

2014
New Hampshire Department of Agriculture's
Statewide Invasive Species Control Project

A cooperative effort involving NH Dept. of Agriculture, Markets & Food and
NH Dept. of Transportation

Re: Watershed Special Permit #SP-147

Introduction

The following report details the herbicide applications conducted by the NH Dept of Agriculture, Markets & Food (DAMF), Division of Plant Industry for the 2014 growing season. This work was done in accordance with the requirements outlined in the DAMF, Pesticide Control Division's approved Watershed Special Permit (SP-147). Funding for the purchase of herbicide products, and project support provided by the NH Department of Transportation.

In total, approximately 26 acres of Japanese knotweed (*Falopia japonica*) and 6,589 woody invasive plant stems were treated during the 2014 growing season (see Table 3 for a breakdown of species and Table 4 for yearly comparison). Altogether, the 2014 treatment year included eight state highways and three federal highway systems (see Table 1). In addition to the original permit (SP-147), three separate amendments were requested and approved. One of the amendments was for the control of a large stand of Japanese knotweed along the Salem Rail Trail and another was for the treatment of knotweed in the Town of Boscawen within and adjacent to the Northern Rail Trail system.

2014 Invasive plant treatment sites

Location	Town Beginning	Town End	Length	Acres of treatment	Woody Stems Treated	Land Use
Route 1A	Seabrook	Hampton	16 Miles	3.5 Acres		ROW
Route 3	Belmont	Meredith	17.5 Miles	4.75 Acres	3,311	ROW
Route 9	Madbury	Madbury	2 Miles	1.5 Acres		ROW
Route 11	New London	Andover	8.5 Miles	0.5 Acres		ROW
Route 106	Concord	Meredith	31 Miles	3 Acres	958	ROW
Route 108	Madbury	Stratham	1.5 Miles	0.5 Acres		ROW
Route 113	Holderness	Sandwich	11.5 Miles	1 Acres		ROW
Route 155	Madbury	Madbury	3 Miles	.75 Acres		ROW
I-89	Bow	Concord	1.6 Miles	1.75 Acres		ROW
I-93	Salem	Plymouth	22.5 Miles	6.5 Acres	357	ROW
I-393	Concord	Pembroke	3.5 Miles	0.75 Acres	1,276	ROW
Rail trail	Salem	Salem		1 Acres		ROW
Depot St	Boscawen	Boscawen		2.5 Acres		ROW
Scrutton Pond Rd	Barrington	Barrington		1 Acre		DOT
Visitor Center Common	Claremont	Claremont		1 Acre	687	Town
Total			110.6 Miles	30 Acres	6,589	

Table 1

Herbicide applications began on July 30, 2014 and ended on November 4, 2014. The three herbicides used are listed in Table 2, below. Garlon 4 Ultra was diluted to 22% with Canola Oil. Roundup Pro Concentrate was diluted to 5% and use solely for the first four treatments, but was then mixed with Milestone diluted to 0.5%. The active ingredients found in each of these herbicides (triclopyr, glyphosate and aminopyralid) are all systemic and readily translocated throughout the target plant thus resulting in complete die-off.

Trade Name of Pesticide	Amount of A.I. in Product	EPA Registration #	No. of Acres	% Solution	Total Amount of Product Used
Roundup Pro Concentrate	50.2% glyphosate	524-529	-25 Acres	5%	3.39 gallons
Garlon 4 Ultra	60.45% triclopyr	62719-527	-6,589 Stems	22%	1.48 gallons
Milestone	40.6% aminopyralid	62719-519	-27.75 Acres	0.05%	4.08 ounces

Table 2

The application methods used in 2014 are the same as those used in previous years, which included Low Volume Basal Bark (LVBB) for most woody species; and Foliar Spray (FS) for herbaceous species and some woody invasive shrubs. Table 3 lists the species treated and application method used:

Table of invasive species treated and application method used

Common name	Scientific name	Plant type	Application method
Japanese barberry	<i>Berberis thunbergii</i>	Woody	FS
Oriental bittersweet	<i>Celastrus orbiculatus</i>	Woody	LVBB
Autumn olive	<i>Elaeagnus umbellata</i>	Woody	LVBB / FS
Burning bush	<i>Euonymus alatus</i>	Woody	LVBB
Glossy buckthorn	<i>Frangula alnus</i>	Woody	LVBB / FS
Honeysuckle	<i>Lonicera spp.</i>	Woody	LVBB
Japanese knotweed	<i>Falopia japonica</i>	Herbaceous	FS
Common buckthorn	<i>Rhamnus cathartica</i>	Woody	LVBB

LVBB = Low Volume Basal Bark; FS = Foliar Spray

Table 3

Treatment Year	# of Stems	Acres of Knotweed
2012	2,690	23 Acres
2013	7,000	43 Acres
2014	6,589	25 Acres
Total	16,279	91 Acres

Table 4



From left to right: Roundup Pro Concentrate, Secure Ultra (anti-drift); NS3 (non-ionic surfactant); and Milestone

Japanese knotweed – 25 acres (this is an approximation due to most sites having numerous individual populations of knotweed distributed throughout thus making it very difficult to calculate a precise total) were treated using Roundup Pro Concentrate (Glyphosate) at 5% solution mixed with a 0.5% solution of Milestone applied as a foliar spray. The applications were done using both a backpack pump sprayer treating the knotweed just after flowering. According to the Milestone label, a motorized mist blower cannot be used. The treatments included unmanaged populations as well as follow-up applications to a few knotweed stands that didn't die off completely from the previous year's work. In these instances, approximately 85-95% of the knotweed did not regrow, but a few stems managed to survive. Some of these plants did not show any symptoms of herbicide impacts whereas some did. The ones that were symptomatic after being treated the previous year were stunted, deformed and had smaller foliage, see photo at the top of the following page.



This is one of the numerous patches of Japanese knotweed at Exit 24 in Ashland that were treated in 2013 using a 5% solution of Roundup Pro Concentrate that resulted in approximately 95% success. The red circle shows a small mutated clump of knotweed that exhibits mutated growth from the herbicide application. The leaves are stunted and twisted. A second treatment using a 5% solution of Roundup Pro Concentrate mixed with a 0.5% solution of Milestone was applied in the late summer of 2014. The photo also shows native plant species starting to become established within the area once occupied by the knotweed.



This section of I-93 median just north of Ashland was treated in 2012 and 2013 to control a dense population of Japanese knotweed. This photo taken in August, 2014 shows that the treatments were approximately 99% successful and there are just a few small knotweed stems that emerged. Typically, knotweed at this time of year would be fully mature reaching >10 feet tall. A third application was done in September, 2015.

Woody Invasive plants –In all, 6,589 woody invasive stems were treated using the low-volume basal bark banding method using Garlon 4 Ultra (Triclopyr) at a 22% solution diluted with Canola oil. Based on observation of previous years treatments the success rate is estimated to be around 95% at this application rate. In 2013, trail using Pathfinder II, which is a premixed triclopyr based herbicide with 13.6% a.i. proved to be far less successful at an estimated 65%.

Findings – Observations of the effects of the herbicide applications conducted during the past few years indicates that the treatments were very successful. The impacts to Japanese knotweed appeared to be in the

range of 85-100% after just one application. Follow-up applications were conducted for those plants that survived previous treatments. These follow-up applications did not require a measurable amount of effort or time to achieve.

The success rate appeared to be higher for the woody invasive shrubs being closer to 95-100% control from one application. Oddly, a few treated Autumn olive plants exhibited signs of regrowth during the spring following the application from the previous year, but shortly thereafter the foliage turned yellow and died. It was also observed that several Autumn olive retained a few living branches the second year, but as the season progressed these branches soon died off.



Low Volume Basal Bark Banding application of 23% solution of Garlon 4 Ultra diluted with Canola oil.



There are very few numbers of Giant knotweed in NH and this is one of them. There are three of these populations along Depot St in Boscawen and they were all treated using Roundup Pro Concentrate at a 5% solution mixed with 0.5% Milestone applied as a foliar spray.



This is one of the other stands of Giant knotweed that also occurs along Depot St in Boscawen. This was treated in August and this photo was taken a month later.



For marking purposes and as a reminder which Japanese knotweed populations I treated I found it very helpful to paint fluorescent orange spray paint onto a few leaves facing oncoming traffic so that later in the season while driving by I could easily verify that they were treated.

Conclusion – The herbicide aspect of this IPM invasive plant control program is making a significant impact to the overall population of invasive plants on a statewide level. Not only is it making a direct impact, but it also serves to bring awareness and interest in invasive plant control from communities, municipalities, state agencies, environmental interest groups and the general public. In total since the inception of this project, approximately 16,279 woody invasive plant stems were sprayed using low-volume basal bark banding with 95-100% success; and approximately 91 acres of Japanese knotweed have been treated using foliar spray with approximately 85-100% success.

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