Invasive Plant Management Plan
For
Boyce Hill Town Forest

Fayston, Vermont

July 2020

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Summary

This plan was developed to address invasive plant management on the Boyce Hill Town Forest property in Fayston, Vermont. There were six invasive plant species detected on the property: bush honeysuckle (*Lonicera* spp.), common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), winged euonymus (*Euonymus alatus*), common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinaceae*).

All six species presented as individuals (recorded as points) or small populations (recorded as polygons) of varying height and maturity.

A non-native iris was located in the northern half of the property; however, the plant is not currently listed as invasive.

Hand-pulling and mechanical removal treatments are ideal for motivated volunteers and staff, and are specifically suggested for short (<5'), small diameter (<1") woody invasive species, such as glossy buckthorn, common buckthorn, autumn olive and bush honeysuckle. Hand-pulling and mechanical removal of these four species (when they have these distribution characteristics) are effective treatments and can provide a rewarding experience for those involved.

For invasive woody shrubs that are tall (≥5') or that occur in higher-density, and for some species whose biology limits the success of hand-pulling and mechanical management, chemical management is the most effective treatment option. In applying herbicide, remember that *the label is the law*.

Because of the size of the plants in the Boyce Hill Town Forest, the suggested treatments in this involve chemical management methods. Refer to Appendix IV for further invasive plant control resources provided by the State of Vermont.

Consistent yearly monitoring, both during the timespan of this plan and afterwards, is prescribed in this plan in addition to suggested chemical and mechanical treatment methods. Monitoring is the most effective way to prevent the spread and establishment of invasive species, and dramatically reduces the cost of long-term invasive plant management.

Property Description

The 93.3-acre property is located in Washington County in the town of Fayston. It is bordered on all four sides by residential development or private woodlots. Forest comprises a small amount of the property, as the majority of the land has long been mowed for aesthetic purposes. The lowest elevation of the property is around 1400 feet, with the highest point of the property just above 1800 feet.

Starting in the 1970s, the property was transitioned from young woodland to an open meadow periodically maintained for the views of the valleys and mountains beyond. The Town of

Fayston was gifted the property and a conservation easement was placed on the property in 2019, securing public access for recreational, cultural and educational purposes.

Invasive Plant Management

Invasive plants are plant species that are non-native, or alien, to the ecosystem under consideration and whose introduction and presence causes damage to the environment, economy or human health. The timely and thorough management of invasive plants early in the invasion mitigates this damage and reduces overall management costs in the long term.

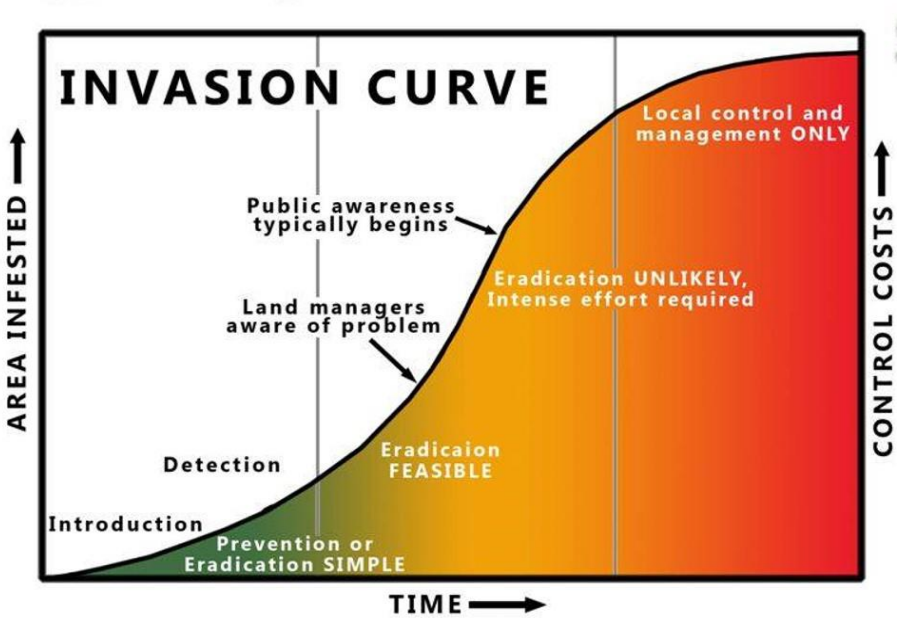


Figure 1: The Invasion Curve (Harvey and Marzotti, 2018).

According to the Castegren Ecological Assessment Record, the property serves as a linkage to a state-owned forest matrix block. The conservation of native biodiversity and healthy ecological functioning is essential for habitat connectivity and to fulfill the purposes of the conservation easement. Invasive plants directly threaten native biodiversity and subsequently the healthy ecological functioning of the areas they infest, as they form dense monocultures that outcompete native plants.

The goals for the management of individual invasive plant populations should reflect the extent of the invasion, the complexity of management efforts required, and how the invasive plant species fits into the ecology of that specific location. In addition, the prioritization of management efforts reflects the goal for the individual plant population, as well as the plant species' rate of spread, the potential for successful control and the cost of management across a temporal scale.

See Appendix III for specific descriptions of management goals and prioritization methodology.

Invasive Plants, Management Objectives and Suggested Treatments

Bush honeysuckle *Lonicera* spp.

History

The four invasive species of *Lonicera*, collectively referred to as bush honeysuckle, were introduced from Asia as early as the 1750s for landscaping, wildlife cover and erosion control use.

Identification & Biology

Bush honeysuckles are deciduous, perennial shrubs that can grow up to 15 feet tall. All four species reproduce primarily via seed and have opposite, egg-shaped leaves, red/orange berries, and fragrant flowers. Their seeds are dispersed primarily by birds, and can remain viable for 3-5 years. Bush honeysuckles tend to hold onto their leaves longer in the fall, leaf out in the spring before natives, flower in the early summer, and ripen their fruit in the early fall. They thrive in forest, forest edge, floodplain, meadows, fields and disturbed areas.

Bush honeysuckle seedling

Bush honeysuckle seedlings

Bush honeysuckle specimen

Bush honeysuckle flowers

Photo credit (Clockwise from top left): Photos 1 and 2 - Steve Wilson (Blue Jay Barrens Blogspot), Photo 3 - iNaturalist user jpinedaa, Photo 4 – Eric Hunt (Lonicera mackii Wikipedia).

The distinguishing characteristic of the invasive bush honeysuckles are their brown, hollow piths, as compared to the native bush honeysuckles, fly honeysuckle (*Lonicera canadensis)* and northern bush honeysuckle (*Diervilla lonicera)*, which have a white, solid pith. In addition, the leaves of northern bush honeysuckle are serrated, whereas the leaf margins of the invasive bush honeysuckles are smooth. Other distinguishing characteristics are the greater height of the invasive bush honeysuckles – the native species do not grow taller than a few feet - and the earlier gain and later loss of the invasive species' leaves.

Ecological Impact

Invasive bush honeysuckles are adept at outcompeting native plants for sunlight, moisture and pollinators. Where they are allowed to establish, they form dense stands that harm native species' seedling recruitment. Research into invasive bush honeysuckle's impacts on wildlife suggests a mix of positive and negative

effects. Evidence from other regions in the United States suggest that honeysuckles might provide forage for deer and a number of bird species, however, there is research that indicates the fruit of bush honeysuckles offers less nutrition to native birds compared to the fruit of native shrubs and, when used as a nest site for native songbirds, may facilitate increased nest predation.

Distribution on Boyce Hill Town Forest Property

One mature, tall bush honeysuckle population was found on the eastern boundary of the property.

Management Objectives & Suggested Treatment

1. **Goal:** *Eliminate* the mature, tall bush honeysuckle population on the eastern boundary.

   Objective: Reduce the extent of the population by 70% each year through 2023.

   Suggested Treatment: Treat with a cut-stump or foliar herbicide application.

   Schedule: As early as May 2021.

2. **Goal:** *Prevent* the future invasion and establishment of bush honeysuckle and other invasive plants.

   Suggested Treatment: Conduct future monitoring.

   Schedule: Annually starting fall 2021.

Common Buckthorn *Rhamnus cathartica*

History

Common buckthorn, often referred to as simply buckthorn, is native to parts of North Africa, Europe and Asia. The name *cathartica* refers to the laxative effect produced by the consumption of the berries. Some evidence suggests its first introduction to North America in the early 1800s was for medicinal purposes, with a second wave of introductions in the mid-1800s for ornamental and hedgerow use.

Identification & Biology

Common buckthorn is a deciduous, perennial shrub or tree that can grow up to 25 feet tall. The species reproduces primarily via seed and has opposite or sub-opposite, light-green to dark-green oval serrated leaves that have 3 to 4 pairs of curving veins, dark berries, and yellow-green flowers. The bark is dark gray,

smooth with lenticels when young, and, as the plant matures, the bark can become shaggy and plated. The seeds are dispersed primarily by birds and can remain viable for at least 2 years. Common buckthorn tends to hold onto its leaves longer in the fall, leaf out in the spring before natives, flower in the early summer, and ripen fruit in the early fall. They thrive in forest, forest edge, meadows, fields and disturbed areas.

Common buckthorn seedlings

Common buckthorn with flowers

Common buckthorn bud with "thorn"

Common buckthorn bark

Photo credit (Clockwise from top left): Mass Audubon, Credit Valley Conservation Authority, iNaturalist user Sten Porse, Montana Weed Control Association.

The distinguishing characteristics of common buckthorn from native look-alikes – namely common choke cherry – are the orange inner bark, the “thorn” typically present between the terminal buds and the thorn-like remnants of senesced lower branches. The leaves of some species of dogwood may also be mistaken for common buckthorn – take care to note the shallow, ridged bark of dogwood compared to the pocked, dotted bark of common buckthorn.

Ecological Impact

Common buckthorn often outcompetes native plants in and around forest habitats, forming dense stands that limit native seedling establishment and shading out native competitors. Anecdotal evidence and some research suggests common buckthorn is able to alter the suitability of the soil to prevent native plant establishment, changes nutrient cycling and reduces native seedling success.

Distribution on Boyce Hill Town Forest Property

One mature, tall common buckthorn population is present on the eastern boundary.

Management Objectives & Suggested Treatment

1. **Goal:** *Eliminate* the mature, tall common buckthorn population on the eastern boundary.

   Objective: Reduce the extent of the population by 50% each year through 2023.

   Suggested Treatment: Treat with a cut-stump or foliar herbicide application

   Schedule: As early as May 2021.

2. **Goal:** *Prevent* future invasion and establishment by common buckthorn and other invasive plants.

   Suggested Treatment: Conduct future monitoring.

   Schedule: Annually starting fall 2021.

Glossy Buckthorn *Frangula alnus*

History

Glossy buckthorn, often referred to as buckthorn or alder buckthorn, is native to Eurasia. Note, some sources list the genus for glossy buckthorn as *Rhamnus*. Originally, the species was placed in the genus *Rhamnus,* only to be later moved into the genus *Frangula* due to its different flower structure. Evidence suggests its first introduction to North America in the early 1800s was for wildlife cover and as a hedgerow plant.

Identification & Biology

Glossy buckthorn is a deciduous, perennial shrub or tree that can grow up to 30 feet tall. The species reproduces primarily via seed and has opposite or alternate, light green to dark-green oval smooth leaves that have parallel curving veins, dark berries, and pale yellow flowers. The bark is dark gray to brown, smooth with lenticels when young, and, as the plant matures, the bark can become shaggy and plated. The seeds are dispersed primarily by birds, and can remain viable for at least 2 years. Glossy buckthorn tends to hold onto its leaves longer in the fall, leaf out in the spring before natives, flower in the spring, and ripen fruit in the late summer. It thrives in moist woodlands and disturbed areas.

Note, unlike common buckthorn, glossy buckthorn buds are not separated by a "thorn".

Glossy buckthorn seedling

Glossy buckthorn

Glossy buckthorn bud

Glossy buckthorn bark

Photo credit (Clockwise from top left): Wikipedia user Salicyna, VT Invasives, Wikipedia user Sten Porse, iNaturalist user Sten Porse, Arieh Tal.

The distinguishing characteristic of glossy buckthorn from native look-alikes – namely common choke cherry – is the smooth leaf margin of glossy buckthorn.

The leaves of some species of dogwood may also be mistaken for glossy buckthorn – take care to note the shallow, ridged bark of dogwood compared to the lenticular bark of glossy buckthorn.

Ecological Impact

Glossy buckthorn often outcompetes native plants in and around moist forest habitats, forming dense stands that limit native seedling establishment. Where they are allowed to establish, they tend to form dense stands that shade out native competitors. Some research suggests glossy buckthorn is most competitive in early successional habitat and areas with recent soil disturbance.

Distribution on Boyce Hill Town Forest Property

One glossy buckthorn individual was found on the hilltop. This individual appeared to be a re-sprout from a former plant's root.

Management Objectives & Suggested Treatment

1. **Goal:** *Eliminate* the glossy buckthorn individual.

   Objective: Reduce the detected occurrences of glossy buckthorn re-sprouts from the detected root to zero by 2022.

   Suggested Treatment: Treat with a cut-stump or foliar herbicide application

   Schedule: As early as May 2021.

2. **Goal:** *Prevent* the future invasion and establishment of glossy buckthorn and other invasive plants.

   Suggested Treatment: Conduct future monitoring.

   Schedule: Annually starting fall 2021.

Winged Euonymus *alatus*

History

Winged euonymus is native to eastern Asia. It was introduced in the 1800s as an ornamental.

Identification & Biology

Winged euonymus is a deciduous shrub that can grow up to twenty feet in height. Its stems typically feature distinctive corky ridges, leading to the

"winged" name. The leaves of winged euonymus are opposite, dark green, tapered at the tip, feature smooth margins and are typically less than two inches in length. The leaves turn to a bright red in the fall. Winged euonymus has inconspicuous, small yellow-green flowers with four petals that emerge in the spring and produce red, capsuled fruit that split to reveal orange seeds in the fall. Seed viability may be less than two years. The preferred habitats of winged euonymus include forests, fields, forest-field edge and disturbed soils.

Euonymus seedling

Euonymus flowers

Euonymus stem

Euonymus fruit

Photo credit (Clockwise from top left): Adirondack Stewardship, Peter Dziuk, The Sanguine Root, El Grafo.

Ecological Impact

The ecological impact of winged euonymus includes the prevention of native seedling establishment and outcompeting of established native plants. This is accomplished through prolific seeding and root sprouting, leading to dense stands that limit light availability and other resources. Individual winged euonymus plants can often self-fertilize, with a single plant being able to produce thousands of seeds and quickly colonize an area. In addition, when an individual

plant is damaged, either naturally or through control efforts, vigorous root sprouting often occurs. Despite these negative effects, it is a source of forage for native birds. There is, however, little research demonstrating the nutrition of winged euonymus fruit relative to native plants.

Distribution on Boyce Hill Town Forest Property

One tall, mature winged euonymus population is present along the eastern boundary.

Management Objectives & Suggested Treatment

1. **Goal:** *Eliminate* the winged euonymus population along the eastern boundary.

   Objective: Reduce the extent of the population by 50% each year through 2023.

   Suggested Treatment: Treat with a cut-stump or foliar herbicide application

   Schedule: As early as May 2021.

2. **Goal:** *Prevent* the future invasion and establishment of winged euonymus and other invasive plants.

   Suggested Treatment: Conduct future monitoring.

   Schedule: Annually starting fall 2021.

Common Reed *Phragmites australis*

History

Common reed was introduced to the United States in the early 1800s.

Identification & Biology

Common reed is perennial grass that can grow up to 15 feet in height. Its stalks are stiff and feature alternate, broad, pointed leaves. Common reed's leaf sheaths gently clasp the stem. Flower inflorescence is a large, hanging panicle that ranges from gray to dark brown to purple. The preferred habitats of common reed include disturbed soils, wetlands, wet ditches and shorelines.

Common reed stand

Common reed flowers

Common reed pre-flowering

Common reed roots

Photo credit (Clockwise from top left): Matt Lavin, Peter O'Connor aka anemoneprojectors, Kenraiz, Rasbak.

Ecological Impact

The ecological impact of common reed includes the prevention of native seedling establishment and outcompeting of established native plants. This is accomplished through prolific seeding and root sprouting, leading to dense stands that limit light availability and other resources.

Distribution on Boyce Hill Town Forest Property

One tall, mature common reed population about two meters^2 in size is present south of the man-made pond.

Management Objectives & Suggested Treatment

1. **Goal:** *Control* the common reed population.

Objective: Reduce the extent of the population by 30% each year through 2023.

Suggested Treatment: Cut stalks in winter. Between late July and August, re-cut stalks and drip an 18-21% glysophate solution into the stem. For more information or alternative treatment methods, refer to vtinvasives.org and contact a local invasive plant control specialist.

Schedule: As early as winter 2020.

2. **Goal:** *Prevent* the future invasion and establishment of phragmites and other invasive plants.

   Suggested Treatment: Conduct future monitoring.

   Schedule: Annually starting fall 2021.

Reed Canary Grass *Phalaris arundinaceae*

History

The introduction of reed canary grass is not well studied; however, it is assumed that variants were introduced from Europe in the 1800s. These variants have likely intermingled genetically with native variants.

Identification & Biology

Reed canary grass is a perennial grass that can grow up to nine feet in height. Its stalks feature flat leaf blades that can be 1-4 feet in length and up to an inch wide. Its flower heads may be present from as early as late spring through later summer.

Ecological Impact

The ecological impact of reed canary grass includes forming monoculture stands that outcompete native plants through dominance of growing space, light, water and nutrients.

Distribution on Boyce Hill Town Forest Property

Disparate reed canary grass populations were identified by Dubois & King, Inc. in their Boyce Hill Town Forest Natural Resources Inventory. Refer to the Natural Resources Inventory for exact locations of reed canary grass.

Management Objectives & Suggested Treatment

1. **Goal:** *Control* the reed canary grass population.

Objective: Prevent the broader establishment of reed canary grass.

Suggested Treatment: Mowing intervals for reed canary grass must be frequent (mowing multiple times from spring through fall) to suppress rhizome growth and re-sprouting.

2. **Goal:** *Prevent* the future invasion and establishment of reed canary grass and other invasive plants.

   Suggested Treatment: Conduct future monitoring.

   Schedule: Annually starting fall 2021.

Future Monitoring & Early Detection, Rapid Response (EDRR)

Future monitoring should occur yearly to track the status of detected invasive plant populations and discover new points of invasion. Given the proximity of the property to established invasive plant populations, the amount of forest edge habitat and road frontage present on the property, future monitoring should focus on the main pathways for invasion: forest-field edges, Boyce Hill Road frontage and the walking paths throughout the property.

An early detection, rapid response (EDRR) species list varies by property prioritizes the removal of small invasive plant populations in an immediate timeframe to prevent widespread establishment. The following species are EDRR species for the Boyce Hill Town Forest due to their suitability for the habitat, presence in the local landscape and potential impact to the Boyce Hill Town Forest property objectives.

1. Glossy buckthorn *Frangula alnus*
2. Asiatic bittersweet *Celastrus orbiculatus*
3. Japanese barberry *Berberis vulgaris*

For species-specific information, including identification and biology please refer to vtinvasives.org. If an EDRR species is detected, develop a plan for its immediate treatment or removal.

Summary of Prioritized Suggested Treatments and Schedules for 2021

Species	***Population***	***Suggested Treatment***	***Schedule***
N/A	N/A	Re-monitor the property for previously detected and potential new infestations. Map newly detected invasive plants and develop a plan for their treatment.	Late Spring 2021.
Common reed	Detected population.	Cut stems in winter. Re-cut stems in late summer and drip an 18-21% glysophate solution into the cut stems.	Drip herbicide application: Late July-August 2021.
Glossy buckthorn	Detected individual.	Apply a foliar herbicide application.	Foliar herbicide application: May-October 2021.
Common buckthorn Bush honeysuckle Winged euonymus	Detected populations.	Cut-stem or foliar herbicide application.	Cut-stem herbicide application: May-October 2021.

Summary of Prioritized Suggested Treatments and Schedules for 2022

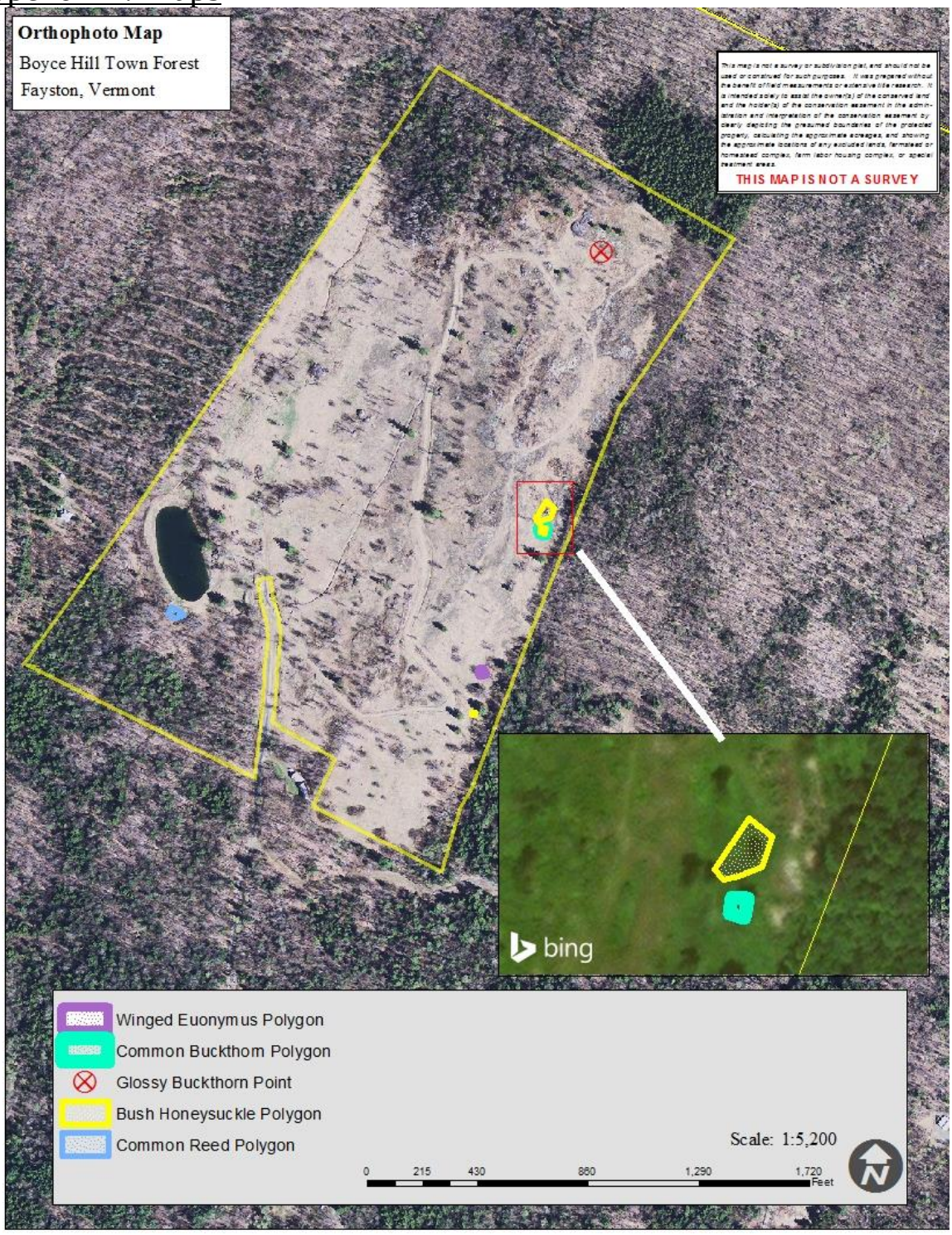
Species	***Population***	***Suggested Treatment***	***Schedule***
N/A	N/A	Re-monitor the property for previously detected and potential new infestations.	Late Spring 2022.

		Map newly detected invasive plants and develop a plan for their treatment.	
Glossy buckthorn	Detected individual.	Apply a foliar herbicide application.	Foliar Herbicide Application: May-October 2022.
Common reed	Detected population.	Cut stems in winter. Re-cut stems in late summer and drip an 18-21% glysophate solution into the cut stems.	Drip herbicide application: Late July-August 2022.
Common buckthorn Bush honeysuckle Winged euonymus	Detected populations.	Cut-stem or foliar herbicide application.	Cut-stem herbicide application: May-October 2022. Foliar herbicide application: May-October 2022.

Summary of Prioritized Suggested Treatments and Schedules for 2023

Species	***Population***	***Suggested Treatment***	***Schedule***
N/A	N/A	Re-monitor the property for previously detected and potential new infestations. Develop a new invasive species management plan.	Late Spring 2023.

Appendix I: Maps



Map 1: Overview of detected invasive plant species on Boyce Hill Town Forest property. Refer to the Natural Resources Inventory for a partial map of reed canary grass populations.

Appendix II: Field Methods

The invasive plant inventory was conducted on June 16th, 2020 by Jack Minich with the Vermont Land Trust.

The inventory focused initially on forest-field edges and trails. Following the assessment of these, subjective, east to west contour transects were walked through the property. These transects were adjusted to include different slope aspects, elevations, and plant community types. Finally, the Boyce Hill Road frontage within the property was assessed.

Data was collected on site using the Collector app, which allows the user to collect spatially referenced information on individual plants and concentrated plant populations in the form of points and polygons. Species name, maturity, approximate size and distribution were recorded for each plant or plant population detected.

ArcGIS software was used to generate maps displaying the polygon and point observations. These maps show the overall distribution of invasive plants on the property and were used to create the invasive plant management plan.

Appendix III: Definition of Management Goals & Prioritization Methodology

Management goals are defined below:

1. Prevent – Prevent the establishment of an invasive plant species through monitoring.
2. Eradicate – The individual population is small and isolated enough that complete eradication of all plants and reproductive propagules is possible with little chance of re-establishment.
3. Eliminate/Reduce to Zero Density – The individual population is of high enough priority or small enough geographic size to allow it to be completely eliminated from an area, however, the population is widespread enough in the landscape that re-establishment is likely.
4. Control Outliers – The infestation is so large that the priority is to eliminate small outlier populations distinct from the broader infestation.
5. Control the Perimeter – The infestation is so large that, once outlier populations have been eliminated, the edges of the infestation should be controlled.
6. Control Where Possible – The infestation is widespread and elimination is unlikely, thus control efforts should focus on areas that would offer the most benefit to other management concerns.

The prioritization of management efforts is a simple ranked methodology, whereby management goals, the likely rate of spread, the potential for success in control efforts and the financial cost of management across a temporal scale are scored on a 1 to 3 scale and then added. The individual invasive plant populations with the highest score receive top priority.

Appendix IV: Invasive Plant Control Resources

Vermont Invasives (www.vtinvasives.org) is an excellent resource on invasive plants provided by the State of Vermont. The management section of their website (https://vtinvasives.org/land/management) includes extensive resources on herbicide safety and application, as well as non-herbicide treatment methods. In addition, the gallery of terrestrial invasives (https://vtinvasives.org/gallery-of-land-invasives) hosts species-specific biology and treatment information.

Appendix V: Disposal of Invasive Plant Material

Proper disposal of invasive plant material is essential for mitigating the spread and new establishment of invasive plants elsewhere on the property and neighboring properties.

Herbaceous invasive plants can either be solarized in black trash bags for a week under full sun, dried out in an area for a week where they are exposed to full sun and free air movement while not being in contact with bare ground, or both techniques. Doing either technique, or a combination of the two, should render the invasive plant material unable to re-sprout.

Woody invasive plants can be rendered unable to re-sprout using the aforementioned open-air drying technique. Due to their woody tissue, however, drying time should be increased to three weeks.

With both woody and herbaceous invasive plants, take care during their removal and disposal to limit the dropping of root fragments, fruit and seeds, stems and other parts of the plant onto soil. Carefully bag any plant material with fruits or seeds present and dispose of this bagged material following your local waste management district's guidelines.

Appendix VI: References

Cusack C. *2019 BDR*. Dec 2019. Ermione (Town of Fayston) 131703.

Diamond A. 2018. *Ecological Assessment Record: Castegren, Fayston*. Apr 2018. Ermione (Town of Fayston) 131703.

Harvey R. G., Mazzotti F. J. 2018. *The Invasion Curve: A Tool for Understanding Invasive Species Management in South Florida*. UF/IFAS Extension. WEC347. Published Dec 2014.

Vermont Invasives. *Shrub Honeysuckle*. https://vtinvasives.org/invasive/honeysuckles-shrub.

Martinod K. L., Gorchov D. L. *White-tailed deer browse on an invasive shrub with extended leaf phenology meets assumptions of an apparent competition hypothesis*. AoB Plants. 2017: 9. Published Feb 2017.

Collier M. H., Vankat J. L., Hughes MR. 2002. *Diminished plant richness and abundance below Lonicera maackii, an invasive shrub*. American Midland Naturalist. 147: 60–71. Published Jan 2002.

Schmidt K. A., Whelan C. J. 1999. *Effects of Exotic Lonicera and Rhamnus on Songbird Nest Predation*. Conservation Biology. Vol. 13, No. 6: 1502-1506. Published Dec 1999.

Rodewald A. D. 2012. *Spreading Messages about Invasives*. Diversity and Distributions. 18: 97-99. Published Jul 2011.

Jull L. 2009. *Invasive Exotic Shrub Honeysuckles: Major Threats to Midwestern Woodlands*. UW Extension and Wisconsin DNR. Brochure. Published 2009.

Vermont Invasives. *Common Buckthorn*. https://vtinvasives.org/invasive/buckthorn-common.

1854 Treaty Authority. *Identification Comparisons of Invasive Buckthorn to Native Plants in NE Minnesota*. http://www.1854treatyauthority.org/images/IDComparisonsofInvasiveBuckthorn&HoneysuckletoNativePlantsinNEMN.pdf.

Vermont Invasives. *Glossy Buckthorn*. https://vtinvasives.org/invasive/buckthorn-glossy.

Miller P. 1754. *The Gardener's Dictionary*. Publisher unknown. Published 1768.

Wingard H. S. 2007. *Invasion of transition hardwood forests by exotic Rhamnus frangula: Chronology and site requirements*. University of New Hampshire, Masters Theses and Captstones. 286: 6. Published spring 2007.

Cunard C., Lee T. D. 2008. *Is patience a virtue? Succession, light, and the death of invasive glossy buckthorn (Frangula alnus)*. Biological Invasions. Vol. 11, No. 3: 557-586. Published Mar 2009.

Ecological Landscaping Alliance. *Winged Euonymus: An invasive plant fact sheet*. https://www.ecolandscaping.org/04/landscape-challenges/invasive-plants/winged-euonymus-an-exotic-invasive-plant-fact-sheet/

Vermont Invasives. *Winged Euonymus*. https://vtinvasives.org/invasive/burning-bush-or-winged-euonymus.

Vermont Invasives. *Common Reed*. https://vtinvasives.org/invasive/common-reed.

Center for Agricultural and Bioscience International. *Phragmites Australis Datasheet*. Invasive Species Compendium. https://www.cabi.org/isc/datasheet/40514#todescription.

Vermont Invasives. *Reed Canary Grass*. https://vtinvasives.org/invasive/reed-canary-grass