INVASIVE PLANTS MITIGATION PLAN

for the Town of Atkinson's

SAWYER CONSERVATION AREA

Atkinson, New Hampshire

133.6± acres

Prepared for Landowner:

Town of Atkinson (Conservation Commission)

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Prepared by:

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Landowner

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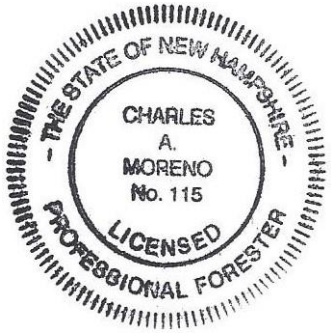
Charles Moreno, NH LPF #115
Consulting Forester
TSP #09-6203

September 2019



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Above: The field near the Sawyer Avenue access is completely overtaken by Oriental bittersweet.
Cover Page: A variety of invasive species fully occupy the understory of a forested area.

The author of this forest plan, Charles A. Moreno, NH LPF #115, certifies that the contents of the plan, except where footnoted, but including all written material, maps (base information referenced), plan format and organization, are original to the author.

The purpose of this plan is to provide natural resources information and forest management recommendations to the landowner, the Town of Atkinson, NH. This document is a work for hire done by Charles A. Moreno for the landowner, and may be used by same for any purpose. Copying of this plan by any other individual or organization, including any written material, plan content and/or format, requires appropriate citation and/or the written permission of Charles A. Moreno, Consulting Forester. Any revisions to the plan cannot be made under the author's name without the author's written permission.

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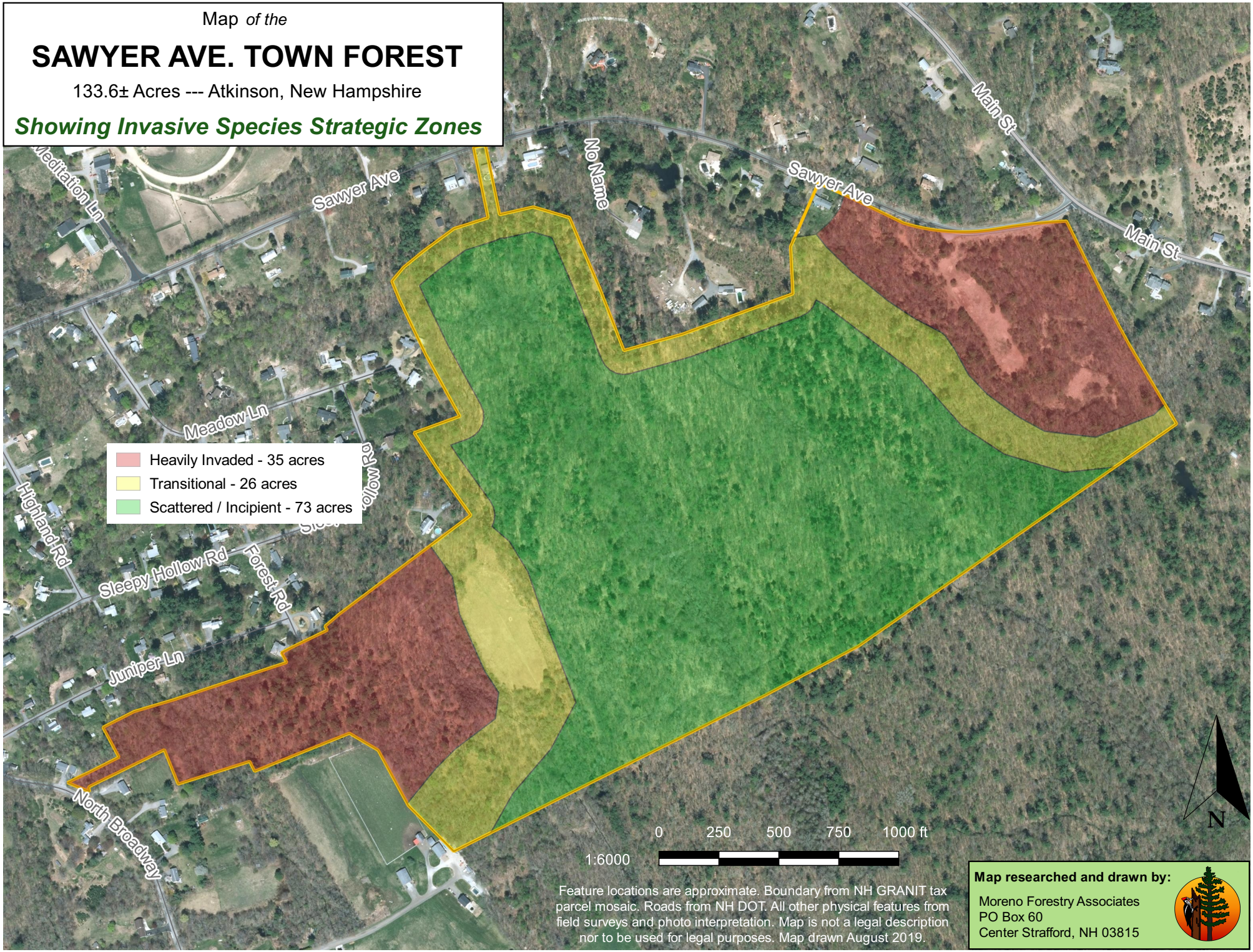
Map *of the*

SAWYER AVE. TOWN FOREST

133.6± Acres --- Atkinson, New Hampshire

Showing Invasive Species Strategic Zones



Feature locations are approximate. Boundary from NH GRANIT tax parcel mosaic. Roads from NH DOT. All other physical features from field surveys and photo interpretation. Map is not a legal description nor to be used for legal purposes. Map drawn August 2019.

Map researched and drawn by:

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Invasive Plant Mitigation Plan

Sawyer Conservation Area

Atkinson, NH

INTRODUCTION

Overview

Owned by the Town of Atkinson, the Sawyer Conservation Area is a largely forested, 133.6±-acre* tract situated in south-central Atkinson, lying between Sawyer Avenue, North Broadway Road, and the New Hampshire-Massachusetts state line. The Sawyer Avenue access point is situated about 1.5 miles south of the Atkinson town center.

Tangled vines and shrubs characterize heavily invaded forest in the Sawyer Conservation Area's northeast.

The Conservation Area's recreational trails are popular with dog walkers, hikers, snowshoers, cross-country skiers, bird watchers, and others. A variety of habitats are found on the property. While the central expanse is wholly forested, two fields are found within the forest in the tract's east and west.

Invasive plants (non-native species which compete with native vegetation) dominate the property's eastern and western ends. In the remainder of the property, conditions range from intermixed natives and exotics, lightly scattered invasives, to invasive-free areas, as described below.

*Calculated from Tax Map data. Historic surveys suggest total acreage is 140.4 acres.

Project Scope

The purpose of this document is to outline a mitigation strategy for invasive plants in the Sawyer Conservation Area by:

1. Determining the degree and nature of invasion, area by area;
2. Differentiating management zones based on character/density of invasion, and;
3. Presenting control methods and strategies, with corresponding costs.

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Exotic, Invasive Plants Observed

- Japanese barberry – *Berberis thunbergii*
- European barberry – *Berberis vulgaris*
- Oriental (Asiatic) bittersweet – *Celastrus orbiculatus*
- Burning bush – *Euonymus alatus*
- Honeysuckle (various) – *Lonicera spp.*
- Glossy buckthorn – *Frangula alnus*
- Autumn olive – *Elaeagnus umbellata*
- Multiflora rose – *Rosa multiflora*

Control Methods

- **Heavy mechanical ("Brontosaurus" or "Brush Mulcher")** - $1,500 per day (1 – 2 acres treated daily, depending on severity of invasion). A coarse cutting head, typically mounted on a tracked excavator or skid steer, mows vegetation. Mostly *non-selective*, brontosauruses and mulchers are well-suited for heavily invaded areas where few, if any, native plants are present to save. Herbicide can be applied (at additional cost, see below) as a follow-up to control invasive plant re-sprout. It is necessary to engage contractors for both tasks.
- **Moderate mechanical ("Bush hog")** - $800 - $1,000 per day. Deck mower pulled by a tractor. Well-suited for old fields with 1 to 3 years of herbaceous/early-successional growth. Also used to maintain re-sprouting shrub areas that were previously cleared by a brontosaurus or mulcher. Site must be rock-free and mostly level. Mowing may provide a substitute for herbicide treatment of invasives if site is accessible *and* can be annually mowed prior to seed production. Unfortunately, desirable saplings and shrubs are also lost.
- **Light mechanical** - $500 to $1,000± per acre. A chainsaw or brush saw is used to sever the stems of unwanted species. This method can be either broad-based or selective, the latter to save desirable native saplings and shrubs. Can be used in conjunction with herbicide (at additional cost), which is more cost effective if applied immediately after cutting. It is necessary to engage one or more contractors for this work.
- **Grazing** - $600 to $1,000± per acre. Goats are typically corralled within portable electric fencing and allowed to graze understory vegetation. This method is non-selective, with nearly all vegetation browsed. (Desirable small trees should be protected to prevent stripping of their bark). Follow-up herbicide (at additional cost) treatment is needed to prevent invasive re-sprout.
- **Herbicide** - $600 to $1,000± per acre. Targeted application with several herbicide and method options depending on intended vegetation, stem size, and season. Kills unwanted vegetation. Can be used in conjunction with brontosaurus work or other mechanical control, or can be employed singly depending on conditions. It is necessary to engage a licensed herbicide applicator.
- **Pulling** – $50 to $200± per acre, depending on size and density of plants, and availability of volunteers to assist experts. Small plants are removed by hand, with or without mechanical aid (e.g., weed wrench or mattock). Intended for low-density areas. Trained volunteers or contracted forest technicians can complete this work.

Treatment Areas

See the map on page 3 for the locations of the areas described below.

Heavily invaded (35± acres) - These areas feature 1,000 to 20,000 (or more) stems of non-native species per acre. Invasive plants typically outnumber desirable native plants, both by count and amount of biomass. Heavily invaded areas tend to self-perpetuate; the prolific seed production of exotics accelerates the invasion, with invasive plant regeneration outpacing native plants in a feedback loop. Though not a lost cause, heavily invaded areas such as those in the eastern and western sections of the Sawyer Conservation Area require considerable effort and funds which are better allocated elsewhere, at least initially. Cost per acre for remediation of heavily invaded conditions may exceed $2,000, as a combination of heavy mechanical treatment (e.g., brontosaurus) and herbicide are often needed to sufficiently suppress non-native regeneration. Several years of follow-up treatments are required after the first, intensive treatment activity.

Transitional (26± acres) – A 100 to 200± foot buffer adjacent to the property's heavily invaded areas and along residences near the property's northern boundary shields the relatively invasive-free center of Sawyer Conservation Area from the wider invasion. This transitional area generally contains less than 1,000 non-native stems per acre, with substantial native vegetation intermixed, though a density gradient exists where invasive concentrations are higher near heavily invaded areas and becomes lighter near the scattered/incipient zone. A mixed treatment approach in this zone is likely needed, with hand-pulling, herbicide treatment, and light-mechanical removal used in combination. *Any treatment scheme should begin at the boundary with the scattered/incipient zone and proceed outward toward the residential boundary or heavily invaded areas.*

A milder invasive presence is found at the "leading edge" between the Transition and Scattered/Incipient zones.

Scattered/Incipient (73± acres) – The forested interior of the Sawyer Conservation Area is largely free of invasive species, though clusters and scattered individual stems are present (generally fewer than 100 stems per acre). This area should be the focus of initial removal efforts, as the cost/effort per acre is minimal compared to more heavily invaded zones. Removing one plant often makes a significant ecological difference, preventing the spread of propagules and further colonization. A "seek & remove" strategy is appropriate here, where volunteers and/or contractors canvas the entire area in two directions (e.g., on north-south transect lines, and again along east-south transects), uprooting smaller specimens by hand and noting the locations (with flagging and GPS) of deeply rooted specimens or those too large to pull. These larger specimens are then removed with mechanical and/or chemical means.

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Logistics

Treatment Phases. Three treatment phases are recommended corresponding to the treatment areas.

Removing the invasive thicket along the main access trail from Sawyer Avenue is recommended as a first phase activity.

- **1st Phase** treatments include: A) Canvassing and removing all invasives from the 73± acre interior area (Scattered/Incipient), and B) Heavy-mechanical removal of invasives along the main Sawyer Avenue trail into the tract interior. Follow-up mowing or herbicide treatment is needed after re-sprout but before the plants reseed.
- **2nd Phase** treatments, covering 26± acres, are to occur in the Transition Zones, the leading edges between heavily invaded areas and the already treated Scattered/Incipient interior area. Mixed methods are used, including light mechanical, hand pulling, and herbicide. Follow-up treatment is necessary.
- **3rd Phase** treatments involve restoring the Heavily Invaded sections in the tract's east (near Sawyer Avenue) and west (beyond the western field). These treatments will involve broad-based treatments such as brontosaurus or forestry mulcher, with follow-up light mechanical and herbicide (by a licensed applicator). Field areas that are currently heavily invaded can be mowed annually with a bushhog before seeds ripen.

Scheduling.

Method	Optimal Time of Year
Brontosaurus/Brush Mulcher	Anytime of year, especially early summer prior to seed production.
Bushhog	Summer, prior to seed production.
Grazing	After leaf-out, but prior to seed production.
Herbicide	Spring through fall. Optimally, September.
Brushsaw w/ Herbicide	Summer, with immediate herbicide application (same day).
Uprooting (Pulling)	Spring through fall. Optimally, late October to early November when plants are easier to detect.

Trail Closures. The main Sawyer Avenue trail should be closed on the day that brontosaurus work occurs. Interior trails should be closed for the day when herbicide work occurs.

PROJECT SUMMARY / SCHEDULING / METHODS / COST

Year	Season	Activity	Acres	Method	Projected Cost
First Phase					
2019 or 2020	Fall	Remove all invasives in Scattered/Incipient Zone.	73±	Canvass, locate, and hand-pull. Return to uproot large plants.	$15,000±. ~$200±/acre.
2019 or 2020	Fall	Improve vegetation along trail from Sawyer Avenue access	1±	Heavy mechanical, with follow-up herbicide or continued bush hogging.	$1,500± initially, Follow-up, $1,000±. ($2,500± total).
Second Phase					
2020 to 2021	Spring/ Summer/Fall	Treat Transition Zone (the leading edge") to expand clean interior.	26±	Light mechanical, uprooting, and herbicide (stumps).	$25,000±. ~$1,000±/acre.
Third Phase					
2021 to 2023	Spring/ Summer	Treat Heavily Infested Areas.	35±	Heavy mechanical, with follow-up herbicide and/or continued brush mulcher and bush hogging.	$70,000±. ~$2,000±/acre.

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