



New Hampshire

Department of Agriculture, Markets & Food

Shawn N. Jasper, Commissioner

New Hampshire Department of Agriculture, Markets & Food

Division of Plant Industry

Annual Report

2023

Prepared by Piera Siegert, Director

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Division of Plant Industry:

Personnel: 4 FTE, 1 PTE (apiary inspector)

Licensed Plant Dealers (2023): 911

Registered apiaries (2023): 698

Mission statement: The Division of Plant Industry’s mission is to curtail the spread of invasive insects, plants, and pathogens that may negatively impact agricultural, natural, and human ecosystems in the State of New Hampshire.

The Division accomplishes mission through licensure, inspection, survey, certification, quarantine, and outreach activities.



Certification of firewood kiln to meet receiving state requirements *Photo: P. Siegert, DAMF.*

Programs & Activities Include:

Name	Activities	Source
Plant Industry	Nursery licensure and inspection program. Certification activities. Invasive plant outreach and management. Compliance agreements and permits. Insect identifications.	General Funds, recurring
Apiary Inspections	Apiary inspection program, maintenance of state apiary.	General Funds, recurring
Upland Invasive Species Remediation Fund	Cost share of chemical control of invasive plants for municipalities. Outreach and supplies for invasive plant management.	General Funds (non-lapsing, non-recurring)
CAPS Program	Surveys conducted through national USDA CAPS program. Primarily Exotic Wood Borers / Bark Beetles, and nursery survey.	USDA Grant
Invasive Insects Survey	Surveys conducted through PPA7721 federal grant program. Primarily specialty crops—vegetable pests, orchard pests, small fruit, grapes, and Asian defoliators. Semi-competitive granting program with variable awards. Funding bridges deficit in FTE funding via USDA CAPS program.	USDA Grant
Outreach	Outreach activities in the past have included firewood, Firewood Scout, and spotted lanternfly outreach programs	USDA Grant



Spotted lanternfly adult. *Photo: C. Rallis, DAMF*



Emerald ash borer adult. *Photo: C. Rallis, DAMF*



Honeybee adult. *Photo: C. Rallis, DAMF*

Principle Laws & Rules:

- Insect & Plant Pest Suppression: RSA 430: 1-8
- Nurseries, Plant Dealers & Nursery Stock: RSA 433:21-36, Agr 2500 (expires 2/21/2027)
- Invasive Species: RSA 430:55, Agr 3800 (expires 1/9/2027)
- Beekeeping and Hive Products: RSA 429: 1-12, Agr 1800 (expires 5/13/2024)

Relevant websites:

- www.agriculture.nh.gov/divisions/plant-industry/index.htm
- www.nhbugs.org and Facebook page: [NH Bugs](#)
- www.firewoodscout.org

Quarantines:

Regulated article or pest	Type	Impact
Firewood	New Hampshire External Quarantine	Prohibits importation of untreated firewood into New Hampshire—with some exceptions as allowed via compliance agreement.
Spongy moth	Federal	Shippers sending regulated articles outside of federal regulated area can do so via compliance agreement or inspection demonstrating absence of life stages.
Japanese beetle, European corn borer, onion white rot, others	Receiving states	Assistance for NH producers to meet plant protection requirements of receiving states. Vary by state, trade good, production and storage conditions, and point of origin. Requires certification and/or inspection.

Completed 2023 Pest Detection Surveys:

Surveys were conducted for **29** pest threats to New Hampshire’s environment and agriculture. Survey was conducted at nurseries, open fields, and forested areas identified as potential high-risk areas.

Planned 2024 Pest Detection Surveys:

Surveys are planned for **33** pest threats to New Hampshire’s environment and agriculture. Survey is planned at vegetable farms, nurseries, open fields, and forested areas identified as potential high-risk areas.

Examples of Innovative Programs:

NHBugs: NHbugs.org is an information clearinghouse for forest insect threats. It is a collaboration between Plant Industry, Forest & Lands, UNH Cooperative Extension, USDA APHIS, and USDA Forest Service. It includes a photo upload function and reporting form for the public to submit information about suspect insects or tree damage. It provides a streamlined response to public reports of forest threats. It houses critical and updated information about forest pests like emerald ash borer and hemlock woolly adelgid. NHBugs also has a facebook page facilitating two-way communication between the cooperating agencies and the public.



Firewood Scout: Recreational transportation of firewood risks introducing forest pests. Outreach that emphasizes the pro-active steps that campers can take to help protect forest resources supports forest health programs. One step is to buy firewood locally. Firewood Scout is a nationwide smartphone-enabled website that uses Google Maps and a state-developed firewood vendor database to connect campers to more than 500 New Hampshire firewood vendors.



Systems Approaches to Nursery Certification (SANC): SANC promotes a harmonized, risk-based systems approach to nursery and greenhouse certification. It is a voluntary certification program developed by the National Plant Board and AmericanHort. There is one SANC facility in the state—the first facility in the country dually-enrolled in the US Canadian Greenhouse Grown Plant Certification Program and SANC.



PROGRAMS

APIARY INSPECTION

[Apiaries and Beekeeping | Plant Industry | NH Department of Agriculture, Markets and Food](#)

The Division offers a voluntary Apiary Registration Program and inspections of hives for beekeepers experiencing problems. The Division will assist the beekeeper with developing appropriate controls to prevent the infection of other hives if a parasite or disease is detected. Additionally, the Division will inspect honeybees and/or apiary equipment that are being moved to another state to certify their apparent freedom from infectious diseases, parasites and/or pests. There is no filing fee for Apiary Registration, but the inspection fee for bee colonies starts at \$5. There is no fee for inspecting broodless equipment in rule, and this is an oversight that should be addressed in upcoming rulemaking. Inspections are requested by contacting the Division.



Annual budget for the apiary inspection program is \$5,271, which primarily supports a part-time on-call apiary inspector salary, travel, supplies, and equipment.

The principle negative factor for managed bee health in New Hampshire continues to be *Varroa destructor*. Consultations demonstrate that there is a need for increased education about *Varroa* biology, sampling, and control. Consultations suggest that many beekeepers in the state, both large and small, do not treat for *Varroa destructor*. Beekeepers express concern about managed bee exposures to pesticides used for mosquito and tick control.

Table 1: Apiary Program Metrics

	2011	2012	2013	2014	2015	2020	2021	2022	2023
Registered Beekeepers	274	293	306	351	372	596	631	660	698
Registered Colonies	.	.	.	.	.	2,483	2,644	2,650	3,025
Consult Calls	.	.	.	.	.	24	31	21	16
Colonies Consulted	.	.	.	.	.	94	37	25	23
Field Inspections	19	9	13	45	51	11	15	9	14
Colonies Inspected	48	21	38	.	162	200	48	41	106
Regulated Pest Abatement	.	.	.	.	.	1	0	0	0

2023 Invasive Species Coordinator Yearly Report

New Hampshire Department of Agriculture,
Markets & Food, Division of Plant Industry

Prepared by: *Douglas Cygan*

Executive Summary:

This report summarizes the 2023 calendar year activities of the Upland Invasive Species Program and Fund ([RSA 430:58](#)).

It provides a brief overview of the Department's invasive species program; current and ongoing initiatives; and demonstrates how DAMF works with other state & federal agencies, municipal partners, and environmental groups.

Responsibilities:

The Invasive Species Program Coordinator is responsible for addressing invasive species infestations throughout the state. This includes the following duties:

- **Make maps statewide of invasive species infestations.**

Maps are made using the national invasive species database & mapping program – [EDDMaps](#). The mobile app collects geo-referenced point data and record submissions for each listed prohibited and restricted species. Once submitted, each record is forwarded to Doug Cygan for review, verification, and approval. Once approved, each record is available to stakeholders for use in planning and implementing control strategies.

- **Notify municipalities of invasive species infestations.**

Multiple strategies are used to engage municipalities. One strategy is outreach and education programs conducted by Mr. Cygan. In cases with Early Detection and Rapid Response (EDRR) species, such as Mile-a-minute, Giant hogweed, and Perennial pepperweed, Mr. Cygan initiates coordination with the municipality's conservation commissions to ensure they know about the species presence. They are advised on methods to manage those plants. Mr. Cygan actively manages populations of each of these species to reduce the threat they pose to the communities in which they are found.

- **Hold a valid commercial, not for hire, category B pesticide applicators license.**

Mr. Cygan has held a valid Commercial, Not for Hire, Category B applicators license for 20+ years. His license was renewed on January 6, 2024.

- **Maintain an active upland invasive species program that includes a combination of mechanical, cultural, biological, and chemical controls for the purpose of preventing and inhibiting the spread of invasive species.**

Mr. Cygan established the Statewide Invasive Species Management Program prior to his role as the Invasive Species Coordinator. This program has existed for 20+ years. This program uses an Integrated Vegetation Management (IVM) approach to facilitate best management practices for the control of invasive plants on state owned lands, highway systems, parks, and their appurtenances. This program emphasizes a cooperative approach with the following state agencies: Department of Transportation (DOT), Fish & Game (F&G), Department of Environmental Services (DES), and Department of Natural

& Cultural Resources (DNCR). Additionally, Mr. Cygan works with the Army Corp of Engineers (ACOE), US Fish & Wildlife Service (USF&WS) and the Environmental Protection Agency (EPA) on invasive species. He is also involved in invasive species management projects with numerous cities and towns.

- **Subsidize the purchase of herbicides by municipalities when funding is available.**

In addition to the ongoing active management efforts associated with this program, the Statute (RSA 430:58) established a remediation fund for the subsidization of municipal expenditures for their direct cost of herbicide purchases. This fund reimburses only the costs of herbicide products. Reimbursed amount is depending upon available funding and determined on a pro-rata basis. In 2023, the first eligible year, one applicant submitted a request for reimbursement.

Information about the Cost Share Program is on DAMF's website: <https://www.agriculture.nh.gov/divisions/plant-industry/herbicide-cost-share-invasives.htm>. The deadline for submission is November 1st of each year. Applications received after this date are not eligible and will not be processed per RSA 430:58.

- **Develop and distribute invasive species program information around the state.**

A host of invasive species information ranging from the current list of Prohibited Invasive Species, the New Hampshire Guide to Upland Invasive Species booklet, invasive plant poster, numerous fact sheets and information regarding control measures can be found on DAMF's website: <https://www.agriculture.nh.gov/divisions/plant-industry/invasive-plants.htm>

Integrated Vegetation Management (IVM)

NHDAMF's IVM approach to invasive species control utilizes various traditional techniques typically associated with Integrated Pest Management (IPM). IVM is based exclusively on plant management. Each project for consideration undergoes a visual assessment to determine the most suitable management method. This assessment includes evaluating the habitat type, land features, wetlands presence, and/or any other environment conditions that influence both the scope of work and minimizing off-target impacts. IVM techniques include:

Mechanical –Mowing, cutting, or pulling invasive plants to reduce their overall biomass. This can improve accessibility around a site and reduce potential safety concerns, such as cuts and scrapes from the thorns of Multiflora rose.



Cultural – Seeding or planting to outcompete invasive plants, alteration of a site’s hydrology (flooding) to displace invasives. Other cultural techniques include smothering, solarizing, wire mesh, or bagging plants.



Photos (left to right): Smothering, wire mesh, bagging.

Biological – Uses host specific insects or pathogens that develop self-sustaining populations to combat invasive plants. Currently the only biocontrol agents that are used as part of the Invasive Species Management program are the purple loosestrife leaf-eating beetles (*Galerucella spp.*). These beetles were first released in 1996 and have proven successful.



Photos (left to right): Feeding damage by *Galerucella* on purple loosestrife, *Galerucella spp.* beetle larva, and adult *Galerucella spp.*

Chemical – Uses herbicides to achieve large scale success. Herbicides used are systemic and target the invasive plant’s physiology, ultimately negatively impacting the plants’ rooting system reducing survivorship.



DAMF’s IVM program uses a combination of these methods to optimize control. Frequently, herbicides are a part of the management effort. The program reduces and minimizes herbicide usage by incorporating mechanical control initially, especially with

populations of woody invasive plants. Cutting and/or mowing large woody invasive shrubs eliminates the photosynthetic capabilities of the plant, introducing stress to the underground rooting system, and providing an injury site to improve rapid uptake of the herbicide.

Often, woody invasive plants are treated using a low volume basal bark application of Garlon 4 Ultra. When possible, a lower level of herbicide is deployed (5-20%) than the industry standards (25-35%). Canola oil is used as a diluent rather than diesel fuel or



kerosene as suggested on the label. We can achieve 85-95% success in management with no regeneration using this method.

Herbaceous plants like Japanese knotweed and Black swallow-wort, along with two EDRR species - Mile-a-minute and Perennial pepperweed, are treated using Rodeo or similar product applied as a low volume foliar spray at approximately 5%. To improve efficacy, a non-ionic surfactant, spreader-sticker is used, which helps the herbicide penetrate the cuticle layer of the leaf so the product can translocate down to the rooting system. Spot treatments are done to eliminate drift and potential off-target impacts.

Due to the nature of the work every precautionary measure is taken to ensure that native species and the environment are unharmed by invasive species management activities. This can include development of new tools for localized application to target specific plants for management. One example includes a 2023 perennial pepperweed collaborative project in the Seacoast region. Perennial pepperweed is an invasive herbaceous plant prevalent in Massachusetts' tidal marshes. In NH, however, pepperweed is only known from a few sites in the Seacoast region. DAMF partnered with US Fish & Wildlife Service (USF&WS) and DES to manage the pepperweed in this diverse habitat. To spot treat pepperweed and ensure that only the pepperweed was targeted with herbicide, a combination of application tools are being used. These included, a hand-held spray bottle, and piloting the use of specialty water vials typically used in the cut-flower industry. Using the florists water vials was a way to deliver herbicide via cut stem application and eliminate off-target impacts. High mortality of treated pepperweed was observed with no impacts to surrounding native marsh species, including the rare Marsh elder (*Iva frutescens*). (Note: All of the water vials were removed.)



Perennial pepperweed (*Lepidium latifolium*) spot herbicide treatments, and pilot using floral water vials to deliver herbicide via cut stem application.

Another example of collaboration between agencies includes a continuing partnership with DOT to manage invasive species along state and federal highways.



The photos on the left show the DOT support & safety vehicles provided to Mr. Cygan during herbicide activity. The photo to the right shows the application equipment used.



The DOT truck in the left-hand photo shows the 25-gallon tank spray and cone basket that Mr. Cygan uses while treating along highways, mostly for control of Japanese knotweed. Both photos on the right show treatment results.



Collaborative efforts have also included treatments along state-owned rail. The image on the left is a map of the DOT Railroad System (in red). DAMF is assisting in managing Japanese knotweed along this corridor from Lincoln south to Laconia. The photo on the right is one of the trestles traversed on this corridor.

A total of 8 pesticide special permits were issued for projects during 2023:

- DOT - Railroad Corridor – Lincoln to Laconia (Special Permit SP-255 and SP-256)
- Perennial pepperweed – Seabrook, Hampton, Rye, and New Castle (including surveying the nuclear power plant property) (Special Permit SP-204)
- NHF&G - Deer Hill Wildlife management Area – Brentwood (Special Permit SP-120)
- NHF&G - Winnisquam Boat Launch – Laconia (Special Permit SP-348)

- Town of Canterbury Riverlands Property (Special Permit SP-337)
- Town of Lee – Japanese knotweed (Special Permit SP-286)
- Town of Plymouth – Bell Road – Japanese knotweed control (Special Permit SP-254)

The following is a list of projects where special permits were not required:

- **DOT**

- ◊ Sand Pits and Regional District Properties – Management of Japanese knotweed and other invasive plants

- **F&G Properties**

- ◊ Adams Point Wildlife Management Area – Invasive plant management
- ◊ Goat Island - Treatment of Black swallow-wort and other invasive plants
- ◊ Cromett Creek – Durham - Invasive plant management



Invasive plant control incorporates cutting / mowing followed by spot herbicide applications.

- **DNCR – Parks Division**

- ◊ Odiorne State Park, Rye - Treatment of invasive plants
- ◊ Fort Stark, New Castle – Pulling of Jimsonweed, and management of other Invasive plants



Odiorne SP successional progression as invasive plant management work continues.

- **EPA Superfund Site**

- ◊ Beede Property in Atkinson – Smothering Glossy buckthorn and ultra-low volume treatment of other invasive plants (see additional details on page 10)

- **Army Corp of Engineers**

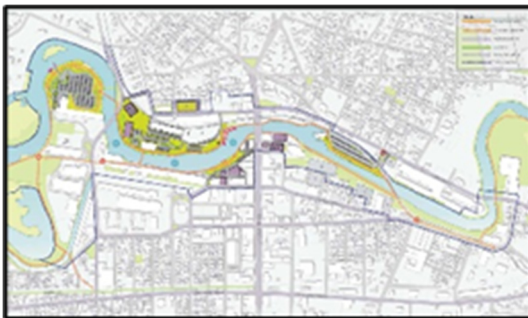
- ◊ Jimsonweed IVM management in Henniker occurring throughout several feed corn fields

- **City of Concord**

- ◊ I-93 Vista View – Management of Oriental bittersweet, Japanese knotweed, and Tree of heaven
- ◊ Blossom Hill Cemetery - Invasive plant management

- **City of Nashua**

- ◊ Riverwalk Project - Invasive plant management



- **Town of Durham**

- ◊ Wagon Hill Farm Conservation Lands - Invasive plant management
- ◊ Mill Pond Dam Removal Project - Invasive plant management



- **Town of Lee**

- ◊ Garlic mustard control at several conservation properties
- ◊ Five Corners Conservation Property - Treatment of invasive plants

- **Town of Meredith**

- ◊ Page Pond Community Forest - Woody invasive plant control work



- **Normandeau Environmental Consulting**

- ◊ Nashua River / Shoreline Stabilization project – Treatment of invasive plants
- ◊ Durham dam removal project

Early Detection, Rapid Response (EDRR) Projects:

- Mile-a-minute

- ◊ Seabrook at four residential properties – Ongoing management continues
- ◊ New detections as of 2023: Towns of Sunapee and Lyme – survey and management planned for 2024



- Perennial pepperweed

- ◊ Seabrook, Hampton, Rye, and New Castle – Spot treatments using low-volume foliar spray

- Jimsonweed

- ◊ Rye, New Castle – On going pulling effort to prevent spread
- ◊ Henniker – New sites as of 2023 occurring in cow corn farm fields on properties owned by the Army Corps of Engineers (ACOE). One of the fields was reported to Mr. Cygan in November 2023. A site visit confirmed presence and Mr. Cygan initiated the ACOE to establish a partnership to begin management. The DAMF and ACOE met to survey their property holdings and meet with the farmer who cultivates corn on the fields to discuss future management efforts. Jimsonweed is on the State’s Watch list.



Above: Jimsonweed (*Datura stramonium*) populations along the seacoast shoreline – managed by pulling.



Left: Jimsonweed growing in farm fields owned by the ACOE and leased out for production of cow corn/feed.

Invasive Species Survey Effort:

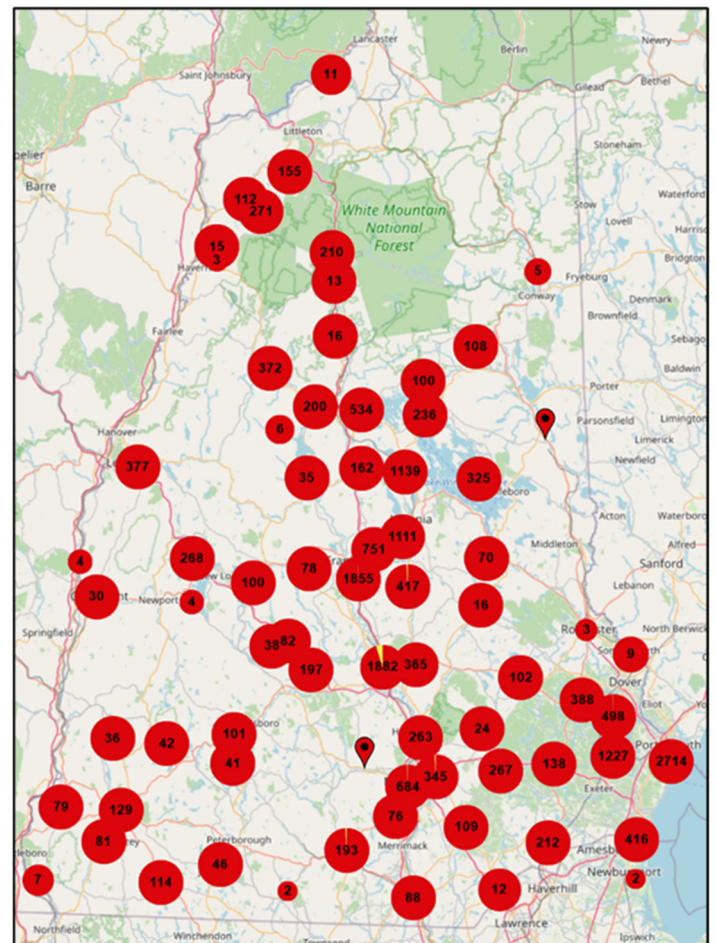
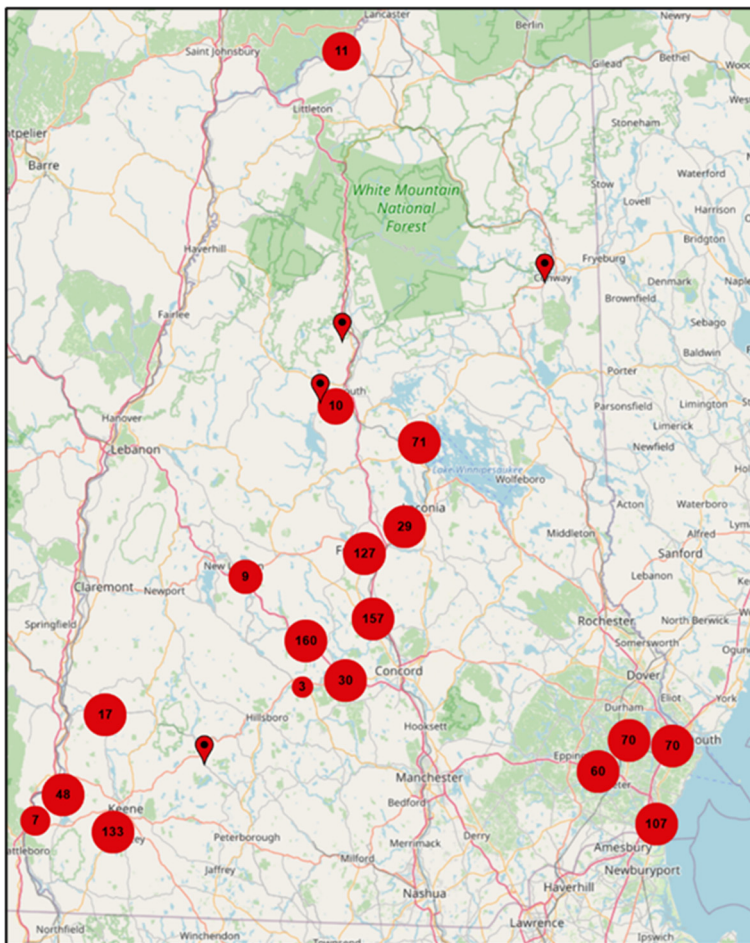
- **EDDMapS** – In all, **1,123** records were submitted by Mr. Cygan during the 2023 calendar year. A total of 20,735 reports have been submitted by Mr. Cygan from 1994-2023.

Query parameters	Results summary
<ul style="list-style-type: none"> • Record Type: Current Status • Observation Date: 01/01/2023 to 12/31/2023 • Reporter: Douglas Cygan - New Hampshire Department of Agriculture, Markets & Food • Infestation Status: Positive, Treated • Country: Canada, United States 	<ul style="list-style-type: none"> • Your query returned 1,123 locations with records. • 1,123 locations have the exact coordinates shared publicly. • Based on most recent information this includes 23 infested acres. • 1,123 new locations were added in the time period for this query. • 1,123 records have been made at these locations. • 0 records are revisits updating the status of 0 locations.

Query parameters	Results summary
<ul style="list-style-type: none"> • Record Type: Current Status • Observation Date: 01/01/1994 to 12/31/2023 • Reporter: Douglas Cygan - New Hampshire Department of Agriculture, Markets & Food • Infestation Status: Positive, Treated • Country: Canada, United States 	<ul style="list-style-type: none"> • Your query returned 20,135 locations with records. • 20,124 locations have the exact coordinates shared publicly. • Based on most recent information this includes 32 infested acres. • 20,156 new locations were added in the time period for this query. • 20,276 records have been made at these locations. • 120 records are revisits updating the status of 111 locations.



Left: This EDDMapS record shows one of the new Jimsonweed sites found in 2023 on ACOE land.

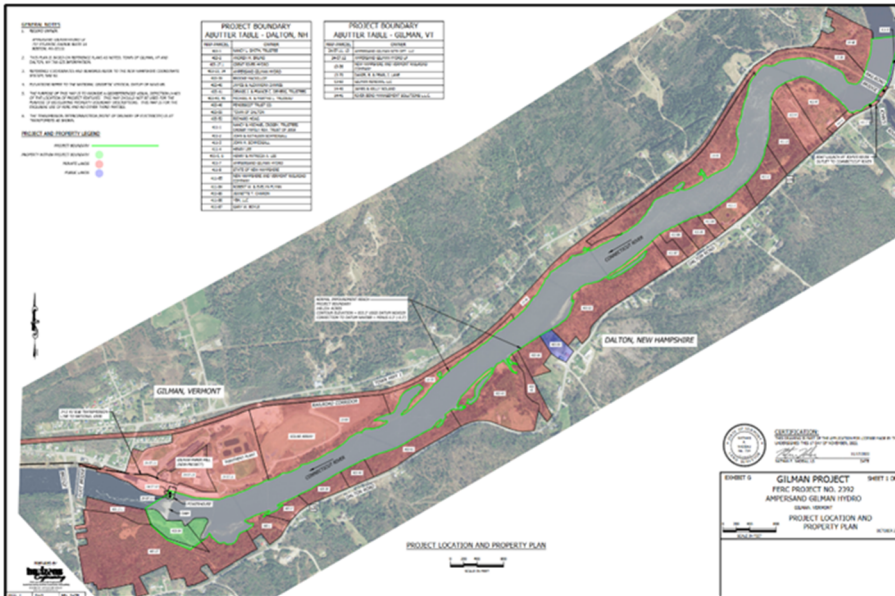


EDDMapS reports left, 2023 reports (1,123), right total reports (1994-2023: 20,735)

Special Projects:

- Ampersand Gilman Hydro Electric Dam Project – Dalton**

The regulatory agencies involved with recertification of the Ampersand Gilman Hydro Electric Dam require invasive species management as a condition of their approval as per the Federal Energy Regulatory Commission (FERC) guidelines. Mr. Cygan was contacted in the summer of 2023 to help with surveying the project limits (see map left) for the presence of invasive plants. Surveys and monitoring existing populations will be an ongoing as their plan of operation evolves.

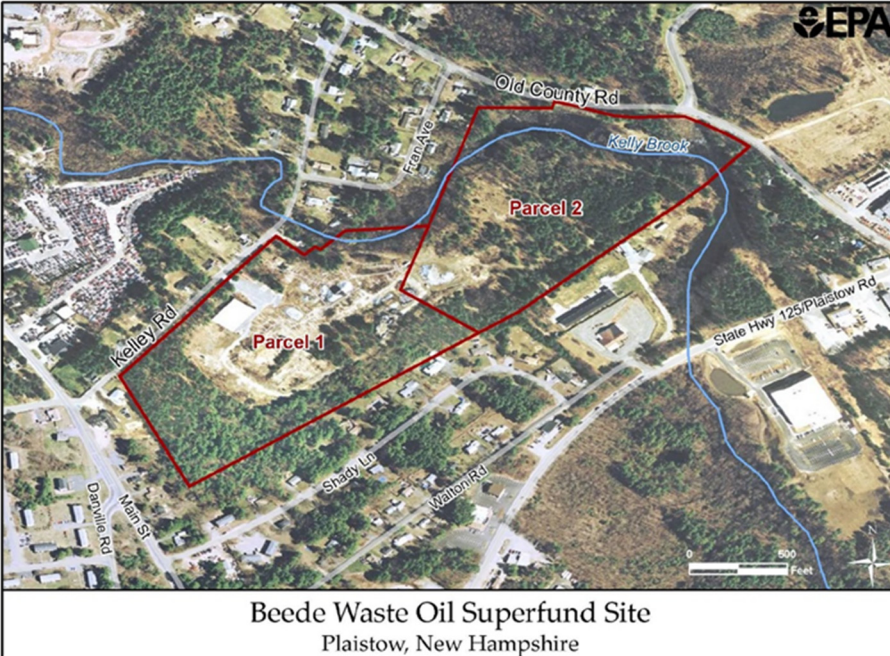


Left: Ampersand Gilman Hydro Electric Dam.

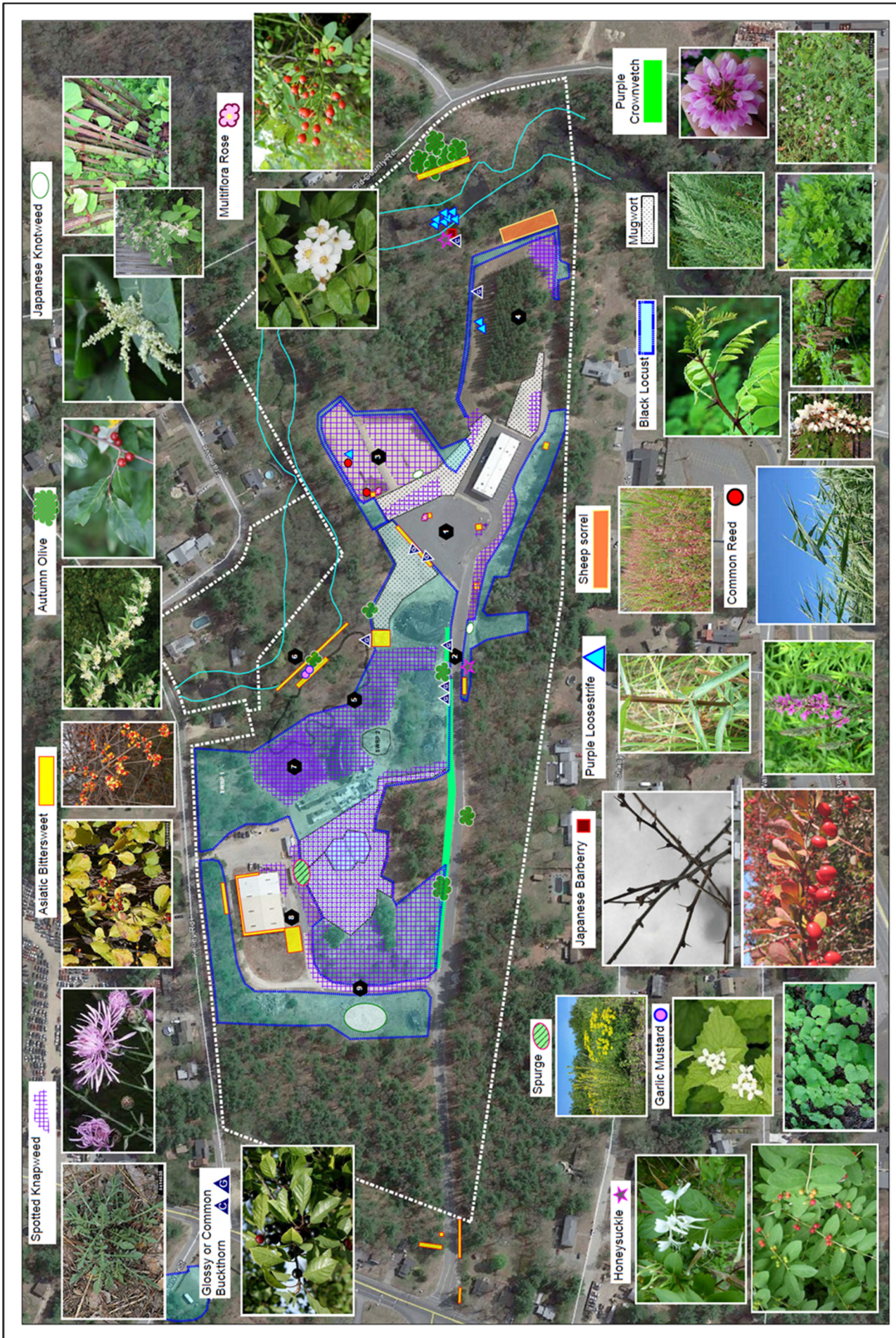
Beede Waste Oil Superfund Site

This 41-acre property in the Town of Plaistow was once a waste oil storage and recycling facility operating from the 1920s until 1994 when the site was abandoned. Almost 1,000 large drums/barrels of waster products remain on site. Additionally, the site has an unlined lagoon, underground storage tanks, and above ground tanks that all contribute to oil escaping into the ground and nearby Kelley Brook. The site is currently undergoing remediation by the EPA and DES’s Hazardous Waste Remediation Bureau (see site map).

In 2021, the environmental consulting firm Woodard & Curran, and Ibis Environmental, requested the help of Mr. Cygan regarding invasive plant populations occurring in areas requiring site work. At the initial site visit/survey, Mr. Cygan proposed that DAMF would participate in the project by helping with further invasive species surveys, conducting spot treatments, and smothering selected invasive species populations. Survey identified many populations of invasive plant species.



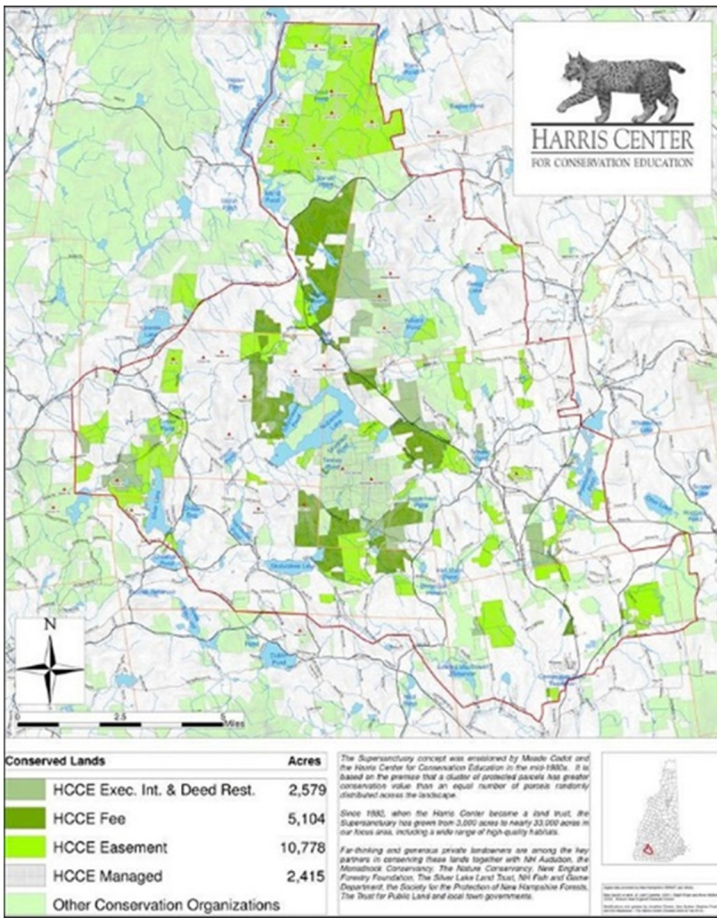
Beede Waste Oil Superfund site map.



Invasive plants detected during survey of Beede Waste Oil Superfund site.

- **Harris Center for Conservation Education**

Coordinated efforts with Eric Masterson to select invasive species management pilot projects on the properties owned by the Harris Center for Conservation Education. The map below shows their holdings.



Harris Center for Conservation Education land holding map

- NH DOT Quarterly Pesticide Training Programs – This is one component of the Statewide Cooperative Initiative between DAMF and DOT. In 2023, Mr. Cygan worked with DOT to develop agenda items for these licensing recertification training workshops and gave two trainings - one on invasive plants and the other on the DAMF invasive species program.

Photos, left, top and center: outreach to organizations.

Photo, left, bottom: DAMF and DOT Statewide Cooperative Initiative / Recertification Training meeting.

Presentations (Outreach & Education):

- In 2023, a total of 21 PowerPoint presentations about invasive species were presented to municipalities, environmental organizations, garden clubs, and school groups. Pre-covid the number of presentations was around 50 within a year. During the pandemic (2020-2022), Mr. Cygan only gave one presentation.



- UNH Pesticide Safety Education Program – This was developed by UNH to provide educational resources and training programs for private and commercial pesticide applicator certification. Mr. Cygan provides the invasive species component for their Right-of-Way training. After taking the class, participants can then take the test, and if they pass, will become license pesticide applicators in category B, Right-of-Way, Weed & Brush Control. Depending on enrolment, UNH offers 3 to 4 of these classes per year.

Cooperative UNH and DAMF Research for the Control of Glossy Buckthorn Project:

This experimental project was a 2018 collaboration between DAMF and the University of New Hampshire. It led to significant reductions in herbicide use for woody invasive plants. Most treatments done by DAMF use the 5% active ingredient (AI) rate, but sometimes higher 20% rates are warranted. DAMF continues to use Canola oil as the diluent when applying as a low volume basal bark application. Water is used when foliar spray is more suited. The results of the research project between are shown below:

Summary of Buckthorn Herbicide Experiments at UNH Kingman Farm
Compiled by T. Lee, October 16, 2020

COOPERATORS

University of New Hampshire (Steve Eisenhaure, Tom Lee, Hannah McCarthy, David Moore)
New Hampshire Department of Agriculture, Markets, and Food (Doug Cygan)
Ibis Wildlife Consulting (Ellen Snyder)

INTRODUCTION

The following is a brief summary of the results from the herbicide experiments initiated in September, 2019, at the UNH Kingman Farm. The experiments were designed by Cygan, Eisenhaure, Lee, McCarthy, and Snyder.

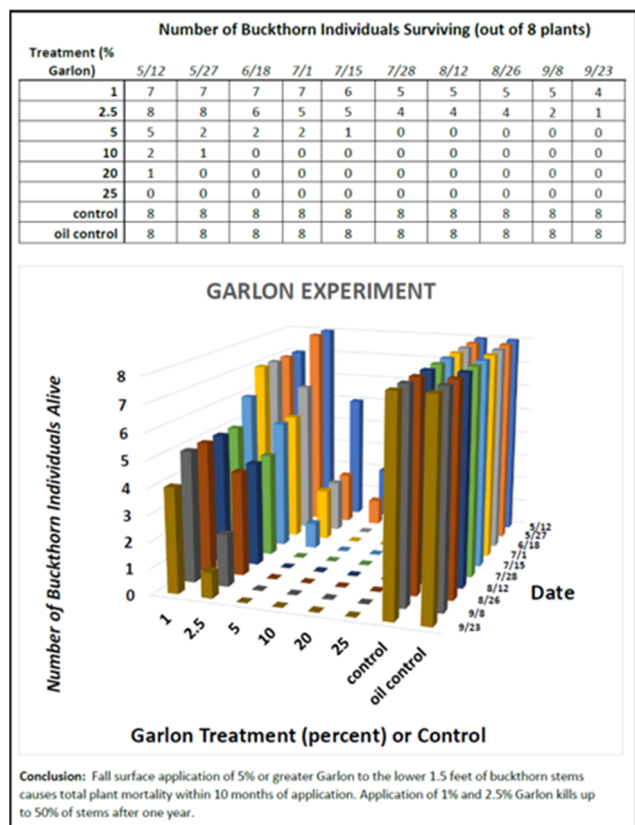
(1) GLYPHOSATE APPLICATION TO CUT STEMS

Sixteen, three-year-old and 16 two-year-old buckthorn plants at Kingman Farm were selected. All were cut at the base in September 2019. Half the plants were controls, half were treated with glyphosate solution brushed over the cut stump. Half of the treated plants received 5% glyphosate, half received 10%. Treatments and controls were divided equally among two- and three-year-old plants. Treatments were applied by Doug Cygan from NH Department of Agriculture, Markets, and Food.

All control plants survived to the most recent sampling date (23 September 2020). All treated plants, regardless of % glyphosate, were dead by our first 2020 sampling date (12 May 2020), and (mercifully) remained dead through the most recent sampling.

Treatment	Number of Plants (n)	Percent Alive					
		5/12	5/27	6/18	7/15	8/12	9/23
Control	16	100	100	100	100	100	100
5% glyphosate	8	0	0	0	0	0	0
10% glyphosate	8	0	0	0	0	0	0

Control plants sprouted early in the season (May) and the number of sprouts remained relative constant until measurements ceased on 23 September.



Left: Autumn olive treated by DAMF using the 5% low volume basal bark method. This photo was taken 1-month after treatment.

Other Initiatives:

- **New Hampshire Invasive Species Strategic Plan:**

Mr. Cygan coordinated with Bill Nichols, Senior Ecologist/Botanist DNCR, to draft a finalized version of the ISC's [New Hampshire Invasive Species Strategic Plan](#). Its purpose is to provide a framework for communication and coordination to enhance efficiencies among partners. This is important because both the local and regional scales must be considered in invasive species management. This plan was formally adopted and made available in 2023.

- **Revisions to the *Good Forestry in the Granite State* publication:**

UNH's Cooperative Extension is currently in the process of updating their "Good Forestry in the Granite State" resource. The review process is overseen by Karen Bennett and Dode Gladders who requested to Mr. Cygan's assistance in revising the invasive plants section. The revision process was not fully completed in 2023. However, it is anticipated that this publication will be finalized and available by mid-2024.

Invasive Species Committee (ISC):

The Invasive Species Committee (ISC) is a volunteer group of 11 appointed members who meet on a routine basis to address invasive terrestrial (those that occur in uplands, not surface waters) plants, insects, and fungal species and their effects upon the state and its natural and economic resources. It acts as an advisory committee to the Commissioner of DAMF on matters relating to invasive species in the state.

The efforts of the ISC include, but are not limited to, the following: prepare and publish a list of Prohibited Invasive Species and a list of Watch Invasive Species; establishing means by which the state shall minimize such adverse effects; promote research and educational activities so as to achieve the best possible protection of agriculture, forest, wildlife, and other natural resources of the state and of human health; and to prevent and control the spread of invasive species in the state. It was established in the year 2000 under [RSA 430:54](#). Mr. Cygan has been a member since the committee's inception and has also served as the Chair.

In 2023, the ISC focused on reviewing additional plants for their potential to be invasive in NH, their risks to agriculture and the environment, and whether they should be recommended for prohibition or placed onto a watch list. This review is meant to inform the invasive species rulemaking process. The existing invasive species rules are scheduled to expire in 2027.

**Fact Sheet:
Prohibited Invasive Plant Species Rules, Agr 3800**

Updated 01/31/2017

This fact sheet is a synopsis of the adopted rules on invasive plant species and is intended for general use by the nursery and landscape industry, plant growers, plant dealers, general public, State Agencies, and Municipalities. A complete copy of the rules can be accessed on the internet at http://agriculture.nh.gov/topics/plants_insects.htm.

In accordance with the Invasive Species Act, HB 1258-FN, the NH Department of Agriculture, Markets & Food, Division of Plant Industry is the lead state agency responsible for the evaluation, publication and development of rules on invasive plant species for the purpose of protecting the health of native species, the environment, commercial agriculture, forest crop production, or human health. The rule, Agr 3800, states "No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1, New Hampshire prohibited invasive species list".

New Hampshire Prohibited Invasive Plant Species List

Scientific name	Synonyms	Common name
<i>Acer platanoides</i> L.	<i>Acer platanoides</i> var. <i>schwedleri</i> Nichols.	Norway maple
<i>Ailanthus altissima</i> (P. Mill.) Swingle	<i>Ailanthus glandulosa</i> Desv.	Tree of heaven
<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande	<i>Alliaria alliaria</i> (L.) Britt.; <i>Alliaria officinalis</i> Andr. ex Bieb.; <i>Erysimum alliaria</i> L.; <i>Sisymbrium alliaria</i> (L.) Scop.	Garlic mustard
<i>Alnus glutinosa</i> (L.) Gaertn.	<i>Alnus alnus</i> (L.) Britt.; <i>Betula alnus</i> L. var. <i>glutinosa</i> L.	European black alder
<i>Berberis thunbergii</i> DC.		Japanese barberry
<i>Berberis vulgaris</i> L.		European barberry
<i>Celastrus orbiculatus</i> Thunb.		Oriental bittersweet
<i>Centaurea stoebe</i> L. ssp. <i>micranthos</i> (Gugler) Hayek	<i>Centaurea biebersteinii</i> DC.; <i>Centaurea maculosa</i> Lam., misapplied; <i>Centaurea maculosa</i> Lam. ssp. <i>micranthos</i> Gugler	Spotted knapweed
<i>Cynanchum louiseae</i> Kartesz & Gandhi	<i>Cynanchum nigrum</i> (L.) Pers.; <i>Vincetoxicum nigrum</i> (L.) Pers.	Black swallow-wort
<i>Cynanchum rossicum</i> (Kleopow) Borhidi	<i>Cynanchum medium</i> , of authors not R. Br.; <i>Vincetoxicum medium</i> , of authors not (R. Br.) Dcne.; <i>Vincetoxicum rossicum</i> (Kleopow) Barbarich	Pale swallow-wort
<i>Elaeagnus umbellata</i> Thunb. var. <i>parvifolia</i> (Royle) Schneid.	<i>Elaeagnus parvifolia</i> Royle	Autumn olive
<i>Euonymus alatus</i> (Thunb.) Sieb.	<i>Celastrus alatus</i> Thunb.	Burning bush
<i>Frangula alnus</i> P. Mill.	<i>Rhamnus frangula</i> L.	Glossy buckthorn
<i>Glyceria maxima</i> (Hartman) Holmb.	<i>Glyceria spectabilis</i> Mert. & Koch; <i>Molinia maxima</i> Hartman	Reed sweet grass
<i>Heraclium mantegazzianum</i> Sommier & Levier		Giant hogweed
<i>Hesperis matronalis</i>		Dames rocket

<i>Impatiens glandulifera</i> Royle	<i>Impatiens roylei</i> Walp.	Ornamental jewelweed
<i>Iris pseudacorus</i> L.		Water-flag
<i>Lepidium latifolium</i> L.	<i>Cardaria latifolia</i> (L.) Spach	Perennial pepperweed
<i>Ligustrum obtusifolium</i> Sieb. & Zucc. var. <i>obtusifolium</i>	<i>Ligustrum obtusifolium</i> var. <i>leiocalyx</i> (Nakai) H. Hara	Blunt-leaved privet
<i>Ligustrum vulgare</i> L.		Common privet
<i>Lonicera japonica</i> Thunb.	<i>Nintooa japonica</i> (Thunb.) Sweet	Japanese honeysuckle
<i>Lonicera maackii</i> (Rupr.) Herder*		Amur honeysuckle*
<i>Lonicera morrowii</i> Gray*		Morrow's honeysuckle*
<i>Lonicera tatarica</i> L.*		Tartarian honeysuckle*
<i>Lonicera</i> × <i>bella</i> Zabel*	<i>Lonicera morrowii</i> × <i>L. tatarica</i>	Bella honeysuckle*
<i>Lysimachia nummularia</i> L.		Moneywort
<i>Microstegium vimineum</i> (Trin.) A. Camus	<i>Andropogon vimineum</i> Trin.; <i>Eulalia viminea</i> (Trin.) Kuntze	Japanese stilt grass
<i>Persicaria perfoliata</i> (L.) H. Gross	<i>Ampelgogon perfoliatum</i> (L.) Roberty & Vautier; <i>Polygonum perfoliatum</i> L.	Mile-a-minute weed
<i>Pueraria montana</i> (Lour.) Merr. var. <i>lobata</i> (Willd.) Maesen & S. Almeida	<i>Dolichos lobatus</i> Willd.; <i>Pueraria lobata</i> (Willd.) Ohwi; <i>Pueraria thunbergiana</i> (Sieb. & Zucc.) Benth.	Kudzu
<i>Reynoutria japonica</i> Houtt. var. <i>Japonica</i>	<i>Fallopia japonica</i> (Houtt.) R. Decr.; <i>Pleuropterus cuspidatus</i> (Sieb. & Zucc.) Moldenke; <i>Polygonum cuspidatum</i> Sieb. & Zucc.	Japanese knotweed
<i>Reynoutria sachalinensis</i> (F. Schmidt ex Maxim.) Nakai	<i>Fallopia sachalinensis</i> (F.S. Petrop. ex Maxim.) R. Decr.; <i>Polygonum sachalinense</i> F. Schmidt ex Maxim.	Giant knotweed
<i>Reynoutria</i> × <i>bohemica</i> Chrtek & Chrtková	<i>Fallopia japonica</i> × <i>F. sachalinensis</i> ; <i>Fallopia</i> × <i>bohemica</i> (Chrtek & Chrtková) J.P. Bailey; <i>Polygonum</i> × <i>bohemicum</i> (Chrtek & Chrtková) P.F. Zika & A.L. Jacobson	Bohemia knotweed
<i>Rhamnus cathartica</i> L.		Common buckthorn
<i>Rosa multiflora</i> Thunb. ex Murr.		Multiflora rose

Variance: Persons conducting temporary scientific studies, which may include hybridization of seedless species may apply for a variance to do so by contacting the NH Department of Agriculture, Markets & Food, Division of Plant Industry.

For additional information



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 Division of Plant Industry
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<http://www.agriculture.nh.gov/divisions/plant-industry/invasive-plants.htm>

NURSERY/PLANT DEALER LICENSING PROGRAM [Nursery/Plant Dealer Licensing Program | Plant Industry | NH Department of Agriculture, Markets and Food](#)

The Division of Plant Industry participates in an interstate and international network of plant protection agencies with a goal to reduce the transport of economically injurious plant pests by certifying the condition and quality of shipped nursery stock. The Division licenses New Hampshire’s Plant Dealers, and inspects nursery stock sold within New Hampshire, as well as that shipped both nationally and internationally.

Any nurseryman, plant dealer, or landscaper that temporarily or permanently retains nursery stock in his or her possession shall obtain a plant dealer / landscaper license. *Agr 2501.03 (b)*. A list of licensed plant dealers is available from the Division’s website: [gryLicensePaidCurrentYear.xlsx \(nh.gov\)](#)

Table 2: Plant Dealer Licensure and Nursery Inspections

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Plant Dealer licenses issued	700	725	746	722	736	782	818	831	828	829	884	917	911
New Plant Dealer licenses	53	50	13	24	64	70	29	45	38	43	74	76	75
Shipping nurseries	65	65	65	65	65	65	65	70	51	79	73	63	79
Nursery inspections	152	119	120	123	248	181	135	179	315	456	565	580	483

Items of interest from 2023 nursery licensure and inspection activities:

- An increase in the number of licensed nurseries indicating shipping plants out-of-state. Increases were primarily with small home growers offering on-line sales of plants. It is anticipated that there are others that are selling plants on-line that are not licensed.
- Four Administrative Fines were collected for the sale of prohibited invasive plants. Prohibited invasive plants offered for sale within the state included creeping Jenny (*Lysimachia nummularia*), and Japanese Barberry (*Berberis thunbergii*).
- Aphids, spidermites, mealy bug and various scales were significant pests in greenhouses and nurseries.

CAPS Nursery and Retail Plants Pest Survey:

Visual and trapping surveys were conducted at 46 high risk nurseries receiving tree and shrub nursery stock from out-of-state. New Hampshire has a very active greenhouse, nursery and landscape industry with 911 individual businesses selling plants. Plant production and related services amount to more than \$381 million annually (NE Ag. Statistics Service, NE Nursery Assoc., UNH Coop. Ext, NH Int. Trade Resource Ctr., US Census Bureau, NHDAMF). Nurseries have been identified as a high-risk pathway for the introduction of invasive species and can facilitate the artificial spread of many invasive species of concern. It is critical to establish regular inspections of nurseries within the state to monitor for specific exotic/invasive pests that may be transported through inter/intrastate movement of nursery stock. By actively searching for target pests, this survey provides data that helps create an accurate distribution map of specific pests in the United States, thereby assisting scientists and regulators to make recommendations and regulations on how to best safeguard U.S. resources that may be negatively impacted by a given pest. The survey also ensures that nursery/greenhouse owners and managers are educated about certain exotic/invasive species of concern in relation to their industry and ultimately sets the foundation for early detection of pest threats to agriculture and the environment.

CAPS Exotic Wood Borer / Bark Beetle Survey

New Hampshire is a densely-forested state with significant hardwood and conifer forest resources. Forests cover approximately 84% of the state's lands. These forests define the culture of the state, are critical components of the state's environmental resources, and are an important part of the state's economy – from forest-based recreation, to manufacturing, to sales of fir Christmas trees and maple syrup. The forest industry in New Hampshire has an approximate value of \$3 billion per year. Establishment of exotic timber infesting beetles could have a significant adverse economic impact to this

industry. Additionally, recent climatic conditions have created an environment highly susceptible to establishment of forest pests.

Severe drought conditions have significantly impacted the health of the state's forests, making them at increased risk from introduced forest pests. Cool and dry springs have allowed greater survivorship of many forest-feeding caterpillars, including forest tent caterpillar and spongy moth outbreaks. This survey for exotic longhorned beetles was conducted at 10 high risk mixed conifer sites primarily in Carroll, Merrimack, Rockingham, and Strafford counties.



Atalantycha sp. Photo: C. Rallis, NHDAMF

Table 3: CAPS Nursery and Retail Plants Pest Survey Targets *images not to scale*

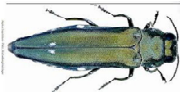
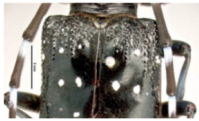

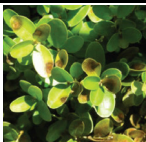












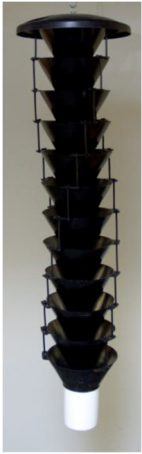







Common Name	Scientific Name	Survey Type	# Confirmed Positives
Oak splendor beetle 	<i>Agrilus biguttatus</i>	Visual	0
Citrus longhorned beetle 	<i>Anoplophora chinensis</i>	Visual	0
Asian longhorned beetle 	<i>Anoplophora glabripennis</i>	Visual	0
Boxwood blight 	<i>Calonectria pseudonaviculata</i>	Visual	0
Boxtree moth 	<i>Cydalima perspectalis</i>		0
Pine sawfly 	<i>Diprion pini</i>		0
Beech leaf disease nematode 	<i>Litylenchus crenatae</i>	Visual	0
Pine beauty moth 	<i>Panolis flammea</i>		0
False codling moth 	<i>Thaumatotibia leucotreta</i>		0
Oak processionary moth 	<i>Thaumetopoea processionea</i>		0

Table 4: CAPS Exotic Wood Borer Survey *images not to scale*

Common Name	Scientific Name	Trap	# Confirmed Positives
Large pine weevil 	<i>Hylobius abietis</i>		0
Japanese pine sawyer 	<i>Monochamus alternatus</i>		0
Black fir sawyer 	<i>Monochamus urussovii</i>		0
Black spruce beetle 	<i>Tetropium castaneum</i>		0
Brown spruce longhorn beetle 	<i>Tetropium fuscum</i>		0
Velvet longhorned beetle 	<i>Trichoferus campestris</i>		0

PPA § 7721 Funded Surveys

Forest Pest Survey Program




Survey was conducted for exotic bark beetles and Asian defoliators (Table 5), by monitoring six traps at each of ten high risk sites in Carroll, Merrimack, Rockingham, and Strafford counties. Traps were deployed from May to October, depending on the species. Samples were collected every 1-2 weeks. Samples were screened, sorted, and identified by the SSC and other Division staff.

Collected samples were negative for all targets. There was a flight of *Lymantria dispar dispar* in New Hampshire in 2023, and all Flighted Spongy Moth Complex (FSMC) traps captured a few to hundreds of male moths. Samples were collected, frozen, and submitted to the OTIS lab for DNA analysis. Of the 264 samples run by the lab, 263 were determined to be *Lymantria dispar dispar*. In one circumstance, the diagnostic assay failed to reach a final determination.

Retail Nursery Survey:

Funding was requested to survey retail and wholesale nurseries specifically targeting spotted lanternfly

Table 5: § PPA 7721 Asian Defoliator / Bark Beetle Survey *images not to scale*

Common Name	Scientific Name	Trap	# Confirmed Suspects
Pine-tree lappet 	<i>Dendrolimus pini</i>		0
Siberian silk moth 	<i>Dendrolimus sibiricus</i>		0
Common pine sawfly 	<i>Diprion pini</i>		0
Okinawa spongy moth 	<i>Lymantria albescens</i>		0
Asian spongy moth 	<i>Lymantria dispar asiatica</i>		0
Japanese spongy moth 	<i>Lymantria dispar japonica</i>		0
White-winged spongy moth 	<i>Lymantria polstalba</i>		0
Hokkaido spongy moth 	<i>Lymantria umbrosa</i>		0
Rosy moth 	<i>Lymantria mathura</i>			0
Nun moth 	<i>Lymantria monacha</i>		0
Oak processionary moth 	<i>Thaumetopoea processionea</i>		0

(*Lycorma delicatula*) (SLF) and *Phytophthora ramorum*. Both of these plant pests have been introduced into New Hampshire through nursery stock in recent years—SLF multiple times. Nurseries were selected for inclusion in the survey by querying the Plant Dealer database. From that database, nurseries that received trees and shrubs from states with established SLF were surveyed. Likewise, those nurseries that received nursery stock from California, Oregon, and Washington were also included in survey for *P. ramorum*.

The SLF portion of the survey started in April. The goal was to identify potential introductions of SLF egg masses on nursery stock and remove those egg masses prior to hatch. This was largely successful. One nursery in the state received nursery stock with SLF egg masses. Egg masses were removed and monitored in the lab for emergence. In all cases, eggs were viable and nymphs hatched. There were periodic surveys during the season at each of the nurseries that received egg masses in 2023 or any previous year. Circle traps and limb traps were deployed at the nurseries with interceptions of SLF egg masses. No life stages other than egg masses on incoming nursery stock were detected during the survey.

The *P. ramorum* survey started in June. No suspect samples were submitted for diagnostic work.

Spotted Lanternfly Outreach project:

The Division received funding to provide outreach primarily to the public and travelers about the risks from spotted lanternfly and steps to reduce introduction. The project started July 1, 2023 and continues through June 30, 2024. Activities in 2023 included advertising in the NH Camping Guide, and social media campaign. Presentations, participation in expos, design of additional outreach materials, and another social media campaign are planned in 2024.

COMPLIANCE AGREEMENTS AND CERTIFICATION PROGRAMS

Kiln Certification Program:

The Division performs this certification function with temperature thermocouples borrowed from the USDA. Five kilns were certified to the highest treatment standard (T314-c: 71°C/160°F for 75 minutes) required by receiving states. One kiln was certified to the previous emerald ash borer standard (T314-a: 60°C/140°F for 60 minutes). The kiln certified to the lower standard does not distribute to a state requiring the higher treatment standard. Certifications were conducted in February and March, 2023.



Spotted lanternfly, *C. Rallis*, NHDAMF



Spotted lanternfly nymph, *C. Rallis*, NHDAMF



Spotted lanternfly adult, face, *C. Rallis*, NHDAMF

This checklist is intended as a tool for the Department of Agriculture, Markets & Food Division of Plant Industry to help companies prepare for shipping heat-treated firewood out-of-state through approved firewood compliance agreements. Facilities with multiple locations may require separate checklists to review practices. Firewood compliance agreements assist in meeting the regulatory requirements of receiving states with a firewood regulatory strategy. Requirements listed are derived from review of state regulations and are not maintained by or guaranteed for accuracy by the Div. Plant Industry. It is the responsibility of the facility to seek clarification from the receiving states as to any additional requirements for conducting business in their state and to maintain compliance with those standards. The Div. Plant Industry can provide state contacts upon request for further assistance. Once this checklist is completed and approved, a compliance agreement will be issued pending kiln certification. A copy of the checklist and compliance agreement shall be maintained in your records. The originals will stay with the Div. Plant Industry.

1. Distribution: Firewood distribution includes the following states (states in bold regulate New Hampshire origin firewood):

<input type="checkbox"/> AL	<input type="checkbox"/> AK	<input type="checkbox"/> AZ	<input type="checkbox"/> AR	<input type="checkbox"/> CA	<input type="checkbox"/> CO	<input type="checkbox"/> CT	<input type="checkbox"/> DE	<input type="checkbox"/> FL	<input type="checkbox"/> GA
<input type="checkbox"/> HI	<input type="checkbox"/> ID	<input type="checkbox"/> IL	<input type="checkbox"/> IN	<input type="checkbox"/> IA	<input type="checkbox"/> KS	<input type="checkbox"/> LA	<input type="checkbox"/> ME	<input type="checkbox"/> MD	<input type="checkbox"/> MI
<input type="checkbox"/> MA	<input type="checkbox"/> MN	<input type="checkbox"/> MS	<input type="checkbox"/> MO	<input type="checkbox"/> MT	<input type="checkbox"/> NE	<input type="checkbox"/> NV	<input type="checkbox"/> NJ	<input type="checkbox"/> NM	<input type="checkbox"/> NY
<input type="checkbox"/> NC	<input type="checkbox"/> ND	<input type="checkbox"/> OH	<input type="checkbox"/> OK	<input type="checkbox"/> OR	<input type="checkbox"/> PA	<input type="checkbox"/> PR	<input type="checkbox"/> RI	<input type="checkbox"/> SC	<input type="checkbox"/> SD
<input type="checkbox"/> TN	<input type="checkbox"/> TX	<input type="checkbox"/> UT	<input type="checkbox"/> VT	<input type="checkbox"/> VA	<input type="checkbox"/> WA	<input type="checkbox"/> WV	<input type="checkbox"/> WI	<input type="checkbox"/> WY	

States with Additional Permit, Certificate, Notification, or Labeling Requirements:

CT Firewood Permit (<https://portal.ct.gov/-/media/CAES/DOCUMENTS/EAB/2014/FirewoodTransportPermitApplication.pdf>)

FL Approved Compliance Agreement Number

IL Firewood Permit (includes \$25 fee) (<https://www2.illinois.gov/sites/agr/Insects/Pests/EmeraldAshBorer/Documents/FirewoodImporter.pdf>)

IA Labeling includes county and state where firewood was harvested

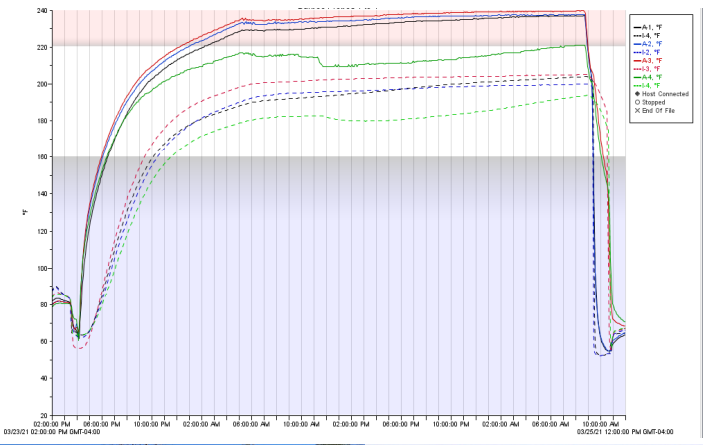
KS Phytosanitary Certificate (without firewood ONLY)

MN Approved Compliance Agreement

UT Shipping Certificates & advance notification

WA Shipping Certificates & WSDA gypsy moth Compliance Agreement. Certificate requires county of origin.

2. Safeguard heat-treated firewood, inspect, and report pests: There is an expectation that firewood that has undergone certified heat treatment will be safeguarded from re-infestation of pests on or in the wood. Federal and state gypsy moth quarantines require that any materials stored outside are inspected for gypsy moth life stages prior to shipment out of the gypsy moth quarantine area. This may require a separate gypsy moth certification for shipments outside of the federal gypsy moth quarantine. States may implement spotted lanternfly quarantines that would have similar requirements as those for gypsy moth. Safeguarding could include bundling in plastic, storage under cover, not storing heat treated firewood under trees or in direct contact with soil, or 100 feet of separation from standing vegetation. Safeguarding also includes knowing and training the staff to be aware of signs of current insect infestation, removing bundles with any live insect life stages from shipments, and reporting regulated pests like gypsy moth, emerald ash borer, or spotted lanternfly on heat-treated firewood to the NH Dept. Agriculture, Markets & Food.
3. Record-keeping requirements: Some states are explicit as to temperature measuring requirements as well as record keeping requirements. To ensure compliance with all states, maintain heat treatment recordings, supplier and customer records for 2 years. Temperature measuring equipment shall be accurate, capable of collecting temperature data at least once every five (5) minutes and recording or storing data for 30 days. Facility shall obtain and verify internal wood temperatures by sensors located in pieces of wood at representative locations within the stacks. There shall be a minimum of four (4) sensors available for each run—one (1) for measuring ambient temperature and three (3) for measuring internal wood temperature per kiln. At least one sensor shall be placed in a piece of firewood in a location in the kiln furthest away from internal heat circulation. Facility records for treatment chamber temperatures, firewood suppliers, and customer records shall be maintained for 2 years and available for periodic review to ensure continued compliance.



NEW HAMPSHIRE DEPARTMENT OF AGRICULTURE, MARKETS & FOOD		FIREWOOD HEAT TREATMENT COMPLIANCE AGREEMENT FOR SHIPMENT OF REGULATED ARTICLES	
1. Name and mailing address of Person or Firm:		2. Location:	

3. Regulated Articles: Firewood to AZ, CO, CT, FL, IL, IA, KS, LA, ME, MI, MN, NY, NC, ND, OH, OK, OR, PA, RI, UT, VT, VA, WA, WI

4. Certification Information: Heat treatment chamber/kiln's temperature monitoring equipment shall be accurate, capable of collecting temperature data at least once every five (5) minutes and recording or storing data for 30 days. Facility shall obtain and verify internal wood temperatures by sensors located in pieces of wood at representative locations within the stacks. There shall be a minimum of four (4) sensors available for each run—one (1) for measuring ambient temperature and three (3) for measuring internal wood temperature per kiln. At least one sensor shall be placed in a piece of firewood in a location in the kiln furthest away from internal heat circulation. Facility records for treatment chamber temperatures, firewood suppliers, and customer records shall be maintained for 2 years and available for periodic review to ensure continued compliance.

Annual compliance check of the heat treatment chamber/kiln using independent thermocouples. At least three (3) thermocouples will be placed in similar pieces of firewood to measure internal wood temperature. The facility will be certified at the certification standard as measured by the independent thermocouples during the annual compliance check. If there are multiple heat treatment chambers/kilns at the facility, the entire facility will be certified at the standard achieved by all heat treatment chambers/kilns, unless the facility can demonstrate operation and tracking of wood treated by different heat treatment chambers/kilns.

5. Certification Standard:

11 °C (50°F) for 75 min (T114-c) 60°C (140°F) for 60 min (T114-a) 50°C (113°F) for 30 min (T114-b)

Meets ALL STATE treatment requirements. Does NOT meet AZ, CT, FL, ME, NY, UT, VT. Does NOT meet AZ, CT, FL, ME, MN, NY, OR, UT, VT treatment requirements.

6. Receiving states with additional permit, certificate, notification, or labeling requirement:

CT FL IL IA KS MN UT WA

7. Issuing State Authority, Background Information, and Terms:

RSA Section 433:26 authorizes the New Hampshire Department of Agriculture, Markets & Food to enter into compliance agreements with persons engaged in the growing, handling, or moving of plant or plant products. The movement of firewood is an identified pathway for the introduction and spread of invasive forest pests and pathogens.

The above firewood producer enters into this compliance agreement with the New Hampshire Department of Agriculture, Markets & Food in order to qualify the movement of heat treated firewood to states with a firewood regulatory strategy. All shipments of firewood are subject to the regulations of the receiving state, including permit, labeling, and record keeping requirements. The facility is responsible for any additional certifications required, including federal gypsy moth certification. Heat-treated firewood shall be safeguarded against insect infestation, and shipments will be inspected by the facility for presence of insect life stages. Any shipment showing signs of insect life stages may not be shipped under this compliance agreement and notification of presence of pests shall be made by the facility to the New Hampshire Department of Agriculture, Markets & Food.

This agreement is subject to RSA 433:24. Any certificates or certification numbers issued for use by remain the property of the New Hampshire Department of Agriculture, Markets & Food and any distribution of the certificates or certification numbers requires approval. Certificates and certification numbers shall not be used upon written notification by the New Hampshire Department of Agriculture, Markets & Food. No liability shall be attached to the New Hampshire Department of Agriculture, Markets & Food or any representative of the department with respect to this certificate. The producer shall maintain a copy of this agreement in their records.

I, (print name), the undersigned, agree to handle, process and/or move regulated articles in accordance with the provisions of the quarantine(s) or regulation(s), use all permits and certificates in accordance with the instructions, maintain and offer for inspection such records as may be required, carry out all additional conditions, treatments, precautions and sanitary measures which may be required by the inspector.

8. Signature:	9. Title:	10. Date Signed:
11. Telephone:	12. Email:	13. Agreement Number:
The affixing of the signatures below will validate this agreement which shall remain in effect until _____, but may be revised as necessary or revoked for noncompliance.		14. Date of Agreement:
15. State of New Hampshire Official (Name and Title):		16. Address: NH Dept. Agriculture, Markets & Food Div. Plant Industry 20 Hazen Dr Concord, NH 03301
17. Signature:		



Firewood compliance documents, an example thermocouple temperature reading, and certification activities

Table 6: 2023 NH Certified Firewood Kilns

Company	Town (Kiln)	Certification Standard	Issue Date
Burbee Firewood	Brookline	T314-c (71°C/160°F for 75 min)	02/16/2023
New London Wood Products	New London	T314-c (71°C/160°F for 75 min)	02/27/2023
Ossipee Mountain Land Co.	Tamworth	T314-c (71°C/160°F for 75 min)	02/03/2023
Province Kiln Dried Firewood	Belmont	T314-a (60°C/140°F for 60 min)	02/24/2023
RC Conner	Exeter	T314-C (71°C/160°F for 75 min)	02/07/2023
Treehugger Farms	Westmoreland	T314-C (71°C/160°F for 75 min)	02/06/2023

Compliance Agreements:

Several nurseries have agreements in place with the Division of Plant Industry to demonstrate compliance with receiving state quarantines, including those for Japanese beetle and other invasive chafers, *Lymantria dispar dispar*, spotted lanternfly, European corn borer, onion white rot and garlic stem and bulb nematode.

Table 7: 2023 NH Compliance Agreements

Company	Japanese beetle and other chafers	Spongy moth	Spotted lanternfly	European corn borer	Onion white rot and stem & bulb nematode
DS Cole Growers	X	X	X	X	X
Marlborough Greenhouse	X				
Pleasant View Gardens	X	X		X	X
Studley Gardens	X	X			

STATE QUARANTINES [Firewood Quarantine](#) | [Plant Industry](#) | [NH Department of Agriculture, Markets and Food Firewood](#) | [NH Bugs](#)

Exterior Firewood Quarantine: New Hampshire prohibits the entry of firewood which has not been certified heat-treated to 60°C/140°F for 60 minutes or which is not moved under a compliance agreement. Compliance agreements are available to kilns agreeing to heat-treat out-of-state firewood, for transporters delivering firewood to compliant heat-treatment kilns, and in circumstances where wood harvested within New Hampshire is taken out-of-state for processing and then delivered back into New Hampshire.

Table 8: 2023 NH Certified Firewood Kilns

	2018	2019	2020	2021	2022	2023
Certified HT kilns	2	3	3	7	7	6
Transporters to certified HT kilns	5	11	6	5	1	1
NH firewood processed out-of-state	0	1	1	1	2	3
Total	7	15	10	9	10	10

NH Bugs Facebook page: NH Bugs uses Facebook to provide periodic messaging about forest health risks from insects and direct internet traffic to the www.NHbugs.org website. Partners from Div. Plant Industry and UNH Cooperative Extension have access to manage the page and promote content. The page is a mixture of fun and facts about forests, forest health, forest pests, and insects. Currently the site has an estimated 1,400+ followers, most from New Hampshire.

Firewood Scout: New Hampshire joined Firewood Scout [Home — Firewood Scout](#) a smartphone-friendly website designed to connect campers to campfire wood in the spring of 2016. More than 500 New Hampshire vendors of locally-sourced or certified heat-treated wood have been listed on the site. Participation in Firewood Scout has been promoted on local radio shows, through NH Bugs, at expos, through sponsored Facebook posts, and direct outreach to campgrounds.

PEST UPDATES

Emerald ash borer: [Emerald Ash Borer | Plant Industry | NH Department of Agriculture, Markets and Food](#) [Emerald Ash Borer | NH Bugs](#) *Agilus planipennis* continues to be detected in new towns in the state through trapping and visual survey conducted by the NH Div. Forests and Lands and UNH Cooperative Extension. Emerald ash borer is considered widely distributed throughout the state, south of the White Mountains.

Table 9: Emerald ash borer detections in New Hampshire

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
# New Counties	1	2	1	0	1	2	2	0	0	0	1
# New Towns	2	5	7	12	15	24	26	59	20	15	16
Total Counties	1	3	4	4	5	7	9	9	9	9	10
Total Towns	2	7	14	26	41	65	91	150	170	185	207
% Towns Infested	<1%	3%	6%	11%	18%	28%	39%	64%	72%	79%	89%

●—————● Internal quarantine ●—————● No internal quarantine



Fig. 4: EAB adult (top), and larva (bottom). Photo credit: NW Siegert, USFS

It should be noted that elimination of both the federal and New Hampshire emerald ash borer quarantines does not mean that emerald ash borer is unregulated within New Hampshire:

- RSA 433:28 prohibits the sale of nursery stock infested with dangerous plant pests or diseases.
- RSA 433:29-433:30 provides the authority to inspect and require treatment or disposal of infested nursery stock.
- RSA 430:51-430:55 provides the authority to protect the state from the spread of invasive species, with emerald ash borer listed as a prohibited invasive species.
- RSA 227-K:17 prohibits the sale, offering for sale, giving away, moving or shipping any tree of forest product into or within New Hampshire that is known or believed to be infested with a forest pest declared as a dangerous insect or disease.
- New Hampshire’s exterior firewood quarantine prohibits the importation of firewood from out-of-state, unless under compliance agreement.

Management Program: Emerald ash borer management on state lands is conducted by the Division of Forests and Lands and focuses on survey, release of bio-control agents, and chemical treatment of select trees. Extension foresters and the green industry provide landowner management recommendations.

Outreach Program: The keystone for emerald ash borer outreach in the state is [Emerald Ash Borer | NHBugs](#). This website has content related to forest pests that threaten New Hampshire and the information on the website is reviewed by the participating agencies. As expected, EAB has continued to spread in the state, making the outreach component of the multi-agency response even more critical as more New Hampshire residents and municipalities make management decisions about their ash trees.

Hemlock woolly adelgid [Hemlock Woolly Adelgid | Plant Industry | NH Department of Agriculture, Markets and Food](#)
[Hemlock Woolly Adelgid | NHBugs](#) *Adelges tsugae* continues to be detected in new towns in the state via visual survey conducted by the NH Div. Forests and Lands. The only county without detections of hemlock woolly adelgid is Coös. Hemlock woolly adelgid was first detected in Portsmouth in 2000. There was a quarantine on nursery stock and forest products until 2018.

Table 10: Hemlock woolly adelgid detections in New Hampshire

	Pre-2010	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
# New Towns	31	11	13	7	10	11	8	21	8	2	4	5	15	6	0
Total Towns	31	42	55	62	72	83	91	112	120	122	126	131	146	152	152
% Towns Infested	13%	18%	24%	26%	31%	35%	39%	48%	51%	52%	54%	56%	62%	65%	65%

●—————● Internal quarantine ●—————● No internal quarantine

It should be noted that elimination of the hemlock woolly adelgid quarantine does not mean that the pest is unregulated in New Hampshire:

- RSA 433:28 prohibits the sale of nursery stock infested with dangerous plant pests or diseases.
- RSA 433:29-433:30 provide the authority to inspect and require treatment or disposal of infested nursery stock.
- RSA 227-K:17 prohibits the sale, offering for sale, giving away, moving or shipping any tree or forest product into or within New Hampshire that is known or believed to be infested with a forest pest declared as a dangerous insect or disease.
- RSA 430:51-430:55 provides the authority to protect the state from the spread of invasive species, with hemlock woolly adelgid listed as a prohibited invasive species.

Elongate hemlock scale [Elongate Hemlock Scale | NHBugs](#) *Fiorinia externa* continues to be detected in new towns in the state via visual survey conducted by the NH Div. Forests and Lands. It is primarily known from the southern and eastern counties, with two towns with detections in Carroll County. Elongate hemlock scale was first detected in Nashua in 2006.

Table 11: Elongate hemlock scale detections in New Hampshire

	Pre-2010	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
# New Towns	4	2	2	4	4	2	3	21	24	1	3	3	6	3	11
Total Towns	4	6	8	12	16	18	21	42	66	67	70	73	79	82	93
% Towns Infested	2%	3%	3%	5%	7%	8%	9%	18%	28%	29%	30%	31%	34%	35%	40%

Invasive jumping worms [Jumping Worms | NHBugs](#) Invasive jumping worms have been reported primarily by backyard gardeners throughout the state. They have also been found in the vicinity of nurseries. Invasive jumping worms are primarily reported through the [Reporting Form | NHBugs](#) reporting form. There are best management practices posted on the website. These primarily relate to not moving invasive jumping worms as part of plant swaps. Div. Forests and Lands, USFS, UNH Extension, Div. Plant Industry, Div. Pesticide Control, and Natural Heritage Bureau representatives meet periodically to discuss concerns about invasive jumping worms, including spread to and potential impacts on New Hampshire’s forests. Invasive jumping worms are not currently regulated within the State of New Hampshire.

Spotted lanternfly: [Spotted Lanternfly | Division of Plant Industry | NH Department of Agriculture, Markets and Food](#) [Spotted Lanternfly | NH Bugs](#) *Lycorma delicatula* was intercepted on nursery stock entering New Hampshire starting in 2020 and each year afterwards, including in 2023. Follow-up survey has not found any evidence of establishment of spotted lanternfly.

Following the 2020 interception, the nursery that received nursery stock with spotted lanternfly (SLF) egg masses on them implemented best management practices (BMPs) [SLF BMPs for Nurseries.pub \(nh.gov\)](#) to reduce their risk of being a pathway of introduction of this pest into the state. These BMPs focused on prevention, scouting, reporting, and response. In 2023, more than 112 egg masses were intercepted on nursery stock. With an average of 50 eggs/mass, that is more than 5,600 eggs removed prior to hatch and potential establishment. Div. Plant Industry staff collected removed egg masses and allowed them to hatch within the lab to determine viability. All egg masses were viable, and emerged SLF neonates were destroyed. Div. Plant Industry followed-up with the shipping states and conducted surveys and inspections throughout the season. Utilizing best management practices provided protection from this invasive pest. It should be noted that this is a significant reduction in the number of egg masses intercepted in 2023 compared to 2022. This decline in infested nursery stock shipped into New Hampshire was also reflected in fewer nurseries receiving nursery stock, and fewer trees within the shipment having egg masses. Overall, the cooperative effort with industry and between sending and receiving states is working to reduce the number of introduced egg masses.

The use of the BMPs successfully reduced the nursery industry's risk of spreading SLF to their customers in New Hampshire and other northeastern states. The Division plans to continue survey efforts and promoting the use of BMPs. This is an example of industry and state regulators working together to reduce the risk of introduction of a significant nuisance pest.

NH's SLF risk is not clear based on current science. Current models seem to indicate that NH is high risk for introduction, likely to have a long enough growing season to allow SLF to enter the adult stage, but insufficient growing degree-days to get to the egg-laying stage, and a very low predicted reproductive growth rate. If this is true, then a significant risk for the state is as part of the transportation pathway of SLF egg masses—the risk is for a NH nursery unintentionally transporting SLF egg masses on nursery stock into a neighboring state with a higher growth rate and likelihood of establishment. As such, the nursery and green industries continue to be a focus of the SLF response in the state.

Although New Hampshire does not have an exterior spotted lanternfly quarantine, that does not mean that spotted lanternfly is unregulated within New Hampshire:

- RSA 433:28 prohibits the sale of nursery stock infested with dangerous plant pests or diseases.
- RSA 433:29-433:30 provides the authority to inspect and require treatment or disposal of infested nursery stock.
- RSA 430:51-430:55 provides the authority to protect the state from the spread of invasive species, with spotted lanternfly listed as a prohibited invasive species.



Numbers of federal certificates issued through PCIT have declined since 2014. This is primarily due to market changes for NH greenhouses as well as participation of one greenhouse in the United States-Canada Greenhouse-Grown Plant Certification Program (GCP). Shipments are certified through the GCP rather than via a phytosanitary certificate.

The Division oversaw a compliance agreement for export of bedding plants to Canada through the GCP. In 2020, the authorized facility became the first in the country dually-certified through the GCP and SANC (Systems Approach to Nursery Certification) programs. In 2023, the Division conducted two audits of the grower, one full-systems audits and one surveillance audits. Audits were conducted based on the pest management plan approved for the greenhouse upon acceptance into the programs. Several years of successfully completed audits allowed the facility to successfully apply to move from conditional certification status. This reduces the number of required annual audits from four to two.

Participation in these programs has resulted in improved communication between the facility and the Division of Plant Industry, improvements in the facility's pest scouting program, and the ability of the exporter to have greater flexibility in when orders are shipped as well as accommodating last minute order changes. The Division of Plant Industry has benefited by an improved understanding of the pest detection and control systems in place within the facility that define the risk of the facility.

However, participation in these voluntary certification and compliance programs does require staff time from both the facility in the program and the regulatory staff. The facility needs to maintain and be able to retrieve records as required by the certification programs, as well as conduct the operations (scouting, treating, etc.) as outlined within the Facility Manual. The regulatory staff needs to prepare audits, conduct audits, review records for compliance, and prepare reports. In the case of the GCP, the regulatory staff also needs to review the plants on the Plants in Production list to a range of databases. This ensures eligibility into both Canada and the U.S. specific to each plant and its origin. If the facility changes countries of origins or plants offered for sale on a regular basis, revising this list can be a significant effort. There is no cost-recovery system in place that allows the Division to cover costs of oversight of this program and that is a potential consideration for future participation in similar programs.

Table 12: Export certification activity

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
State certificates issued through PCIT	20	22	36	21	3	10	7	7	2	18	201	183	190
Exporters requesting inspection for international shipments	3	5	8	4	7	5	6	7	4	4	3	5	7
Federal certificates issued through PCIT	85	86	129	123	16	10	7	8	4	7	10	14	14
Orders shipped under Compliance Agreement in US Canadian Greenhouse Certification Program	-	-	-	-	82	79	93	104	119	109	200	200	200
Total nursery stock international exports (Federal Phytosanitary Certificates + USCGCP Compliance Agreement)	85	86	129	123	98	89	100	112	123	126	210	214	214

PERMITS

Table 13: Permits issued

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
525: Permit to receive soil	2	5	.	2	3	3	3	4	4	0	5	0	3
526: Plant Pests and Biological Control Organisms	40	55	30	32	41	34	38	35	54	58	100	142	132
BRS: Regulated Genetically	25	17	9	7	3	3	2	1	3	0	0	0	0
588: Controlled Import Permit	.	1	2	2	3	4	5	5	7	1	0	0	5

In addition to receiving physical specimens of ticks, insects, and other arthropods, the Division performs identification services through email, and the NHBugs Facebook page. Additionally, the NHBugs website has an on-line photo submission portal and is the recommended location for concerned residents to upload pictures of forest pests. Use of those identification services are not represented here.

Table 14: Identifications

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ticks	62	54	30	61	38	34	62	36	47	36	37	23	33
Other arthropods	68	26	17	24	9	24	12	14	6	2	33	9	14



All insect images by C. Rallis, DAMF, in this report were created using an imaging system based on the USGS Bee Inventory Monitoring Lab’s (BIML) setup, which includes a Canon DSLR and a Canon mp-e 65mm 1-5x macro lens mounted on a Cognisys Trackshot motorized rail. The images were photostacked using Zerene Stacker software, with final touchup in Adobe Photoshop.