Trustees of the Trust Funds
Town of Durham
7 Newmarket Road
Durham, NH 03824

Doe Farm Invasive Plant Management Strategy

April 2016

The Doe Farm, an 87 acre tract of forest located off Bennett Road in Durham, was given to the Town in trust by Olinthus N. Doe in 1909. The property includes substantial frontage on the Lamprey River. Within the property are the foundation (cellar hole) for the former farmhouse, the Doe family cemetery and several scenic trails. The property has been used by Town residents for active and passive recreation purposes, and as a conservation resource since the early 1990s. The terms of the Trust call for the Town to "forever hold and improve" the property and for the income derived from its management used to preserve the cemetery, with any excess income used "in support of the common schools of Durham". The Trust is administered by the Trustees of the Trust Funds.

The property has been actively managed since the 1990's. using A forest management plan was commissioned in 2001 by the Trustees and completed by Consulting Forester Charles Moreno. Wildlife Biologist Ellen Snyder, completed a stewardship plan in 2009 for the Conservation Commission. Selective harvesting and silviculture activity was undertaken in 2000 and again in 2010, based on the 10-15 year cycle recommended in the management plan. A winter storm which uprooted a number of large pines triggered the 2010 harvest which was required to salvage blown down timber and reduce forest fire danger. A result of both harvests is the forest's natural regeneration, with thousands of oak, pine, maple, and birch seedlings and saplings now present.

In 2015, the Trustees commissioned Moreno to undertake a detailed inventory and mapping of the exotic invasive plants that have established a stronghold on the property. This inventory revealed that approximately 13.2 acres of the 87 acre total (15.5%) are severely infested with a variety of invasives, ranging from 5,000 to 20,000+ stems per acre. Approximately 17.6 acres (20.2%) are moderately infested (500-5,000+/- stems per acre) and 36.6 acres (42.0%) are lightly infested (10-500+/- stems per acres). The remaining 19.7 acres (22.6%) are mostly free of invasive species. Glossy buckthorn is the most common invasive species on Doe Farm. The property also has Japanese and European barberry, Oriental bittersweet, burningbush, common buckthorn, multiflora rose, honeysuckle, autumn-olive and Norway maple. The detailed mapping of the invasive species at Doe Farm was accompanied by in-field flagging to allow for easy identification of the severe and moderate areas. Regrettably, in late March or early April someone took down most of this flagging, requiring expenditures to re-mark the boundaries of infected areas.

Invasive species are plants that are not native to the area and which compete with, and ultimately displace, native species, including the next generation of trees. By growing and spreading quickly, they create a dense lower leaf canopy that shades out the forest floor, preventing native species from growing and reproducing. If left unchecked, a forest ecosystem choked out by invasive species will, over a period of years, die off, leaving very poor habitat and unusable property.

Based on the results of the inventory and the severity of the problem, the Trustees asked Moreno to obtain quotes from companies that specialize in the treatment and removal of invasive species. Three responses to the request for proposals were received and reviewed by Moreno and the Trustees. The approaches used by the respondents included mechanical removal only, use of herbicides only, and a combination of mechanical means followed by selective application of herbicides. All herbicide treatments require proper permitting from the State of New Hampshire Department of Environmental Protection. The cost and the anticipated results of the treatments varied widely. The all-mechanical approach utilizes special machines to pull and chop the plants and their roots (similar to roto-tilling the forest floor). This is only moderately effective as not all of the roots or seeds are destroyed and new growth will occur the following season. It is also relatively non-selective in areas where the invasive species are mixed with desirable native species.

The sole use of chemical herbicides involves foliar spraying utilizing back-pack sprayers over a multi-day period depending on weather/wind conditions. Follow-up applications are necessary either later in the year or the following years. While more effective than mechanical-only means, there is risk that overspray will impact nearby desired saplings and seedlings, and ground level growth.

The combined approach utilizes hand-cutting of stems in the early spring (March/April) followed by selective application of herbicide in the early fall when native plants have mostly entered dormancy (invasive species tend to leaf out first and drop their leaves last). There are at least two advantages to this approach. First, since the exotics are first cut down, herbicide use is greatly reduced. Secondly, this method minimizes the damage to native trees, shrubs, and plants that are intermixed, both by reducing the chances for overspray or by inadvertent cutting if follow-up mowing were applied. At first, this method is more labor-intensive and expensive than the other alternatives, but over the long-term will be most effective in reducing invasives and protecting native growth. As invasive numbers are sharply reduced, this approach will also cost less to apply.

The process requires approximately 4 days for the contractor's crew to go through the most severely impacted areas in early spring (before leaf-out) and return in the September for the herbicide application. A return treatment the following year is required. The Trustees, in cooperation with the Town, has engaged the contractor to begin the initial cutting process immediately.

The Trustees must develop and gain consensus an on-going eradication program for subsequent years in both treated areas and non-treated areas. This may include the use of trained volunteers or "docents" that are assigned a specific area (1/2 to 1 acre) and asked to maintain it on a regular basis. This effort will require strong cooperation between the Trustees, the DPW, the Conservation Commission and others who have an interest in Doe Farm.

The Trustees view the invasive species eradication plan as an element of a larger plan for the long term use of Doe Farm. The development of this larger plan will need to express the Town's stewardship intent, and will therefore have to incorporate both the conservation and recreation interests of the Town, as well as the terms of the original trust. The Trustees will begin development of this plan in the near future.

The map developed by C. Moreno, Consulting Forester is shown below.

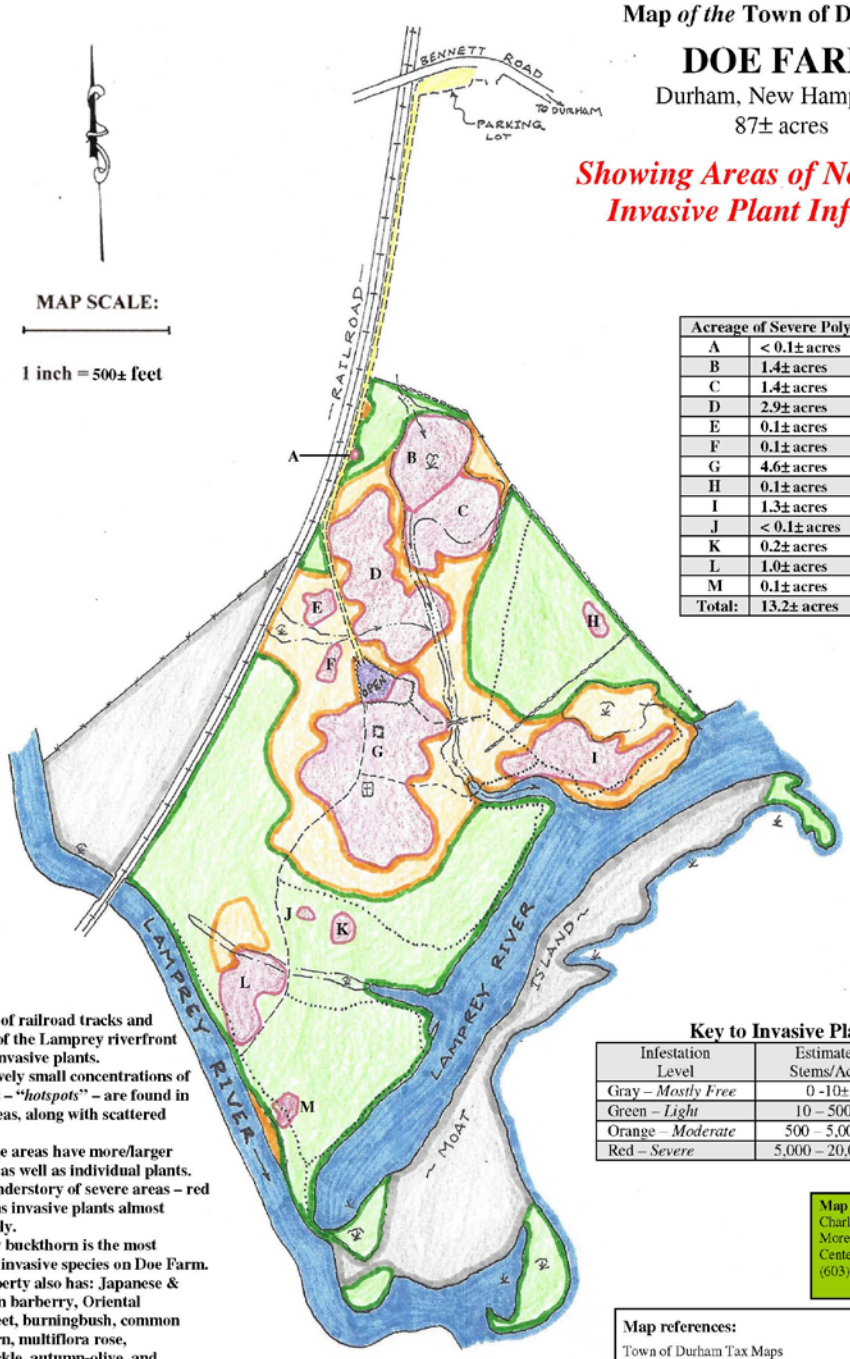
Map *of the* Town of Durham's

DOE FARM

Durham, New Hampshire

87± acres

Showing Areas of Non-Native, Invasive Plant Infestation



MAP SCALE:

1 inch = 500± feet

Acreage of Severe Polygons	
A	< 0.1± acres
B	1.4± acres
C	1.4± acres
D	2.9± acres
E	0.1± acres
F	0.1± acres
G	4.6± acres
H	0.1± acres
I	1.3± acres
J	< 0.1± acres
K	0.2± acres
L	1.0± acres
M	0.1± acres
Total:	13.2± acres

Notes:

1) Edges of railroad tracks and sections of the Lamprey riverfront contain invasive plants.
2) Relatively small concentrations of invasives – "*hotspots*" – are found in green areas, along with scattered plants.
3) Orange areas have more/larger *hotspots*, as well as individual plants.
4) The understory of severe areas – red – contains invasive plants almost exclusively.
5) Glossy buckthorn is the most common invasive species on Doe Farm. The property also has: Japanese & European barberry, Oriental bittersweet, burningbush, common buckthorn, multiflora rose, honeysuckle, autumn-olive, and Norway maple.
6) Control relies on a mixed treatment strategy, with ongoing efforts.
7) Control of invasives on abutting properties is an important factor.

Key to Invasive Plant Areas

Infestation Level	Estimated Stems/Acre	Acres
Gray – *Mostly Free*	0 -10±	19.7±
Green – *Light*	10 – 500±	36.6±
Orange – *Moderate*	500 – 5,000±	17.6±
Red – *Severe*	5,000 – 20,000+	13.2±

Map researched and drawn by:
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Moreno Forestry Associates
Center Strafford, NH
(603) 335-1961 November 2015

Map references:

Town of Durham Tax Maps
NH DOT Orthophotography (2010). Supplied by Strafford County Regional Planning Commission.
"Sketch Map of Doe Farm" (Moreno, January 2000)
Field Examination (Moreno Forestry Associates, 2015)

This map is not intended as a legal description or for legal purposes. Property lines, acreages, and interior details are approximate.