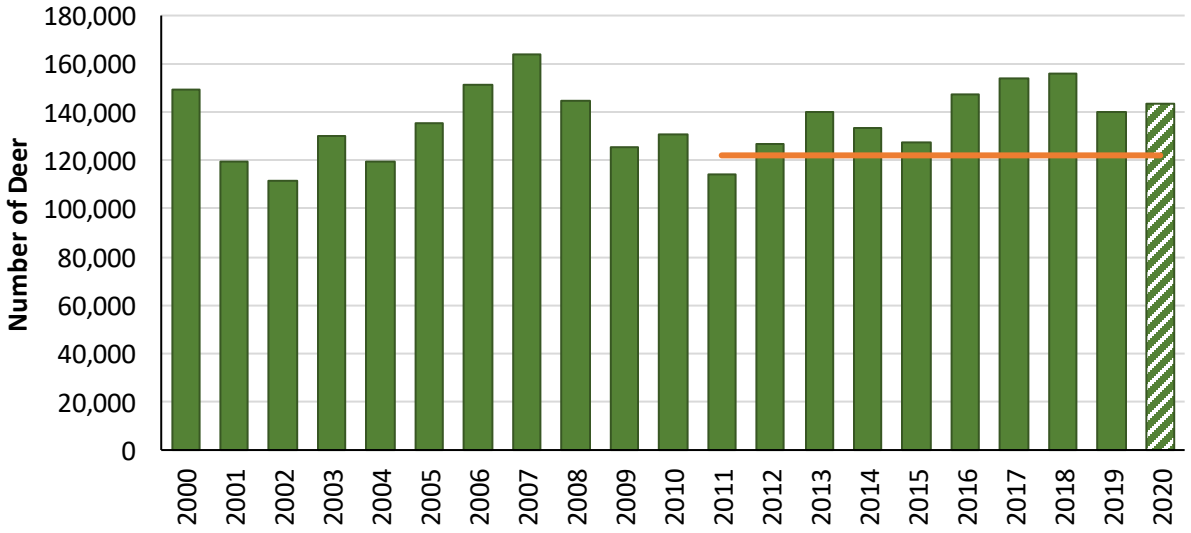


Figure 4. Statewide pre-hunt deer population estimates, 2000–2020. Population estimates are based on VT-DOEPOP, Sex-Age-Kill, Reconstruction, MARK-removal, and roadkill-based modeling. The horizontal orange line represents the sum of WMU-specific population objectives established in the *2020–2030 Big Game Management Plan*.

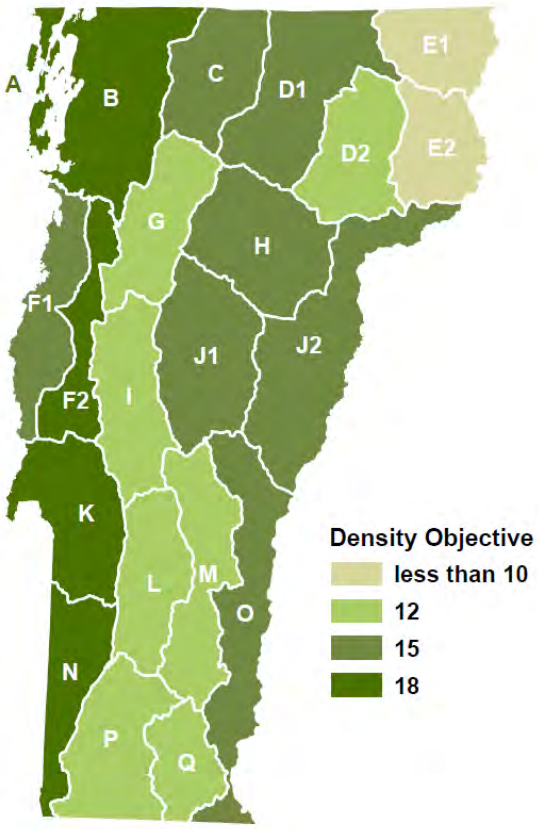


Figure 5. Deer density objectives by wildlife management unit. Deer densities are deer per square mile of habitat.

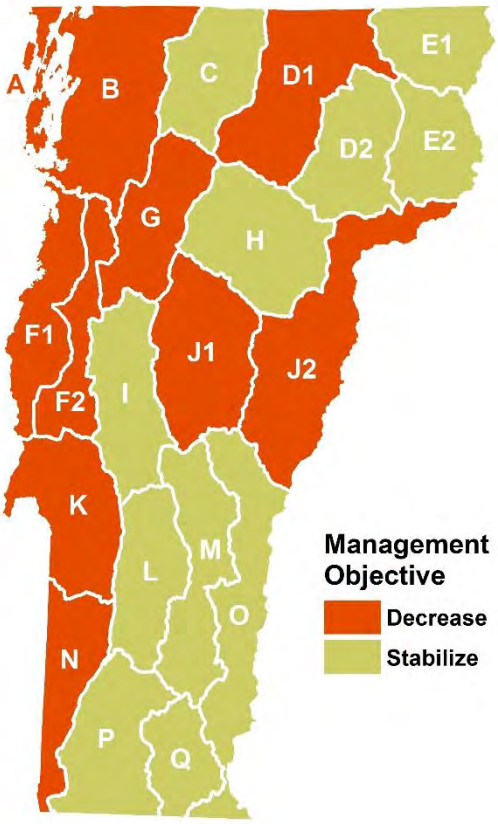


Figure 6. Desired change in the deer population, by wildlife management unit, to reach density objectives.

New Hunting Regulations

Several changes to deer hunting regulations will take effect in 2020 and are expected to have a substantial impact on antlerless deer harvests.

The archery season was lengthened from 37 days to 60 days and crossbows will be legal for all archery hunters. Bag limits have also been liberalized, allowing archers to now harvest up to 4 deer with a bow. However, experience from Vermont and other states indicates the primary factor limiting the archery harvest is the number of hunters, not the length of the season or the bag limit. Crossbow adoption among younger hunters is likely to be slow and will have only a minor impact on the harvest from slightly higher success rates. The recruitment of new archery hunters, or reactivation of former hunters, will have a greater impact on the harvest, but is likely to occur over several years, not all at once. As such, the Department is predicting a 10% increase in the archery antlerless harvest in 2020, above and beyond any changes in the deer population, as a result of the new hunting regulations.

The new novice season will allow new, first-time adult hunters to hunt during the youth weekend and therefore harvest antlerless deer. However, participation in this season is expected to be limited (perhaps 200 people) and have no impact on the total harvest during the youth/novice season. Youth season will also be two weeks earlier this year, but that is not expected to have any impact on the harvest.

The new antlerless muzzleloader season in late October is expected to significantly increase antlerless permit fill rates. This season will give hunters 4 additional days to fill their antlerless permit. Importantly, those 4 days are prior to the rifle season, when weather is more favorable, deer haven't been pushed around and learned to avoid hunters, and more hunters will have not yet harvested a deer. As a result, the Department is predicting that fill rates will increase by a factor of 1.75. For example, a WMU that previously had a 20 percent fill rate will now have a 35 percent fill rate (see Table 1). This puts fill rates in most WMUs at levels that are comparable to success rates during youth season. Many people will predict much higher fill rates, but rates exceeding 50 percent are unrealistic. Deer hunting in Vermont is still difficult, muzzleloaders still have limitations, and some hunters will never try to fill their permit.

Collectively, all of the changes to deer hunting regulations that will take effect this year are unprecedented. As such, there are no examples from other states to look to for guidance for the suite of changes that are taking effect at the same time. The predicted effects of these regulation changes are based on the Department's knowledge of Vermont's deer population, deer hunters, and the effects of previous, less substantial changes to hunting regulations. The current status of the deer population, with densities exceeding objectives and concerns about low or declining physical condition in many areas, precludes taking a more conservative approach to antlerless harvests at this time. However, this recommendation is conservative, as the proposed antlerless harvests will take 2-4 years in most cases to achieve WMU-specific density objectives. Even if antlerless harvests do exceed expectations, they will only move populations toward objective levels quicker. Importantly, deer management will continue to be adaptive and harvests will be adjusted in the future as we gain information on the actual effects of the regulation changes.

Antlerless Harvest and Buck Age Structure Management

Antlerless harvests are an important tool for managing buck age structure and the overall buck hunting experience. The 2018 Big Game Survey found that 74% of Vermont hunters are interested in managing for older, larger deer. Further, 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." Providing additional antlerless harvest opportunities helps to reduce hunting pressure on bucks, allowing more bucks to survive to older ages. Increased antlerless harvests are also necessary to achieve a more balanced buck-to-doe ratio. Perhaps most importantly, a healthy deer population produces healthier, larger-antlered, larger-bodied bucks.

Ultimately, the Department would like to maintain the buck population at its current level. It may seem counterintuitive that this can be done with fewer does in the population, but age structure and birth rate data clearly indicate that it is possible. When does are in better physical condition they give birth to more fawns, and, more importantly, are able to raise more of those fawns to adulthood. This means that fewer, healthier does can recruit more deer into the population than a larger number of less-healthy does on over-browsed habitat. If the physical condition of deer can be improved, recruitment of fawns to adulthood will improve. Since half of fawns are male, this would allow the buck population to remain at its current level, or even increase, despite fewer does on the landscape.

Antlerless Harvest Recommendation

Archery Season

The Department believes it is appropriate to have all WMUs open to the taking of antlerless deer during the 2020 archery season. Antlerless harvest in archery season is a key component in deer population management in Vermont. Archery hunters tend to distribute their hunting effort and, as a result, harvest in areas with higher deer numbers. Therefore, archery harvest has a low impact in areas with fewer deer. Importantly, archery harvest allows hunters to better regulate local deer herds in areas with high deer densities, particularly areas where firearm hunting is limited.

Youth and Novice Season

The Department is strongly committed to recruiting new hunters into Vermont's deer hunting heritage. Based on this commitment and the importance of harvesting an adequate number of female deer each year, the Department recommends that the youth and novice season bag limit be one deer of either sex in all WMUs. This will provide these hunters additional opportunity to harvest a deer and the opportunity to help properly manage Vermont's deer herd. The Department also recommends that hunters during this season be able to take any buck, regardless of antler characteristics. It is critical that spike-antlered bucks be taken during this season so the Department can track their prevalence in the population (for population modeling) and obtain important biological information (e.g., weight, antler measurements) from this portion of the yearling buck population. This is the primary reason Department biologists examine deer during this season each year. This will have no impact on buck age structure management in WMUs that still have an antler restriction, as the buck harvest during this season is less than 10 percent (8 percent in 2019) of the overall buck harvest.

Antlerless Permits

Antlerless permits are recommended for 19 of the state's 21 WMUs in 2020. These permits may be filled during the early antlerless-only muzzleloader season in late October or during the December muzzleloader season. The Department recommends that a total of 23,000 antlerless permits be issued (the same number approved for distribution in 2019). An increase in antlerless permits is recommended in 7 WMUs, and a decrease in antlerless permits is recommended for 5 WMUs (Figure 7). These recommendations account for new, WMU-specific deer density and physical condition objectives established in the 2020-2030 Big Game Management Plan (see Appendix A for additional detail). They also represent an increased effort to reduce deer populations in parts of Vermont by taking advantage of new deer hunting regulations. This permit allocation is expected to result in the harvest of an additional 6,385 antlerless deer above those harvested during the archery and youth/novice seasons. Harvesting this number of antlerless deer should yield approximately 5,428 adult female deer (85 percent of muzzleloader antlerless deer are adult does).

The total recommended antlerless harvest represents a substantial increase over recent antlerless harvests. However, recent antlerless harvests were limited by an inability to distribute more antlerless permits in some areas, so they did not represent desired harvest levels. This recommendation takes advantage of new hunting regulations to achieve antlerless harvests that will be more effective at achieving WMU-specific deer density objectives. However, this recommendation is conservative due to uncertainty about the effects of the new regulations. Ultimately, even greater antlerless harvests will be necessary in many WMUs to achieve density objectives, particularly if winter severity continues to be low.

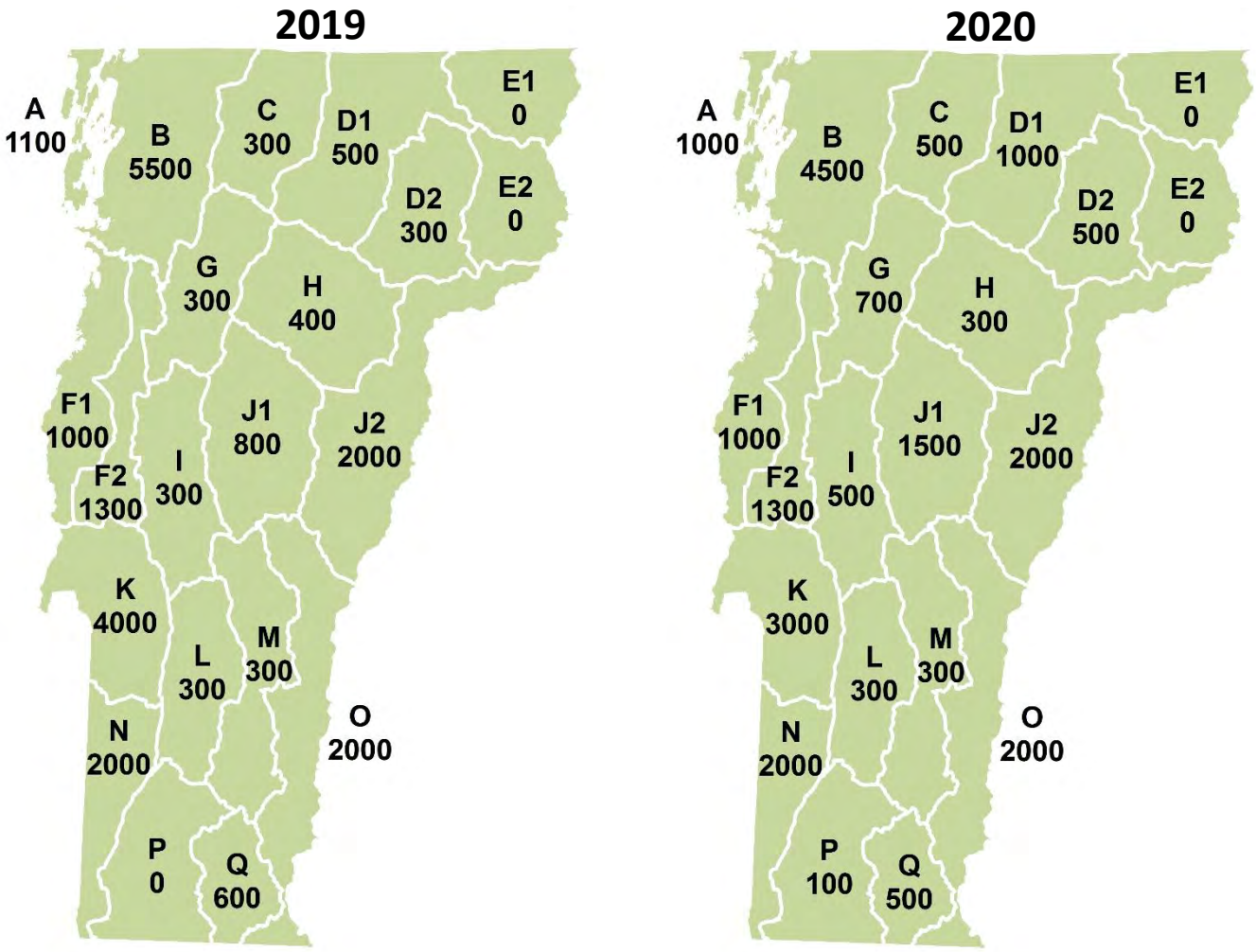


Figure 7. Antlerless permit allocations by wildlife management unit for 2019 and 2020 (proposed).

Table 1. Estimated deer densities, predicted antlerless deer harvest during the 2020 archery, youth, and muzzleloader seasons, and actual 2019 antlerless harvest by wildlife management unit.

	Deer per mi^2			Early Antlerless		Muzzleloader Antlerless			2020	2019 Recommended & (Actual)		2020 Total	% of Doe
WMU	Objective	2019	2020	Archery	Youth	Permits	Fill Rate	Harvest	Total Antlerless	Antlerless		Adult Does[a]	Population Harvested
A	18	33	33	102	17	1000	22%	219	339	219[b]	(238)	286	26%
B	18	27	26	531	146	4500	25%	1135	1813	1361[b]	(1435)	1519	20%
C	15	16	17	164	65	500	44%	218	446	276	(286)	370	11%
D1	15	18	19	250	104	1000	41%	408	762	486	(481)	632	12%
D2	12	13	14	97	37	500	34%	171	306	185	(198)	254	10%
E1	<10	7	7	12	8	0		0	19	23	(19)	15	1%
E2	<10	6	7	9	4	0		0	12	24	(12)	10	1%
F1	15	18	18	114	25	1000	24%	244	382	278[b]	(257)	321	11%
F2	18	21	21	105	26	1300	25%	319	450	323[b]	(273)	379	13%
G	12	15	16	115	22	700	30%	208	345	204	(166)	290	9%
H	15	13	14	204	44	300	29%	87	335	293	(306)	278	8%
I	12	12	14	90	15	500	29%	145	249	163	(137)	209	7%
J1	15	20	21	208	38	1500	38%	568	814	395	(377)	686	12%
J2	15	19	19	273	76	2000	32%	639	989	716	(669)	829	12%
K	18	24	24	178	48	3000	23%	701	928	778[b]	(537)	782	15%
L	12	11	12	66	18	300	35%	105	189	117	(120)	158	8%
M	12	12	13	48	9	300	30%	91	148	113	(87)	124	4%
N	18	21	21	93	31	2000	22%	446	570	418[b]	(272)	480	14%
O	15	16	17	168	40	2000	27%	534	741	570	(417)	624	14%
P	12	10	11	68	24	100	35%	35	127	88	(82)	104	4%
Q	12	12	13	69	4	500	22%	110	184	133[b]	(123)	155	11%
STATE				**2961**	**801**	**23000**	**28%**	**6385**	**10147**	**7157[b]**	**(6492)**	**8505**	**12%**

[a] *Adult does (1+ year old) are typically 85% of the archery and muzzleloader antlerless harvest and 70% of the youth season antlerless harvest.*

[b] *Recommended antlerless harvest in 2019 was limited by inability to distribute additional antlerless permits.*

Table 2. Muzzleloader antlerless permit history by WMU, 2010–2019, and recommended permit allocation for 2020. Numbers in parentheses are the number actually distributed.

WMU	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A	950	550	650	900	900	900	1100	1100 (843)	1100 (720)	1100 (939)	**1000**
B	5000	3200	3600	3400	3800	3350	5500	5500	5500	5500	**4500**
C	500	0	0	400	400	100	350	700	800	300	**500**
D1[a]	1100	175	250	450	850	100	300	500	1200	500	**1000**
D2[a]	500	0	0	100	0	0	100	300	800	300	**500**
E1[a]	0	0	0	0	0	0	0	0	0	0	**0**
E2[a]	0	0	0	0	0	0	0	0	0	0	**0**
F1	1100	450	525	250	175	0	200	1200 (917)	1000 (900)	1000	**1000**
F2	1700	425	575	450	275	0	700	1500 (1297)	1300	1300	**1300**
G	200	0	0	100	200	100	300	300	300	300	**700**
H[b]	800	225	300	150	550	100	750	900	1100	400	**300**
I	200	0	0	50	0	0	0	300	300	300	**500**
J1	1000	275	400	100	150	0	300	750	1200	800	**1500**
J2[c]	1750	775	1150	950	1000	400	1500	1750	2500	2000	**2000**
K[d]	4700 (3672)	1400	2000	3900	5000 (4403)	2250	4100 (3569)	4100 (2505)	4000 (2446)	4000 (2440)	**3000**
L	200	0	0	100	0	0	0	300	300	300	**300**
M[e]	300	0	0	0	0	0	200	300	300	300	**300**
N	2900 (2030)	1425	1975	2100	3000 (2123)	1850	2100 (1835)	2100 (1588)	2000 (1487)	2000 (1462)	**2000**
O[f]	1950	675	750	750	750	500	1200	2000	2600 (2300)	2000	**2000**
P	0	0	0	0	0	0	0	0	0	0	**100**
Q[a]	750	0	250	200	0	0	250	900 (692)	700 (604)	600	**500**
STATE	**25600**	**9575**	**12425**	**14350**	**17050**	**9650**	**18950**	**24500**	**27000**	**23000**	**23000**

[a] *WMU boundary changed in 2014.*

[b] *Permit totals prior to 2014 are for former WMU H1.*

[c] *Permit totals prior to 2014 are for former WMUs H2 and J2.*

[d] *Permit totals prior to 2014 are for former WMUs K1 and K2.*

[e] *Permit totals prior to 2014 are for former WMUs M1 and O1.*

[f] *Permit totals prior to 2014 are for former WMUs M2 and O2. A portion of WMU Q was also added to this unit in 2014.*

Table 3. Muzzleloader antlerless permit fill rate by WMU, 2010–2019.

WMU	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	5-Yr Avg
A	12%	14%	11%	10%	11%	9%	10%	12%	19%	13%	13%
B	16%	16%	13%	13%	14%	12%	15%	13%	19%	14%	14%
C	28%			26%	22%	20%	29%	19%	33%	24%	25%
D1*	24%	27%	22%	26%	22%	10%	25%	28%	29%	24%	23%
D2*	23%			21%			18%	18%	21%	21%	20%
E*											
F1	11%	18%	13%	12%	13%		15%	11%	16%	13%	14%
F2	11%	12%	15%	13%	12%		14%	11%	19%	12%	14%
G	30%			35%	16%	7%	20%	16%	28%	14%	17%
H*	19%	24%	20%	18%	19%	12%	16%	17%	20%	18%	17%
I	20%			24%				11%	24%	15%	17%
J1	16%	23%	16%	22%	12%		23%	19%	26%	19%	22%
J2*	18%	19%	16%	22%	22%	16%	20%	16%	23%	17%	18%
K	14%	16%	10%	11%	10%	10%	13%	12%	18%	14%	13%
L	16%			23%				14%	31%	15%	20%
M	15%						18%	15%	24%	13%	17%
N	14%	13%	11%	11%	11%	9%	13%	12%	18%	11%	13%
O*	13%	19%	15%	16%	23%	15%	15%	15%	20%	11%	15%
P											
Q*	8%		14%	12%			11%	12%	18%	10%	13%
STATE	**16%**	**16%**	**15%**	**18%**	**16%**	**11%**	**15%**	**14%**	**21%**	**14%**	**15%**

**WMU boundary changed in 2014.*

Public Meeting Comments

Three online public hearings were held April 13, 15, and 16, 2020 to gather hunters' comments on the deer herd. Approximately 200 members of the public participated in these hearings. A summary of comments on the status of the deer herd is provided in Appendix B. Two additional online public hearings will be held in May, 2020.

Appendix A: Explanation of Management Recommendations by WMU

Deer densities, habitat conditions, and winter severity can vary substantially from one part of Vermont to another. Additionally, these factors and the effects of historical deer densities have resulted in deer in some regions being in better physical condition than others. This results in variable deer population dynamics across the state; therefore, deer management prescriptions are made at the WMU level rather than statewide.

The Department is aware that deer densities (and other factors) vary within each WMU, sometimes substantially. Unfortunately, managing deer at a smaller scale than a WMU is not currently feasible given the structure of hunting regulations and the Department's ability to collect enough data. However, hunters generally do a good job of targeting areas of higher deer density within a WMU if they have sufficient access.

Description of data provided for each WMU

Area of deer habitat: Deer habitat is all land that is not developed.

Management Objective: The desired change in the deer population (Increase, Decrease, Stabilize)

Recommended Antlerless Harvest: The total recommended antlerless harvest for 2020 across all seasons. The number of adult does (≥1 year old) expected to be harvested as a result (85% of archery and muzzleloader antlerless harvest, 70% of youth/novice antlerless harvest) is also shown, as is the percentage of the WMU's doe population that this would represent.

Deer Density: Estimated pre-hunt deer density over the past 9 years based on retrospective population modelling and the projected density in fall 2020. The density objective established in the 2020-2030 Big Game Management Plan is shown and represented by a red line in the figure. The shaded green area shows ±2 deer per square mile – the range in which the management objective will be to stabilize.

Harvest: The total buck and antlerless deer harvests during all seasons during the past 10 years

Yearling Antler Beam Diameter/Yearling Male Weight/Fawn Weight: These physical condition metrics are from deer examined by biologists at check stations and are shown for the past 10 years. The average for the most recent 3 years is shown, as well as the minimum acceptable level established in the 2020-2030 Big Game Management Plan. The red shaded area in the figures represents levels below the established minimum.

Adult Birth Rate: The average adult birth rate (fetuses per doe) over the past 5 years based on examinations of incidentally killed deer during February-May. Sample size is shown in parentheses. The minimum acceptable level established in the 2020-2030 Big Game Management Plan is also shown.

Winter Severity: The median winter severity index in that WMU or region over the past 30 years and the expected adult doe mortality outside of the hunting seasons based on that winter severity.

Red Numbers: Numbers are red when they do not meet the objectives established in the 2020-2030 Big Game Management Plan.

Yellow Highlight: Boxes are highlighted yellow when they are significant considerations for the management recommendation, potentially superseding other data.

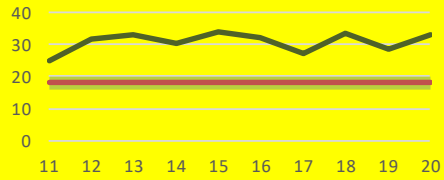
WMU Map: The map shows the distribution of the 2019 deer harvest in the WMU. Each dot represents a deer harvested in the underlying town, not the exact location of harvest

A

71 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**339** 286 Adult Does 26% of doe population

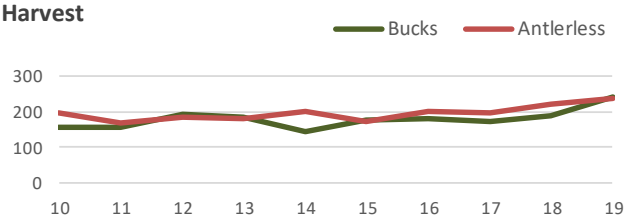
Deer Density



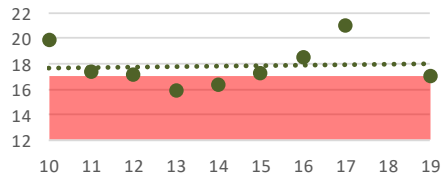
2020 Estimate **33**

Objective 18

Harvest



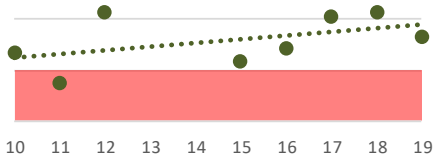
Yearling Antler Beam Diameter



3-Year Avg. **19.0**

Minimum 17

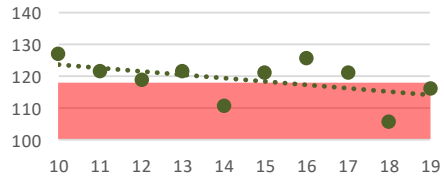
Fawn Weight



3-Year Avg. **69.5**

Minimum 60

Yearling Male Weight



3-Year Avg. **114.2**

Minimum 118

Adult Birth Rate

5-Year Avg. **2.00** *(3)*

Minimum 1.60

Winter Severity

Median WSI **15**

expected non-hunt mortality 9%

Wildlife Management Unit A encompasses the Champlain Islands (Grand Isle County). Winters here are among the least severe anywhere in Vermont and the habitat is relatively productive due to an abundance of agriculture. Despite high population density, physical condition of deer in this region remains good, presumably due to the abundance of agricultural habitat.

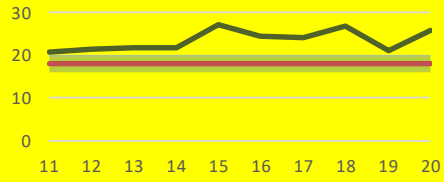
The abundant agriculture and other open land means only 46% of the habitat is forested. As a result, the estimated density of 33 deer per square mile of habitat equates to 71 deer per square mile of forest. This density of deer is having significant impacts on forest ecosystems. The health of these ecosystems is the primary management concern in this region.

B

616 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**1813** 1519 Adult Does 20% of doe population

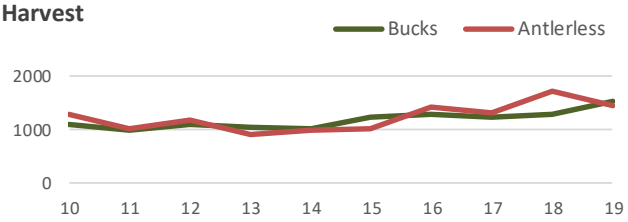
Deer Density



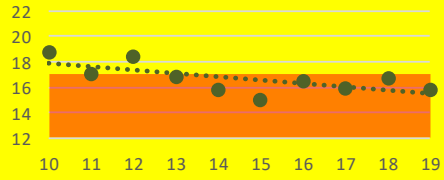
2020 Estimate **26**

Objective 18

Harvest



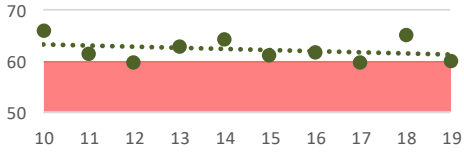
Yearling Antler Beam Diameter



3-Year Avg. **16.1**

Minimum 17

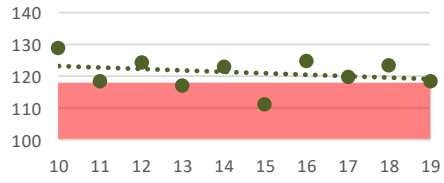
Fawn Weight



3-Year Avg. **61.7**

Minimum 60

Yearling Male Weight



3-Year Avg. **120.4**

Minimum 118

Adult Birth Rate

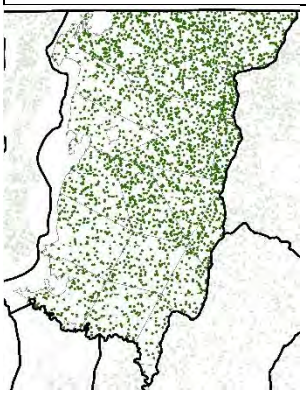
5-Year Avg. **1.88** *(27)*

Minimum 1.60

Winter Severity

Median WSI **23**

expected non-hunt mortality 10%



Wildlife Management Unit B encompasses the Champlain Valley north of the Winooski River. Severe winters are rare in this region and the habitat is relatively productive, with an ideal mix of forest and fields.

Physical condition of deer in this region is declining, and, although some metrics are not yet at concerning levels, this indicates that deer densities have exceeded the level that the habitat can support long-term. This is further supported by widespread and often substantial evidence of deer impacts to forest ecosystems.

Deer density in this WMU has been above management objective for many years and recent antlerless harvests have been insufficient to reduce those densities. As such, greater antlerless harvests are recommended until density is reduced to objective.

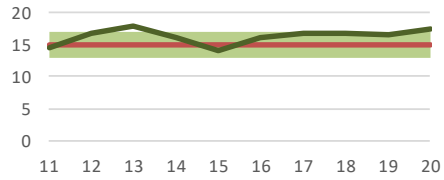
Hunter density is high in this part of the state and those hunters appear willing to harvest additional antlerless deer if given the opportunity. However, limited hunter access to private land is a significant management challenge in this WMU.

C

386 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**446** 370 Adult Does (11% of doe population)

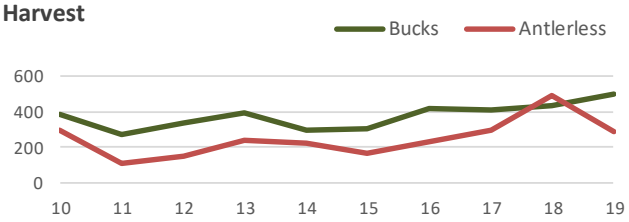
Deer Density



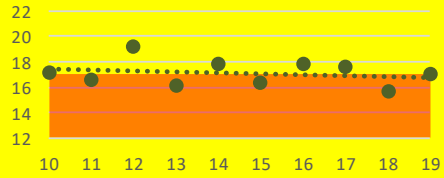
2020 Estimate **17**

Objective 15

Harvest



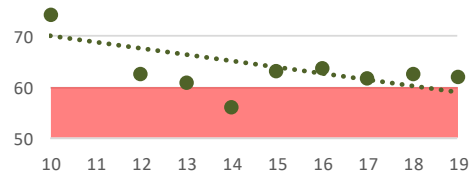
Yearling Antler Beam Diameter



3-Year Avg. **16.8**

Minimum 17

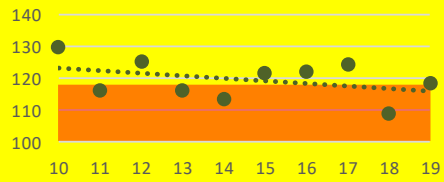
Fawn Weight



3-Year Avg. **62.2**

Minimum 60

Yearling Male Weight



3-Year Avg. **117.1**

Minimum 118

Adult Birth Rate

5-Year Avg. **1.36** *(11)*

Minimum 1.60

Winter Severity

Median WSI **39**

expected non-hunt mortality 12%

Wildlife Management Unit C encompasses the northernmost portion of the Green Mountains, from Johnson to the Canadian border. The westernmost portion of the WMU consists of lower elevation farmland similar to WMU B and has notably higher deer densities than higher elevation portions of the WMU.

Physical condition of deer in this WMU is moderately poor and suggests that density has been near or slightly above the level the habitat can support for many years. This is presumably driven primarily by higher density in the western portion of the WMU.

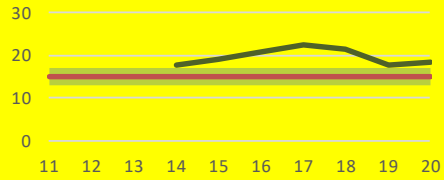
Deer density has remained relatively stable in this WMU over the past 10 years, and importantly has been above the current objective of 15 deer/mi² (albeit only slightly) since 2016. Recent antlerless harvests have been insufficient to reduce the deer population in this WMU, so the current recommendation represents a slight increase intended to bring the density closer to the objective.

D1

570 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**762** 632 Adult Does 12% of doe population

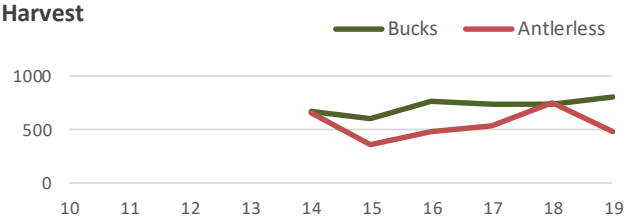
Deer Density



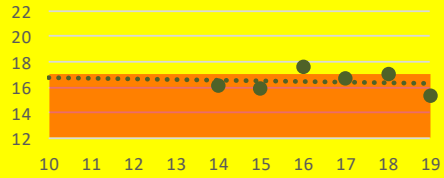
2020 Estimate **18**

Objective 15

Harvest



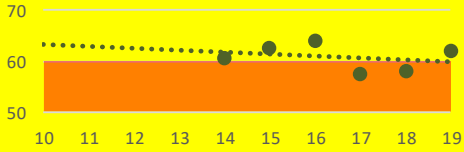
Yearling Antler Beam Diameter



3-Year Avg. **16.4**

Minimum 17

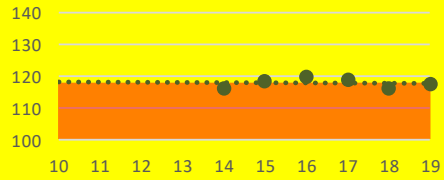
Fawn Weight



3-Year Avg. **59.2**

Minimum 60

Yearling Male Weight



3-Year Avg. **117.4**

Minimum 118

Adult Birth Rate

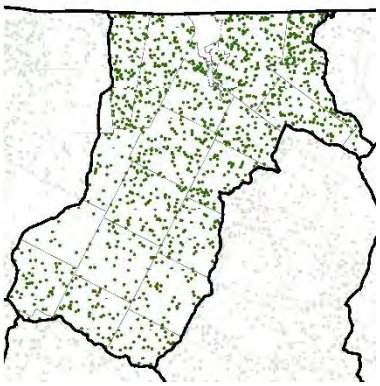
5-Year Avg. **1.69** *(49)*

Minimum 1.60

Winter Severity

Median WSI **48**

expected non-hunt mortality 14%



Wildlife Management Unit D1 is in the northern Vermont piedmont biophysical region. Deer habitat in this WMU is fairly productive, with a mix of forest and fields. Winters in this region tend to be more severe than much of the rest of the state, which limits the density of deer that can be supported long term.

Physical condition of deer in this WMU is concerning, particularly given the amount of agriculture and general quality of habitat and the relative severity of winters. Clearly the population has been overabundant for many years.

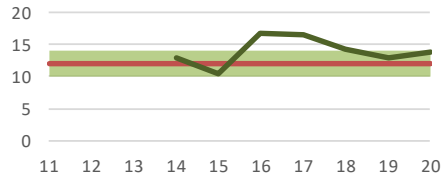
Past antlerless harvests have been insufficient to reduce deer density in this WMU, so a greater antlerless harvest is recommended. Increased antlerless harvests will need to continue, regardless of winter severity, until deer density reaches the objective.

D2

387 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**306** 254 Adult Does (10% of doe population)

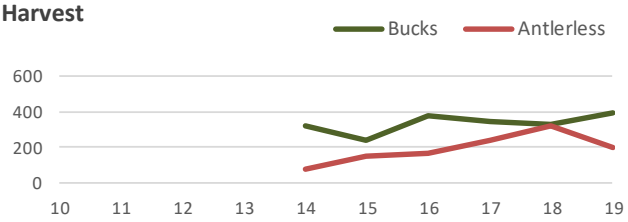
Deer Density



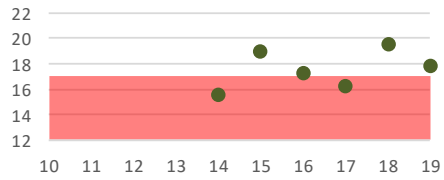
2020 Estimate **14**

Objective 12

Harvest



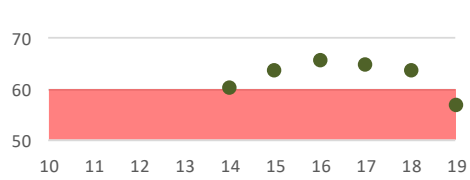
Yearling Antler Beam Diameter



3-Year Avg. **17.8**

Minimum 17

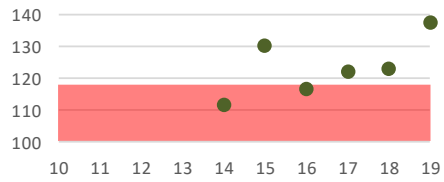
Fawn Weight



3-Year Avg. **61.8**

Minimum 60

Yearling Male Weight



3-Year Avg. **127.4**

Minimum 118

Adult Birth Rate

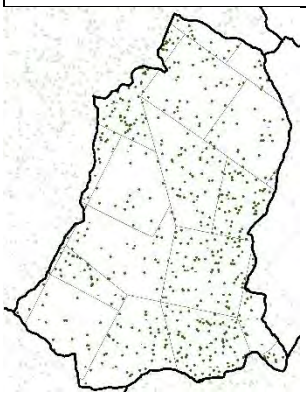
5-Year Avg. **1.73** *(15)*

Minimum 1.60

Winter Severity

Median WSI **62**

expected non-hunt mortality 16%



Wildlife Management Unit D2 is located in the Northeast Kingdom. Higher elevation portions of the unit are heavily forested while lower elevations, particularly along the Passumpsic river valley, include more open land and agriculture. As a result, deer density is higher in lower elevation areas in the southeastern part of the unit.

Winters in this WMU are often severe, which limits deer density, particularly in the higher elevation areas, and helps keep deer in good physical condition. However, several of the lower elevation towns (e.g., Burke, Lyndon, St. Johnsbury) have seen record or near-record harvests in recent years, suggesting the deer population in this part of the WMU is growing.

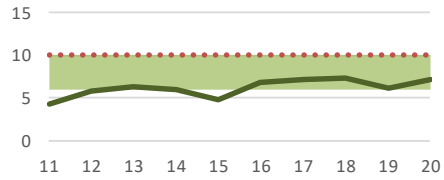
The antlerless harvest recommendation is intended to maintain the population at 12 deer/mi² by allowing for slightly increased antlerless harvests, which will be concentrated in the lower elevation, higher density parts of the WMU. The Department will also be considering an expanded archery zone around St. Johnsbury to further increase antlerless harvests in this area where complaints about deer damage to gardens and landscaping are common.

E

648 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**32** 25 Adult Does (1% of doe population)

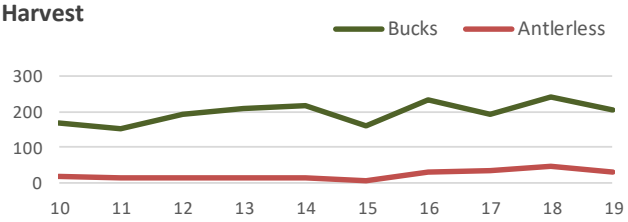
Deer Density



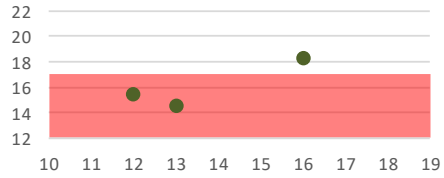
2020 Estimate **7**

Objective **<10**

Harvest



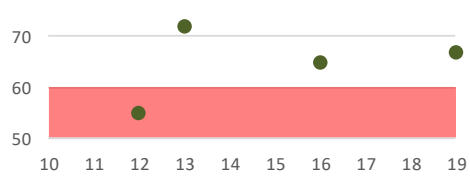
Yearling Antler Beam Diameter



3-Year Avg. **14.6**

Minimum **17**

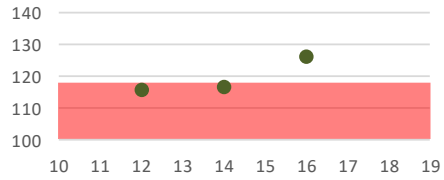
Fawn Weight



3-Year Avg. **72.0**

Minimum **60**

Yearling Male Weight



3-Year Avg. **108.5**

Minimum **118**

Adult Birth Rate

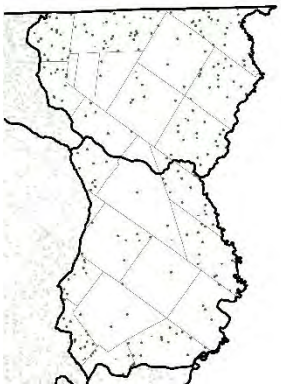
5-Year Avg. **1.77** *(13)*

Minimum **1.60**

Winter Severity

Median WSI **77**

expected non-hunt mortality **18%**



Wildlife Management Units E1 and E2 are located in the northeast corner of Vermont in the northeast highlands biophysical region. This region regularly experiences severe winters which limit deer density.

These WMUs are heavily forested, but young forest is abundant due to widespread commercial timber harvesting. As a result, summer deer habitat is relatively high quality. It is the quantity and quality of winter habitat, specifically mature softwood cover, that limits deer abundance in this region.

Additionally, deer in this region must coexist with a relatively abundant moose population. Because they largely compete for the same resources at certain times of year, the densities of both species must be considered in management decisions. The current density objective in these WMUs considers both the relationship between deer and moose and the limited quantity and quality of current deer winter habitat. Maintaining deer density below 10/mi² helps minimize the risk of brainworm infection in moose and allows deer winter habitats to improve.

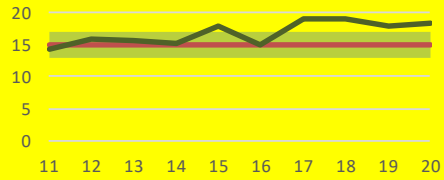
Deer density remains well below the 10/mi² threshold but has been slowly increasing over the past 10 years. If this trend continues it will soon be necessary to increase the antlerless harvest in this region. The current antlerless recommendation simply represents additional harvest opportunity provided to archery and youth/novice hunters and will have no effect on the population.

F1

316 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**382** 321 Adult Does 11% of doe population

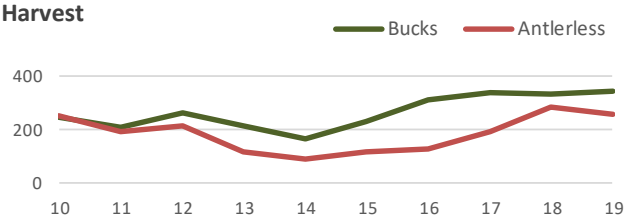
Deer Density



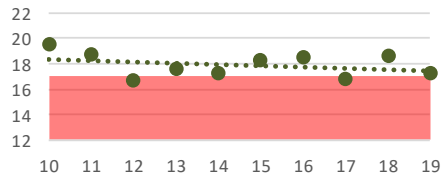
2020 Estimate **18**

Objective 15

Harvest



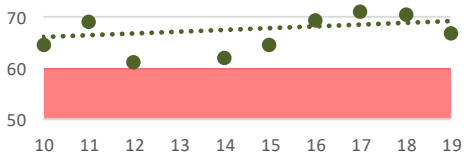
Yearling Antler Beam Diameter



3-Year Avg. **17.6**

Minimum 17

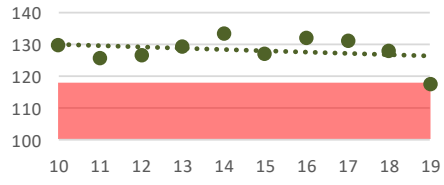
Fawn Weight



3-Year Avg. **69.5**

Minimum 60

Yearling Male Weight



3-Year Avg. **125.5**

Minimum 118

Adult Birth Rate

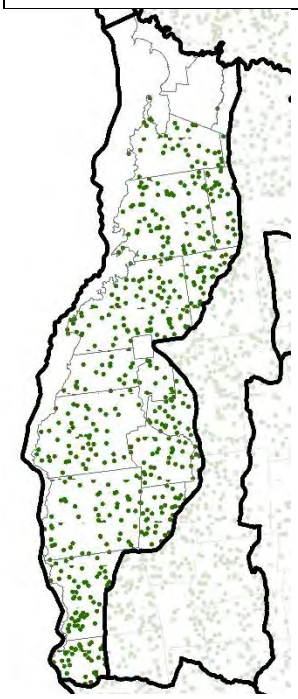
5-Year Avg. **1.58** *(12)*

Minimum 1.60

Winter Severity

Median WSI **15**

expected non-hunt mortality 9%



Wildlife Management Unit F1 is in the southern Champlain Valley, from Burlington south through the heavily agricultural regions of Addison County. Winters are relatively easy for deer in this part of Vermont and the abundance of agriculture results in excellent deer habitat. This is reflected in the physical condition of the deer, which is consistently among the best in the state.

The abundance of agriculture and otherwise open land results in only 33% of this WMU being forested. The current density of 18 deer/mi² of habitat therefore equates to 56 deer/mi² of forest. High densities like this have caused widespread and significant impacts to forest ecosystems, including many of the uncommon natural communities that are found in this region.

Deer density has increased notably during the past 5 years, with many towns having record or near-record harvests each year. The recent increase in antlerless harvest may have helped to slow this increase, and possibly stabilize the population, but harvests have been insufficient to reduce deer density toward the objective. The recommended antlerless harvest represents a substantial increase over recent years but will still take several years to reduce the density to the objective. Consistently higher antlerless harvests will be necessary to maintain the population at the objective level.

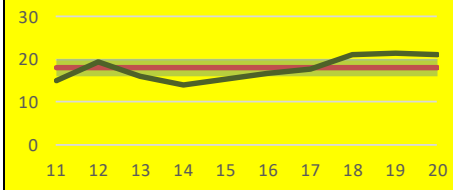
Limited hunter access to private land is a significant management challenge in this WMU.

F2

268 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**450** 379 Adult Does 13% of doe population

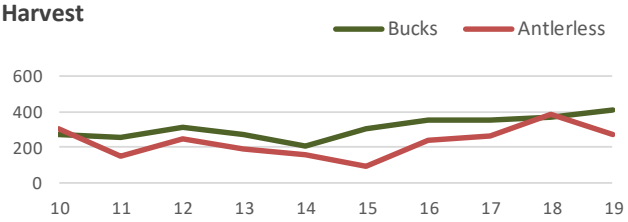
Deer Density



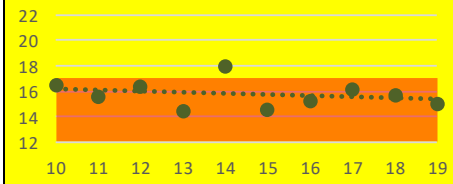
2020 Estimate **21**

Objective 18

Harvest



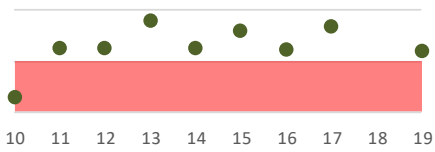
Yearling Antler Beam Diameter



3-Year Avg. **15.6**

Minimum 17

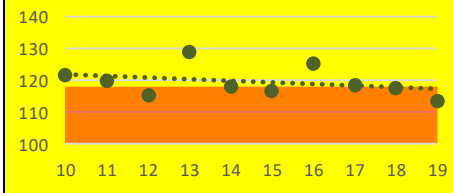
Fawn Weight



3-Year Avg. **68.3**

Minimum 60

Yearling Male Weight



3-Year Avg. **116.4**

Minimum 118

Adult Birth Rate

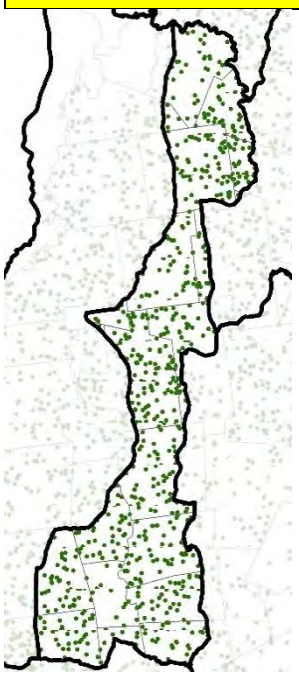
5-Year Avg. **2.00** *(8)*

Minimum 1.60

Winter Severity

Median WSI **23**

expected non-hunt mortality 10%



Wildlife Management Unit F2 is located in the southern Champlain Valley in the foothills of the Green Mountains. Winters here are relatively easy for deer and the habitat is generally good with a mix of forest and field.

Considering the prevalence of agriculture and mild winters, the poor condition of yearling bucks is particularly concerning. This suggests that deer density has exceed the level the habitat can support. Indeed, deer impacts to forest ecosystems are common in this WMU.

Deer density has increased notably over the past 5 years and many towns in this WMU have experienced record or near record harvests in the past 2 year. The recent increase in the antlerless harvest may have helped to slow this trend but has been insufficient to reduce the population toward the objective.

The current antlerless harvest recommendation is a notable increase from recent years but will still take several years to reduce density to the objective level. Consistently higher antlerless harvests will be necessary to maintain density at objective in this WMU.

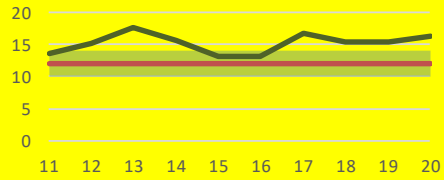
Limited hunter access to private land is a significant management challenge in this WMU.

G

388 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**345** 290 Adult Does (9% of doe population)

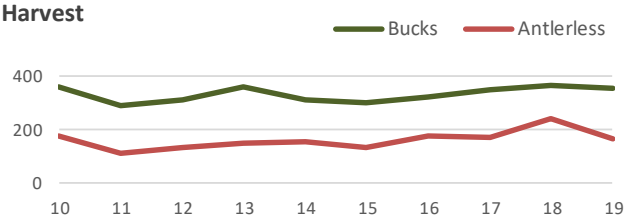
Deer Density



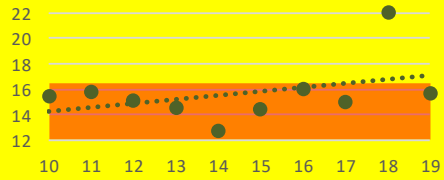
2020 Estimate **16**

Objective 12

Harvest



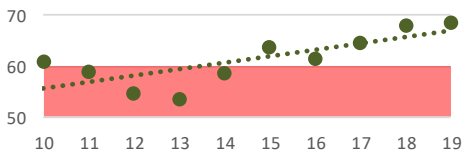
Yearling Antler Beam Diameter



3-Year Avg. **17.6**

Minimum 16.5

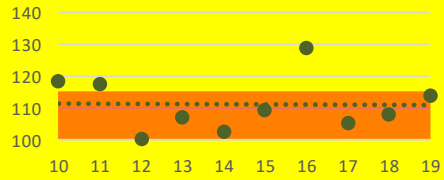
Fawn Weight



3-Year Avg. **67.0**

Minimum 60

Yearling Male Weight



3-Year Avg. **109.1**

Minimum 115

Adult Birth Rate

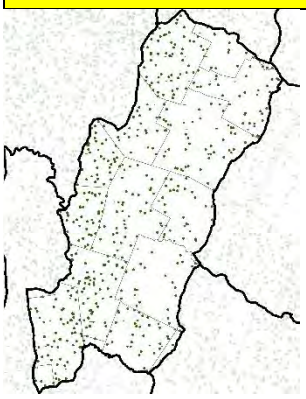
5-Year Avg. **1.54** *(13)*

Minimum 1.60

Winter Severity

Median WSI **39**

expected non-hunt mortality 12%



Wildlife Management Unit G is in the northern Green Mountains from the Appalachian Gap (Rte 17) north to Johnson. This area is heavily forested and mountainous, and includes both Camel's Hump and Mount Mansfield. Deer habitat is very poor due to the unproductive mountain terrain and very limited young forest habitat. Winters here can occasionally be severe, but are often more moderate at lower elevations where deer typically spend the winter.

Deer density in this unit is low at higher elevations, but moderate to high at lower elevations, particularly on the western edge of the unit. The poor physical condition of deer clearly indicates that density has exceeded what the habitat can support, likely for many years. This was the primary basis for reducing the population objective in this unit from 13-18 deer/mi2 to 12 deer/mi2.

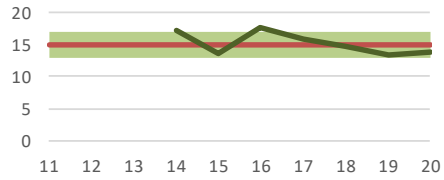
Past antlerless harvests have had no apparent effect on the deer population in this WMU. The recommended antlerless harvest represents a substantial increase and reflects a change in management approach due to new density and physical condition objectives.

H

518 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**335** 278 Adult Does (8% of doe population)

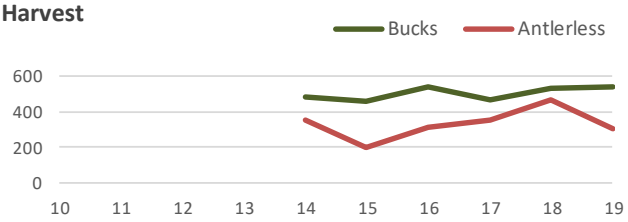
Deer Density



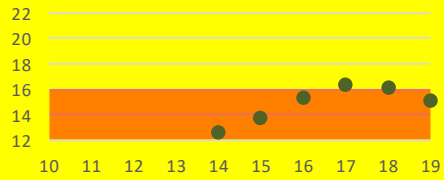
2020 Estimate **14**

Objective 15

Harvest



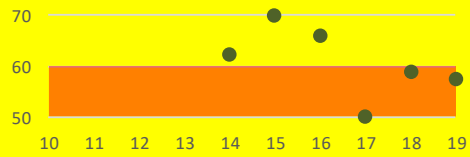
Yearling Antler Beam Diameter



3-Year Avg. **15.9**

Minimum 16

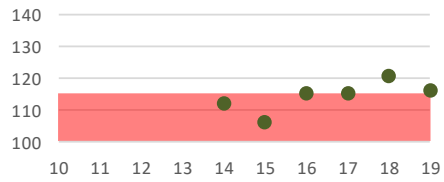
Fawn Weight



3-Year Avg. **55.5**

Minimum 60

Yearling Male Weight



3-Year Avg. **117.3**

Minimum 115

Adult Birth Rate

5-Year Avg. **1.61** *(23)*

Minimum 1.60

Winter Severity

Median WSI **43**

expected non-hunt mortality 13%

Wildlife Management Unit H is located in north-central Vermont, from Stowe east to Groton and Barre-Montpelier north to Hardwick. Habitat quality for deer varies considerably in this unit, and that is reflected in local deer densities. Lower elevation areas closer to Montpelier and Barre have more agriculture and open land and easier winters, resulting in relatively high deer density. The remainder of the WMU is higher elevation (including the Worcester and Groton ranges) and heavily forested. Winters are more severe in these areas and habitat quality is generally poor. As a result, deer density is lower.

Physical condition of deer in this WMU is generally mediocre, and yearling antler beam diameters and fawn weight are concerning. These are presumably related to historical overabundance of deer and declining habitat quality, and the current overall density of deer in this WMU should be sustainable. However, it will be important in the future to increase antlerless harvest in the Barre-Montpelier area where deer are overabundant. The Department will be considering an expanded archery zone to address this concern. Deer density should not be allowed to increase anywhere in this WMU until physical condition improves.

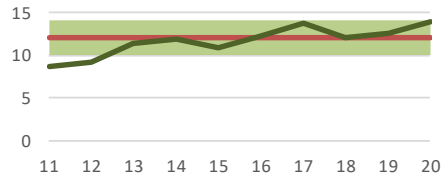
I

424

mi^2 deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**249** 209 Adult Does 7% of doe population

Deer Density



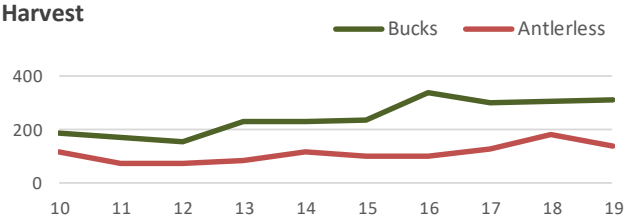
2020 Estimate

14

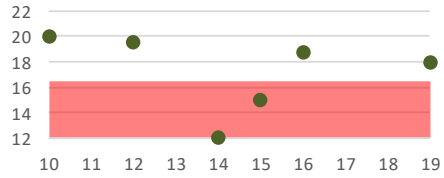
Objective

12

Harvest



Yearling Antler Beam Diameter



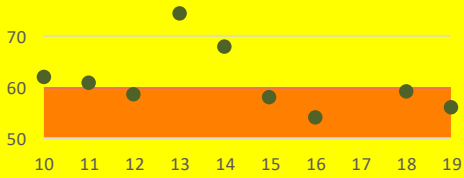
3-Year Avg.

17.3

Minimum

16.5

Fawn Weight



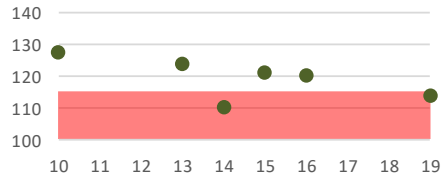
3-Year Avg.

56.4

Minimum

60

Yearling Male Weight



3-Year Avg.

118.3

Minimum

115

Adult Birth Rate

5-Year Avg.

1.45 *(12)*

Minimum

1.60

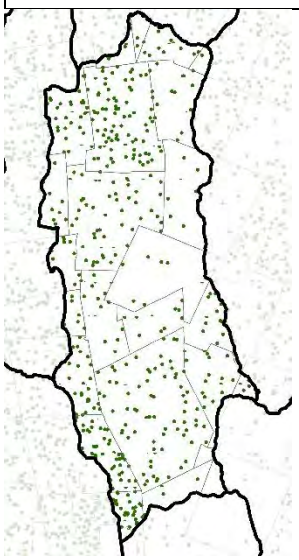
Winter Severity

Median WSI

39

expected non-hunt mortality

12%



Wildlife Management Unit I is located in the central Green Mountains, from Route 4 in Killington north to the Appalachian Gap (Rte 17). Deer habitat is generally poor due to the unproductive mountain terrain and very limited young forest habitat. Winters here can occasionally be severe but are often more moderate at lower elevations where deer typically spend the winter.

Deer density in this unit is low at higher elevations, but can be moderate to high at lower elevations, particularly on the western edge of the unit. The birth rate and fawn weights are concerning, but sample sizes are limited. Importantly, the deer population in this unit has grown little over the past 10 years, despite very limited antlerless harvest. This indicates that habitat quality is the primary factor limiting population growth and supports maintaining deer density at the current level.

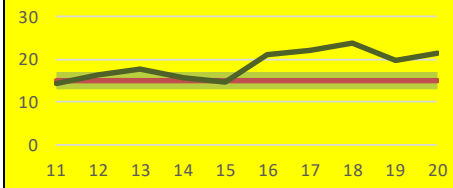
Since the population has been growing with past antlerless harvests, increased antlerless harvest is recommended to stabilize density at the current level.

J1

528 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**814** 686 Adult Does 12% of doe population

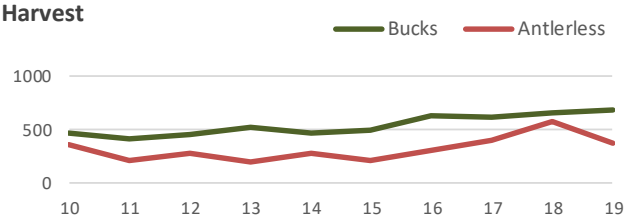
Deer Density



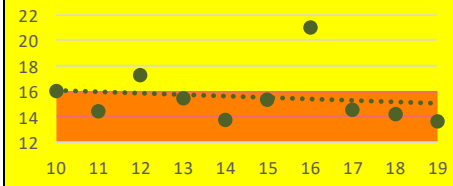
2020 Estimate **21**

Objective 15

Harvest



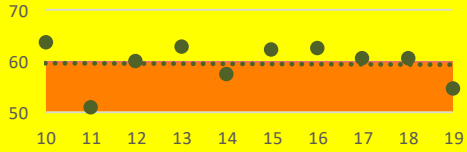
Yearling Antler Beam Diameter



3-Year Avg. **14.1**

Minimum 16

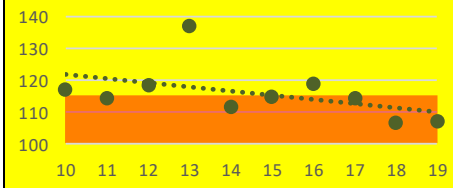
Fawn Weight



3-Year Avg. **58.7**

Minimum 60

Yearling Male Weight



3-Year Avg. **109.3**

Minimum 115

Adult Birth Rate

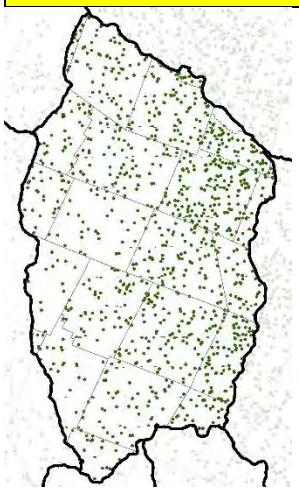
5-Year Avg. **1.62** *(39)*

Minimum 1.60

Winter Severity

Median WSI **43**

expected non-hunt mortality 13%



Wildlife Management Unit J1 is located in central Vermont. It encompasses the area from route 100 east to route 110 in Tunbridge and Chelsea, and from route 2 south to Bethel. Habitat quality for deer varies considerably in this unit, and that is reflected in local deer densities. Eastern parts of the WMU are hilly with an almost ideal mix of forest and field resulting in relatively high deer density. Conversely, the western half of the WMU is more mountainous and heavily forested. Habitat quality is poorer and, as a result, deer density is lower.

Physical condition of deer in this WMU is poor. This is presumably related to historical overabundance of deer and declining habitat quality, as these metrics have been low for many years. Clearly, deer density in this unit has exceed the level the habitat can support long-term. To improve the health of deer in this WMU, deer density must be reduced.

The recommended antlerless harvest is a substantial increase over recent years but is necessary to reduce the population. It will take approximately 5 years at this higher harvest level to reduce deer density to the objective.

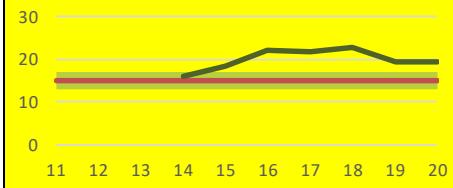
It will also be important in the future to increase antlerless harvest in the Barre-Montpelier area where deer are overabundant and conflicts are more likely. The Department will be considering an expanded archery zone to address this concern.

J2

705 mi^2 deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**989** 829 Adult Does (12% of doe population)

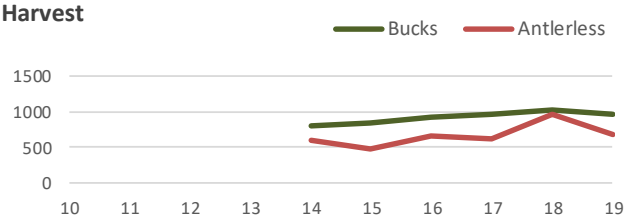
Deer Density



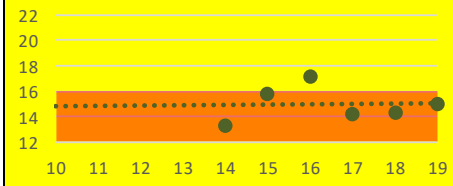
2020 Estimate **19**

Objective 15

Harvest



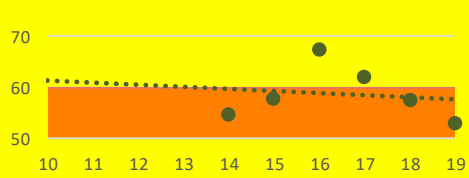
Yearling Antler Beam Diameter



3-Year Avg. **14.5**

Minimum 16

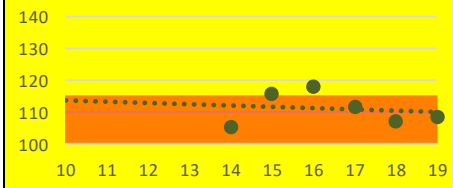
Fawn Weight



3-Year Avg. **57.5**

Minimum 60

Yearling Male Weight



3-Year Avg. **108.9**

Minimum 115

Adult Birth Rate

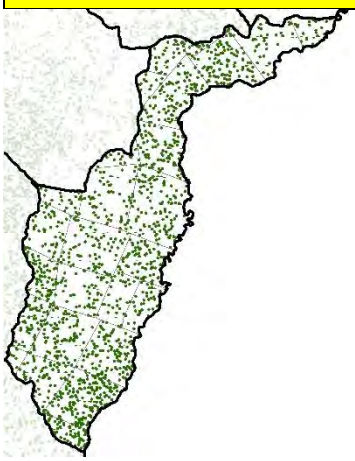
5-Year Avg. **1.43** *(28)*

Minimum 1.60

Winter Severity

Median WSI **40**

expected non-hunt mortality 12%



Wildlife Management Unit J2 encompasses the Connecticut River Valley from Lunenburg to White River Junction. Winters can occasionally be severe but are typically moderate to easy. The habitat contains a desirable mix of forest and field but forest habitats are very poor quality due to a lack of young forest and historical overabundance of deer and resultant chronic overbrowsing.

Physical condition of deer in this WMU is poor. This is presumably related to historical overabundance of deer and declining habitat quality, as these metrics have been low for many years. Clearly, deer density has exceeded the level the habitat can support long-term. To improve the health of deer in this WMU, deer density must be reduced.

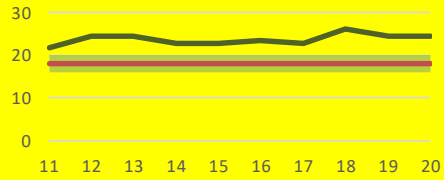
The recommended antlerless harvest is a notable increase over recent years but is necessary to reduce the population. It will take approximately 4 years at this higher harvest level to reduce deer density to the objective.

K

438 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**928** 782 Adult Does 15% of doe population

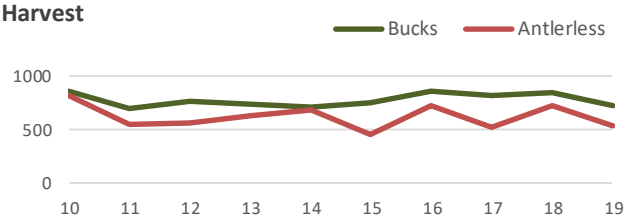
Deer Density



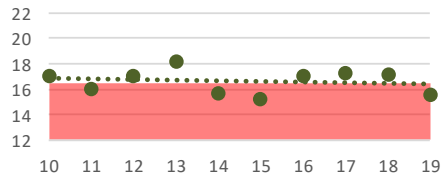
2020 Estimate **24**

Objective 18

Harvest



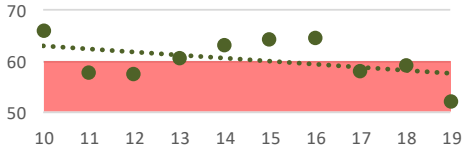
Yearling Antler Beam Diameter



3-Year Avg. **16.7**

Minimum 16.5

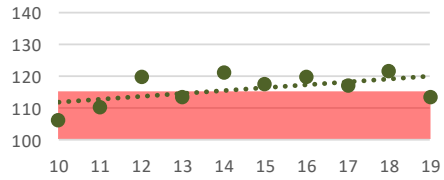
Fawn Weight



3-Year Avg. **56.4**

Minimum 60

Yearling Male Weight



3-Year Avg. **117.3**

Minimum 115

Adult Birth Rate

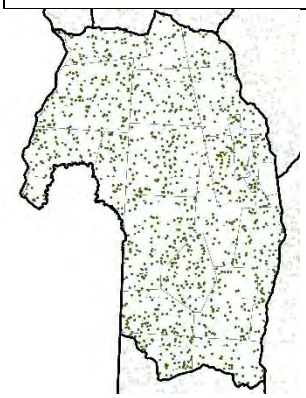
5-Year Avg. **1.72** *(25)*

Minimum 1.60

Winter Severity

Median WSI **17**

expected non-hunt mortality 9%



Wildlife Management Unit K is located in the Western Foothills biophysical region, encompassing areas west of US Route 7 from Brandon south through Rutland to Danby. This region has relatively easy winters and habitat with a good mix of forest and field. Importantly, oak is abundant and widespread and is an important factor in maintaining decent physical condition of deer despite chronic overabundance.

Deer browse damage to forest regeneration is ubiquitous throughout the WMU and has been occurring for decades in many areas. Chronic overabundance of deer has significantly impacted forest ecosystems and contributed to the proliferation of invasive species.

The Department has previously been unable to increase antlerless harvests in this WMU due to the inability to distribute additional antlerless permits. If all permits are distributed this year and the recommended harvest is achieved, it will take at least 5 years at this harvest level to reduce deer density to the objective.

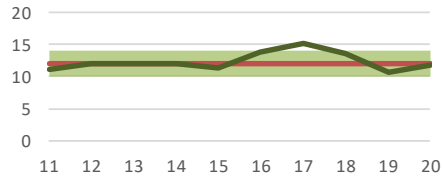
Limited hunter access to private land is a significant management challenge in this WMU.

L

365 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**189** 158 Adult Does 8% of doe population

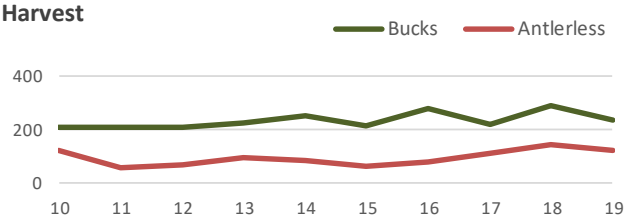
Deer Density



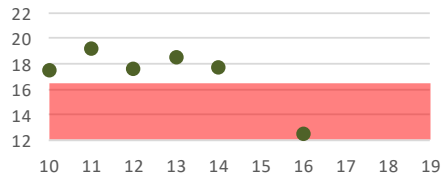
2020 Estimate **12**

Objective 12

Harvest



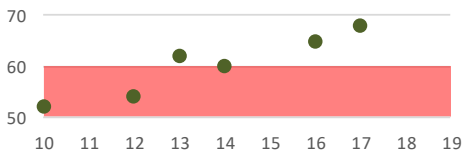
Yearling Antler Beam Diameter



3-Year Avg. **16.3**

Minimum 16.5

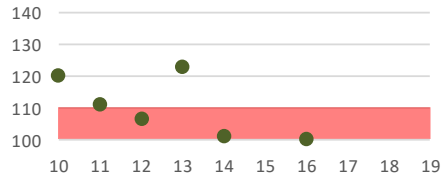
Fawn Weight



3-Year Avg. **75.7**

Minimum 60

Yearling Male Weight



3-Year Avg. **108.0**

Minimum 110

Adult Birth Rate

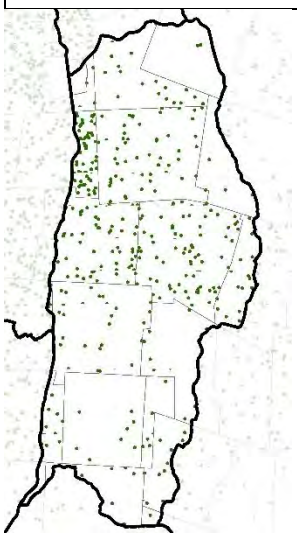
5-Year Avg. **1.67** *(15)*

Minimum 1.60

Winter Severity

Median WSI **39**

expected non-hunt mortality 12%



Wildlife Management Unit L is located in the southern Green Mountains, from US Route 4 in Killington south to route 30 in Winhall. Deer habitat is generally poor due to the unproductive mountain terrain and very limited young forest habitat. Winters here can occasionally be severe but are often more moderate at lower elevations where deer typically spend the winter.

Deer density in this unit is low at higher elevations, but can be moderate to high at lower elevations on the western edge of the unit, particularly closer to Rutland.

Yearling antler beam diameter and weight are both below desired levels, but sample sizes have been limited. Importantly, the population has not grown over the past 10 years despite very limited antlerless harvests. This suggests that habitat quality is the primary factor limiting deer density in this WMU

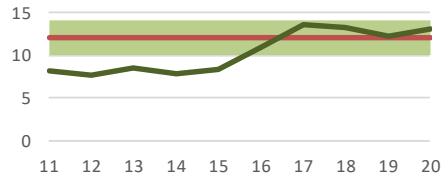
The recommended antlerless harvest is intended to maintain the population at its current level. It is a slight increase over recent antlerless harvests which will help address higher deer densities along the western edge of the unit and provide additional antlerless harvest opportunities.

M

451 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**148** 124 Adult Does (4% of doe population)

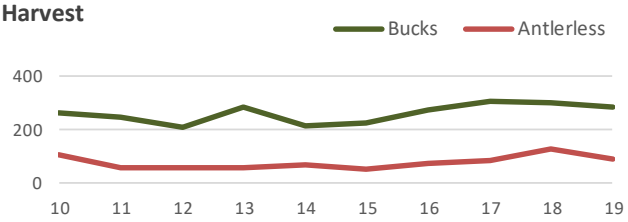
Deer Density



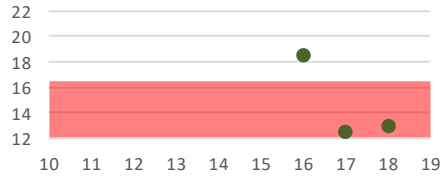
2020 Estimate **13**

Objective 12

Harvest



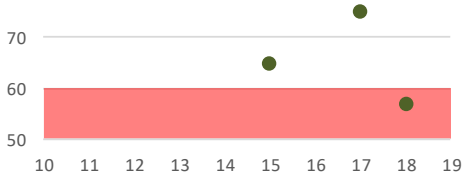
Yearling Antler Beam Diameter



3-Year Avg. **14.7**

Minimum 16.5

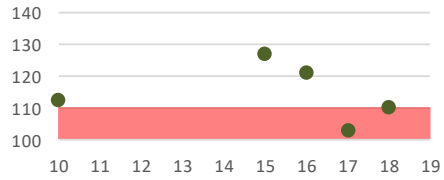
Fawn Weight



3-Year Avg. **65.7**

Minimum 60

Yearling Male Weight



3-Year Avg. **111.3**

Minimum 110

Adult Birth Rate

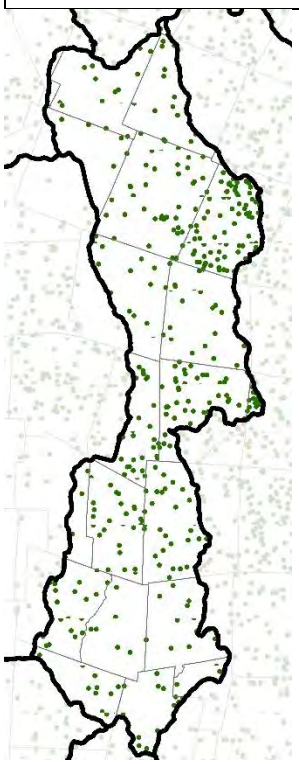
5-Year Avg. **1.76** *(24)*

Minimum 1.60

Winter Severity

Median WSI **40**

expected non-hunt mortality 12%



Wildlife Management Unit M is located in the eastern foothills biophysical region from Stockbridge south to Townshend. Deer habitat is generally poor due to the heavily forested, unproductive mountain terrain and limited young forest. Winters here can occasionally be severe but are often more moderate at lower elevations where deer typically spend the winter.

Deer density in this unit is variable, but generally low.

Yearling antler beam diameter is below desired levels, but sample sizes have been very low. Physical condition of deer is not currently concerning, and the current density of deer should be sustainable. The population increased in 2016 and 2017 following exceptionally easy winters but has otherwise been stable for many years despite very minimal antlerless harvests. This suggest that habitat is the primary factor limiting deer density.

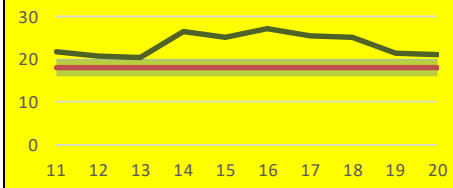
The recommended antlerless harvest is intended to maintain the population at its current level. It is a slight increase over recent antlerless harvests which will provide additional antlerless harvest opportunities with little or no effect on the population.

N

323 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Decrease	**570** 480 Adult Does 14% of doe population

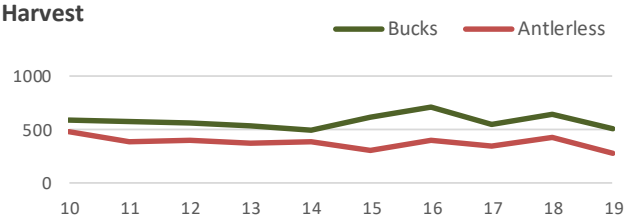
Deer Density



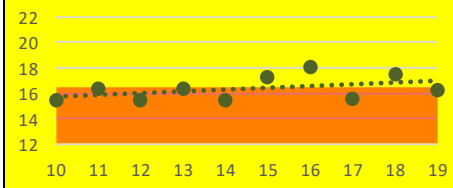
2020 Estimate **21**

Objective 18

Harvest



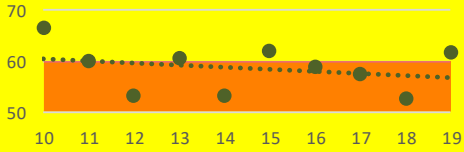
Yearling Antler Beam Diameter



3-Year Avg. **16.4**

Minimum 16.5

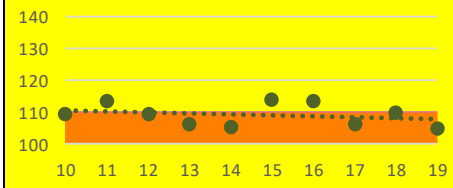
Fawn Weight



3-Year Avg. **57.4**

Minimum 60

Yearling Male Weight



3-Year Avg. **107.0**

Minimum 110

Adult Birth Rate

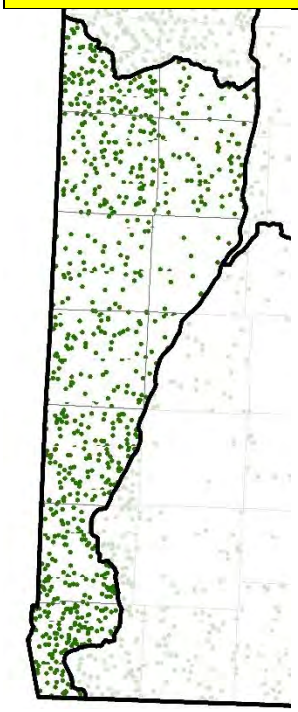
5-Year Avg. **1.86** *(37)*

Minimum 1.60

Winter Severity

Median WSI **17**

expected non-hunt mortality 9%



Wildlife Management Unit N in the southwest corner of Vermont, including parts of the Taconic Mountains and Vermont Valley biophysical regions. This region has easy winters, productive soils, and habitat with a good mix of forest and field.

Deer browse damage to forest regeneration is ubiquitous throughout the WMU and has been occurring for decades in most areas. Chronic overabundance of deer has significantly impacted forest ecosystems and contributed to the proliferation of invasive species. Importantly, oak is abundant and widespread and is likely an important factor in maintaining good birth rates as it allows does to be in good condition during the breeding period.

Physical condition of deer is concerning, particularly given the productivity of the soils and abundance of oak. Presumably, this related to chronic overabundance and declining amounts of young forest. Deer densities must be reduced in this region to improve the health of the deer and the forest ecosystems.

The Department has previously been unable to increase antlerless harvests in this WMU due to the inability to distribute additional antlerless permits. If all permits are distributed this year and the recommended harvest is achieved, it will take approximately 5 years at this harvest level to reduce deer density to the objective.

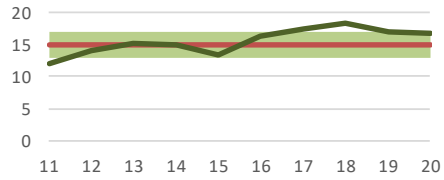
Limited hunter access to private land is a significant management challenge in this WMU.

O

548 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**741** 624 Adult Does (14% of doe population)

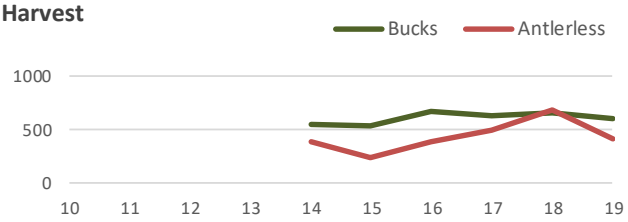
Deer Density



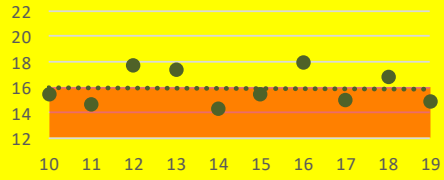
2020 Estimate **17**

Objective 15

Harvest



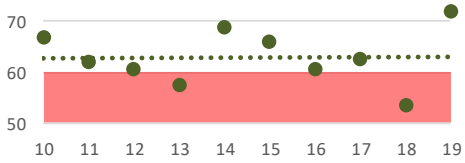
Yearling Antler Beam Diameter



3-Year Avg. **15.6**

Minimum 16

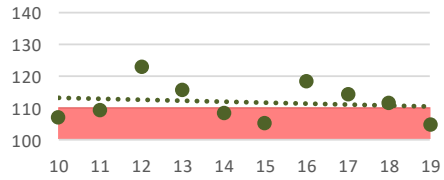
Fawn Weight



3-Year Avg. **62.7**

Minimum 60

Yearling Male Weight



3-Year Avg. **110.2**

Minimum 110

Adult Birth Rate

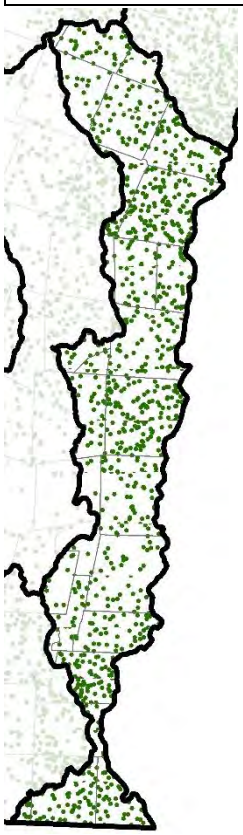
5-Year Avg. **1.68** *(22)*

Minimum 1.60

Winter Severity

Median WSI **20**

expected non-hunt mortality 9%



Wildlife Management Unit O encompasses the Connecticut River Valley from White River Junction south to Massachusetts. Winters here are relatively easy for deer and the habitat contains a good mix of forest and field.

Deer browse damage to forest regeneration is common throughout the WMU and has been occurring for decades in many areas. Chronic overabundance of deer has significantly impacted forest ecosystems and contributed to the proliferation of invasive species. This, combined with declining amounts of young forest, has contributed to the generally poor quality of forest habitats.

Physical condition of deer is mediocre in this WMU, hovering at or slightly above minimum acceptable levels. This provides additional evidence that deer densities have been at or above the level the habitat can support for many years.

Recent antlerless harvests have helped stabilized deer density but have been insufficient to reduce the population. The recommended antlerless harvest is a moderate increase over recent years and is intended to bring the density closer to the objective.

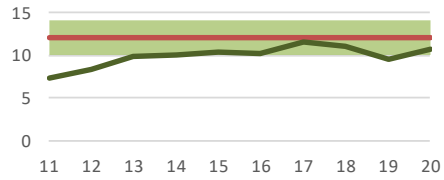
Deer density does vary within this unit due to both habitat quality and hunter access to private land. Limited hunter access to private land is a substantial management challenge.

P

455 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**127** 104 Adult Does (4% of doe population)

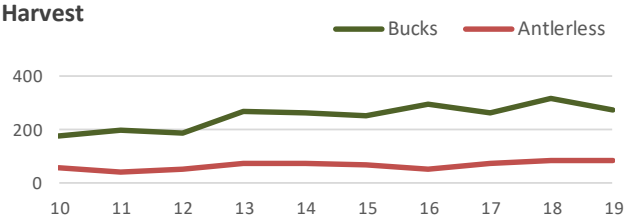
Deer Density



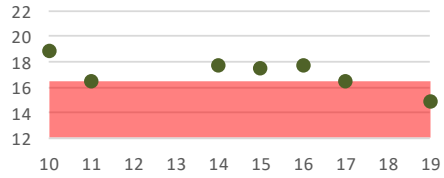
2020 Estimate **11**

Objective 12

Harvest



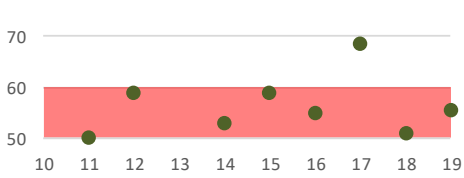
Yearling Antler Beam Diameter



3-Year Avg. **16.4**

Minimum 16.5

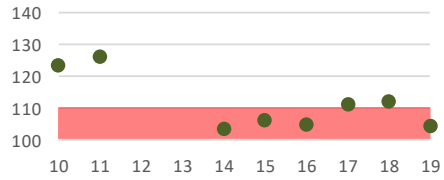
Fawn Weight



3-Year Avg. **58.4**

Minimum 60

Yearling Male Weight



3-Year Avg. **109.1**

Minimum 110

Adult Birth Rate

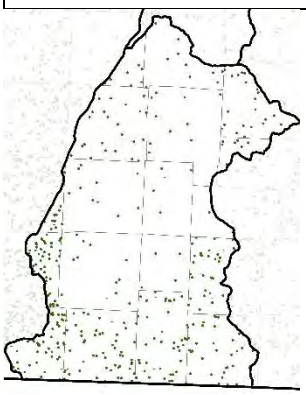
5-Year Avg. **2.20** *(11)*

Minimum 1.60

Winter Severity

Median WSI **50**

expected non-hunt mortality 14%



Wildlife Management Unit P in the southern Green Mountains, from the Massachusetts border north to Winhall. This high elevation, mountainous, heavily forested unit contains some of the poorest quality deer habitat in the state. Winters are often severe, particularly at higher elevations. However, many deer can migrate to lower elevation areas along the southern and western edge of the unit where winters are much more moderate.

Physical condition of deer in this unit is moderately concerning, with several metrics currently below minimum acceptable levels. However, sample sizes have been small, which limits inference from these data. Importantly, deer density over the past 10 years has hovered around 10 deer/mi² will very minimal antlerless harvest (archery and youth only, no antlerless permits), suggesting that habitat quality is the primary factor limiting deer density.

A lower deer density objective may be appropriate in this WMU, but deer impacts to forest ecosystems are uncommon and the Department is hopeful that increased timber harvesting on National Forest lands will improve habitat quality and allow for some population growth.

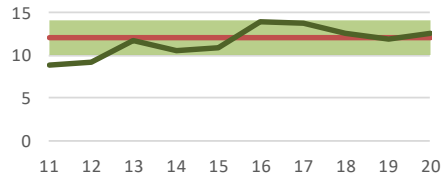
Notably, deer harvests have been steadily increasing near Bennington and in towns along the Massachusetts border. Some of these towns had near-record harvests in 2019. Given this trend, the Department would like to increase antlerless harvest opportunity in these areas by allocating a small number of antlerless permits. Most of these permits are likely to go to landowners, which will increase the likelihood that deer are harvested from areas of higher deer density.

Q

233 mi² deer habitat

Management Objective	Recommended Antlerless Harvest
Stabilize	**184** 155 Adult Does (11% of doe population)

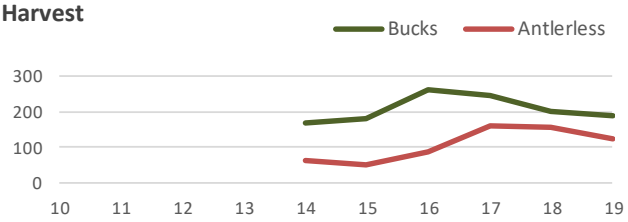
Deer Density



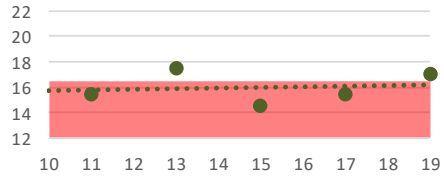
2020 Estimate **13**

Objective 12

Harvest



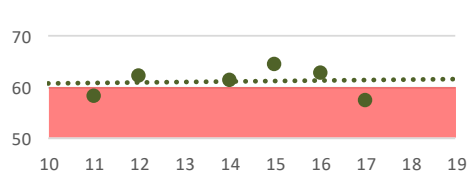
Yearling Antler Beam Diameter



3-Year Avg. **15.7**

Minimum 16.5

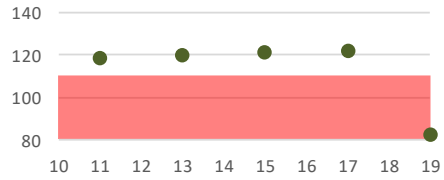
Fawn Weight



3-Year Avg. **61.8**

Minimum 60

Yearling Male Weight



3-Year Avg. **108.2**

Minimum 110

Adult Birth Rate

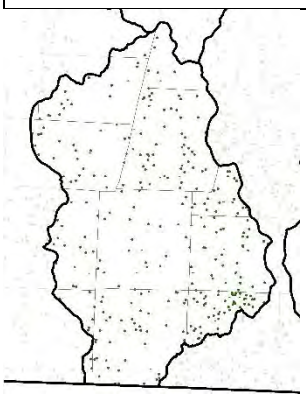
5-Year Avg. **1.83** *(6)*

Minimum 1.60

Winter Severity

Median WSI **25**

expected non-hunt mortality 10%



Wildlife Management Unit Q is located in the eastern foothills biophysical region from Massachusetts north to Townshend. Habitat quality is relatively poor in this small, heavily forested WMU, primarily due to a lack of young forest habitat. Winters here are relatively easy for deer. Generally, deer density is highest near Brattleboro and lower to the north and west as elevation increases.

Yearling antler beam diameter and weight are currently below minimum acceptable levels, but samples sizes have been very low which limits inference from these data.

Recent antlerless harvests appear to have stabilized deer density at the objective. The recommended antlerless harvest is similar to recent years and is intended to maintain the density at the current level.

Evidence of deer damage to forest ecosystems is common near Brattleboro. Unfortunately, deer harvest is limited by the town's firearm discharge ordinance. As a result, the Department will be considering an expanded archery zone to reduce deer impacts in this area.

Attachment 7

Report of Big Game—Spring Turkey Season

A. As Passed by the Fish and Wildlife Board

10 App. V.S.A. § 2. Report, big game

(a) A person taking big game, as defined by 10 V.S.A. § 4001(31), pursuant to the seasons provided by law or regulation of the Fish and Wildlife Board, shall within 48 hours report the taking and exhibit the carcass to the nearest game warden, official Fish and Wildlife Department Reporting Station, or to a person designated by the Commissioner to receive the reports. Notwithstanding this section, due to the public health risk associated with COVID-19, a person taking turkey shall report electronically or as otherwise authorized by the Commissioner and shall only be required to exhibit the carcass of a turkey at the request of a state game warden.

No big game carcass shall be transported out of the State without first being reported as required herein.

(b) The Commissioner shall pay to the authorized agent a fee of $1.00 for each report taken on species where reports are required by law.

B. Proposed Revision

10 App. V.S.A. § 2. Report, big game

(a) A person taking big game, as defined by 10 V.S.A. § 4001(31), pursuant to the seasons provided by law or regulation of the Fish and Wildlife Board, shall within 48 hours report the taking and exhibit the carcass to the nearest game warden, official Fish and Wildlife Department Reporting Station, or to a person designated by the Commissioner to receive the reports. No big game carcass shall be transported out of the State without first being reported as required herein.

(b) The Commissioner shall pay to the authorized agent a fee of $1.00 for each report taken on species where reports are required by law.

(c) Notwithstanding the reporting requirements of subsection (a) of this section, due to the public health risk associated with COVID-19, a person taking turkey shall report electronically or as otherwise authorized by the Commissioner and shall only be required to exhibit the carcass of a turkey at the request of a state game warden.