

Quantifying Deer in Carlisle

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I have been in communication with David Stainbrook, the Deer and Moose Project Leader for the Massachusetts Division of Fisheries and Wildlife (Mass Wildlife) regarding determining how to quantify the number of deer in Carlisle and the number that need to be taken to reduce the population to acceptable levels. This document summarizes our discussion.

As with most problems facing the world there are many nuances and complications that make a straightforward mathematical computation or model difficult. We rely on expert advice for most such problems in the world in order to merge all of those complications and nuances into a direction for action and an assessment mechanism for success or failure. An assessment of the deer situation is no different than these other complex problems and does not easily lend itself to a single number.

To begin to try to quantify it, we need to understand that Mass Wildlife, when talking about deer density numbers is basing this metric on deer habitat, not on physical square miles. The difference is the removal of such things as ponds, rivers, roads, buildings, playgrounds and the like. Mr. Stainbrook recommends simplifying it to be the amount of forest land which can be computed from aerial footage. Mr. Stainbrook estimates we have 11.4 square miles of forest land, aka deer habitat. By contrast, the total land size of Carlisle is 15.5 square miles.

In his 2019 presentation to the Town, Mr. Stainbrook noted that Mass Wildlife has a benchmark target of 12-18 deer per square mile of deer habitat for the entire state (page 9). This number is where they determined that deer are not having a negative impact on the health of the forest. If we take the upper bound of that number, 18, times 11.4 square miles, we get about 200 deer is the most that Mass Wildlife would like to see in the town.

In his presentation to the Town in 2015, Mr. Stainbrook estimated that we have 30-60 deer per square mile in Carlisle (page 24). In his 2019 presentation he noted that Mass Wildlife is moving towards an impact assessment of the forest health as opposed to specific deer numbers, which he reiterated in our most recent conversation. Still, he said if quantification is required, then starting with the lower bound of that estimate at 30 deer per square mile, times 11.4 square miles, is approximately 340 deer. This of course is not going to be consistent across the whole town and there could be pockets where it is much higher or lower as a function of localized hunting access across town.

Combining these values of the maximum that Mass Wildlife believes are sustainable for the forest (200) with the minimal estimate of current population (340) we conclude that we have at least 140 too many deer in the Carlisle forests.

Again, Mr. Stainbrook emphasizes that these numbers are estimates and the more important assessment is the health of the forest. Mr. Stainbrook said his division strives to come back to each

town in the Commonwealth once every five years to re-assess the health of the forest. As they were most recently here in 2016, he hopes to be back in 2021 to re-assess forest health. In the meantime, he was hoping to conduct pellet count surveys here at Great Brook and Estabrook Woods this year but was unable to hire technicians in the March/April timeframe required for these surveys due to the COVID-19 crisis, so they will be on the list again for next spring.

Mr. Stainbrook and I also discussed the rate of increase of the deer herd. In his 2019 presentation he estimated 4-10% increase each year without any hunting (page 20). However, he noted that these numbers are highly variable as a result of many factors. My own personal observation is that this is a geometric progression and as such from a growth factor perspective is similar to the models used to predict infections in the COVID-19 crisis. In those models, small variations in the rate of infection caused wild swings from “there is nothing to worry about” to “it is the end of the world as we know it”. The same appears to be true when assessing deer herd growth.

As such, Mr. Stainbrook recommends against trying to use these numbers to predict growth into the future. It is better to re-assess the forest health on a regular basis to see if adequate progress is being made on mitigating the negative effects of deer overpopulation.

Mr. Stainbrook noted that in a town like Carlisle the primary limiting factor is hunting access. If we don't continue to increase hunting access now then the population will continue to rise. He noted that over the next 10-15 years the numbers could rise to over 50 deer per square mile. Such an increase would have even greater negative impact on forest health. Further we'd then have around 600 deer in town, which is 400 over the desired maximum target and correcting for that will be much more difficult than the current estimate of 140 too many.

I should also note that Mr. Stainbrook's 2019 presentation contains graphs of likely outcomes for various predications for deer herd size. It shows the expected increase without hunting on page 20, including reasonable limits for the minimum or maximum that could be possible. An estimation of what can happen with our current hunting program with reduced season length, bow hunting only, and many properties off-limits is shown on page 24. It is the goal of the Deer Control Committee to move us towards the graph on page 23 by such items as expanding hunting access to more properties and running the full season length. In all these graphs, there are a variety of factors that can cause the population to increase or decrease more or less and the graphs show reasonable expectations for the minimum and maximum anticipated impact of different policies. These graphs are much better descriptions of what is possible under different programs than simple numerical value would be.

On Page 28 of Mr. Stainbrook's 2019 presentation is a map showing how much of the town is outside of setbacks required by state law. Other than the large blocks owned by Harvard in Estabrook Woods, the US Fish and Wildlife in Great Meadows, and the Department of Conservation and Recreation in Great Brook, the majority of the land which could be hunted is Town owned. Therefore, in my assessment, the key to the success or failure of removing enough deer to make a difference is a function of what we do on Town owned land.

In conclusion, Mr. Stainbrook recommends against trying to use these numbers to predict the exact number of deer that are in town or that need to be taken on a yearly basis to achieve the desired impact. Rather the goal should be to increase access as much as possible because we know we have an existing overpopulation problem as demonstrated by previous forest health assessments conducted by

Mass Wildlife. It is not possible for us to take too many deer given the limited hunting access we have in town with so much off-limits to hunting due to setbacks. Regular (every 5-year) re-assessments of forest health will be able to tell us if we've successfully stabilized and are reducing the overpopulation problem or if we need to do even more.

The two presentations Mr. Stainbrook gave specific to Carlisle's situation and referenced in this document can be found here:

2015: <https://app.box.com/s/76k39r8o0grze00jzpr2s0k89te1v21q>

2019: <https://app.box.com/s/jcba5s0os1qseylz8mnmx8igjsyk589c>