<u>State of the Woods</u>

In the Town of East Hampton

Andrew Gaites November 2018

The Town of East Hampton adopted its deer management plan in June of 2013. One of the key points of the plan was to establish reliable metrics to monitor the effectiveness of any deer management programs considered. Years of deer-vehicle accident data and hunting data was readily available for compilation and review but no local vegetation studies of any kind were to be found. In order to show scientifically, what some of us already could see was occurring, a protocol to measure deer impact on vegetation was necessary.

The following year, I met Tom Rawinski, a botanist with the U.S. Forest Service. Mr. Rawinski had been observing the impact of deer browse on plants all over the Northeast for years. He was in the process of developing a method for monitoring town-wide deer impact of forests over time. He came to visit East Hampton in 2014 and introduced me to his method, which he has since dubbed, the "Ten-tallest Method". In places like the photo shown in Figure 1 it's easy for anyone to see that the vegetation inside the deer fence is thick and lush while the outside is heavily impacted. But even Mr. Rawinski was shocked at the deer-induced "forest disintegration" he witnessed in some of the natural areas of East Hampton that I took him to.

Figure 1. A Deer-fenced Private Property in Springs

The Ten-tallest Method involves choosing an indicator species in multiple plots (each 100m^2 in size) across town and monitoring these plots at least annually. Heights of the ten tallest stems are recorded and averaged each year. The assumption is that the results of the indicator

species represent the entire plant community in that area. In a healthy forest, native saplings would be expected to show growth each year. If indicator plants remain small (and few in number), these and other plants may be being negatively impacted. If, on the other hand, stem heights increase (and grow in number), conditions may be good or improving for these and other species in the area.

In the fall of 2014, I began implementing the Ten-tallest Method here in East Hampton. I started with seven plots spread across town from Town Line Road to Montauk. I have since added additional plots for a total of 19; some with multiple indicator species in the same plot. The original seven plots now have five seasons of data. Most of the additional plots were installed just last year in the Grace Estate and Culloden Point areas, due to the implementation of deer damage permits (DDP). The New York State Department of Environmental Conservation (NYSDEC) approved the Town's applications for DDPs on these two preserves specifically to allow the Town to reduce deer density because native vegetation has been so heavily impacted.

Of the original seven plots with five seasons of data (and an eighth plot with four seasons of data), most showed a *decrease* in average height of the ten tallest measured stems. Perhaps the most disheartening plot is EH1 in the Grace Estate where we measured sassafras (*Sassafras albidum*) sprouts, a species highly preferred by deer. (See Figure 2.) Originally, there were 18 sprouts in the plot but one can see from the data herein, there were seasons that fewer than ten sprouts could even be found to measure. By 2018, no sprouts could be found at all. The additional 11 plots that were just installed last year in East Hampton and Montauk, of course need more seasons of data to see trends. However, it is notable that not one of them showed any significant increase in growth based on the average of the ten tallest stems. Average heights stayed about the same or decreased for all of the species measured.

Figure 2. Ten-tallest Plot EH1

Ten-tallest Method for Deer Impact Monitoring

This form is used to document and monitor understory plant populations for height growth, reproductive condition, abundance and browse damage.

Data are typically gathered from a circular 100 square meter plot (5.64 m or 18.5 ft. radius) marked by a central numbered stake.

Site Name	East Hampton				
Site Location	*State:*	NY	*County:*	Suffolk	*City, Town or Village:* East Hampton
Plot Location					
Grace Estate Nature Preserve, East Hampton (near Old Northwest Road, Paumanok Path directly adjacent)					
Latitude:	N41 00.313'		*Longitude:*	W72 13.933'	
Plot Number	**EH1**				
(Note: Plot number consists of site name, stake number and species, e.g., Rheinstrom 1 White Oak.)					
Plot Center Marked with:	Wood stake at base of dead fallen tree/20 ft. off trail				
Species Monitored	**Sassafras albidum**				
Number of Individuals in Plot:	10-20	21-50	51-100	>100	*Actual Count:*

Observer(s)	*Observer(s)*	*Observer(s)*	*Observer(s)*	*Observer(s)*
Andrew Gaites	AG	AG	AG	AG
Juliana Duryea	JD	JD	JD	JD
Date: 10/24/2014	*Date:* 9/24/2015	*Date:* 9/29/2016	*Date:* 9/25/2017	*Date:* 9/28/2018
No. of Fertile Stems in Plot: 18	No. of Fertile Stems in Plot: 8	No. of Fertile Stems in Plot: 10	No. of Fertile Stems in Plot: 3	No. of Fertile Stems in Plot: 0

Height of the Ten Tallest Stems, and Evidence of Browse Damage

Stem No.	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*
1	8		1	5		1	4		1	2	y	1	0	
2	6.5		2	2		2	5.5		2	4	y	2		
3	7		3	5		3	5		3	2	y	3		
4	4.5		4	3		4	6		4			4		
5	4.5		5	2.5		5	6		5			5		
6	4		6	4		6	6		6			6		
7	6		7	3.5		7	3.5		7			7		
8	4		8	3.5		8	3		8			8		
9	4		9			9	3		9			9		
10	4		10			10	4.5		10			10		
Avg. Ht.	5.25		*Avg. Ht.*	3.5625		*Avg. Ht.*	4.65		*Avg. Ht.*	2.666666667		*Avg. Ht.*	0	

Notes

2015 avg height only includes eight plants found. 2017 avg height includes only three plants found. 2018-no plants found.

Deer Damage Permit issued for Grace Estate in 2017.

It is important to note that this is only a start and broad town wide conclusions should not be drawn from this data alone. Also, some plots seemingly fared better than others, displaying that deer impact is certainly not uniform across the town or across all plant species. Additional years of data will help to show deer browse impact in these specific areas over time.

Only two of the 19 plots had species that showed significant growth and these are two of my original plots from 2014. The first is AM1 where we measured American beech (*Fagus grandifolia)* sprouts. Many of the beech trees in this general area are currently showing positive signs of regeneration. Perhaps most obvious are the re-sprouting lower limbs on

already established trees. Lower limbs (within the reach of deer) that had been repeatedly browsed by deer are now growing back on some trees. (See Figure 3.) The average height of measured sprouts at AM1 increased nearly five inches since the first season measurement. (See Figure 4.) This location's environmental state is noticeably different than most parts of town. I learned that the property owner has been allowing the management of deer during recreational hunting season for the past ten years. Approximately 60 deer are reportedly harvested annually from this property. In addition, the directly adjacent golf course property has had an active DDP for about ten years that is implemented for the remainder of the year (excluding recreational hunting season). These active deer management programs are likely responsible for the measureable impact at this site.

Figure 3. American Beech Trees in Amagansett with New Growth

Figure 4. Ten-tallest Plot AM1

Ten-tallest Method for Deer Impact Monitoring

This form is used to document and monitor understory plant populations for height growth, reproductive condition, abundance and browse damage.

Data are typically gathered from a circular 100 square meter plot (5.64 m or 18.5 ft. radius) marked by a central numbered stake.

Site Name	Amagansett				
Site Location	*State:* NY	*County:*	Suffolk	*City, Town or Village:*	East Hampton
Plot Location					
High Point Preserve (Peconic Land Trust), Stony Hill Road					
Latitude:	N40 59.628'	*Longitude:*	W72 09.506'		
Plot Number	**AM1**				
(Note: Plot number consists of site name, stake number and species, e.g., Rheinstrom 1 White Oak.)					
Plot Center Marked with:	Wood stake spray painted orange				
Species Monitored	**Fagus grandifolia**				
Number of Individuals in Plot:	10-20	21-50	51-100	>100	*Actual Count:*

Observer(s)	*Observer(s)*	*Observer(s)*	*Observer(s)*	*Observer(s)*
Andrew Gaites	Andrew Gaites	Andrew Gaites	AG	AG
Juliana Duryea	Juliana Duryea	Juliana Duryea	JD	JD
Date: 10/15/2014	*Date:* 9/24/2015	*Date:* 9/29/2016	*Date:* 9/25/2017	*Date:* 9/27/2018
No. of Fertile Stems (i.e., w/ buds, flowers, fruit) in Plot: 58	No. of Fertile Stems (i.e., w/ buds, flowers, fruit) in Plot: 56	No. of Fertile Stems (i.e., w/ buds, flowers, fruit) in Plot: 65	No. of Fertile Stems (i.e., w/ buds, flowers, fruit) in Plot: 60	No. of Fertile Stems (i.e., w/ buds, flowers, fruit) in Plot:

Height of the Ten Tallest Stems, and Evidence of Browse Damage

Stem No.	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*	*Stem No.*	*Ht. (in)*	*Browsed? (Y/N)*
1	32		1	32.5		1	31		1	43	y	1	42	
2	29		2	34		2	42		2	38	y	2	33	
3	36		3	36		3	31		3	35	y	3	36	
4	28		4	24		4	49.5		4	28	y	4	34	
5	37		5	38		5	30		5	32	y	5	38.5	
6	28		6	26		6	31.5		6	33	y	6	34	
7	31		7	32		7	31		7	32	y	7	34	
8	25		8	26		8	36		8	35	y	8	34	
9	28		9	25		9	36		9	33	y	9	36	
10	27		10	25		10	30		10	33	y	10	31	
Avg. Ht.	30.1		*Avg. Ht.*	29.85		*Avg. Ht.*	34.8		*Avg. Ht.*	34.2		*Avg. Ht.*	35.25	

Notes

Regular season hunting/Deer Damage Permit has been occurring on the adjacent golf course since ~2008 (Terry O'Riordan)

John Rochetta has been managing deer for PLT since 2008 and reports about 60 deer per year removed.

The second plot that had measurable growth is MO2 with over three inches of average growth since the first season measurement. The indicator species chosen here was white oak (*Quercus alba*). I originally chose this species as an indicator simply because there were so many saplings available. The acorn crop may have been unusually large in the preceding years, yielding

thousands of new saplings at the property. Although oaks are reportedly a genus preferred by deer, my data thus far has not showed a lot of obvious browse of the white oaks at this specific site. Interestingly, black oaks (*Q. velutina*) at the plot site were obviously browsed. It's also possible that the sheer volume of plants caused deer browse to be spread out more across the whole property. Additional years of data will hopefully show trends more clearly.

Also included in this report, are five charts showing the size class distribution of stems above breast height. (See Figures 5a.-5e.) Mr. Rawinski and I collected these measurements at the Cathy Lester Preserve, Grassy Hollow, Grace Estate, Boys Harbor, and Jacob's Farm in June of 2018. Trees and saplings were identified to species, counted, and measured at each site in three contiguous circular plots of 400m^2 each. The size classes of the trees' basal areas are displayed in square centimeters on a graph for each of the five properties. What can be observed in each graph is the obvious lack of stems in the smallest category, likely due to many consecutive years of heavy deer browse. A healthy woodland would show a negative exponential distribution with most stems in the smallest category and a gradual decline in the number of trees as they get older and larger, and eventually die off. For comparison, see Figure 6 which shows some data collected by Rawinski from Beaver Meadow State Forest in Chenango County, New York. The sample area is larger than the ones we did in East Hampton so there are more stems overall but the size class distribution is notable, and indicative of a healthy woodland.

Figure 5a. East Hampton Stem Size Class Distributions

Total no. of trees/saplings – Cathy Lester (> BH) measured in three contiguous 400 square m circular plots: 136
Calculated basal area: 21.158 sq. m/ha (92.133 sq. ft/acre)

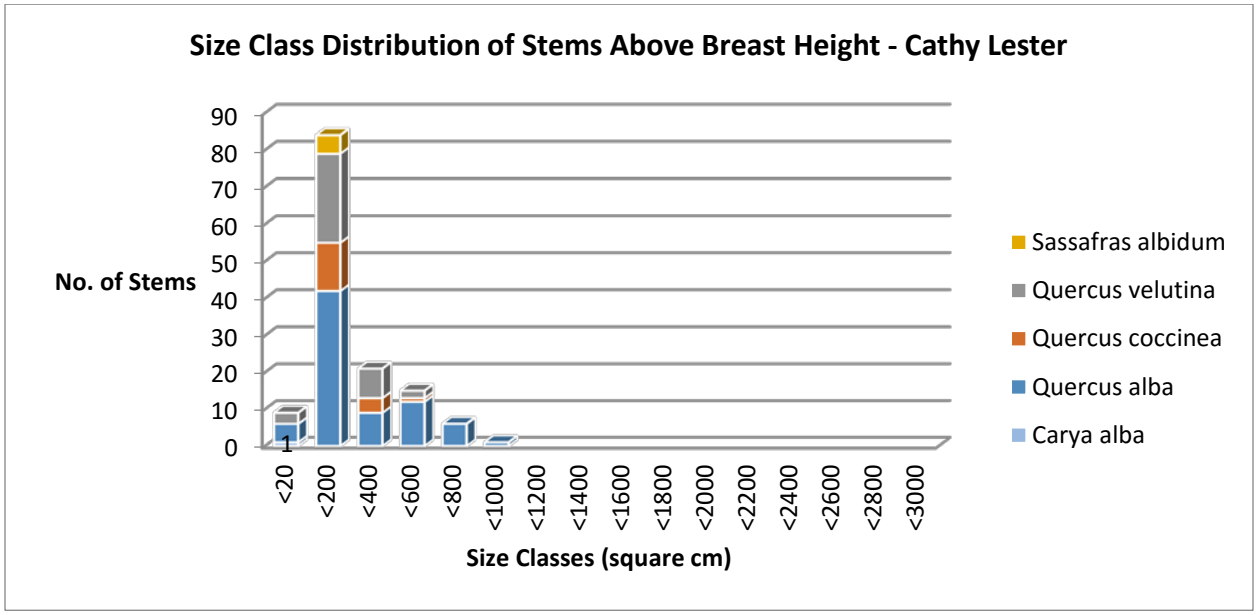


Figure 5b.

Total no. of trees/saplings – Grassy Hollow (> BH) measured in three contiguous 400 square m circular plots: 77
Calculated basal area: 16.763 sq. m/ha (73.000 sq. ft/acre)

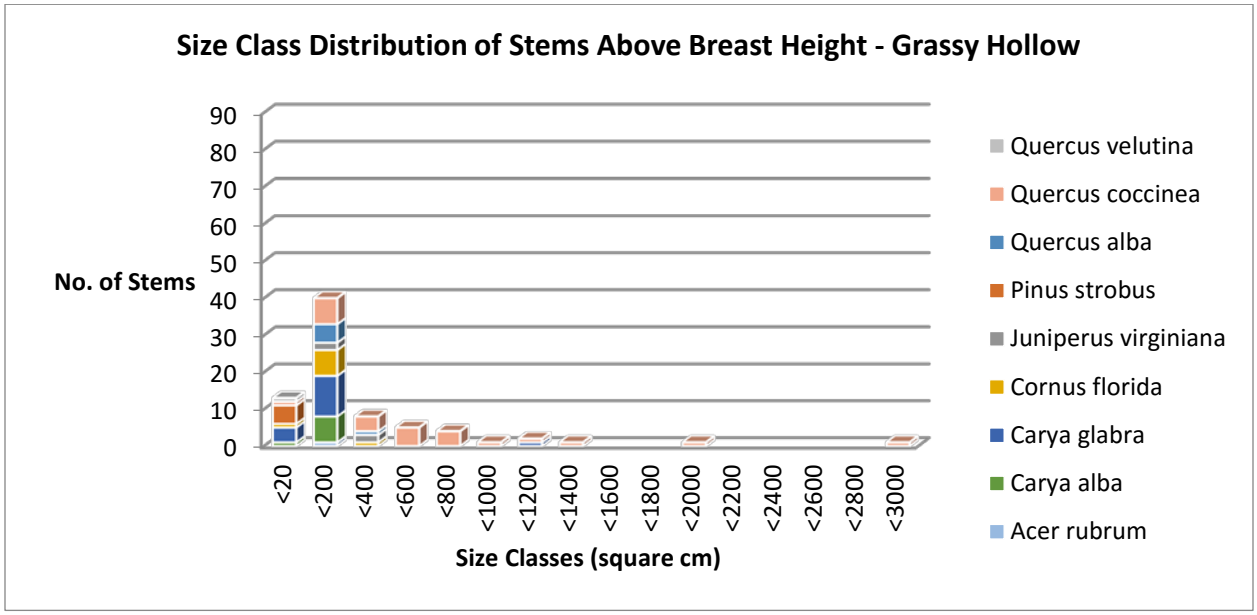


Figure 5c.

Total no. of trees/saplings – Grace Estate (> BH) measured in three contiguous 400 square m circular plots: 50
Calculated basal area: 15.776 sq. m/ha (68.697 sq. ft/acre)

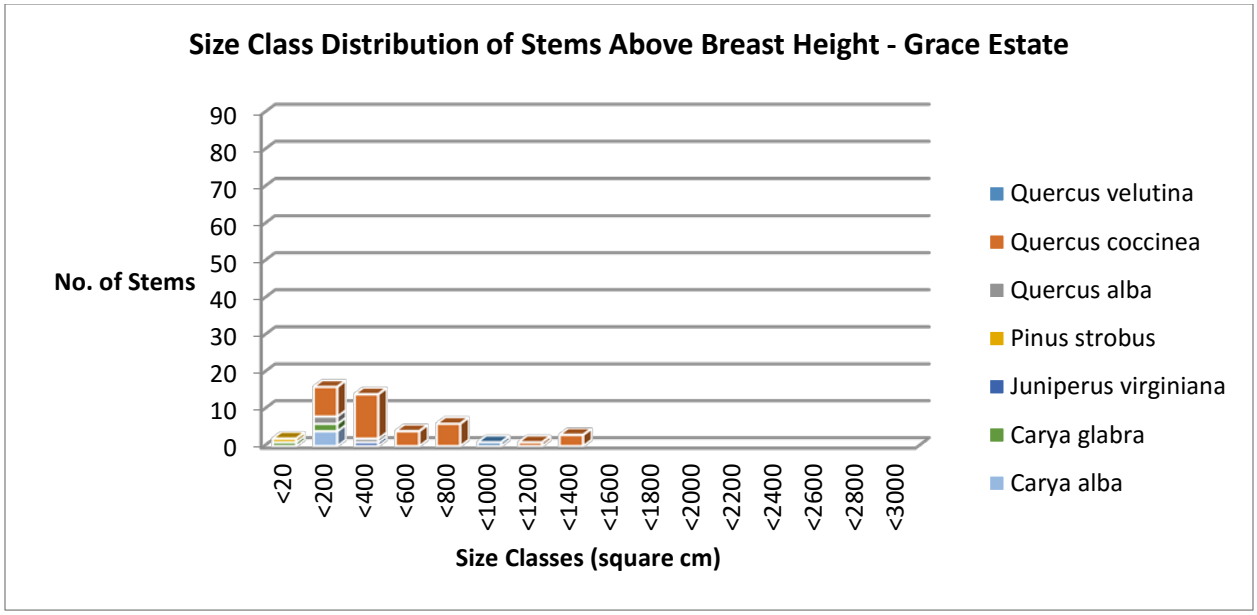


Figure 5d.

Total no. of trees/saplings – Boys Harbor (> BH) measured in three contiguous 400 square m circular plots: 94 Calculated basal area: 20.398 sq. m/ha (88.824 sq. ft/acre)

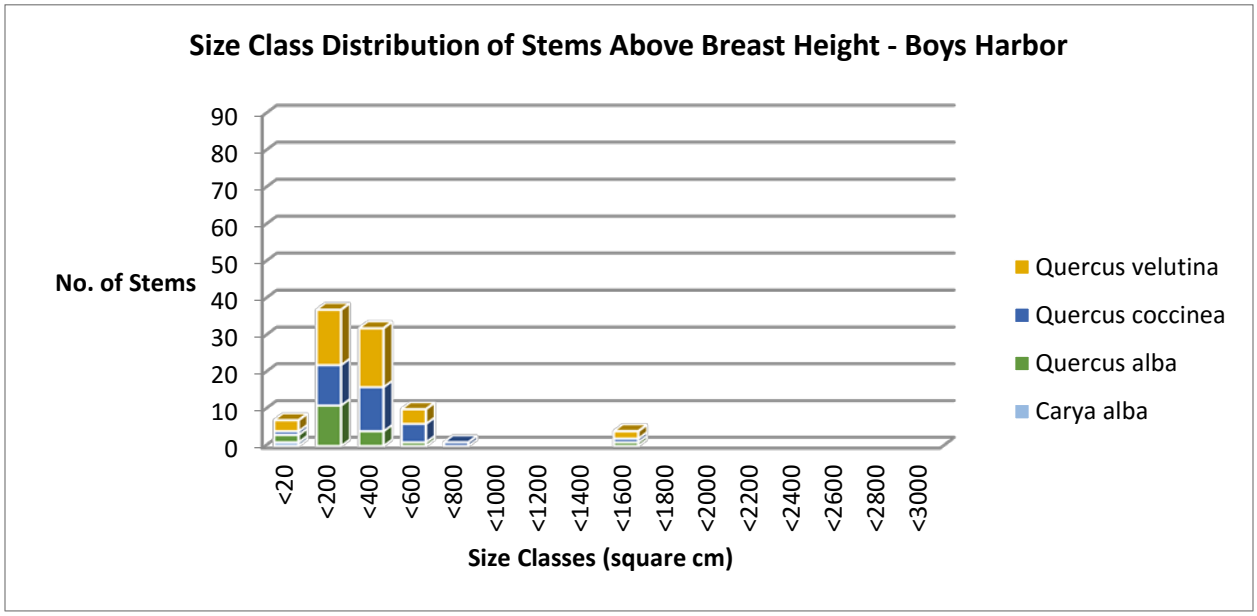


Figure 5e.

Total no. of trees/saplings – Jacob's Farm (> BH) measured in three contiguous 400 square m circular plots: 64 Calculated basal area: 11.15 sq. m/ha (48.552 sq. ft/acre)

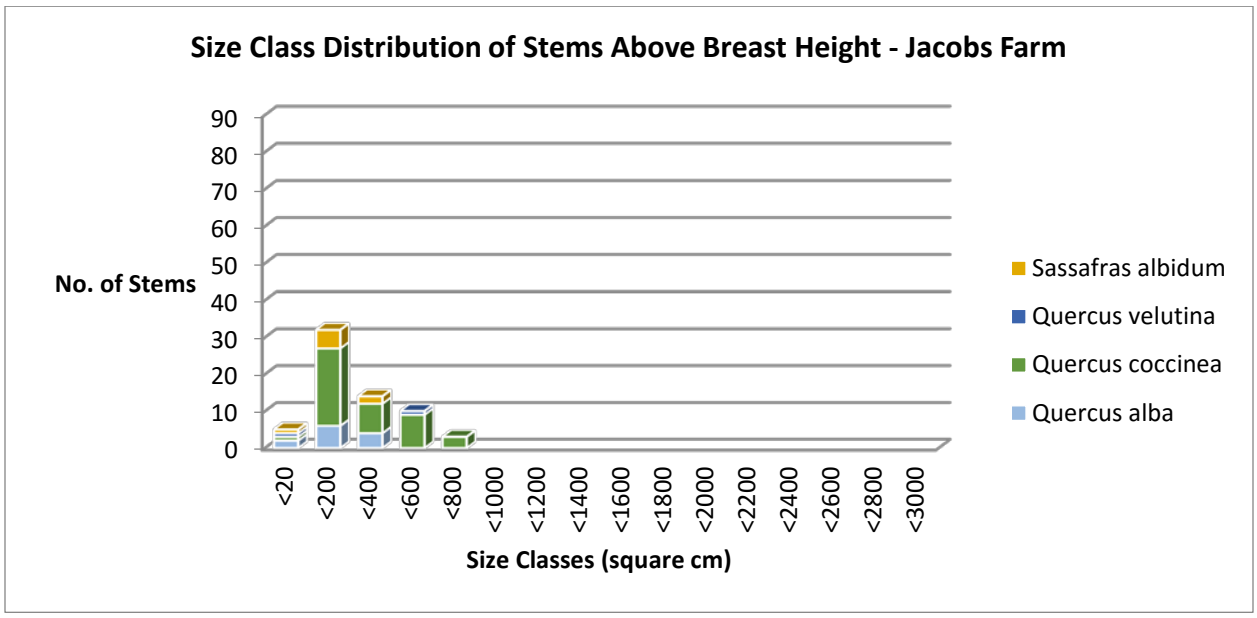
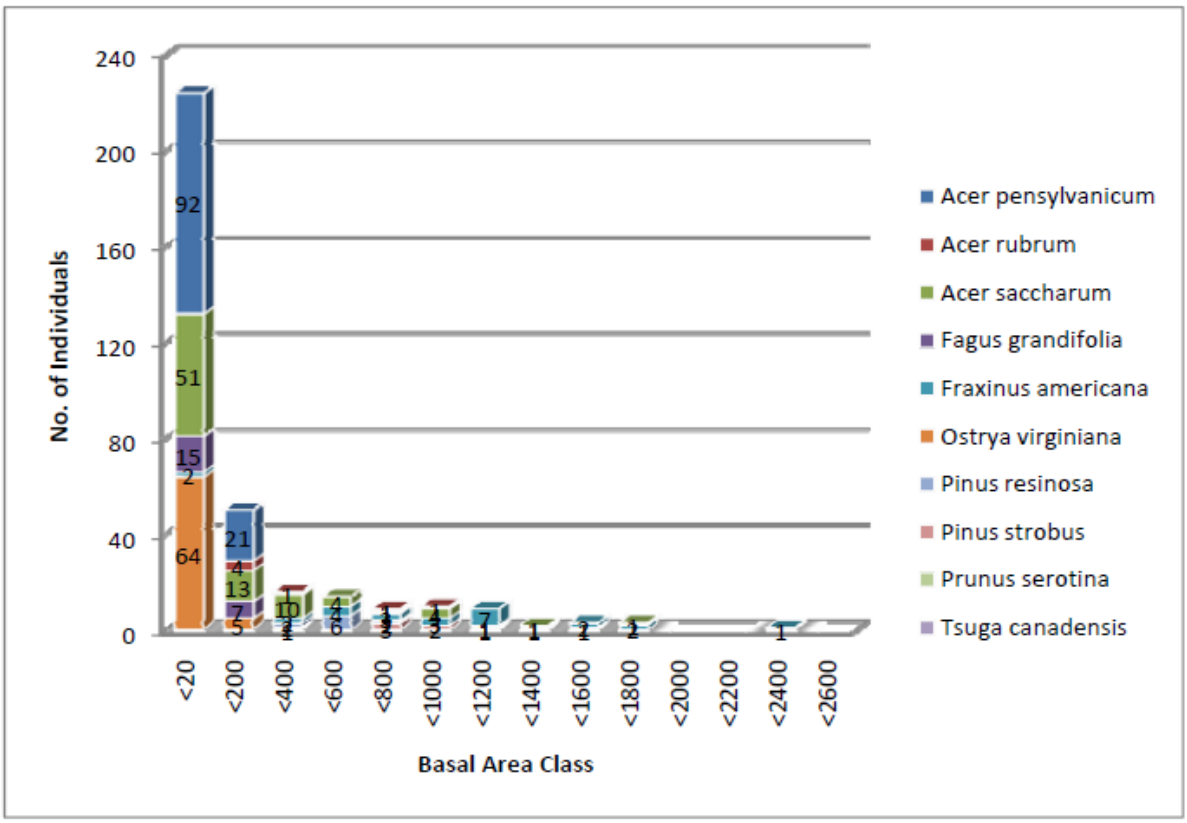


Figure 6. Beaver Meadow State Forest Stem Size Class Distribution

Total no. of trees/saplings (> BH) measured in thirteen contiguous 100 square m circular plots: 341
Calculated basal area: 45.2 sq. m/ha (196.8 sq. ft/acre)



While obtaining a "deer count" is often suggested by both proponents and opponents of aggressive deer management, counts have proven to be inconsistent and inaccurate. Consider the following example. The East Hampton Group for Wildlife hired Wildlife Biometrics to perform a distance sampling count of deer in East Hampton in 2006, resulting in an estimated town-wide total of 3,293 deer. Then, in 2013, the Town of East Hampton hired Vision Air Research to perform an aerial thermal infrared survey of deer, resulting in a town-wide count of 877 deer. While it's conceivable that the 2006 number *could* be representative of the true population, it is obvious that the 2013 number is grossly inaccurate. This is clear because in that same year the Town's Highway Department collected 309 carcasses from Town-maintained roads alone and the calculated recreational hunting harvest was 477. Considering reasonable numbers of road kills on state routes in the town, natural die off and still living deer, one must conclude the total number would be well over 877. It may not be feasible to come up with a precise number of deer in our town, but some of the impacts of deer are measurable. The fact is that the calculated annual number of deer-vehicle collisions across town has been nearing the 500 mark in recent years. Recreational hunting harvest numbers in East Hampton have averaged 424 over the last five years despite hunting license sales being on the decline for decades. Even the relatively small amount of vegetation data we have obtained suggests that

the impact of deer on our woodlands is detrimental to forest regeneration. The Town of East Hampton has been consistent in providing ample recreational hunting opportunities for Town residents and their guests, and the couple of site-specific DDPs are a step in the right direction. However, a more comprehensive and aggressive approach will likely be necessary if we want to see substantial recovery of our woodlands.

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Special Thanks

Thank you to Tom Rawinski who has been instrumental in helping me put this valuable monitoring method into practice in East Hampton.

Thank you to Town employees Andy Drake and Juliana Duryea who spent countless hours in the woods with me over the past few years assisting in data collection.