

QUABBIN RESERVATION WHITE-TAILED DEER IMPACT MANAGEMENT PROGRAM: RESULTS FROM 2017



dcr
Massachusetts



Department of Conservation and Recreation
Division of Water Supply Protection
Natural Resources Section

JUNE 2018

2017 Quabbin Deer Hunt Executive Summary

	Nov 30 & Dec 1 New Salem	Nov 30 & Dec 1 Prescott	Dec. 7 & 8 Hardwick	Dec. 7 & 8 Pelham	TOTALS
Hunters Selected	191	384	201	252	1,028
Eligible Hunters (Returning or Attended Orientation)	181	359	197	230	967
Scouting - % participating Day 1, % participating Day 2, (Total %)	22%; 26%; (41%)	27%; 22%; (45%)	20%; 27%; (42%)	27%; 21%; (44%)	23%; 22%; (44%)
Attendance @ Hunt - Day 1/ Hunters Eligible to Hunt	141 (78%)	252 (70%)	160 (81%)	176 (77%)	729 (75%)
Attendance @ Hunt - Day 2/ Hunters Eligible to Hunt	77 (43%)	153 (43%)	91 (46%)	117 (51%)	438 (45%)
Participation Rate: (Day 1 and/or Day 2)	144 (80%)	257 (72%)	157 (80%)	179 (78%)	737 (76%)
Deer Taken - Day 1 (sex)	3 (2♀, 1♂)	9 (3♀, 6♂)	11 (6♀, 5♂)	13 (5♀, 8♂)	36 (16♀, 20♂)
Deer Taken - Day 2 (sex)	4 (1♀, 3♂)	4 (1♀, 3♂)	4 (3♀, 1♂)	2 (0♀, 2♂)	14 (5♀, 9♂)
Total -both days (sex)	7 (3♀, 4♂)	13 (4♀, 9♂)	15 (9♀, 6♂)	15 (5♀, 10♂)	50 (21♀, 29♂)
Success Rate	5.0%	5.0%	9.0%	8.0%	7.0%
Size of Hunt Area (Mile ²)	6871.4 acres (10.7)	12,019.9 acres (18.78)	5636.7 acres (8.8)	8487.2 acres (13.3)	33015.2 acres (51.6)
Deer Harvest/Square Mile	0.65	0.69	1.70	1.13	0.97
Largest Deer Taken	M – 146 lbs, 2.5 yrs, 8 pt F – 147 lbs, 2.5 yrs	M – 158.5 lbs, 3.5 yrs, 8pt F – 125 lbs, 3.5 yrs	M – 157 lbs, 3.5 yrs, 10 pt F – 125 lbs, 3.5 yrs	M – 178 lbs, 3.5 yrs, 6 pt F – 113 lbs, 2.5 yrs	M – 178 lbs, 3.5 yrs, 6 pt (PEL) F – 147 lbs, 2.5 yrs (NS)

2017 Weather Notes:

During the first week of shotgun season, New Salem and Prescott saw cold conditions with a mean temperature of 32° F (Low: 19°; Hi: 45°). The second week's hunt in Hardwick and Pelham saw cooler temperatures with a mean temperature of 26-29° F (Low: 19°; Hi: 37°). There was no snow either week.

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I. BACKGROUND

Sustainable forest management and water quality are closely linked. Through the stabilization of soil, forests minimize erosion, reduce sedimentation and improve water quality. Woodlands protect water bodies and watercourses by trapping sediments and pollutants from other land uses and activities. Actively growing and regenerating forests comprised of a diversity of species offer the best long-term watershed protection (for an in-depth discussion of the Division of Water Supply Protection's (DWSP) forest management program, please see our comprehensive Land Management Plan). DWSP forest managers have long been concerned about the impacts of deer browsing on forest regeneration. In 1989, a regeneration study at Quabbin Reservoir, MA found that there was not adequate regeneration to maintain a healthy, resilient, diversified forest cover due to sustained high deer densities and herbivory. DWSP was concerned about the potential long-term consequences of high deer densities preventing forest regeneration. In response, in 1991, Quabbin Reservation was opened to limited, controlled public deer hunting after 50 years without hunting. The program's goal was to reduce the impacts of deer browsing to a level that allowed and promoted the development of a healthy, resilient, diverse forest that could adequately and continuously protect water quality. Hunting has been conducted on the reservation each year since.

The controlled hunts constituted only one component of a comprehensive 1991 White-tailed Deer Impact Management Plan for the reservation. Six years of controlled hunting was to be followed by a major review and re-evaluation of the program. That review was conducted in the spring of 1997 when two reports (*Quabbin Regeneration: Summary Report 1988-97* and *Quabbin Reservation White-tailed Deer Impact Management Program: Results and Evaluation 1991-1996*) were released by the DWSP. Also at that time, recommendations for the next phase of the program were issued in the document *Quabbin Reservation White-tailed Deer Impact Management Program: Summary Report and Proposal 1997*. Those recommendations called for a continuation of the controlled hunting program with several changes proposed to make the program more efficient.

Major components of the deer population reduction program were to:

- 1.) Reduce population densities
- 2.) Maintain those densities at a level that allows for the continued growth and regeneration of forest tree species.

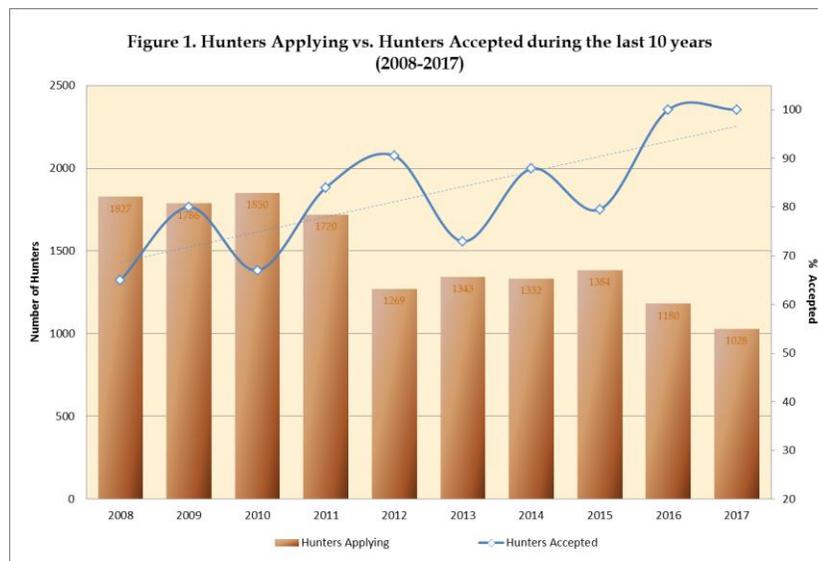
After several years of controlled hunts, substantial reductions in deer population densities were achieved in all hunt areas, and DWSP moved into its *Maintenance Phase* of the program in 2000. The Maintenance Phase was essential for maintaining relatively stable deer population levels and eliminating potentially large fluctuations in deer densities that could occur if hunting were stopped for an extended period of time. In the absence of hunting mortality, deer populations at lower densities with little natural mortality and an increasing food supply would expand and could jeopardize the forest regeneration progress made to date. As part of the Maintenance Phase, the program is reviewed every 5 years. In 2009 and 2014, the program was reviewed and re-evaluated. It resulted in new plans that outlined proposed activities for the next set of five year blocks (**Quabbin Reservation White-tailed Deer Impact Management Program: Program review 2010-2014 and Recommended Actions for 2015-2019.**).

The following report summarizes results from 2016 and outlines the program’s goals and plans for 2017.

II. 2017 PROGRAM RESULTS

A. HUNTERS

Participants in the hunt were chosen in a random lottery from a pool of licensed hunters submitting the required application form and fee. The number of hunters applying for the hunt has varied from approximately 1,028 in 2017 to over 9,500 in 1992. The number of hunters chosen in any one year has varied, depending on the number of areas being hunted and the number of hunting segments per area. The number of hunters accepted is determined based on the desired hunter density. Hunter density takes into account desired deer harvest results and hunter safety. Because hunter density is area-dependent, the number of hunters accepted differs in each Hunt Zone.



Over the years, the number of hunters accepted has been adjusted due to certain changes made to the logistics of the hunt. In recent years, the number of hunters was reduced to achieve the desired 1 hunter per 35-acre hunter density in all zones (Figure 1).

The number of applications received in 2017 (1,028) was lower than the 10-year average (1,472). In fact, it was the lowest number of hunters applying since the program began in 1991. Hunter acceptance in both 2016 and 2017 was 100%. Overall, the number of hunters applying to the Quabbin hunts has dropped by 30% since the 2011 hunt. While some of the novelty of hunting Quabbin has worn, interest still remains, despite the deer density being similar or in some cases *lower* than that outside of the Quabbin gates in Wildlife Management Zone 6.

The Division of Water Supply Protection is also aware of the nationwide trend of

declining hunters and hunter recruitment. The Division strives to make Quabbin an attractive, productive, and safe hunting environment. Quabbin Hunters participating each year allows DWSP to achieve and maintain its deer population and forest regeneration goals.

Orientation:

Since the hunts began in 1991, Quabbin hunters have been required to attend an in-person orientation session every few years. New Quabbin hunters were automatically required to attend a session before they could hunt at Quabbin. Beginning in 2015, hunters were also given another option. DCR developed an online version of the in-person orientation session. If a hunter had attended an orientation session within the last 3 years, that hunter was exempt from any orientation in 2017. Returning hunters who last attended an orientation *more* than 3 years ago were required to complete the online version prior to the hunt. New hunters are still required to attend the in-person orientation.

In 2017, a total of 116 accepted hunters had the option to take the online orientation and 88 (76%) completed it.

Antlerless Permits

Antlerless deer killed at Quabbin are exempt from the hunter's statewide bag limit. In the beginning, hunters were *required* to purchase one antlerless deer permit (ADP) and had the option to purchase a second. This was to reduce the number of females available to breed. DCR achieved a dramatic deer reduction after several years of hunting. Forest monitoring demonstrated that tree regeneration was at a level suitable for the future of water quality.

With the deer density at a manageable level, the program entered the Maintenance Phase of the Deer Management. No longer were we trying to drive down the number of deer, so the way we hunted Quabbin also had to change. Since entering the Maintenance Phase, DCR had tried different ways of maintaining the deer population at suitable levels while still providing a steady hunter density in the hunt zones. In 2000, each Zone was given a "rest" where it was not hunted every 5th year.

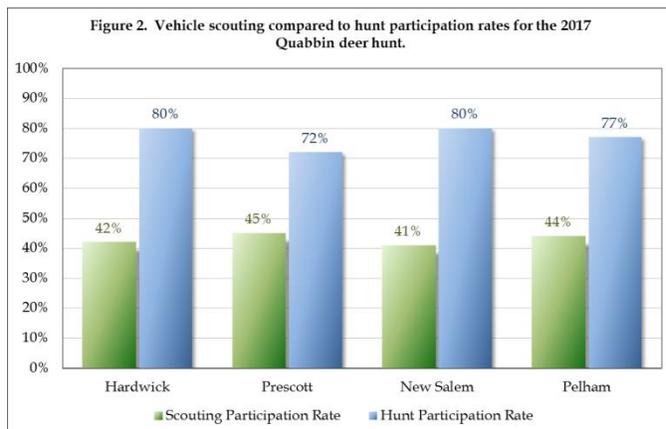
In 2012, DCR and MassWildlife met to discuss the future of the Quabbin hunt. We introduced the concept of managing the Quabbin hunt area similar to Zone 6. This allows us to compare what is going on at Quabbin with what is going on in the surrounding forest. Deer are managed by the number of females in the herd. Antlerless harvest is one of the most important components of a deer management plan. Females are the breeders and it is known that female yearlings (1 yr old) are breeding in Massachusetts. DCR needed better control over the number of antlerless deer that are taken at Quabbin. This can be accomplished through an Antlerless Allocation System similar to what is used in the rest of the state. To begin this process, we needed more information about antlerless harvest and hunters. In 2012 we no longer offered a second antlerless permit and made the permit *optional* to the hunters. The second step was to reduce the total number of hunters to achieve a hunter density of 1 hunter/ 35-acres. It was proposed to do this for 4-years to see A) how many hunters continued to buy antlerless permits

and B) to get a more accurate picture of how many permits it takes to harvest an adult female deer.

After ninety-percent of hunters continued to purchase and hunt with ADP over the last 4 years, DCR had the information it needed. Additionally, a new pilot study gave DCR biologists an independent measure of deer density. The DCR pellet group study, revealed low deer densities in some of the hunt zones. Armed with this new information, DCR, in consultation with MassWildlife, made a decision on how many antlerless permits to allocate to the Quabbin hunt for the 2016 season. These permits were distributed among the 4 active Quabbin hunting blocks based on available data from previous harvests, forest regeneration and deer density estimates. For the 2016 hunt, DCR and MassWildlife issued 500 antlerless permits. Hunters obtained these permits through MassWildlife’s MassFishHunt’s website instant award program. Although the Quabbin bag limit was still 2 deer, hunters awarded ADP will be restricted to only 1 antlerless deer harvest. These antlerless permits are still considered “bonus permits” and not count towards their statewide bag limit. Hunters were allowed to fill their buck tag(s) during the Quabbin hunt. Zone 6 antlerless permits were NOT permitted to be used inside Quabbin’s gates.

Scouting

DWSP allows eligible hunters to access the hunt areas by foot (except Prescott) or bicycle (designated areas only), for scouting prior to the hunt. However, efficient and thorough scouting can only be achieved with greater access. Since 2001, the program has allowed 2



consecutive days of vehicle scouting for all hunting blocks. DWSP has designated the scouting dates as weekend before Thanksgiving, from 8 am- 3 pm each day. Feedback from hunters about scouting continues to remain positive. In fact, a 2013 hunter survey found that 94% of hunters considered the scouting weekend helpful. In 2014, successful hunters were informally polled to determine how many took advantage of the car scouting

weekend. Seventy-three percent (73%) of the successful hunters surveyed had participated in the special scouting weekend. Of the hunters that did not scout, most said they have a specific spot they go to every year and many years of prior knowledge.

The percentage of hunters taking advantage of vehicle scouting prior to the 2017 hunt ranged from 45 percent in the Prescott zone to 41 percent in New Salem zone (Fig. 2). Car scouting will continue to be allowed prior to the 2018 hunt in all active hunting blocks.

B. HARVEST RESULTS

Following the 5-year hunting plan rotation, Petersham was excluded from the hunt in 2017. The other four blocks were hunted for two consecutive days each.

In 2017, 50 deer were harvested during the Quabbin hunt (Table 1). Although this harvest was lower than the 5-year average (75 deer/year), only 500 ADP were available for hunters to purchase. This resulted in less than half of the hunters with the opportunity to harvest an antlerless deer.

Table 1. Results of controlled deer hunt on Quabbin Reservation, 2008-2017.

Year	Total Deer	% Female	% Male	% A/L ¹	DEER/Mi ² (harvest)	# HUNTERS	HUNTER SUCCESS ²	Mi ² HUNTED
2008	80	43.8	56.2	55	1.8	1103	7.3%	43.7
2009	200	57.5	42.5	67.0	3.6	1225	16.3%	55.4
2010	116	41.4	58.6	61.21	2.4	1043	11.1%	49.2
2011	73	37	63	49.3	1.4	1186	6.2%	53.7
2012	84	45.2	54.8	59.5	1.6	931	9.0%	51.6
2013	122	58.2	41.8	69.7	2.8	782	15.6%	43.7
2014	105	49.5	50.5	53.3	2.03	950	11.1%	51.7
2015	48	43.8	56.2	60.4	0.98	865	5.5%	49.2
2016	53	24.5	75.5	30.2	1.00	874	6.1%	53.7
2017	50	42.0	58.0	50.0	0.97	737	6.8%	51.6
Overall/ Avg	931	44.3	55.7	55.6	1.9	9,696	9.5%	50.3

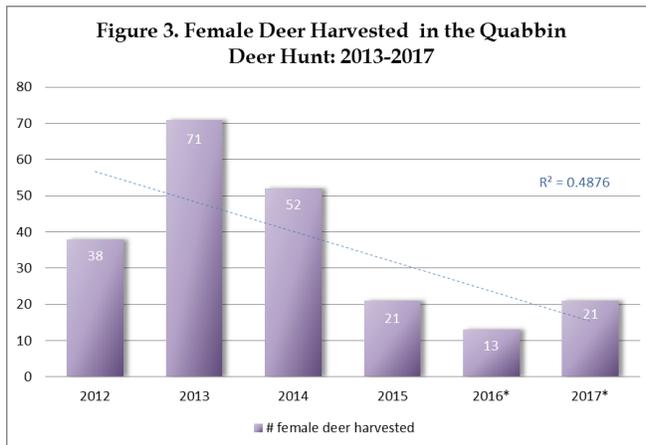
¹ A/L: antlerless; females and young males with antlers less than 3 inches long.

² Hunter Success is the number of deer taken per 100 hunters. Some hunters may have taken more than one deer, so these figures slightly overestimate the proportion of successful hunters.

Female and Antlerless Harvest

Initially, a critical component to the Quabbin hunting program was to facilitate a substantial reduction in the deer herd in all management blocks. Guaranteed antlerless permits and cooperative hunters were necessary to achieve this initial herd reduction goal. Since 1991, Quabbin hunters have been successful in both taking a significant percentage of females (60% of harvest in the 1st five years) and in reducing the deer herd in all management blocks.

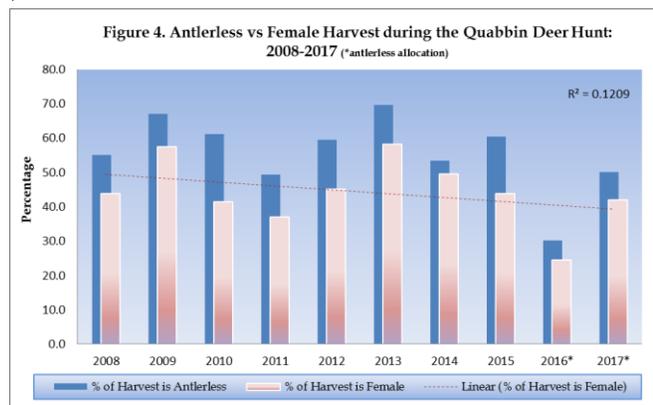
One of the greatest challenges in this type of hunt (rotations, short duration) is minimizing variables that influence harvest. DCR biologists have seen the female harvest fluctuate, but overall there is a reduction in the number of female deer harvested. It is important to distinguish between fluctuations that are a result of how the Quabbin hunt is administered and fluctuations that represent a true change in the female population.



Since a large harvest of female deer in 2013, the female deer taken has continued to decline (Figure 3). Antlerless allocation in 2016 also has contributed to that reduction. Before 2016 however, the proportion of female deer harvested is likely representative of the female population as a whole. Because antlerless deer at Quabbin do not count towards the statewide bag limit and the hunt is limited to just 2 days, hunters are more likely to shoot a doe. In

fact, based on the 2013 hunter survey, 84% of hunters declared they would take an antlerless deer on the first day of the hunt and 94% said they would take one on day two of the hunt. The low number of female deer harvested in 2014 and 2015 corresponds to the density estimates DCR has calculated from a harvest independent study using deer pellet groups. Prior to 2016, about 88% of the females harvested are breeding females (≥ 1.5 yrs old). With Antlerless permit allocation in 2016, that proportion dropped by 10%. In the last 10-years, breeding does made up 22% of the total harvest; only 16% since Antlerless Allocation began.

Antlerless deer (all females + male fawns) harvests have also been variable over the years. Although it has fluctuated over the past 10-years, the antlerless harvest has been high (Figure 4). Historically, since the Quabbin hunts entered the Maintenance Phase, antlerless harvest averaged about 60% of the harvest (2001-2015). In 2016, with the introduction of Antlerless Permit Allocation, the antlerless harvest decreased by 50%, accounting for only 30% of the harvest. In 2017, antlerless harvest was 50% of the total harvest.



The long-term success of the Quabbin hunt depends on the ability of hunters to control deer populations in a relatively short period of time. In order to accomplish our watershed protection goals, antlerless deer must continue to be harvested at a sustainable level that limits large increases in deer population, but still supports a healthy herd and maintains hunter interest. Future antlerless harvest rates will continue to be monitored closely and managed to achieve these goals.

C. DEER DENSITY ESTIMATION AND POPULATION INDICES

1. DEER DENSITY ESTIMATION

Obtaining annual estimates of absolute abundance is not feasible. Therefore, wildlife managers often estimate abundance. An estimate of relative population density is critical to understanding rates of population increase and decrease and determining a population's response to a management or harvest strategy (Caughley 1977, Novak et al. 1991, Rosenberry et al. 1999, Shaw et al. 2006). Using harvest information, DCR has historically estimated the deer density at Quabbin. To estimate relative abundance, several population estimates were made using the average of the Buck Kill Index, Sex-Age-Kill estimator and harvest:population ratio. Additionally, every 5 years the population is reconstructed using the harvest data. These estimators are also used by several state wildlife agencies to look at trends in population data.

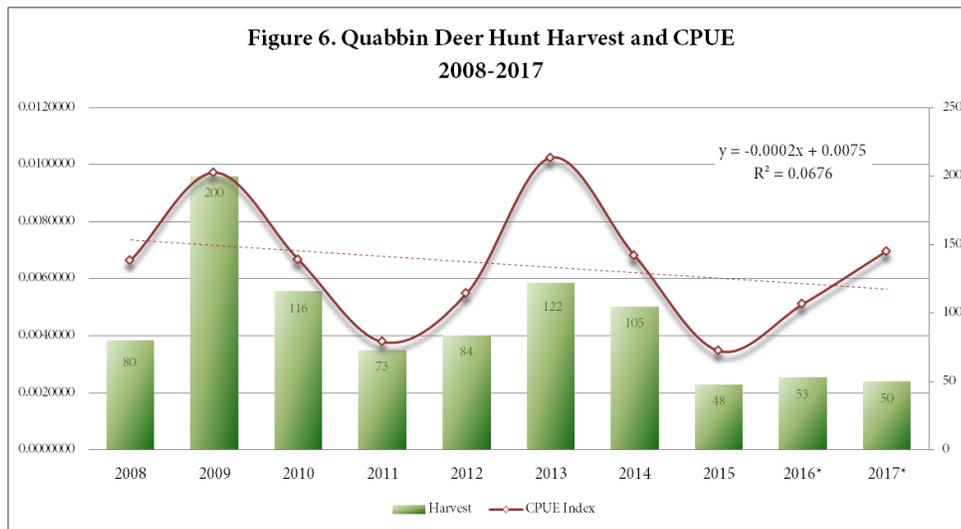
However, because of the structure of the Quabbin hunt (short, intense hunt), relying on harvest data alone to make conclusions about the population can be challenging. The harvest data provide a snap-shot of what is going on in the hunt areas at that time but can be greatly influenced by factors beyond DCR's control. Things like bad weather during the hunt, presence or absence of snow cover, availability of mast and the distribution of both deer and hunters can impact the annual harvest. As a result, density estimates based solely on harvest data are limited in their reliability. Therefore, it is important to use other indices of relative deer abundance.

2. CATCH PER UNIT EFFORT

At Quabbin, as in many cases, detailed information on deer reproduction, mortality, etc. does not exist. In these cases the development of indices are helpful and generate relative population estimates that can be compared across time periods (Karns et al. 2011).

The way the Quabbin hunt is conducted and the information collected lends itself to an index called Catch per Unit Effort (CPUE). This measures the amount of effort it takes for a hunter to harvest a deer at Quabbin. CPUE and techniques used in this application have been reviewed in previous Reports. For a complete description on how DCR uses CPUE as a tool to investigate trends in deer populations please refer to the 2015 Deer Report.

CPUE Results: Over the last 10 years, the CPUE has shown a slightly decreasing trend that mimics the swings in harvest (Figure 6). In 2012, DCR reduced hunter density to 1 hunter per 35-acres. This resulted in a 15% reduction in hunters across the hunt zones and a sharp increase in CPUE both in 2012 and again in 2013. In fact, more deer were harvested with fewer hunters than ever before.



In 2015, there was a low deer harvest; however, the level of hunter effort was also low. The result was a CPUE that was similar to where it was in 2011- where 73 deer were harvested. Since 2016, DCR reduced the number of antlerless permits available to the hunters. Due to this change in the program, Hunter effort also changed. No longer did every hunter have an equal chance at harvesting a deer. Every hunter had the opportunity to harvest a buck, but less than half of the hunters were awarded antlerless permits. Therefore, in order to have comparable data, CPUE was only calculated using antlerless permit hunters that showed up to the hunt. In 2017, thirty-nine deer (39) were harvested by 379 ADP hunters over an average of 15 hunting hours per hunter. This resulted in 78% of the harvest and increased the overall CPUE index for the second consecutive year.

HARVEST INDEPENDENT DEER DENSITY ASSESSMENT

While CPUE is a better way to look at the trend of the deer population vs. classic density estimation, DCR has developed two harvest-independent indices that help to better understand what is going on with the deer population: Forest Regeneration Monitoring and Pellet Group Count Surveys.

1. REGENERATION MONITORING INDEX

The objective of forest management at Quabbin is to create and maintain a complex forest structure, which forms a protective forest cover and a biological filter on the watershed land. Quabbin’s watershed forest is managed to be diverse in both species and age, to vigorously grow and regenerate, and most importantly to maintain a predictable flow of high quality water from the land. The **primary goal** of this Deer Management Program is to maintain a deer density that allows for adequate and continued forest regeneration.

Scientific literature tells us that vegetation begins to be impacted at a deer density of 10-20

deer/mi² (deCalesta, 1994). Browsing by deer at a density over 20 deer/mi² alters the species composition of woody and herbaceous vegetation so that plant-plant relationships change. As a result, both woody and herbaceous diversity suffers and the future forests at Quabbin could be jeopardized.

Regeneration is monitored by the DCR-DWSP Foresters and described in their Regeneration Monitoring Reports. Forest regeneration data gives DCR Wildlife Biologists a *harvest-independent* measure of the effectiveness of deer management at Quabbin. Based on the 2014 Regeneration Monitoring Report, forest regeneration at Quabbin continues to meet its management goal of 2000 stems/acre above 4.5 ft -generally considered to be above deer browse height (Figure 5). However, tree species diversity continues to be an issue and is still dominated by white pine and black birch.

The Division of Water Supply Protection initiated a new Vegetation Impact Protocol in 2015-2016 that included regeneration and specific herbaceous plant indicators to measure the impact of ungulates on the forest with mixed results. The Natural Resource section will continue to try to develop an informative and appropriate vegetative index relevant to deer browse.

2. PELLET-GROUP COUNT SURVEY

In 2015, DCR-DWSP Natural Resource and Forestry staff began a pilot study to investigate whether a Pellet-Group Count Survey on Quabbin and Ware River watershed lands could provide insight into the number of deer and moose using DCR property. Counting deer or moose droppings instead of individuals has several distinct advantages. The technique is straightforward and can be done without a large investment of time and resources. However, the pellet-group deposit rate can be the most challenging variable to determine and can influence the final density estimate. Fortunately, a recently published paper has provided a solid framework for conducting this type of survey over large forested areas. Based on this published deer research, an average deposition rate was used to calculate density (deCalesta 2013).

In the spring of 2015, Quabbin Park, the Ware River and Pelham were surveyed. This information can be found in a Report titled: **Estimating Deer and Moose Densities on DWSP Lands using Pellet-Group Counts: 2015 Pilot Project Results**. In 2016, DCR expanded upon the success of 2015 and covered Wachusett lands (both hunted and unhunted), Sudbury Reservoir lands and Petersham and the Prescott Peninsula at Quabbin. Deer density estimates were highly variable from site to site. At Quabbin, deer density estimates were very low for the Prescott (2.2-5.2 deer/mi²) and much higher for Petersham (15.5-25.9 deer/mi²). The final two areas at Quabbin (Hardwick and New Salem) were sampled in 2017.

Quabbin Reservation White-Tailed Deer Impact Management Program: Results from 2017

	Survey Year	# transects	Total km walked	Plots sampled	Plots with Deer	Density Estimate deer/mi ²	Deer Density Range (deer/mi ²)
Pelham	2015	34	63.9	1659	112	13.7	11.1 - 16.3
Petersham	2016	31	46.7	1500	116	20.7	15.5 - 25.9
Prescott	2016	42	67.8	2181	47	3.7	2.2 - 5.2
Hardwick	2017	20	29.7	974	61	19.6	13.0 - 26.2
New Salem	2017	25	35.0	1149	61	12.7	7.3 - 18.1

While finding the appropriate pellet-group deposition rate for deer is a challenge, this survey can provide an index of relative abundance. In addition, continuing the survey over time will provide another harvest-independent index of deer density at Quabbin Reservation. For a more detailed account of this survey see the DCR report *Estimating Deer and Moose Densities on DWSP Lands using Pellet-Group Counts: 2017 Results*. This information will be useful when making year to year management decisions.

HUNTING BLOCK SUMMARY:

The Quabbin herd is managed as a whole, but due to the reservoir separating the east and west sides of the Reservation, each hunting block is described to look at local trends. The data below (Table 3) shows the deer harvest by Hunt Block during the last 10 years of the program. The current year’s harvest (2017) is in blue font.

Table 3. Quabbin Deer Harvest Results by Hunting Blocks (2008-2017)

YEAR	Pelham	Prescott	Hardwick	New Salem	Petersham	Total
2008	23	N/Ab	18	15	24	80
2009	18	46	51	N/Ab	85	200
2010	N/Ab	45	24	15	32	116
2011	21	19	N/Ab	9	24	73
2012	18	26	23	17	N/Ab	84
2013	14	N/Ab	41	10	57	122
2014	17	43	20	N/Ab	25	105
2015	N/Ab	18	11	10	9	48
2016	16	14	N/A ^b	7	16	53
2017	15	13	15	7	N/A ^b	50
10 year Total	142	224	203	90	272	931
10 year Avg	17.8	28.0	25.4	11.3	34.0	93.1
5 Yr Avg	16.0	22.8	22.0	10.2	26.2	75.6
3 Yr Avg	16.0	15.0	15.3	8.0	16.7	50.3

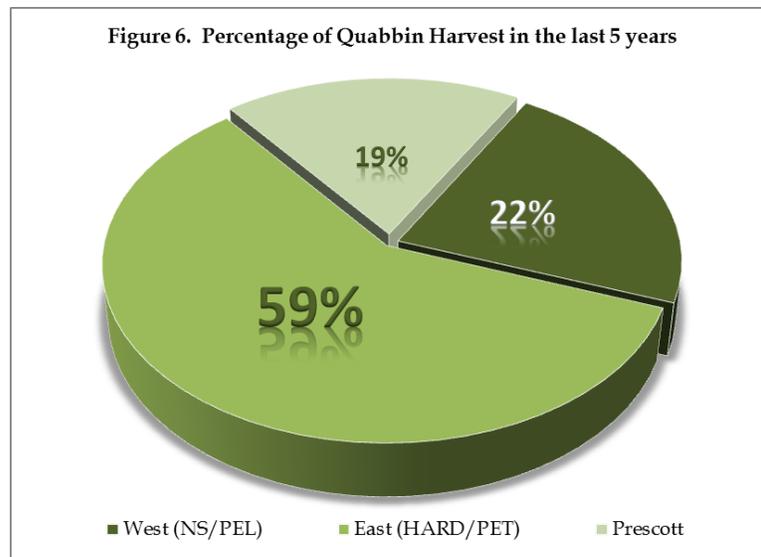
^b Area was not hunted during that year.

Although making generalizations about deer in each hunting block is probably too ambitious due to their small size and the deer’s natural movements, one could treat the Quabbin herd as 3 different populations:

- The Western Zone: New Salem and Pelham
- The Eastern Zone: Hardwick and Petersham
- The Prescott Zone: The Prescott Peninsula

Although gene flow is not restricted to these arbitrary designations, the harvest in these areas may be reflective of the local population. If this is the case, it is worth looking at the trends and differences between these populations.

For example, the Eastern Zone makes up a larger portion of the harvest and has been increasing in recent years. In the last 5 years, a total of 412 deer have been harvested at Quabbin. The Eastern Zone has made up 59% of the harvest, while the Western Zone and Prescott Zone have made up an average of 22% and 19% of the harvest respectively (Figure 6).



Despite being an average of 2,757-acres larger over the past 5 years, the Western side does not produce as many deer in the harvest. This can be due to many factors including, poor hunter distribution, and poor access within the hunt block or lower quality habitat.

III. STATUS AND RECOMMENDED ACTIONS FOR 2018

A. PROGRAM STATUS

With a hunt designed like Quabbin's Deer Management Program, there are many variables that influence harvest in any given year. When this is the case, responsible managers look at trends in density, effort and antlerless harvest. Deer densities at Quabbin continue to be at levels that allow for continued forest regeneration and growth.

Although harvests can fluctuate from year to year, it is important that the number of female (antlerless) deer harvested are in concert with our management objectives. While any

one year is not critical to the overall success of the program, it is important to monitor these trends carefully into the future. Although tree species diversity continues to be a challenge, forest regeneration (stems/acre) continues to improve across the watershed.

RECOMMENDED ACTIONS

In 2018, the Quabbin White-Tailed Deer Management Program will be similar to recent years. The hunter application will still be available online. Orientations will be available both online and in the classroom setting. Portable sanitary facilities will continue to be placed throughout the hunt areas. The Division will continue using scanners for its check-in/check-out procedure. In addition, the 4:00 p.m. checkout time will remain in effect. Biological data will continue to be collected on all harvested deer. However, there will be some changes to which hunting blocks will be open to hunting for 2018.

1. Hunt Zone Rotation

The Quabbin White-tailed Deer Management Program at Quabbin has been extremely successful at reducing the impact of deer on forest regeneration. Estimated deer densities are the lowest they've been since the program began in 1991. As deer densities have declined, the approach to deer management should also be evaluated. The "controlled" and "managed" aspect of the Quabbin hunts requires a lot of organization and effort that occupies a lot of staff time, money and energy. From road maintenance and signage to processing applications, conducting hunter orientations, to the safe operation of the scout and hunt, and resulting data analysis, it is nearly a year-round effort for DWSP staff.

For many years, the Division has implemented a Maintenance Phase framework of controlled hunting to minimize deer impacts on forest regeneration while maintaining hunter interest. Results of the Division's Pellet Group Survey indicate deer densities on the Reservation are below those needed to maintain good forest regeneration (approximately 20 deer/mi²) and very similar to deer densities in areas outside of Quabbin. The Quabbin controlled hunt relies heavily on the commitment and willingness of hunters to consistently apply and participate in a short, intense hunt for 2 days. Recently, there has been a drop in the number of applicants and the participation rate of selected hunters has dropped 10%. The Division's approach to deer management needs to adapt to reflect the changes in both deer density and hunter interest.

With deer densities low, the need for intense, short duration controlled hunts that DCR/DWSP has utilized in the past has passed. In the near future, deer management at Quabbin should be moving towards opening Quabbin hunting blocks to regular hunting

seasons. Many of the Quabbin blocks could be made accessible by foot to hunters during the regular hunting seasons. However, some areas (e.g. Prescott) may be too large or restricted to provide this type of access. Starting in 2019, the Division plans to explore options to change the way certain zones are hunted on DWSP's managed lands surrounding Quabbin Reservoir, while maintaining its requisite control of public access and security safeguards of this public drinking water supply. For this current season, the Division has decided to not hunt any Zone with an estimated deer density under 15 deer/mi². In 2018, only the Hardwick and Petersham Zones will be hunted. As in previous years, each block will be hunted for one, 2-day segment during the second week of shotgun season (Dec 6th and 7th). New Salem, Pelham and the Prescott will be taken out of the rotation for 2018.

2. Antlerless Allocation

DCR, in consultation with MassWildlife, will make the decisions on how many antlerless permits to allocate to the Quabbin hunt. These permits will be distributed among the 2 active Quabbin hunting blocks based on available data from previous harvests, forest regeneration and deer density estimates. For the 2018 hunt, DCR and MassWildlife will issue 300 antlerless permits. Hunters will continue to get these permits through MassWildlife's MassFishHunt's website instant award program.

The bag limit at Quabbin will continue to be 2 deer. Hunters awarded antlerless permits will be restricted to only 1 antlerless deer harvest. These antlerless permits will still be considered "bonus permits" and not count towards their statewide bag limit. Hunters may continue to fill their buck tag(s) during the Quabbin hunt. Zone 6 antlerless permits will NOT be permitted to be used inside Quabbin's gates.

D. QUABBIN PARK

The Division continues to have internal discussions regarding the management of Quabbin Park. Population studies conducted in 2003 and 2007 indicated an extremely high deer density within the park. In addition, a 2015 pilot and 2017 follow-up Pellet-Group Survey found that deer densities continue to be above preferred levels. Recent regeneration surveys within the park indicate a relatively low number of woody stems. The large number of deer within the Park has a potentially large impact on a variety of things. Internal discussions have touched on a diversity of topics including:

- a. The large deer herd and the associated abundance of deer ticks and rate of Lyme disease
- b. The effects of the deer herd on regeneration on Park lands both on and off watershed

- c. The potential of the deer herd within the Park to serve as a source population for other areas of the Reservation and serve as a refuge during times when other areas of the Reservation are hunted.
- d. A variety of public opinions regarding the deer herd within the Park and how they should be managed.

An official Quabbin Park Plan will be drafted over the next fiscal year and will include how deer management will move forward in the Park.

E. PARAPLEGIC HUNTING

Quabbin Reservation has hosted a paraplegic hunt for the Division of Fisheries and Wildlife (DFW) since 2000. This hunt is held in October-November each year outside the regular firearms deer hunting season. Typically 4-6 hunters participate in the hunt at Quabbin, and approximately 30 deer have been harvested over the last 12 years. In 2017, 5 hunters signed up for the Quabbin hunt. No deer were taken by 2 participating hunters over the 3 days. Hunting has taken place in a variety of locations around the administration building within Quabbin Park. Quabbin Reservation will continue to host the paraplegic hunt each year in cooperation with DFW. The 2018 hunt will be held October 1st -3rd.