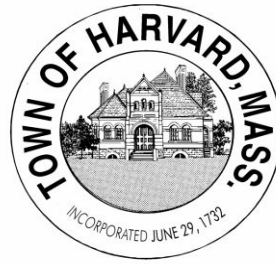


Town of Harvard

The Deer Management Subcommittee's Report to the Conservation Commission on the Management of White-tailed Deer

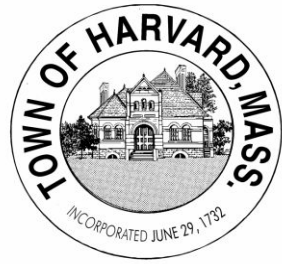
September 12, 2019

Mission Statement



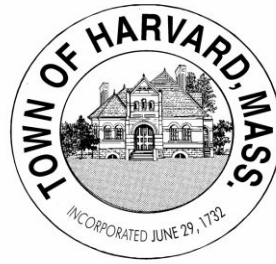
The Deer Management Subcommittee will investigate the available options for monitoring and managing the population of deer in Harvard with the goal of protecting the ecological integrity of its forests. With public education and opportunities for discussion, it will engage townspeople in the development of a plan and set up the necessary structure to safely implement, supervise and evaluate an ongoing deer management program. The goal is to phase in a program starting in the fall of 2019. The Town will pursue the MA Division of Fish and Wildlife's goal for this region of 12-18 deer per square mile.

Public Forums



Town of Harvard Deer Management Report
September 12, 2019

Public Forums

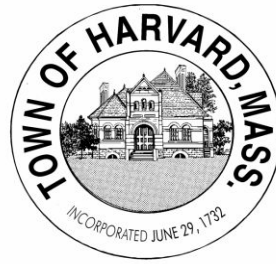


Forum Speakers:

- Michele Grzenda, Conservation Administrator, Town of Weston
- Allen Rutberg, PhD, Professor, Department of Biomedical Sciences, Tufts University
- David Stainbrook, MS, State Deer & Moose Wildlife Biologist, Massachusetts Division of Fisheries & Wildlife
- Samuel Telford, ScD, Professor, Department of Infectious Disease and Global Health, Tufts University
- Robert Wernerehl, PhD, State Botanist, Massachusetts Division of Fisheries & Wildlife

Recordings available at <http://www.harvardcabletv.com>

Public Forums



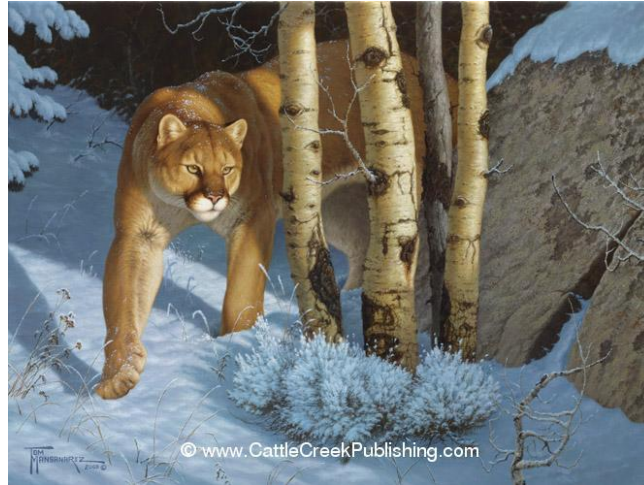
Forum Panelists:

- Lt. Robert Dalton, Manager, Andover Deer Management Program
- Troy Gipps, Manager, Grafton Land Trust Deer Management Program
- James Palmer, Manager, Dover Deer Management Program
- Frank Perry, Manager, Medfield Deer Management Program

Recordings available at <http://www.harvardcabletv.com>

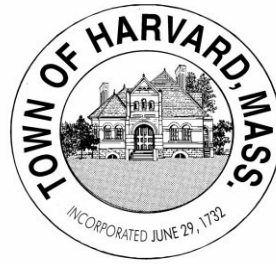
Historic Hunters

Natural deer population density
→ 5-15 deer per square mile

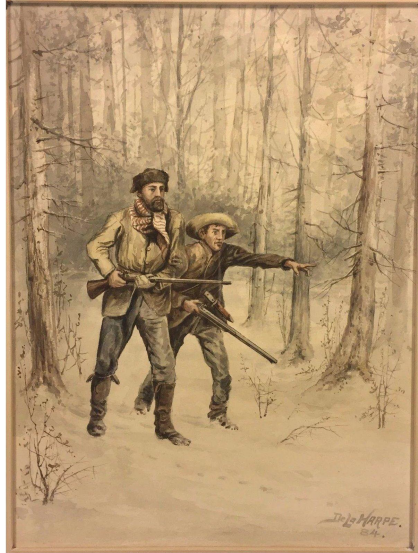


Town of Harvard Deer Management Report
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Colonial Era - 19th Century

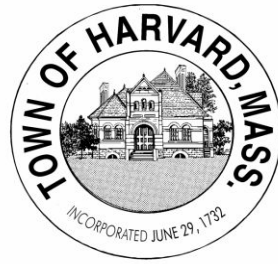


Habitat loss
Over-hunting
→ The brink of extinction



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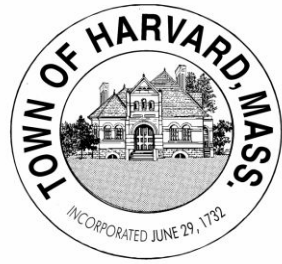
Recovery



- 1900: Lacey Act
- Decline of Farming



Today



30 million nationwide

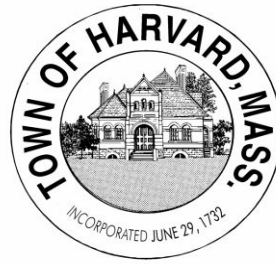
100,000 in Massachusetts

→ Overabundant in many areas



Town of Harvard Deer Management Report
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Overbrowsing



- Sapling trees
- Shrubs
- Herbaceous plants

→ Diversity and Age Distribution Diminished



reported a two-car collision near the post office where Slough and Stow roads intersect with Massachusetts Avenue. Damage to the cars was minor, and no one was injured; neither driver was found at fault.

Wednesday, Aug. 28: A Westcott Road resident who was home alone called 911 at 8:34 a.m., saying an unfamiliar van was parked in the driveway and she could hear noises in the basement. An officer found that, unbeknownst to the resident, a repair person was at work there. At 10:14 a.m. an officer took a report in connection with a sexual assault on a juvenile at a party. At 4:01 p.m. a motorist reported hitting a deer on Littleton Road. A caller at 9:38 p.m. said someone had been driving erratically through town and then turned onto Route 2; an officer notified the state police. At 11:36 p.m., after responding to a medical emergency call, an officer noticed some low-hanging wires on Woodside Road and notified National Grid.

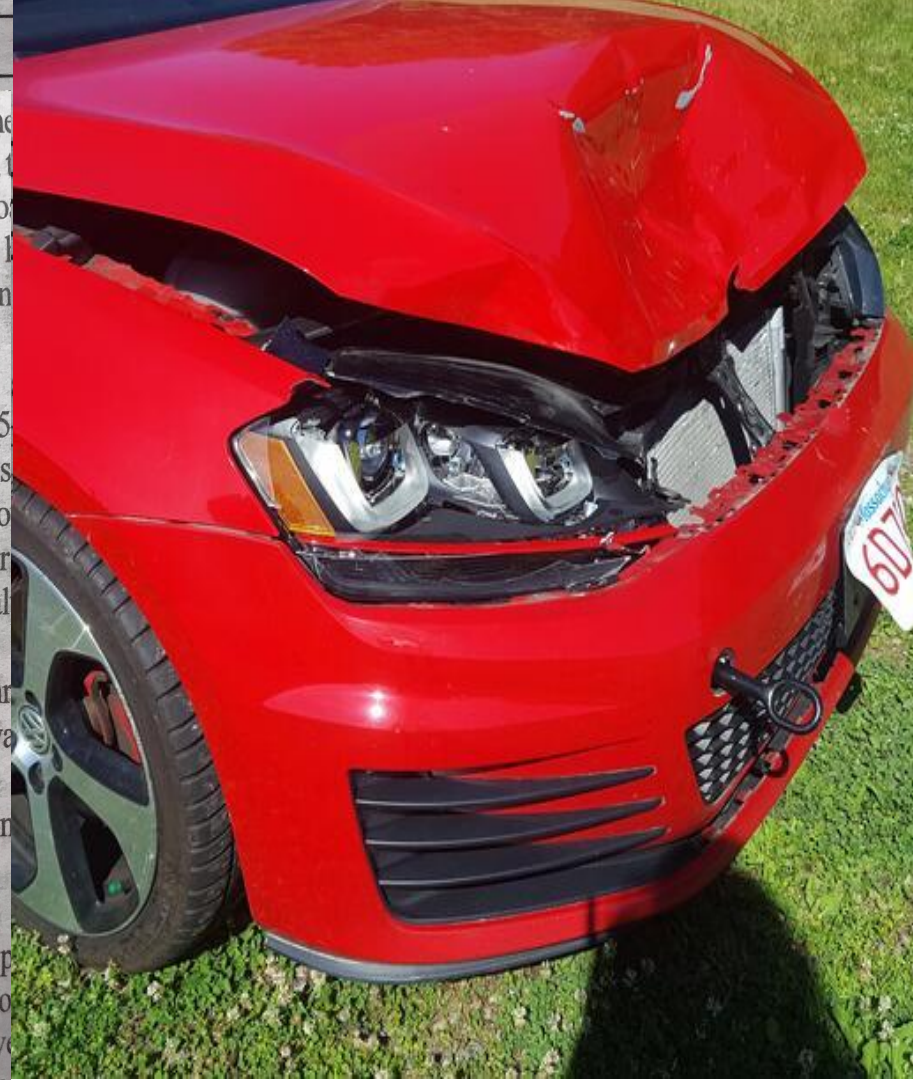
Thursday, Aug. 29: A 911 caller at 7:48 a.m.

also near the post office; when the Mercedes lacked insurance, the car was towed. At 8:18 p.m. a Woodside Road resident reported suspicions about a car that had been in the driveway and then gone when police arrived.

Saturday, Aug. 31: At 5:00 a.m. a caller reported loud noises, perhaps from a car, on Haskell Lane, but police found nothing. At 9:49 p.m. a Harvard officer took a report to state police to a physical altercation at the Garden Inn on Andrews Street, where a large group of unruly people were causing a disturbance; peace was restored.

Sunday, Sept. 1: Nothing to report.

Monday, Sept. 2: At 9:10 p.m. a caller at the Prospect Hill overlook reported suspicious activity; the vehicle was seen driving on the road.



Deer-Vehicle Collisions

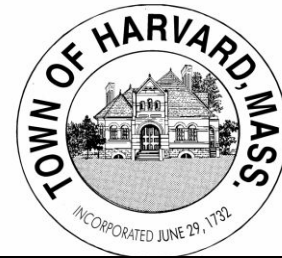


Annual cost:

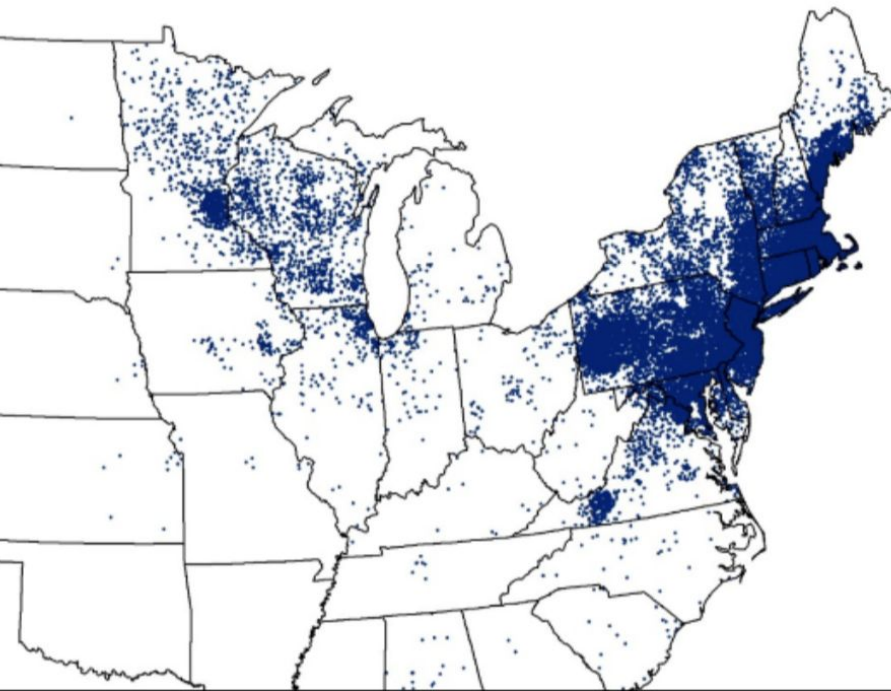
- 1 million deer killed
 - 150 human fatalities
 - 29,000 human injuries
 - \$1 billion property damage
- NHTSA



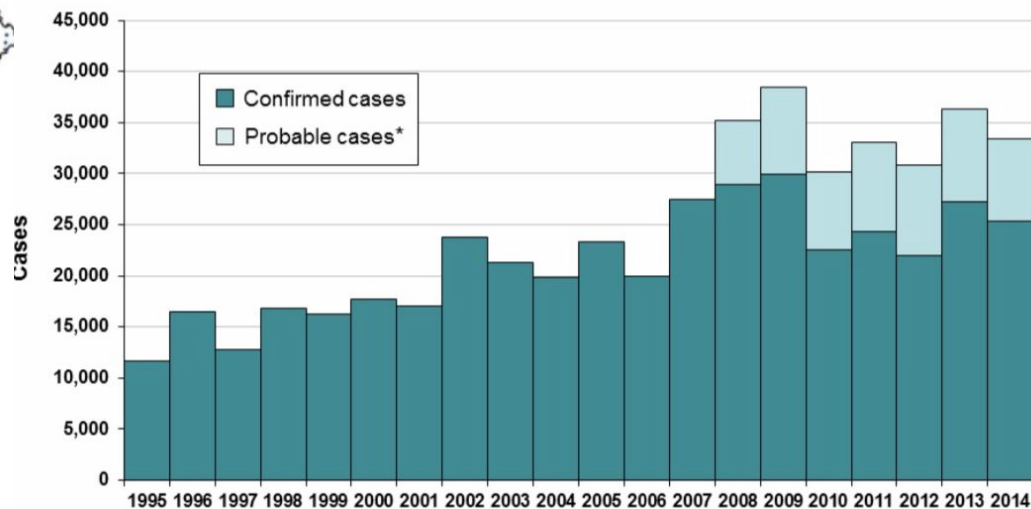
Tick-Borne Disease



Reported Cases of Lyme Disease—United States, 2014



Reported Cases of Lyme Disease by Year, United States, 1995-2014



Tick-Borne Disease



Ehrlichiosis & Anaplasmosis

Number of Annual Ehrlichiosis Cases, 1994-2010

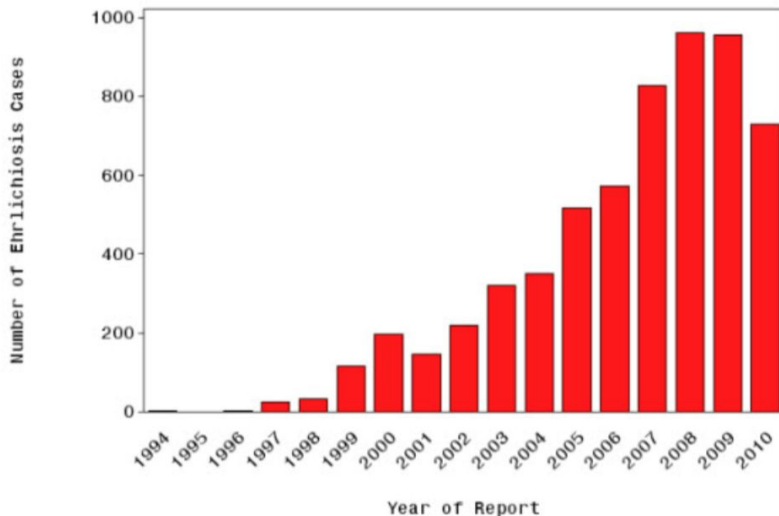
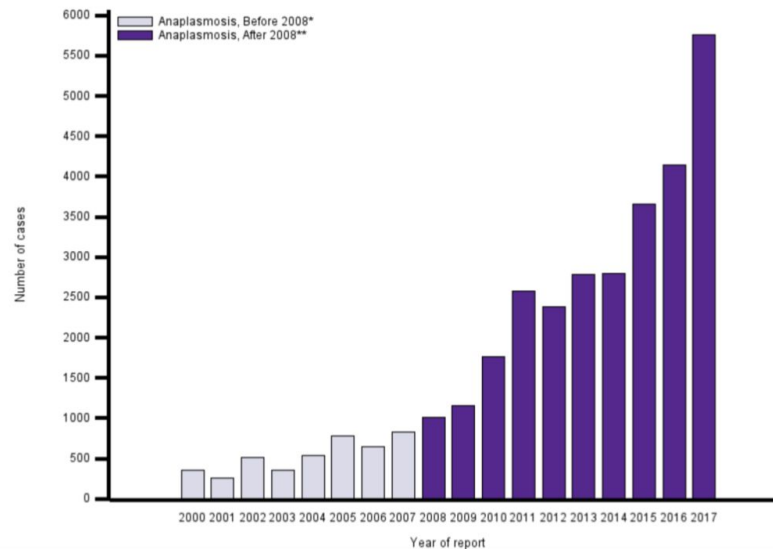
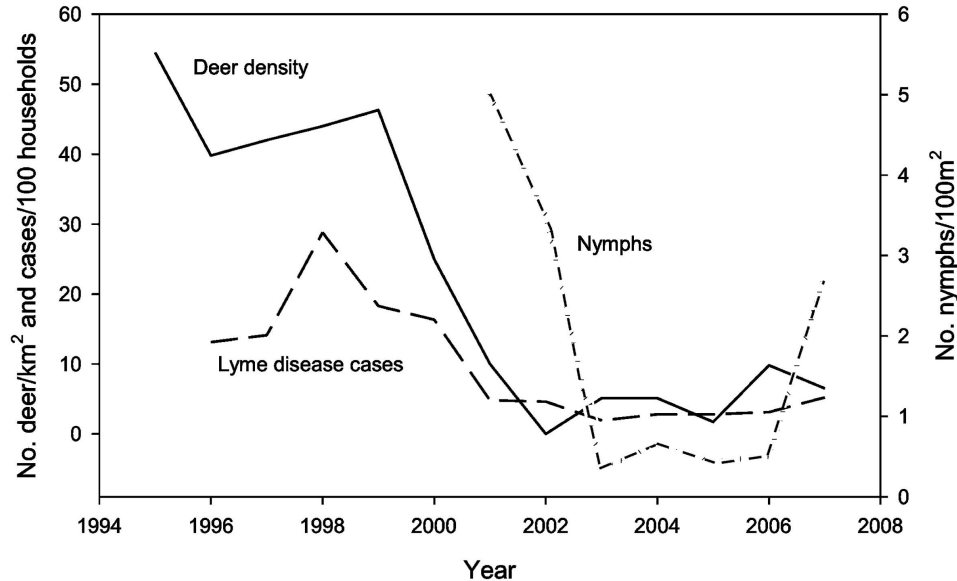
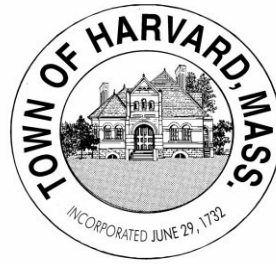


Figure 1 – Number of U.S. anaplasmosis cases reported to CDC, 2000–2017



Deer & Tick Abundance



Primary reproductive host
→ Over 90% of adult female
black-legged ticks feed on white-tailed
deer in order to produce eggs

Reduction in deer density, number of Lyme disease cases and nymphal blacklegged ticks in Mumford Cove, Connecticut, 1995-2007. (Connecticut Agricultural Experiment Station (State of CT))

Deer Health



Overcrowding:

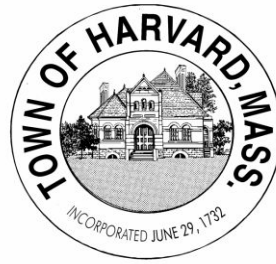
→ Chronic Wasting Disease

→ Bovine Tuberculosis



Town of Harvard Deer Management Report
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Agenda



Introduction

Approach

Background

Impacts - Regional

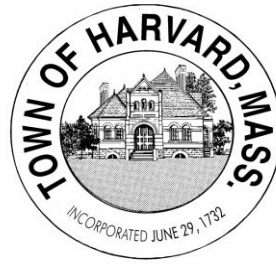
Impacts - Harvard ←

Options

Archery for Deer Management

Recommendation

Harvard: Plants



Pink Lady's Slipper



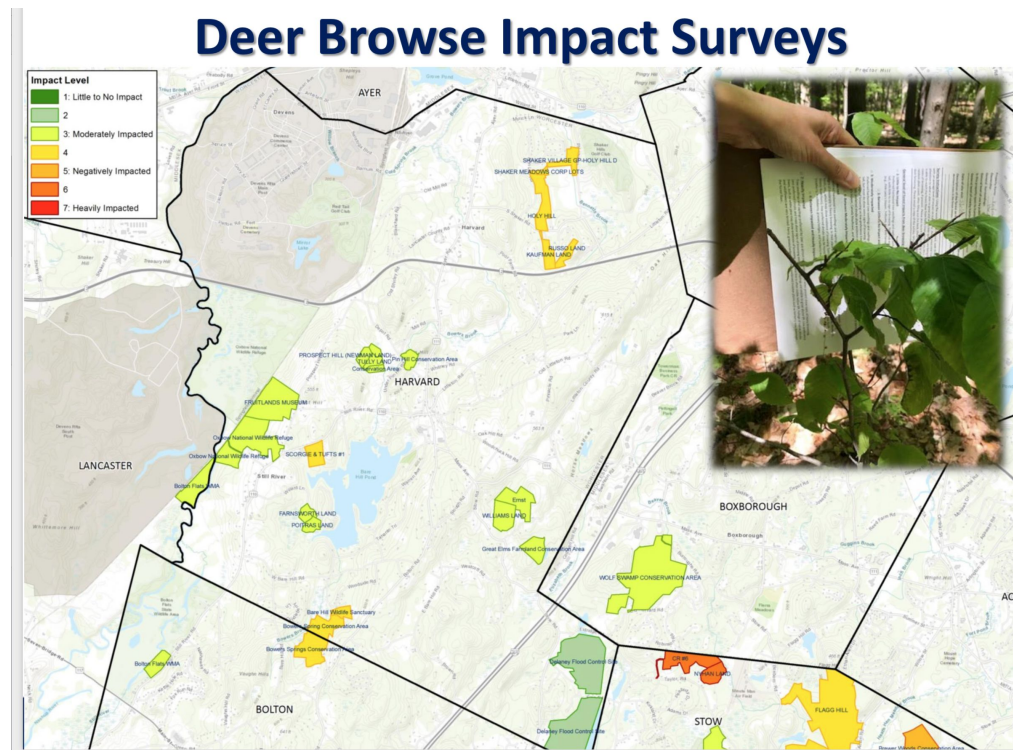
Town of Harvard Deer Management Report
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Harvard: DFW Browse Surveys



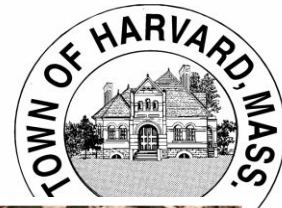
Massachusetts Dept of
Fish & Wildlife (DFW)

2017-2019
11 conservation parcels

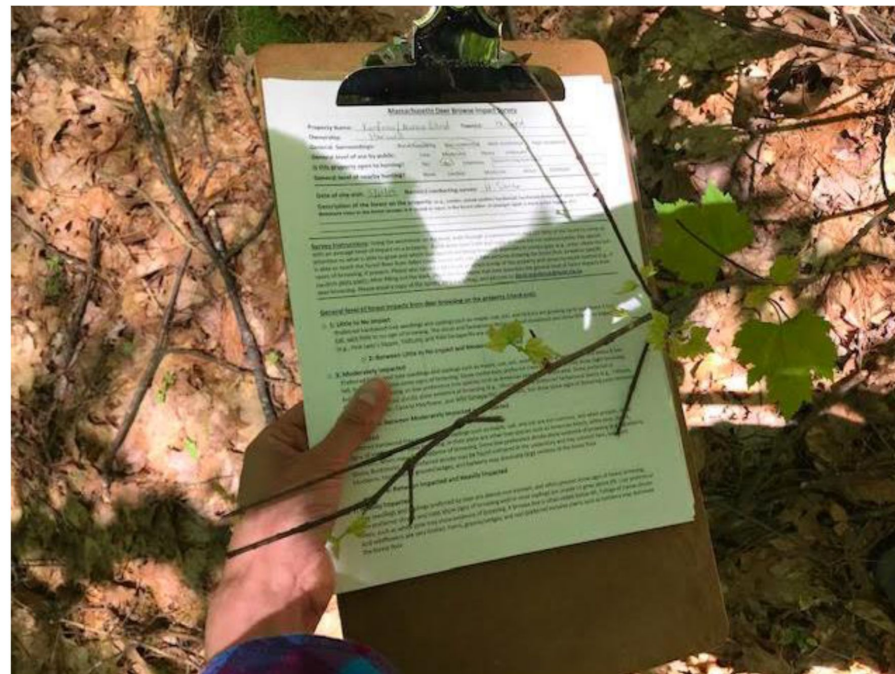


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Harvard: Deer Impacts



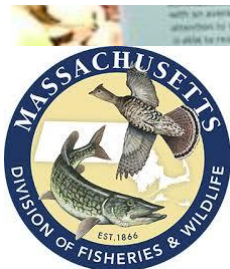
Canada mayflower and fringed polygala present on the forest floor. Canada mayflower was a common species. No sign of browse



Browsed red maple seedling (browsing score 2-3). Many red maples showed none to moderate browse. And many specimens reached over 6 ft tall in the sapling layer.

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Harvard: Deer Impacts



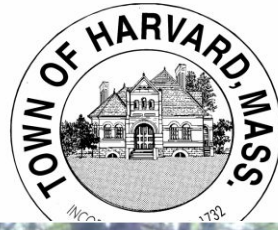
Witch hazel was lightly browsed in the forest (score 2)



American beech was not a common species in this forest. When present, there were some signs of browse (browsing score 2), but not on all specimens.

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Harvard: Deer Impacts



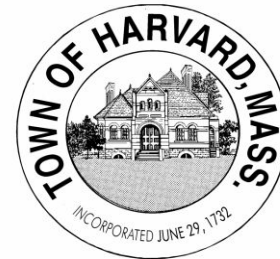
Overall look of the forest near the Tully land with a quite bare understory.
(Tully Land)



Overall look of the forest showed a sparse herbaceous layer.
(Bower's Spring)

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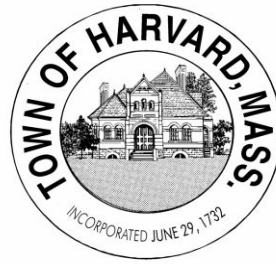
Harvard: DFW Assessment



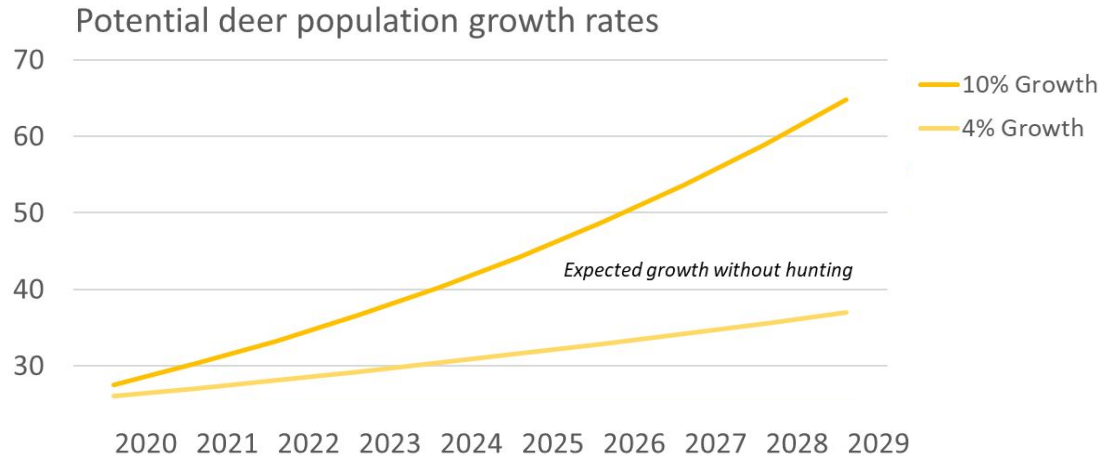
DFW Assessment for Harvard:

- 20-35 deer per square mile on non-hunted land
- 4-10% per year growth rate
- DFW ecological goal: 12-18 deer per square mile

Harvard: Population Growth

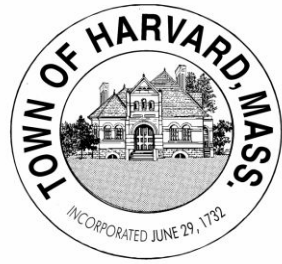


4-10% per year growth rate
→ Could double over next decade





Harvard: Deer Fencing



Crop damage:

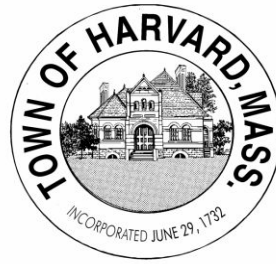
Orchard fencing:

~\$200,000 Westward Orchards

~\$185,000 Carlson Orchards



Management Options



Capture & Relocate

Contraception

Professional Sharpshooting

Primitive Firearms (Muzzle-loader) & Shotgun Hunting

Archery

Capture & Relocate?



Capture/Relocate

→Difficult/Expensive

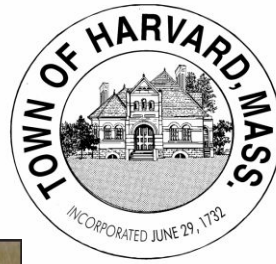
→No relocation sites

→Baiting & capturing not permitted by state



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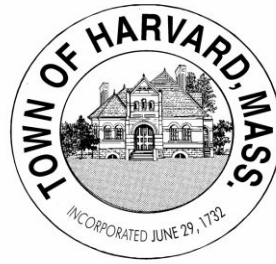
Contraception?



- \$500/deer every 2 yrs
- Cost-prohibitive (Dr. Rutberg)
- Baiting, capturing & vaccine not permitted by state



Firearms?



Professional Sharpshooting

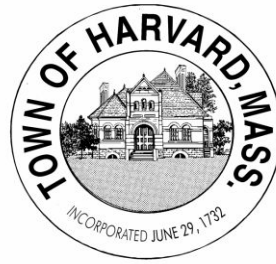
- Highly effective
- Controversial
- Not permitted



Primitive Firearms (Muzzle-loader) & Shotgun Hunting

- Currently practiced in Harvard
(Private land, Delaney, Oxbow)
- Safety concerns

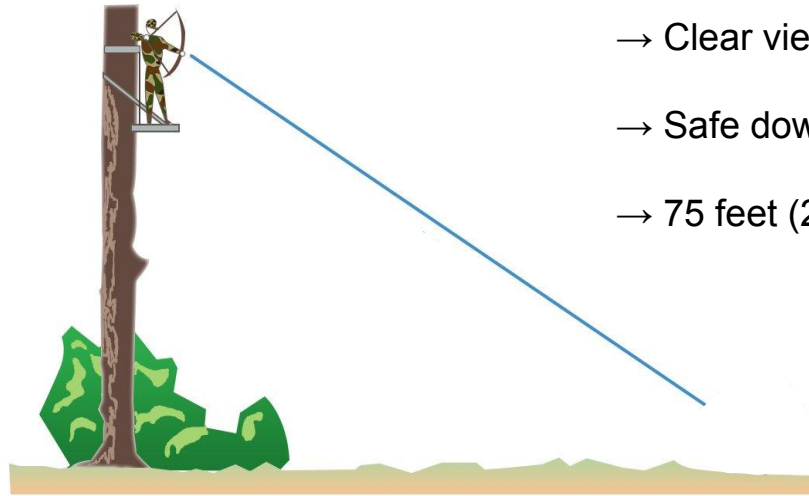
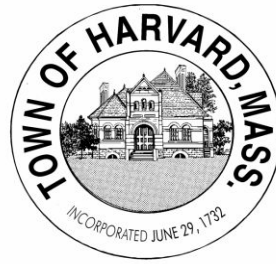
Archery from Tree Stands?



- Currently practiced in Harvard (Private land, Delaney, Oxbow)
- Very safe
- Effective long-term strategy
- Widely used in suburbs



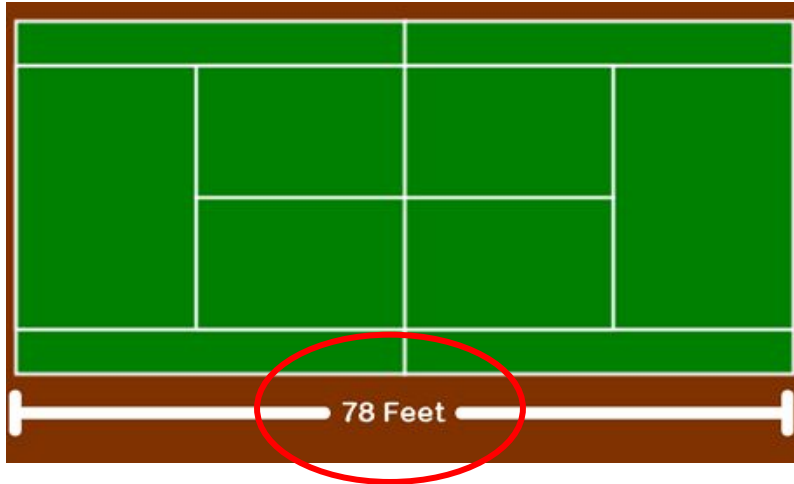
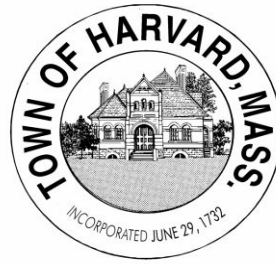
Archery from Tree Stands?



- Clear view of surroundings
- Safe downward shot
- 75 feet (25 yards) max range

Max range approx 75 feet (25 yards)

Archery from Tree Stands?

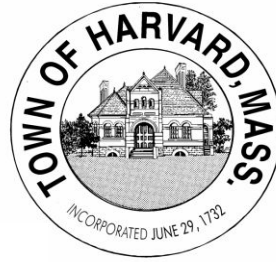


Max range: 75 feet

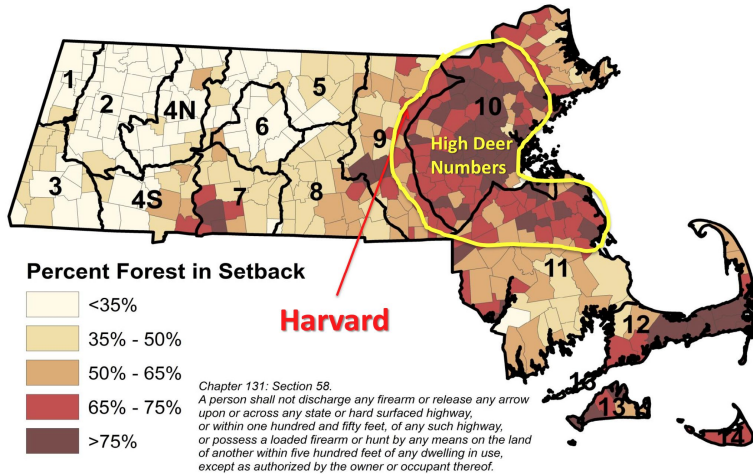
→ A tennis court is 78 feet long

→ This room is 69 feet on the diagonal

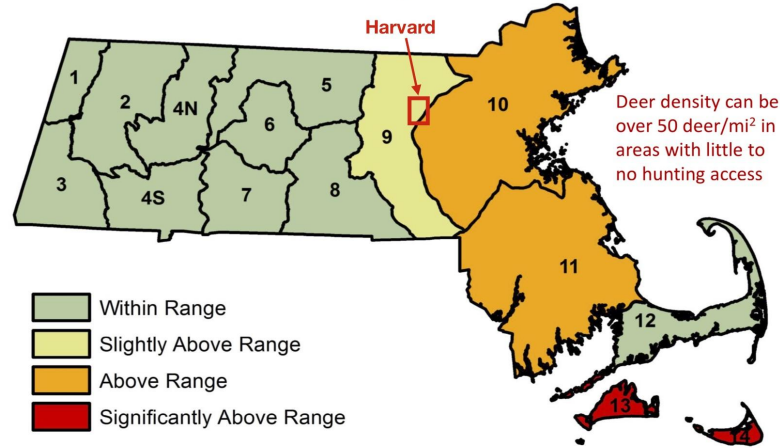
Archery for Management



Percent of Total Forest within a Discharge Setback for all Towns in Massachusetts

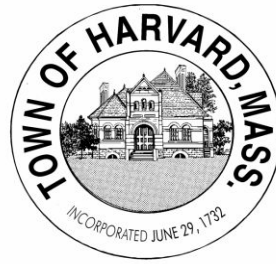


Current Deer Density in Massachusetts



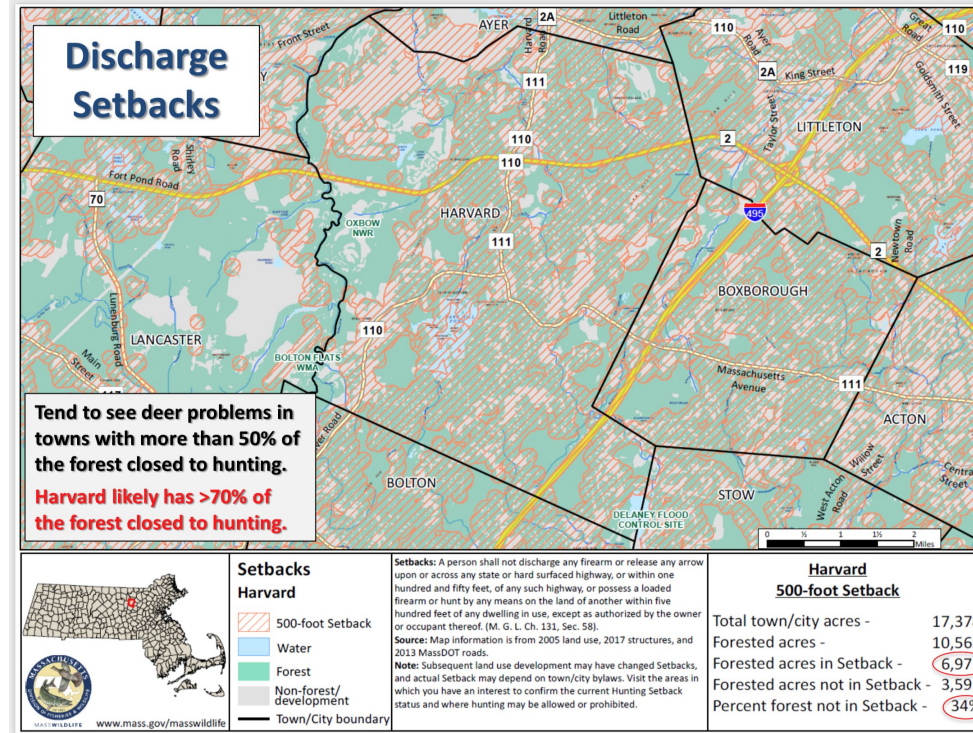
Percent of total forest with discharge setback for Massachusetts towns (left) and regional deer population densities for the 14 Massachusetts Wildlife Management Zones (right). Harvard sits at the eastern edge of Zone 9. (Department of Fish & Wildlife)

Archery for Management

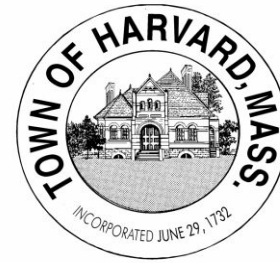


Over 70% of Harvard forests
inside restricted setbacks

→ No hunting allowed



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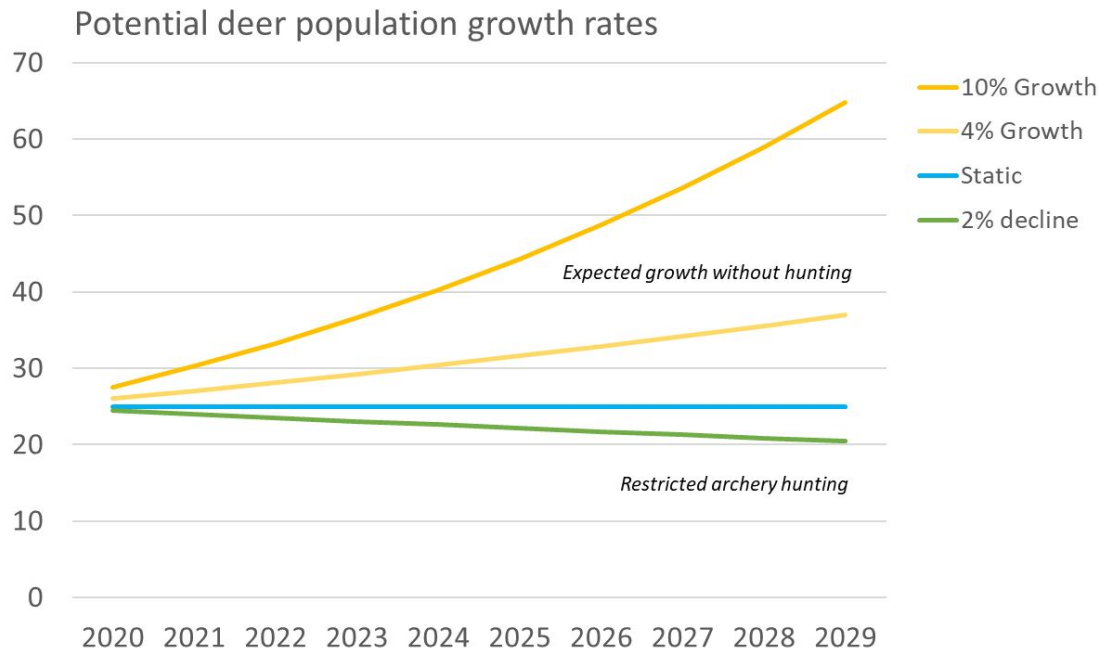
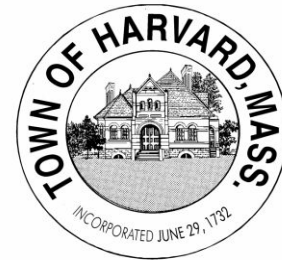


Archery: Effective?

Data from the Weston Program

Cause of Deer Morality in Weston	2010	2011	2012	2013	2014	2015	2016	2017	2018
Deer/car collisions ⁱ	28	26	24	23	34	28	22	20	17
Deer harvested on conservation land	N/A	N/A	18	20	25	26	32	29	35
Deer harvested on private land	18	12	18	22	19	14	19	22	18
Total	46	38	60	65	78	68	73	71	70

Archery for Management



1989: FOREST HEALTH AT QUABBIN

1989: REGENERATION STUDY

2000 stems, >4.5 ft of distributed, diverse tree species.

Off reservation: 1140 stems

Quabbin: 130 stems.

88% of the plots surveyed had no qualifying regeneration.
Increase of dense fern cover- compounding the problem.

1991: DEER MANAGEMENT PROGRAM AT QUABBIN

GOAL:

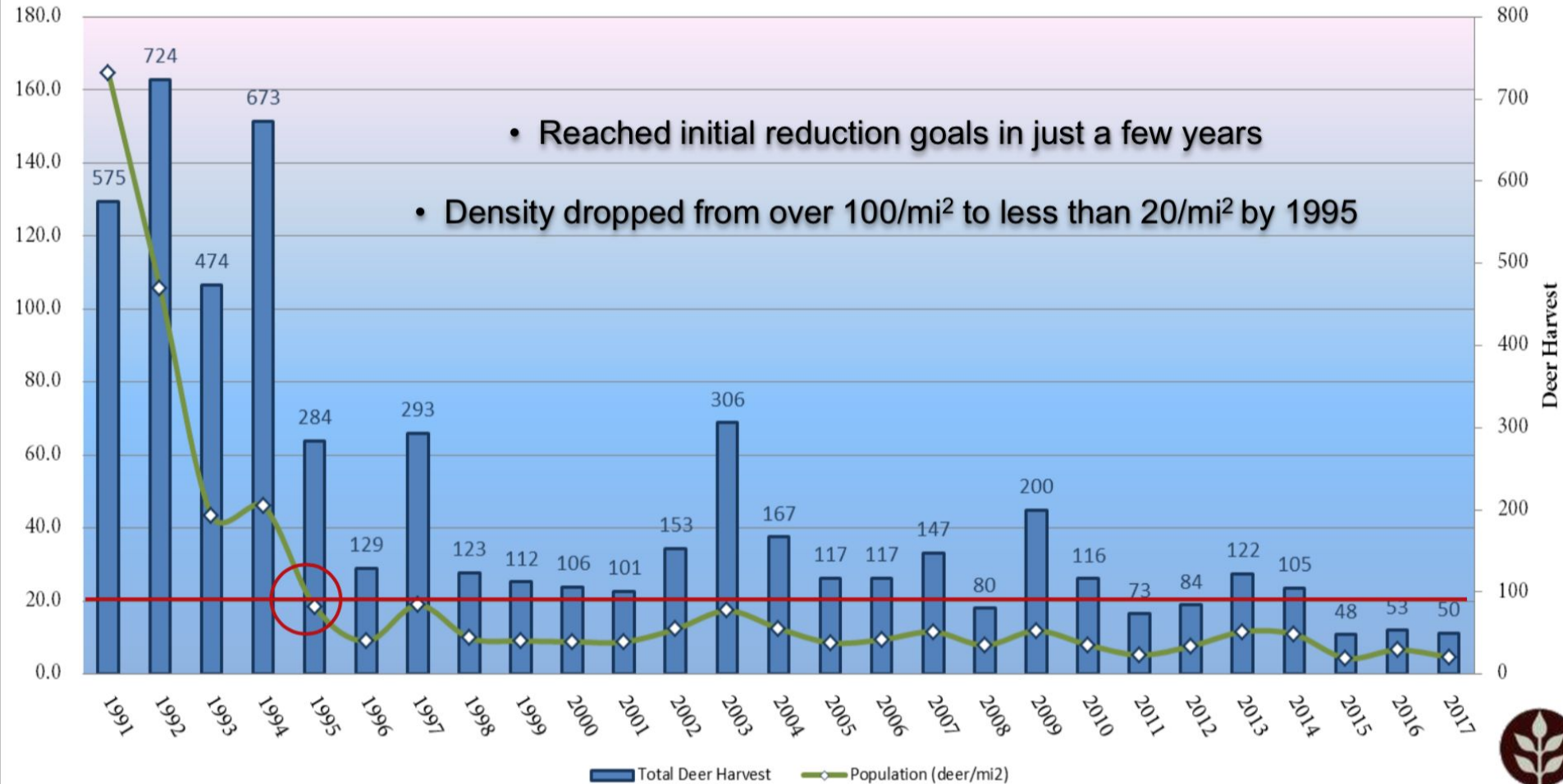
Reduce the impacts of deer browsing to a level that allows and promotes the development of a healthy, resilient, diverse forest that can adequately protect water quality.

MAJOR COMPONENTS:

- 1) Initial reduction of deer population densities.
- 2) Maintain those densities at a level that allows continued growth and regeneration of forest tree species.



Overall Quabbin Deer Harvest and Density Estimation (Deer/mi2)



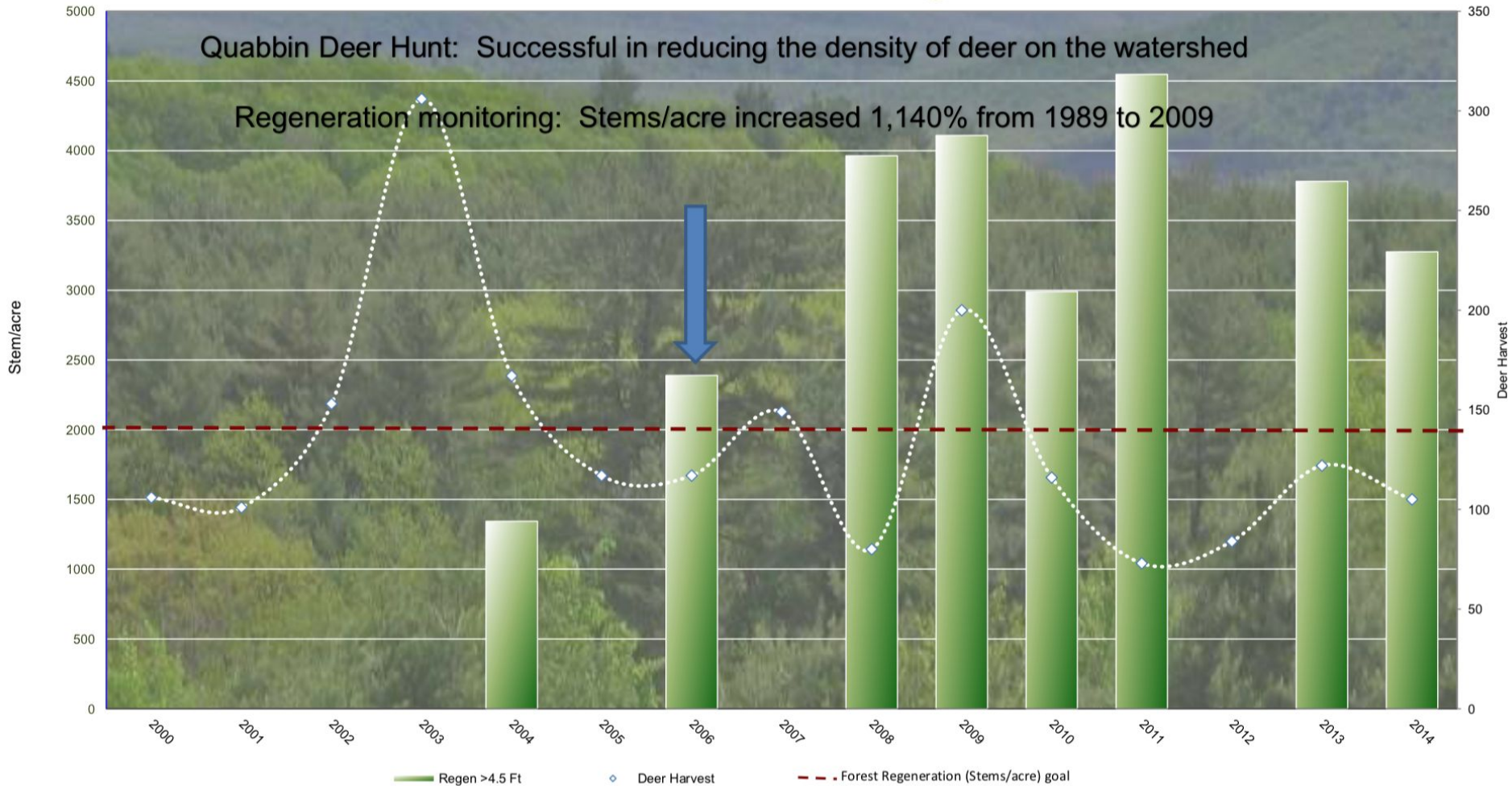
1989 to today: How has the forest recovered?

Remarkable recovery

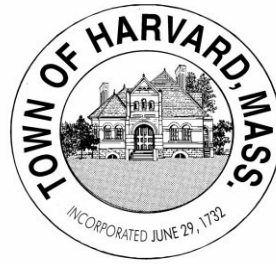
- From 910 to 11,285 stems/acre (1140% increase)



2000- 2014 Estimated Quabbin Regeneration >4.5 ft

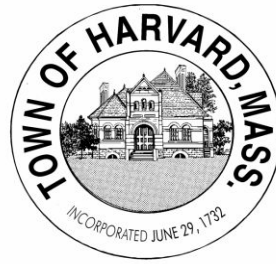


Recommendation



We recommend that the Harvard Conservation Commission authorize a controlled archery hunting program on selected portions of town-owned lands during the regular archery hunting season each year, according to state hunting regulations, and that the Deer Management Subcommittee and their volunteers be authorized to organize and carry out this program.

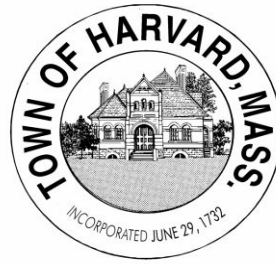
Controlled Archery Program



Modeled after existing programs:

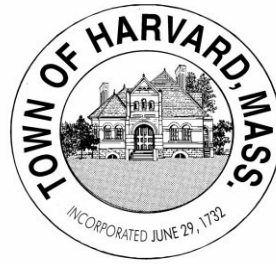
- Andover
- Medfield
- Dover
- Framingham
- Grafton
- Weston
- Carlisle
- Sudbury

Controlled Archery Program



- Licensed hunters
- State-mandated safety training course
- Qualifier (6-inch target @ 75 feet)
- Tree stand only
- 500-foot setback
- Off-trail
- No cost to town

Controlled Archery Program



Illegal hunting on conservation land

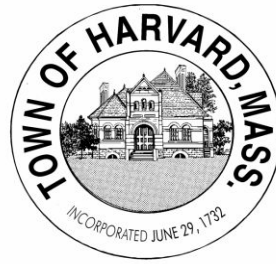
→ Hunters monitor & report

→ Removed, Prosecuted



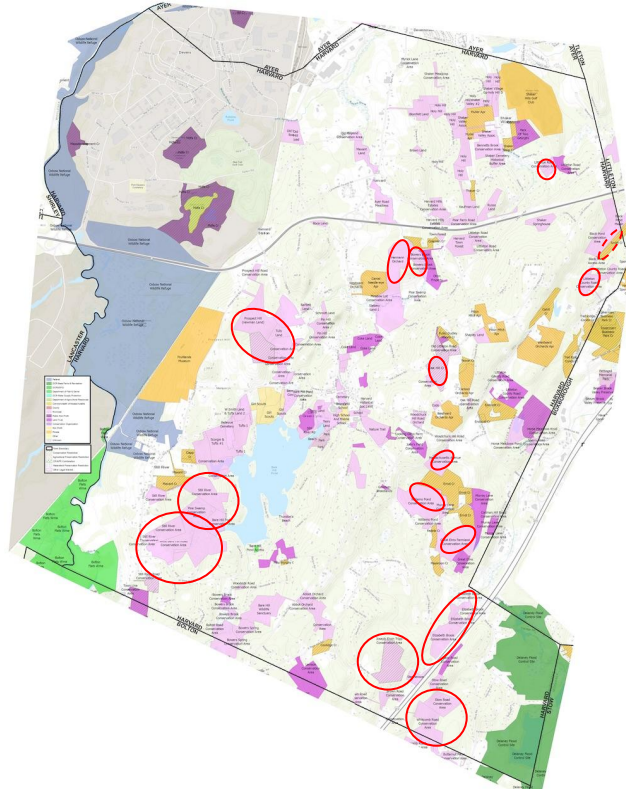
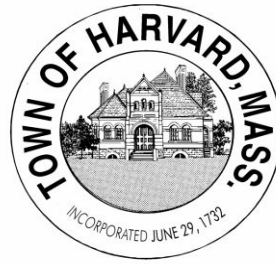
Town of Harvard Deer Management Report
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Monitoring



- 10-tallest method
- Browse surveys
- Pellet counts

Potential Parcels

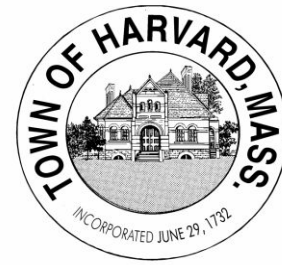


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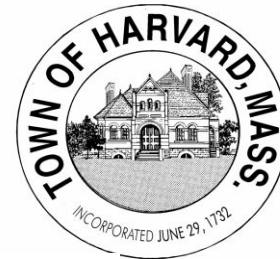
Thank you

Town of Harvard Deer Management Report
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Town of Harvard Deer Management Report
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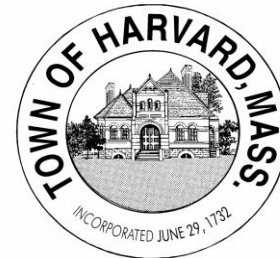
DFW Browse Surveys



Deer Browse Preferences for Common Indicator Plants in Massachusetts

Preferred		
<i>Would expect browsing even at low deer densities (e.g., 6-18 deer per square mile of forest)</i>		
<u>Trees</u>	<u>Shrubs</u>	<u>Herbaceous</u>
Arborvitae	Common Buckthorn (inv.) <i>(sometimes moderate)</i>	Enchanter's Nightshade
Aspen (spp.) <i>(sometimes moderate)</i>	Dogwoods (spp.)	Evening Primrose
Cedar (Eastern Red and Atlantic White)	Multiflora rose <i>(young growth)</i>	Jewelweed (spotted touch-me-not)
Red Maple	Pin Cherry <i>(sometimes moderate)</i>	Lady's Slipper (Pink, Yellow, etc.)
Oak (spp.)	Raspberry/Blackberry <i>(young growth)</i>	Trillium (spp.)
Sugar Maple <i>(sometimes moderate)</i>	Sumac <i>(young growth)</i>	White Wood-aster
White Ash	Viburnum (Maple-leaf, Nannyberry, Hobble-bush)	Wild Sarsaparilla
Moderate-Preference		
<i>Unlikely to be browsed much at low deer densities, but typically browsed at medium to high deer densities</i>		
<u>Trees</u>	<u>Shrubs</u>	<u>Herbaceous</u>
Am. Beech <i>(sometimes lower-preference)</i>	Autumn Olive (inv.)	Aster (spp.)
Am. Chestnut	Beaked Hazlenut	Bracken Fern

DFW Browse Surveys



Deer Browse Preferences for Common Indicator Plants in Massachusetts

Preferred		
<i>Would expect browsing even at low deer densities (e.g., 6-18 deer per square mile of forest)</i>		
Trees	Shrubs	Herbaceous
Arborvitae	Common Buckthorn (inv.) (sometimes moderate)	Enchanter's Nightshade
Aspen (spp.) (sometimes moderate)	Dogwoods (spp.)	Evening Primrose
Cedar (Eastern Red and Atlantic White)	Multiflora rose (young growth)	Jewelweed (spotted touch-me-not)
Red Maple	Pin Cherry (sometimes moderate)	Lady's Slipper (Pink, Yellow, etc.)
Oak (spp.)	Raspberry/Blackberry (young growth)	Trillium (spp.)
Sugar Maple (sometimes moderate)	Sumac (young growth)	White Wood-aster
White Ash	Viburnum (Maple-leaf, Nannyberry, Hobble-bush)	Wild Sarsaparilla
Moderate-Preference		
<i>Unlikely to be browsed much at low deer densities, but typically browsed at medium to high deer densities</i>		
Trees	Shrubs	Herbaceous
Am. Beech (sometimes lower-preference)	Autumn Olive (inv.)	Aster (spp.)
Am. Chestnut	Beaked Hazlenut	Bracken Fern
Balsam Fir (sometimes lower-preference)	Choke Cherry	Canada Mayflower
Birch (spp.)	Greenbriar (young growth preferred)	Goldenrod (spp.)
Black Cherry (sometimes preferred)	Honeysuckle (spp.) (inv.)	Indian Cucumber-root
Hemlock (winter browse)	High-bush and Low-bush Blueberry	Trout Lily
Hickory (spp.) (sometimes preferred)	Oriental Bittersweet (inv.)	
Sassafras	Winged Euonymus (inv.) (sometimes preferred)	
	Witch Hazel	
Low-Preference		
<i>Typically avoided or only browsed at very high deer densities (e.g., above ~ 50 deer per square mile of forest)</i>		
Trees	Shrubs	Herbaceous
Pine (Pitch, Red, White)	Glossy Buckthorn (inv.) (sometimes moderate)	Ferns (most spp.) (sometimes moderate)
Norway Maple (inv.)	Japanese Barberry (inv.)	Garlic-mustard (inv.)
Spruce (spp.)	Mountain Laurel	Jack-in-the-pulpit
Striped Maple (moose eat it)	Rhododendron	Milkweed
	Sheep Laurel	Pennsylvania Sedge
	Sweet Fern	Skunk-cabbage

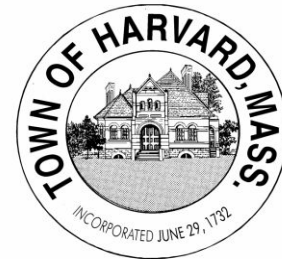
Notes: Many of these plants see regional and seasonal variation in browsing preference, and have varying degrees in their ability to survive and withstand browsing pressure (e.g. American Beech is very browse-tolerant). Deer may prefer stump sprouts and suckers over seedlings and reachable branches, often from less-preferred trees. Some less-preferred evergreens may be browsed in winters where snow depth limits mobility of deer.

(spp.) = several species included

(inv.) = invasive

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DFW Browse Surveys



Massachusetts Deer Browse Impact Survey

Property Name: **Bower's Spring Conservation Area** Town(s): **Bolton**
 Ownership: **Town**
 General Surroundings: Rural/Forest/Ag Low-residential **Med-residential** High-residential
 General level of use by public: Low Moderate **Heavy** Unknown
 Is this property open to hunting? Yes **No** Unknown Special Hunting Restrictions:
 General level of nearby hunting? None **Limited** Moderate Heavy Unknown

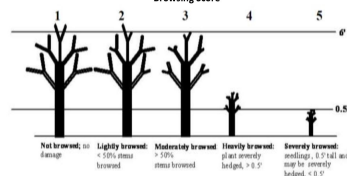
Date of site visit **8/16/17** Name(s) conducting survey: **Stainbrook**

Classify average level of browsing on seedlings/saplings for the following species (minimum 20 stems):

Preferred Species:					
Oak	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
Red/Sugar Maple	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
Less Preferred Species:					
Eastern Hemlock	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
Birch	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
American Beech	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
Black Cherry	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
White Pine	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen
Other, <u>Ash</u>	1	2	3	4	5
				Present in canopy, few in understory	Not Present/Seen

Hickory (2) and Aspen (4)

Browsing Score



General level of deer sign on the property (e.g., scat, tracks, etc.): Low **Medium** High Unknown

Is there any evidence of deer impacts in surrounding areas (e.g., homes with landscaping damage)?

None Very Limited Moderate Heavy **Unknown**

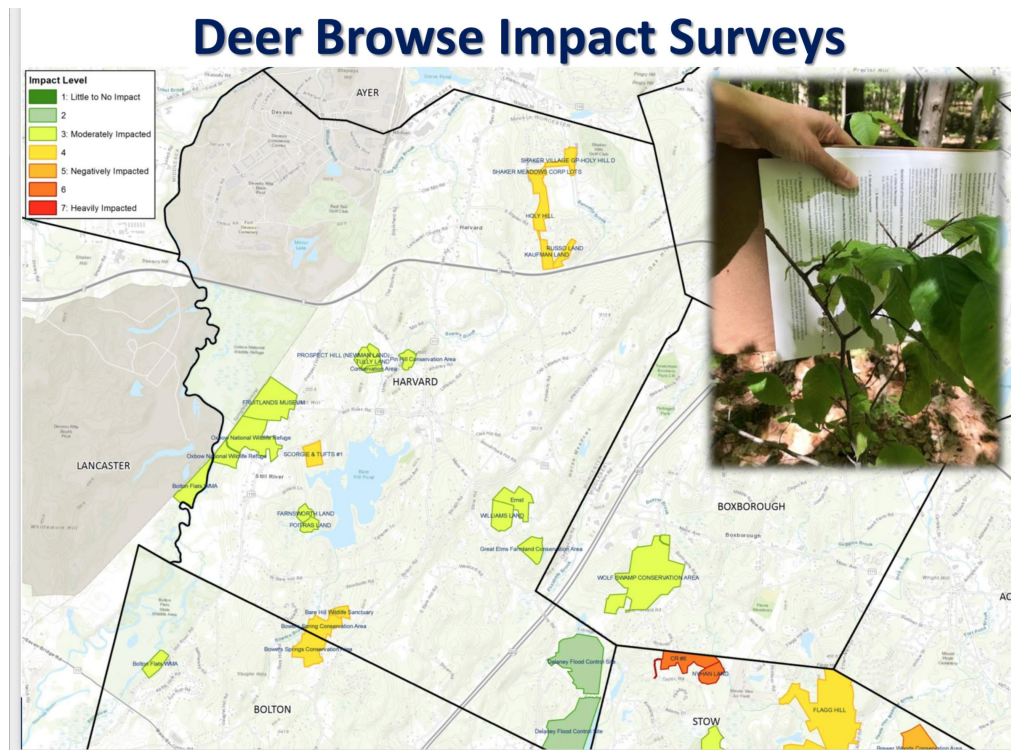
Additional Notes (e.g., describe herbaceous layer):

Very few wild sarsaparilla and Canada mayflower present. A lot of sections with hay-scented ferns. Maple-leaf viburnum heavily browsed and height suppressed in some areas. Fewer impacts seen near the trails, likely from heavy public use and dog walking.

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2017-2019
11 conservation parcels

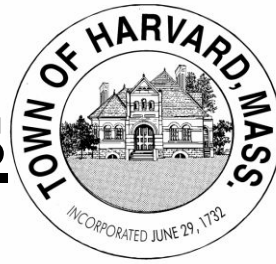


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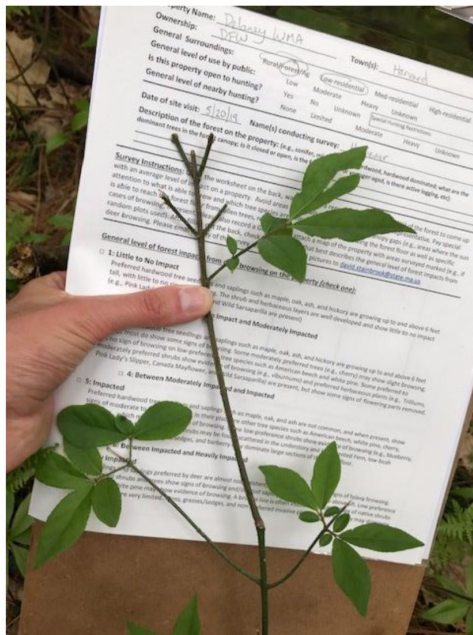
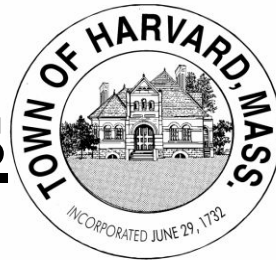
Harvard: DFW Browse Surveys



Browse (browsing score 2) on maple-leaf viburnum, a preferred-moderately preferred species. This was fairly common throughout the area.

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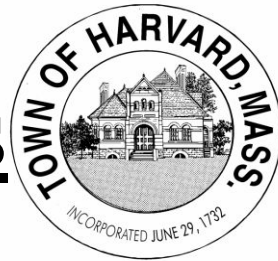
Harvard: DFW Browse Surveys



Browse (browsing score 2-3) on euonymus, on a moderately preferred species. This species was not very common throughout the area, but almost always browsed when present.

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Harvard: DFW Browse Surveys

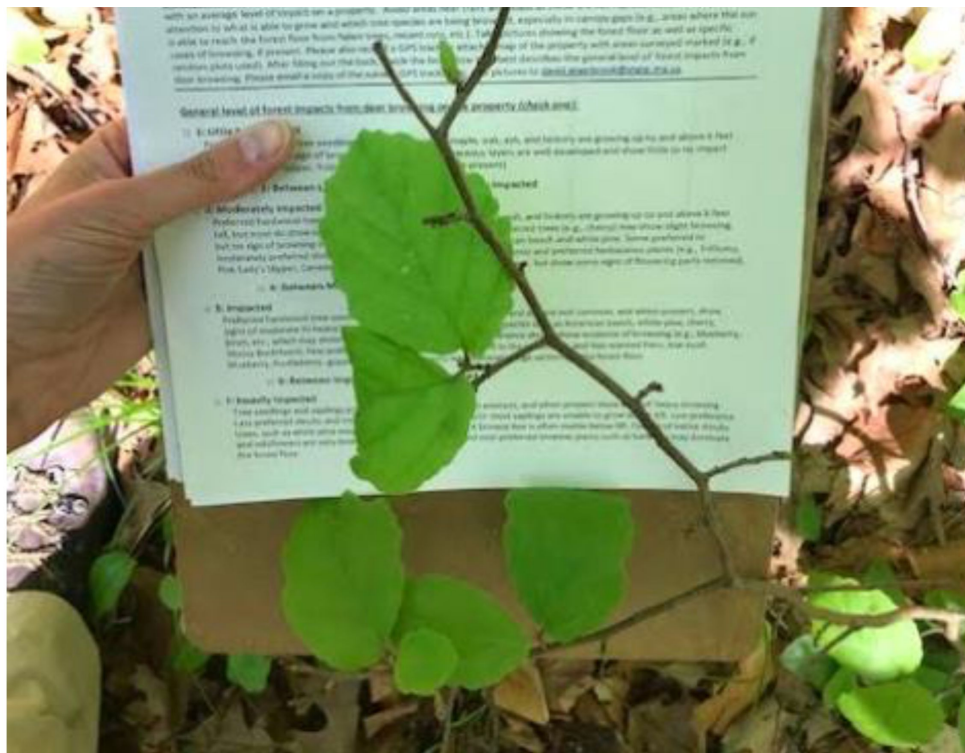
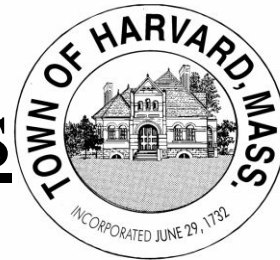


Browsing on low-bush blueberry, typically not preferred by deer.

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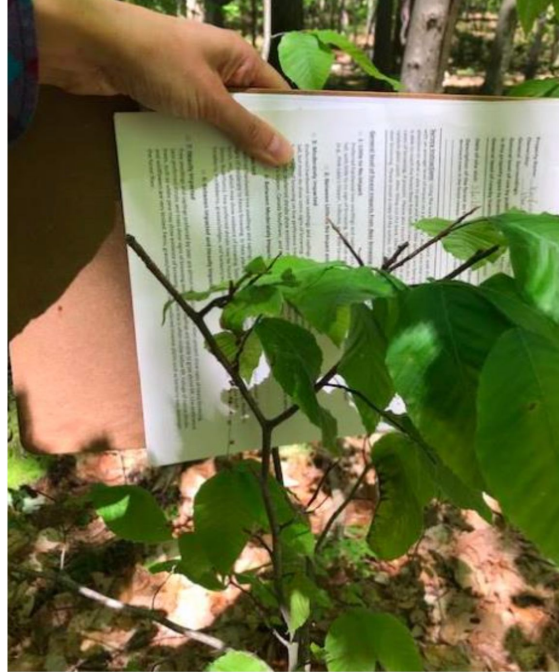
Harvard: DFW Browse Surveys



Witch hazel was lightly browsed in the forest (score 2)

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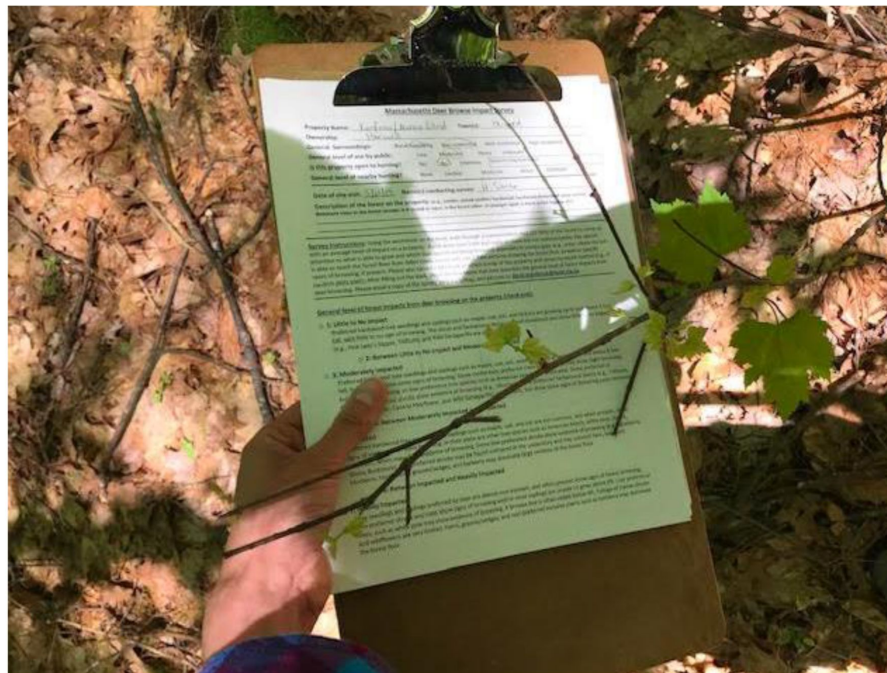
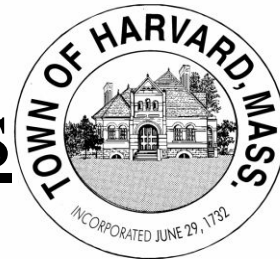
Harvard: DFW Browse Surveys



American beech was not a common species in this forest.
When present, there were some signs of browse
(browsing score 2), but not on all specimens.

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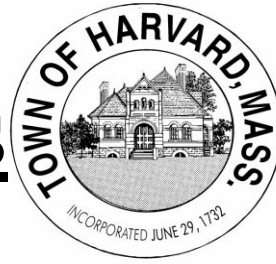
Harvard: DFW Browse Surveys



Browsed red maple seedling (browsing score 2-3). Many red maples showed none to moderate browse. And many specimens reached over 6 ft tall in the sapling layer.

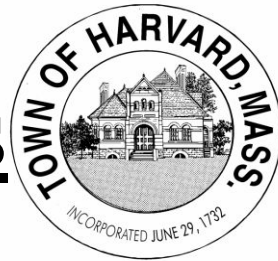
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Harvard: DFW Browse Surveys



Canada mayflower and fringed polygala present on the forest floor. Canada mayflower was a common species. No sign of browse

Harvard: DFW Browse Surveys



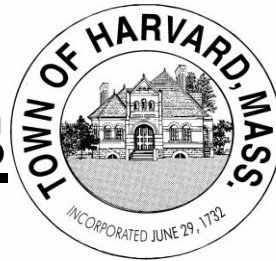
Mix of fern species, trillium and other native herbs on the forest floor.



Dense growth of Canada mayflower on the forest floor. Flowers present, most not yet in bloom. No signs of browse.

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Harvard: DFW Browse Surveys



Browsing on bracken fern.

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Harvard: DFW Browse Surveys

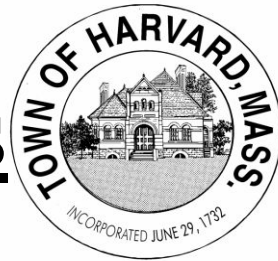


Mixed forest with sparse saplings and dense Canada mayflower and starflower ground cover
(Willard Lane)



White pine section of forest dominated by bracken fern, Pennsylvania sedge and Canada mayflower
(Williams Pond)

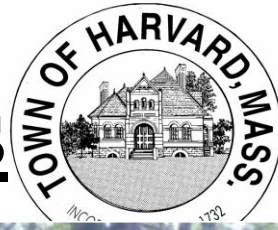
Harvard: DFW Browse Surveys



Herbaceous layer of the forest showed a mix of maple and oak seedlings, lowbush blueberry and huckleberry, Pennsylvania sedge, Canada mayflower and starflower.

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Harvard: DFW Browse Surveys



Overall look of the forest near the Tully land with a quite bare understory.
(Tully Land)



Overall look of the forest showed a sparse herbaceous layer.
(Bower's Spring)

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Harvard: DFW Browse Surveys



View on the Tully land, where from afar looked like a healthy and diverse understory,
but was actually dominated by white pine and witch-hazel, which deer don't prefer.
(Tully Land)