

January 25, 2023

Conservation Commission
City of Portsmouth
1 Junkins Avenue
Portsmouth, NH 03801

Dear Conservation Commission Members,

At its regularly scheduled meeting of Thursday April 21, 2022, the City of Portsmouth Planning Board granted a Wetland Conditional Use Permit to the property owner at 325 Little Harbor Road to replace the existing single family structure, carriage house, shed, barn, and paddock; construct a garage, pool, pool cabana playground; and renovate the existing barn and shed with all associated electric, gas, water, and sewer updates as required on private property and within the public right of way resulting in 195,656 S.F. of impact in the tidal buffer area and 17, 189 S.F. of temporary impact to in the tidal wetland area. This was granted with the following stipulations:

2.a) For each review identified and provided for in the Land Management Plan, an update and report of findings will also be provided to the Planning Board.

2.b) There will be an inspection and report submitted to the Planning Board on the bridge status and safety every 5 years.

An updated Land Management Plan dated December 2022 has been received by the Planning and Sustainability Department and is attached for your review. We have also included the original management plan for your reference (dated fall 2021). This updated report will also be submitted to the Planning Board for review at their February 2023 meeting. If you have any questions or need additional information please do not hesitate to contact me at kehomet@cityofportsmouth.com

Sincerely,

Kate Homet
Associate Environmental Planner
Planning & Sustainability Department
City of Portsmouth

Land Management Plan

A Narrative for Invasive Plant Management
and Native Plant Restoration

325 Little Harbor Road, Portsmouth, NE

Fall 2021



PARTERRE
ECOLOGICAL

Table of Contents

| | |
|---|--------------|
| Introduction & Primary Goals | 1 |
| Invasive Plant Inventory and Plan | 2-5 |
| Invasive Plant Management Techniques | 6-8 |
| <i>Descriptions of proposed Manual Removal and Herbicide Application Management Methods</i> | |
| Bittersweet and Vines | 7 |
| Management Calendar | 8 |
| Native Plant Inventory and Restoration | 9-11 |
| Inventory | 9-10 |
| Restoration planting plan | 11 |
| Restoration strategies and species | 12 |
| Management and Maintenance Schedule | 13 |
| Invasive Species Descriptions | 14-19 |
| Identification and Qualifications of Applicant | 20 |
| Precedent Restoration Project Images | 21 |



Introduction and Primary Goals

The Dilorenzo residence is located at 325 Little Harbor Road in Portsmouth. The 11-acre island lies near the mouth of the Piscataqua River and the majority of the site is within the 100' tidal river buffer. An inventory of existing native and invasive plant species can be found in this plan.

The primary goal of this plan is to seek approval from the Portsmouth Conservation Commission to offset home construction and landscape improvements within the 100' Tidal buffer. We propose to remove invasive species on site and to restore the area with native species that will benefit the ecosystem around Piscataqua Rive and reduce further incursion of invasive species on the island. An inventory of existing native and invasive plant species can be found in this plan.

We propose removing invasive species by low-impact manual hand methods and cut & dab herbicide application by licensed applicators. All invasive species greater than 1" in caliper will be cut and dabbed with herbicide to reduce the chance of erosion along the banks. All existing erosion will be stabilize and any soil disturbed during planting will be stabilized and seeded with native wildflower mix. Techniques are outlined in the report. After removal of invasive species we will restore with native shrubs and perennials that will help prevent resurgence of the invasive plants and enhance the existing ecology.



A mass of invasive Multiflora Rose along the edges of the horse paddock with maturing Black Swallowtail pods hanging from the stem. The majority of the western portion of the island is healthy pine/oak forest, but invasives are dense in areas with historically high disturbance. We propose managing all invasive species and replacing with native alternatives.



325 Little Harbor Road

Invasive Plant Inventory

Mature invasive species have developed isolated populations along the tidal river buffer and threaten to spread into an otherwise healthy native ecosystem. We propose controlling invasive plant species that have developed self sustaining populations on the Dilorenzo's property and restoring with native species. The physiology of the invasive plants has enabled them to out compete the native plant community and compromise the ecological value of the native plant community. The dominant invasive plants, including Multiflora Rose and Barberry, disrupt the formation of a native understory by filling ecological niches and resisting any browsing by native species. A very small Japanese Knotweed population exists near the southwestern corner of the paddock. It can spread quickly in coastal areas and should be managed before it can establish itself. All invasive perennials and shrubs with viable fruit will be removed from the site. Poison Ivy is a native species with valuable ecological benefits. We propose control the and areas of human traffic.

Invasive Plant Species Identified:

Acer platanoides, Norway Maple
Alliaria petiolata, Garlic Mustard
Berberis thunbergii, Japanese Barberry
Celastrus orbiculatus, Asiatic Bittersweet
Cynanchum louiseae, Black Swallowwort
Elaeagnus umbellata, Autumn Olive
Fallopia japonica, Japanese Knotweed
Frangula alnus, Glossy Buckthorn
Lonicera morrowii, Morrow's Honeysuckle
Rhamnus cathartica, Common Buckthorn
Rosa multiflora, Multiflora Rose

**** Likely Invasive Plant Species Identified:***

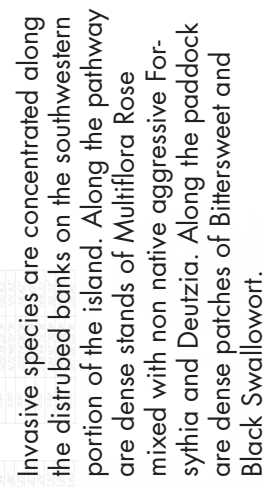
Artemisia vulgaris, Mugwort
Deutzia scabra, Fuzzy Deutzia
Ligustrum vulgaris, Common Privet
Rhodotypos scandens, Jetbead
Vitus sp., Grape (Native but control)

* While not listed as an Invasive Species by ISC (New Hampshire Invasive Species Committee) these species can dominate the shrub layer and crowd out native trees and shrubs. We recommend removal of along with listed invasive plant species in wetland buffers and replace with native shrubs and trees.



Black Swallowwort releasing seedheads in the paddock. The majority of this area is a healthy goldenrod/blackberry meadow with patches of Milkweed, but Black Swallowwort can establish itself quickly and releases compounds in the soil to limit its competitor. Without intervention there will likely be a large infestation.





Dense pockets of invasive shrubs and vines (1100 ft² @ 20% Coverage)

Dense pockets of non-native aggressive species (not listed invasives) with some native species(1075 ft² @ Mostly native species with patches of Black Swallow-wort and Bittersweet.

Mostly native with a very few invasive shrubs and perennials (1075 ft² @ >1% Coverage)

- Japanese Knotweed (20 ft²)
- Wetland Buffer
- Highest Observable tide line
- Existing Pathways

325 Little Harbor Road
Invasive Plant Images



Japanese Barberry with Deutzia and Black Swallowwort at the edge of the forest



Garlic Mustard seedheads with Mugwort on the northern bank



Japanese Barberry with viable fruits



Autumn Olive in the open paddock



A single small population of Japanese Knotweed on site should be managed as soon as possible



325 Little Harbor Road

Invasive management techniques

We propose a combination of manual hand removal and cut & dab herbicide to control invasive plant species within the identified project areas over a phased time line. Once the initial identified invasive plant species have been removed by manual methods (described below), we propose seeding all exposed soil with native seed blend and begin planting identified tree, shrub and perennial plant species selected from the native plant community list that will increase the density and diversity of the existing wetland buffers.

Manual Hand Removal Methods:

Manual methods of invasive plant management will include hand pulling or cutting. To minimize soil disturbance, shallow-rooted invasive plants less than 1" in caliper will be hand pulled from the soil. Invasive plant species greater than 1" in diameter will be cut. All invasive plant material will be disposed of off site. Manual hand pulling and cutting will remove all invasive plants from the wetland buffer.

Cut and Dab and Foam application: All invasive plant species that have a base greater than 1" in caliper are proposed for herbicide application methods. Although invasive, the root systems of plants greater than 1" in caliper usually have extensive fibrous root systems, providing soil stabilization. So we propose a cut & dab method of application of a Triclopyr based herbicide (Garlon) or Glyphosate based herbicide approved for wetland use (trade name Rodeo) on individual cut stumps. Licensed Pesticide Applicators will complete all aspects of the proposed restoration. For treatment of perennial species that cannot be controlled with cut and dab or by manual methods should be treated by a foam based herbicide that is wiped onto the leaves using a cotton glove. This hyper-specific treatment limits any treatment of non-target plants. No treatment will occur in areas of standing water.



Qualified applicators with necessary Personal Protective Equipment paint the stems of invasive species after cutting



Proposed cut stump treatment (below) using hand tools and applying marking dye to eliminate possibility of treatment of stump twice, or missing stump entirely. (Above) Foam treatment allows highly specific placement of herbicide to remove invasive perennials that limits disturbance and protects surrounding species



325 Little Harbor Road

Asiatic Bittersweet ID and Management

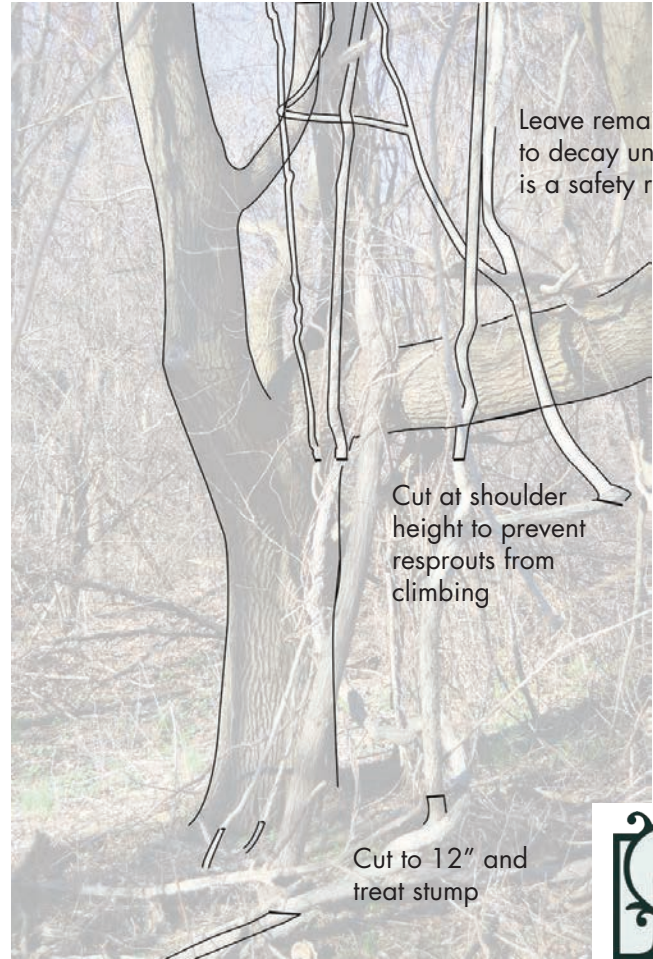
Invasive Bittersweet (*Celastrus orbiculatus*) have the capacity to girdle, weaken, and even kill mature canopy trees. Without some frequency of removal, they will eventually open large holes in the canopy while suppressing saplings from filling the holes. They readily resprout after being cut and can damage the aesthetic and ecological value of meadows.

Mature stems produce thousands of bright red berries that mature in late fall and are spread by birds.

Removing the entire vines from trees is often dangerous and unnecessary (unless it poses safety risk). Our team recommends making cuts at shoulder height followed by a cut at 12" and immediate herbicide treatment. Bittersweet aggressively suckers after cutting so it is important to cut and treat during or after its flowering period (late June to December).



Identification: Alternate, circular light green leaves 2-5 in. long. Distinctive, large light colored vine. Red berries with orange casing appearing in late fall. Seedlings have light green leaves. Deep orange roots.



Leave remainder to decay unless it is a safety risk

Cut at shoulder height to prevent resprouts from climbing

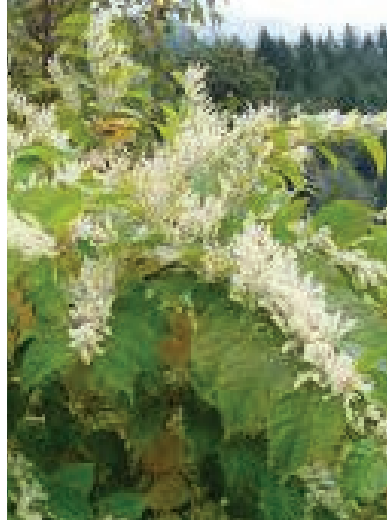
Cut to 12" and treat stump



325 Little Harbor Road Japanese Knotweed Management

Japanese Knotweed (*Fallopia japonica*) is one of the most difficult invasive species to control. Its main mode of spreading is through cut portions of its rhizomes or stem, which can actively resprout even when 1 inch in length. Growing 10-15' and shading out any competitors, Japanese Knotweed can quickly form a monoculture. It can take 2-5 seasons to fully contain through repeat herbicide treatments. It is at its weakest point during the flowering stage, when nutrients are flowing back into the roots (Aug, Sept.) Unfortunately, taproots can extend over 6' below the ground making organic eradication nearly impossible without excavation. There are two ways to approach treatment.

1. Cut and treat: For smaller areas, involves cutting the stem between the 1st and 3rd node and adding a 66% solution of Aquaneat (glyphosate), generally 5 oz per treated stem. If density is less than 5 ft per plant treat every third stem. Do this for 2-5 seasons.
2. Cut in May, wipe leaves in fall or apply to stem in fall: In this case, dense stands of Knotweed are mown in end of May so when they regrow they are at hip height by August. They can then be easily wiped with a 6.0% Aquaneat (glyphosate) solution



Identification: Herbaceous perennial, with long heart shaped leaves. Young sprouts can be red, rhubarb in nature. Extensive roots can spread and colonize quickly and can reach 15 ft. at maturity.



Japanese Knotweed cut in preparation for a fall herbicide foliar wipe treatment (top left). Treatment of Japanese Knotweed stems using a cut and fill method (above). A combination of cut and fill in the first season and foliar wipe in the second has shown to be effective. Foliar wipe can be accomplished by applying herbicide to a glove and wiping leaves or by utilizing a foaming agent to help herbicide stick to the leaves (left). It is a highly specific treatment with little risk of drift.



Management Calendar for Treatment and Planting

| Task | March/ April | May | June | July | August | Sept. | Oct. | Nov. | Dec. |
|---|-----------------|-----|------|------|--------|-------|------|------|------|
| <i>Remove Garlic Mustard and Lesser Celandine seedlings by hand or smothering</i> | | | | | | | | | |
| <i>Cutting of Japanese Knotweed</i> | | | | | | | | | |
| <i>Cut and dab of woody invasive species</i> | | | | | | | | | |
| <i>Treatment of Japanese Knotweed</i> | | | | | | | | | |
| <i>Invasive vine management and cut and dab treatment</i> | | | | | | | | | |
| <i>Restoration planting</i> | | | | | | | | | |
| <i>Treatment of Black Swallowwort</i> | | | | | | | | | |
| <i>Mowing of meadows</i> | | | | | | | | | |



Optimal timing and efficiency



Not optimal but mostly effective



Possible, but not ideal



325 Little Harbor Road

Native Plant Inventory

Within the tidal river buffer is a diverse native plant community dominated by mature Oaks and White Pines with Chokeberry, Black Cherry, Arrowwood Viburnum, and lowbush Blueberry in the understory. In the sunnier areas is a wet meadow featuring Rough Goldenrod, Allegheney Blackberry, Sumac, Common Rush and Elderberry. An occupied Belted Kingfisher nest was found during the site visits. We propose utilizing these existing native plant species as indicators of what naturally inhabits this plant community and propose additional planting of these species and diversifying with other native trees, shrubs and perennials.

Native Plant Species Identified:

Acer rubrum, Red Maple
Acer sacharinum, Sugar Maple
Aronia melanocarpa, Black Chokeberry
Betula populifolia, Gray Birch
Betula papyrifera, Paper Birch
Iva frutescens, Bigleaf Marsh-elder
Juncus tenuis, Path Rush
Juniperus virginiana, Eastern Red Cedar
Kalmia latifolia, Mountain Laurel
Myrica pensylvanica, Bayberry
Parthenocissus quinquefolia, Virginia Creeper
Pinus strobus, Eastern White Pine
Prunus serotina, Black Cherry
Prunus virginiana, Chokecherry

Toxicodendron radicans, Poison Ivy
Quercus alba, White Oak
Rosa virginiana, Virginia Rose
Rhus typhina, Staghorn Sumac
Rubus allegheniensis, Allegheny blackberry
Sambucus canadensis, Elderberry
Solidago bicolor, Silverrod
Solidago sempervirens, Sea-side Goldenrod
Solidago rugosa, Rough-leaved Goldenrod
Swida amonum, Silky Dogwood
Tilia americana, American Basswood
Vaccinium corymbosum, High-bush Blueberry
Viburnum dentatum, Arrowwood Viburnum



Silverrod alongside Blue-stem Goldenrod and Carex. sp



Gray Birch along the bank



325 Little Harbor Road
Invasive Plant Images



Staghorn Sumac along the banks with Arrowwood Viburnum and Virginia Rose in the foreground

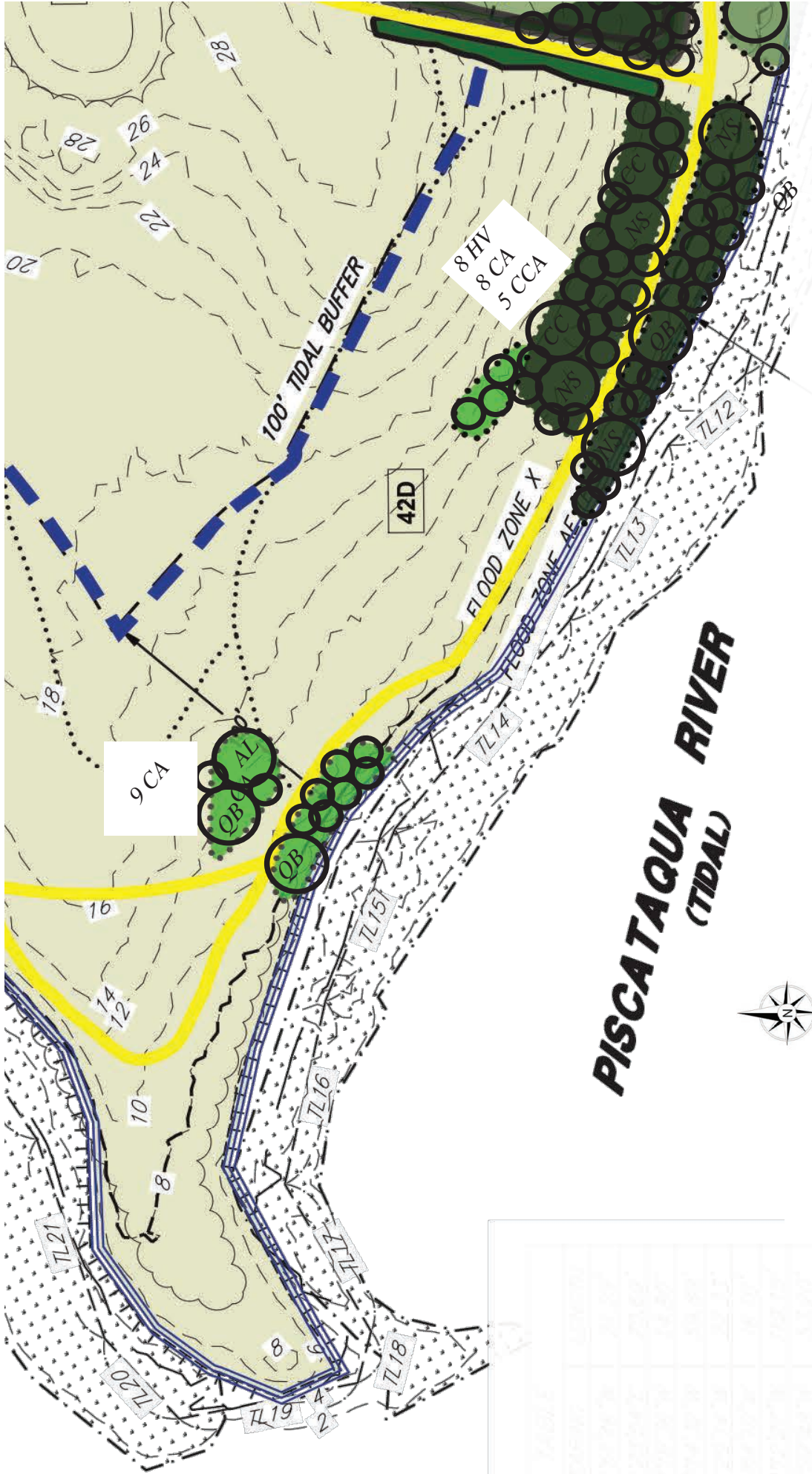


Marsh Elder along with Beechgrass line the western banks of the island





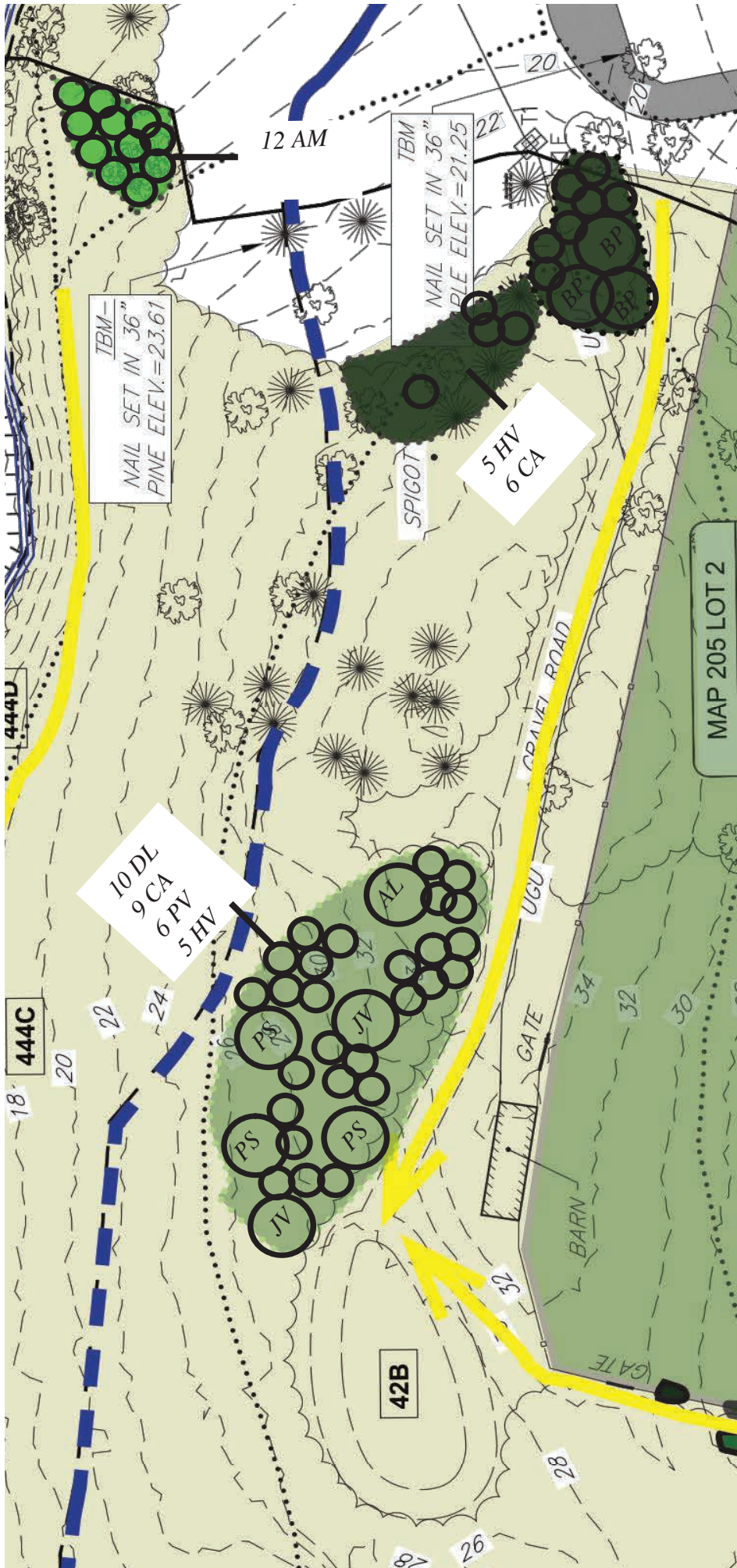
■ Wetland Buffer
●●● Highest Observations
■ Existing Pathways



PISCATAQUA RIVER **(TIDAL)**

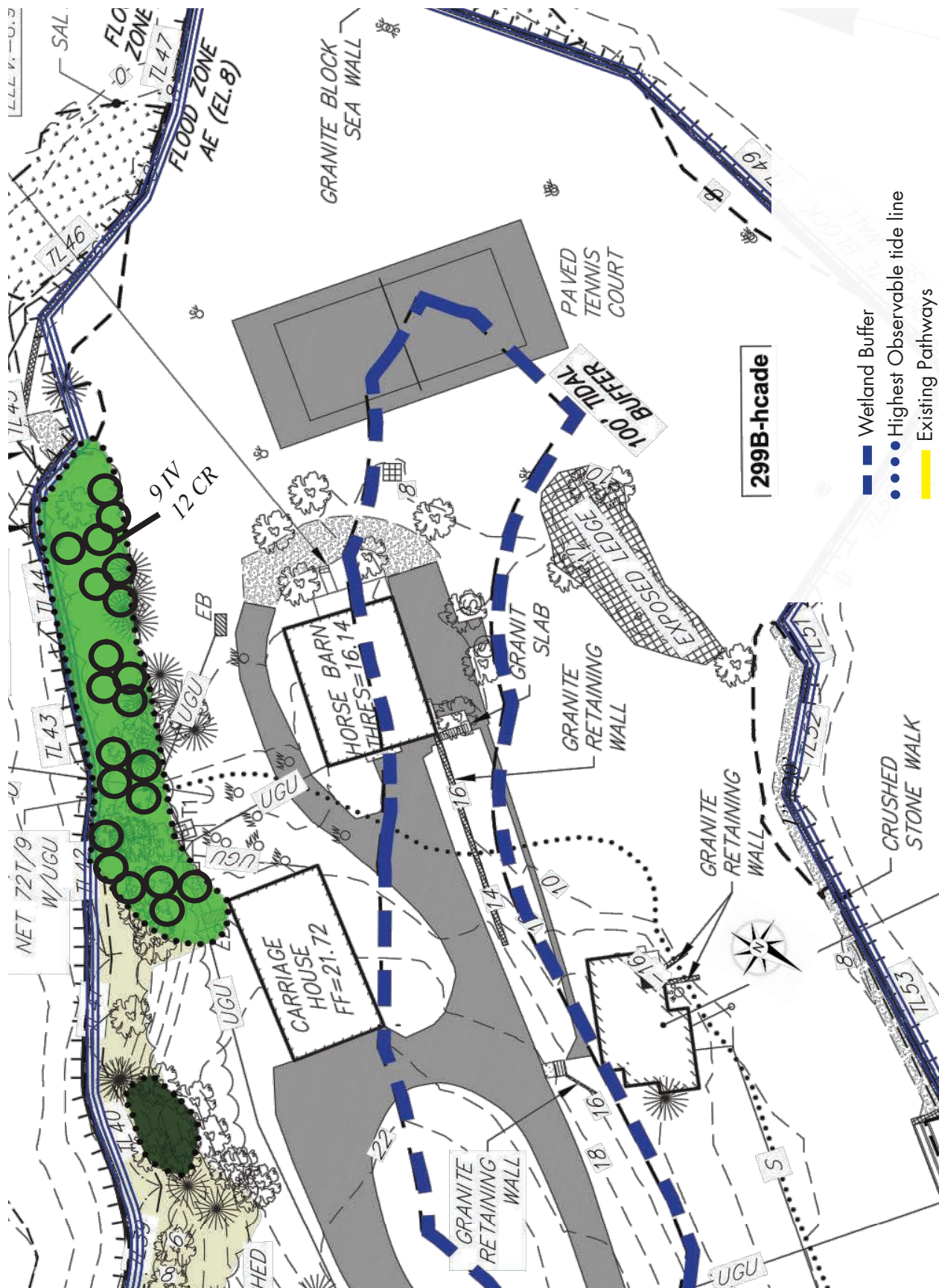


- Wetland Buffer
- Highest Observable tide line
- Existing Pathways



- Wetland Buffer
- Highest Observable tide line
- Existing Pathways





325 Little Harbor Road

Native Restoration Strategies

After invasive plant species have been removed from the wetland buffer, the area will be planted with one to five gallon native conservation grade New England native trees, shrubs and perennials from local seed and cutting sources. It is proposed that native plants will have greater than 90% coverage by the conclusion of the 3 year Order of Conditions. Native plants proposed for installation will add diversity of existing native plants, provide habitat and forage for wildlife, and reduce storm water and sediment flow wetland areas. Plants proposed for installation include:

| | Quantity | Size | Scientific name | Common name |
|--------------------------------------|----------|------|-----------------------------|---------------------------|
| Within 100' Tidal River Buffer | 4 | 3-4' | <i>Amelanchier laevis</i> | Shadblow Serviceberry |
| | 2 | 3-4' | <i>Acer rubrum</i> | Red Maple |
| | 12 | 3-4' | <i>Aronia melanocarpa</i> | Black Chokecherry |
| | 5 | 3-4' | <i>Betula papyrifera</i> | Paper Birch |
| | 2 | 3-4' | <i>Carpinus caroliniana</i> | Ironwood |
| | 44 | 3-4' | <i>Clethra alnifolia</i> | Summersweet |
| | 5 | 3-4' | <i>Cornus amomum</i> | Silky Dogwood |
| | 12 | 3-4' | <i>Cornus racemosa</i> | Gray Dogwood |
| | 10 | 3-4' | <i>Diervilla lonicera</i> | Northern Bush Honeysuckle |
| | 18 | 3-4' | <i>Hamamelis virginiana</i> | Witchazel |
| | 9 | 3-4' | <i>Ilex verticillata</i> | Winterberry |
| | 2 | 3-4' | <i>Juniperus virginiana</i> | Eastern Red Cedar |
| | 24 | 3-4' | <i>Myrica pennsylvatica</i> | Bayberry |
| | 6 | 3-4' | <i>Nyssa sylvatica</i> | Black Tupelo |
| | 6 | 3-4' | <i>Prunus virginiana</i> | Chokecherry |
| | 3 | 3-4' | <i>Prunus serotina</i> | Black Cherry |
| | 7 | 3-4' | <i>Quercus bicolor</i> | Swamp White Oak |
| | 9 | 3-4' | <i>Rhus typhina</i> | Staghorn Sumac |
| | 16 | 3-4' | <i>Rosa virginiana</i> | Virginia Rose |

After planting the conservation grade native shrubs and trees and slope stabilizing perennials, we propose the area be seeded with a custom Dormant seed mix at recommended seeding rates. This dense seed mix will supply a matrix of vegetative growth to cover disturbed soils, and reduce recolonization of invasive plant species. These mixes include:

New England Showy New England Wildflower mix
New England Understory Grass and Forb Mix



325 Little Harbor Road Maintenance Schedule

The recommendations for restoration take into consideration the long term health of the wetland. Once the invasive plant species have been managed in a locus area and any native plants installed, a long-term maintenance plan will be set in motion with the goal of continued control of invasive plant species on site, serve, and sustain native plant populations, and improve the native plant diversity and aesthetic beauty of the wetland.

Fall - Winter 2021

- Complete invasive species management of Buckthorn and woody invasive plant species by cut and dab methods
- Identify and manually hand-pull identified invasive shrubs and vines under 1' in caliper
- Cover all disturbed soil along with native seed mix

Winter 2021-Spring 2022

- Continue utilizing control methods of invasive plant management to exhaust seed bank
- Begin planting native plant species according to approved quantities and varieties
- Monitor plant response and continue hand pulling and herbicide application methods on re sprouting invasive plant species
- Cover exposed soils Conservation seed mix

Summer 2022

- Cut and dab/Foam application to Japanese Knotweed and remaining invasive shrub and tree species
- Continue utilizing control methods of invasive plant management to exhaust seed bank
- Continue planting native plant species according to approved quantities and varieties

Fall 2022 - Summer 2023

- Monitor plant response and continue hand pulling and herbicide application methods on re sprouting invasive plant species
- Followup treatment of Japanese Knotweed (Mowing in spring, treating in fall)
- Cover exposed soils Conservation seed mix
- Monitor native species for plant health

Ongoing Maintenance and Monitoring:

- After the treatments of fall 2023, the management plan should be re-evaluated. If management treatments have been successful, only monitoring and minimal hand removal should be required to keep invasive plant species from being reintroduced. Native trees, shrubs, and herbaceous forbs should dominate the wetland buffer.
- Implementation of the LMP should be completed by qualified professionals including:
 - NH Licensed pesticide applicator
 - Certified Massachusetts/NH Invasive Species Management
 - MCH Massachusetts Certified Horticulturist
- Monitoring reports shall be submitted to conservation at the end of each growing season indicating invasive species management efforts and establishment of the restoration plantings.





Bittersweet

Description:

Celastrus orbiculatus, Asiatic Bittersweet is a deciduous climbing vine common in areas of disturbance in our New England forests. It has glossy, rounded leaves that are alternate with finely toothed margins. The leaves turn yellow in the fall. The fruiting plants produce small greenish flower clusters from leaf axils that mature in fall to produce high numbers of fruiting seed. The seed are noticeably yellow, globular capsules that split open at maturity to reveal red-orange fruiting seeds. Roots are also distinctly orange.



Habitat:

Bittersweet spreads easily into forest edges, woodlands, unmanaged meadows and old fields. Most disturbed sites that are not being actively managed that receive full sun are susceptible. The vine can tolerate shade but is often found in more open, sunny areas.



Management:

Asiatic Bittersweet management is a combination of manual hand pulling with cut & dab herbicide treatments. For established plants, vines should be cut to ground to reduce mass. Persistent root infestations will require repeat cutting and treatments over several seasons. Rake any seeds present, bagging in plastic bags, tying, and disposing of correctly.

Celastrus orbiculatus,
Asiatic Bittersweet





Honeysuckle

Description:

Lonicera morrowii, Morrow's honeysuckles are upright, deciduous shrubs that typically have a multi-stem mounding appearance. Oval leaves are opposite along the stem with smooth edges (no teeth or lobes) and hairy on the underside. Mature stems are often hollow on the interior and peeling on the outer bark. In the spring pairs of fragrant, tubular flowers less than an inch long are borne along the stem in the leaf axils. The fruits are red to orange, and fleshy .



Habitat:

Honeysuckles are relatively shade-intolerant and most often occur in forest edges, abandoned fields, and other open, upland habitats. Woodlands and open meadows, especially those that have been grazed or otherwise disturbed and are left unmanaged are also highly susceptible. Morrow's Honeysuckle have the greatest habitat diversity and are capable of invading wetland edges and other uncommon habitat types.



Management:

Morrows Honeysuckle management is a combination of mechanical mowing and manual hand pulling with cut and dab herbicide treatments. When feasible, the root system is generally shallow and plants can be uprooted easily. Persistent root re sprouting may require repeat cutting with herbicide application over several seasons to fully control.

Lonicera morrowii,
Morrow's Honeysuckle





Buckthorn

Description:

Frangula alnus, Glossy Buckthorn is a deciduous shrub that grows up to 20 ft. tall. The oblong leaves are up to 2" long, arranged alternately along the stem and are dark green on the surface, glossy above and slightly pubescent beneath. The leaves turn yellow in the fall, and remain on the plant when most other species have already lost their leaves. The yellow-green flowers are arranged in 1-8 flowered sessile, glabrous umbels. This plant flowers after the leaves expand, from May to September. The fruit ripen from red to black July to August.

Habitat:

Buckthorn thrives in early successional habitat. Abandoned agricultural or pasture lands, an opening in canopy within woodland, or unmanaged meadows are common areas. Buckthorn will also tolerate wetland soils where it can form dense stands that suppress the growth of native plant species. The seed is readily dispersed by birds, and the extended productivity of the fruit into winter allows the plant to be dispersed through the entire season.



Management:

Manual methods of hand-pulling seedlings is recommended. For larger saplings, a 'Weed Wrench' is effective. Mature Buckthorn can also be cut and the stump application of Triclopyr based herbicide. Rake any seeds present, bagging and disposing of correctly.



Frangula alnus,
Glossy buckthorn





Multiflora Rose

Description:

Rosa multiflora, Multiflora Rose is a shrub with arching canes with a mounding shape in the landscape. The leaves are divided into five to eleven sharply toothed leaflets. The base of each leaf stalk has a pair of fringed bracts which is a key identifier of the plant from other wild rose. Beginning in early summer, clusters of showy white flowers appear. The flowers are followed by developing red fruit, or hips, during the summer that remain on the plant through the winter.



Habitat:

Multiflora Rose thrives in early successional habitat. The rose has a wide tolerance for various soil, moisture, and light conditions. It occurs in dense woods, along river banks and roadsides and in open unmanaged fields. It can form a dense understory that suppresses growth of native plant species. The seed is readily dispersed by birds, and the extended productivity of the fruit into winter months allows wide spread distribution of the plant.



Management:

Manual methods of hand-pulling seedlings is effective. For more established shrubs, a combination of pruning to reduce mass followed by cut & dab treatments with a Triclopyr based herbicide is recommended. Persistent root infestations may require repeat cutting over several seasons. Rake any seeds present, bagging and disposing of correctly.

Rosa multiflora,
Multiflora rose



IDENTIFICATION AND QUALIFICATION OF APPLICANT

This plan has been developed by Miles H. Connors, Director of Ecological Services at Parterre Ecological, a division of Parterre Garden Services. Parterre Ecological Services provides Land Management Planning, expert Invasive Plant Management services, Native Plant Restoration strategies, and ongoing Maintenance and Monitoring in natural area restorations.

PLAN AUTHOR AND QUALIFICATIONS

Miles Hilton Connors
Director of Ecological Services
mconnors@parterreecological.com

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67 Smith Place, unit 12A
Cambridge MA 12138

Miles holds an Bachelor of Science degree in Environmental Planning and Policy and Biology, with a Masters of Science in Sustainable Landscape Planning and Design. Miles is also a Massachusetts Certified Horticulturist, holds an Invasive Plant Certification from UMASS Amherst and is a Licensed Pesticide Applicator.

Members of the Parterre Ecological team are licensed Massachusetts Pesticide Applicators, are Massachusetts Certified Horticulturists and hold an Invasive Plant Certification from UMASS Amherst.



Precedent Images of a Restoration Project completed in 2020



1. Existing Conditions - Client under an enforcement order to restore buffer after tree & shrub removal and hydroseeding turf



2. After installation of sediment control, we mechanically mowed area and seeded with New England Conservation and Wildlife Seed Mix



3. Covered exposed loam with straw erosion control blanket: BioNet S75BN and staple into existing slope



4. Layout native plant species suitable for an Oak Hickory Forest plant community



5. Native plant species installed: *Quercus rubra*, *Kalmia latifolia*, *Ostrya virginiana*, *Corylus americana*, *Betula lenta*, *Fagus grandiflora* and *Viburnum acerfolium*



Land Management Annual Monitoring Report

325 Little Harbor Rd.
Portsmouth, NH

December 2022



Prepared By:
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Work Completed 2022

Spring to Fall 2022 Invasive Species Management:

During the Spring and Summer of 2022, the Parterre Ecological team managed extensive invasive species on site including Oriental Bittersweet (*Celastrus orbiculatus*), Japanese and European Barberry (*Berberis*), Multiflora Rose (*Rosa multiflora*), Black Swallowwort (*Cynanchum louiseae*), Glossy Buckthorn (*Frangula alnus*), and Japanese Knotweed (*Fallopia japonica*). Woody invasive species were cut and chipped in the spring, then re-cut and treated with approved stem-based herbicide (Garlon 3a) in the summer. The small patch of Japanese Knotweed on site was treated in the summer with an approved foam-based herbicide applied directly to the leaves (Rodeo). Black Swallowwort was mowed at specific times of the year to prevent it from going to seed. After the first season of management, approximately 75% of invasive species were eradicated.

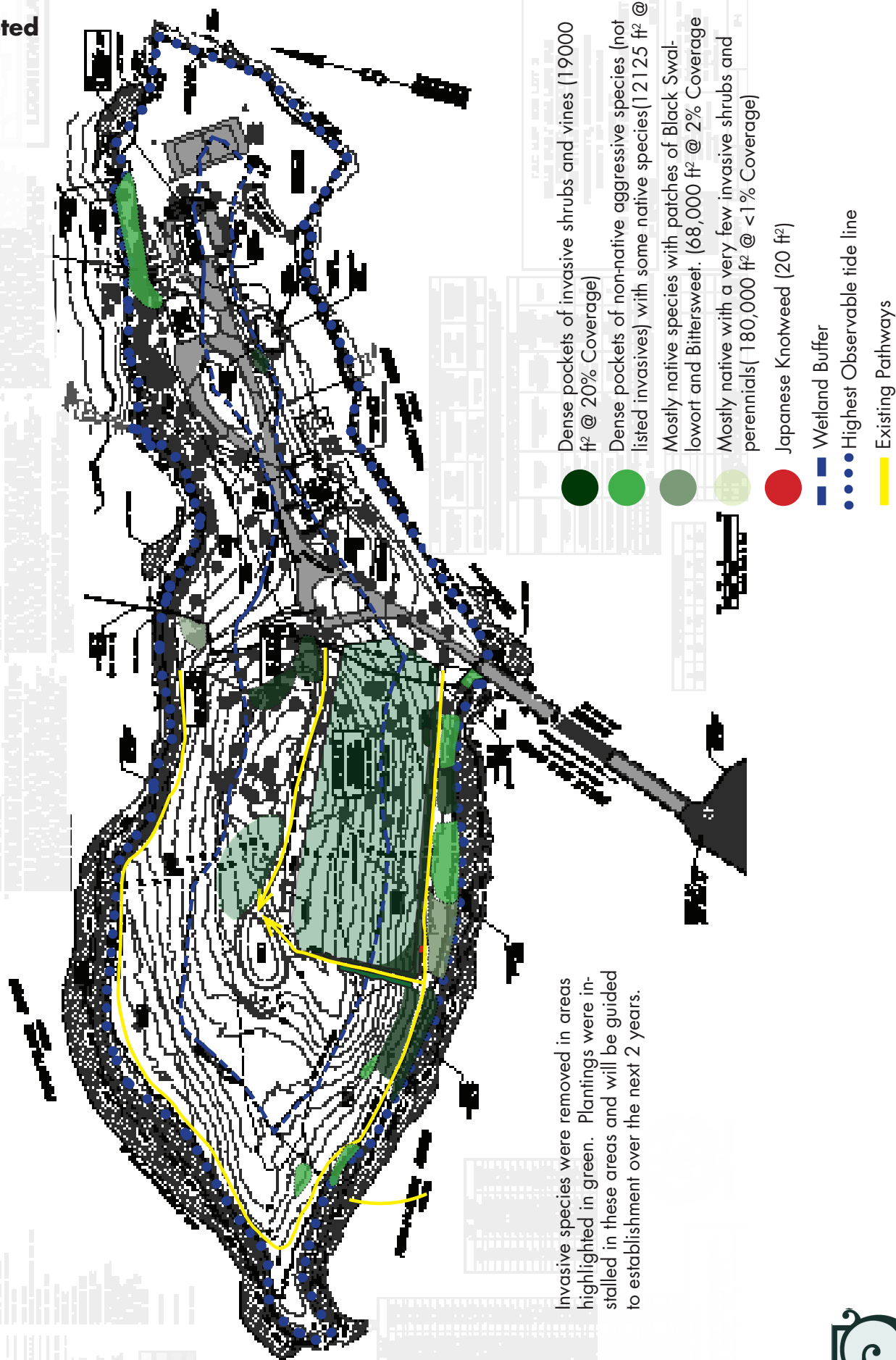
Native Plant Restoration:

During Fall of 2022, Parterre Ecological installed native trees and shrubs per the approved planting plan within the Land Management Plan with modifications based on plant availability and suitability within the wetland buffer. Plantings were installed in pockets where dense invasive species were removed and deer fencing was placed around susceptible plantings. All plantings per the Land Management Plan were installed in 2022 and will be guided to establishment in 2023 and 2024.



Northern Bayberry installed along the lower pasture fence where Multiflora Rose previously dominated.





Invasive Species Management



*Established
Multiflora Rose
and Bittersweet
along the
Pasture Fence
before cutting
and chipping*



*Established
Multiflora Rose
and Bittersweet
along the
Pasture Fence
after cutting
and chipping*



*Invasive species
were chipped
in the spring to
avoid fruiting
branches which
could further
spread of
seedlings*

Invasive Species Management



Established European Barberry cut and dabbed allowing light to native Canada Mayflower.



Left: Treated stump of Oriental Bittersweet that was established in a Norway Spruce.

Right: Foam-herbicide treatment of Japanese Knotweed



2022 Installed Plantings:

Per the order of conditions, the removal of invasive species and disturbance within the wetland was offset with planting of native shrubs and trees listed below. Plants susceptible to deer browsing were caged and compost was added to holes where soil was particularly thin. Where soil was disturbed, the soil was over-seeded with a native understory mix listed below.

| | Quantity | Size | Scientific name | Common name |
|--------------------------------------|----------|------|-----------------------------|---------------------------|
| Within 100' Tidal River Buffer | 4 | 3-4' | <i>Amelanchier laevis</i> | Shadblow Serviceberry |
| | 2 | 3-4' | <i>Acer rubrum</i> | Red Maple |
| | 20 | 3-4' | <i>Aronia melanocarpa</i> | Black Chokecherry |
| | 5 | 3-4' | <i>Betula papyrifera</i> | Paper Birch |
| | 2 | 3-4' | <i>Carpinus caroliniana</i> | Ironwood |
| | 44 | 3-4' | <i>Clethra alnifolia</i> | Summersweet |
| | 5 | 3-4' | <i>Cornus amomum</i> | Silky Dogwood |
| | 12 | 3-4' | <i>Cornus racemosa</i> | Gray Dogwood |
| | 10 | 3-4' | <i>Diervilla lonicera</i> | Northern Bush Honeysuckle |
| | 18 | 3-4' | <i>Hamamelis virginiana</i> | Witchazel |
| | 9 | 3-4' | <i>Ilex verticillata</i> | Winterberry |
| | 2 | 3-4' | <i>Juniperus virginiana</i> | Eastern Red Cedar |
| | 24 | 3-4' | <i>Myrica pennsylvatica</i> | Bayberry |
| | 6 | 3-4' | <i>Nyssa sylvatica</i> | Black Tupelo |
| | 6 | 3-4' | <i>Prunus virginiana</i> | Chokecherry |
| | 3 | 3-4' | <i>Prunus serotina</i> | Black Cherry |
| | 7 | 3-4' | <i>Quercus bicolor</i> | Swamp White Oak |
| | 24 | 3-4' | <i>Rhus glabra</i> | Smooth Sumac |
| | 16 | 3-4' | <i>Rosa virginiana</i> | Virginia Rose |

New England Understory Grass and Forb Mix:

Virginia Wildrye (*Elymus virginicus*), Canada Wild Rye (*Elymus canadensis*), Partridge Pea, (*Chamaecrista fasciculata*), Red Fescue, (*Festuca rubra*), Spiked Gayfeather/Marsh Blazing Star (*Liatris spicata*), Sensitive Fern (*Onoclea sensibilis*), Zigzag Aster (*Aster prenanthoides*/Symphyotrichum prenanthoide), Hollow-Stem Joe Pye Weed (*Eupatorium fistulosum*/Eutrochium fistulosum), White Avens, (*Geum canadense*), Eastern Columbine (*Aquilegia canadensis*), Path Rush (*Juncus tenuis*)



Native Plant Restoration:



Northern Bush Honey-suckle and Gray Birch installed along the forest edge



Summersweet installed where Barberry was previously established



*Caging of Black Chokecherry (*Aronia melanocarpa*) to protect from deer*



Proposed Management for 2023:

Building off the momentum for invasive species management and native plant restoration Parterre will continue management of significantly reduced Japanese Knotweed into 2023

Spring 2023

- Monitor plant response and continue hand pulling and herbicide application methods on re sprouting invasive plant species

Summer 2023

- Monitor plant response and continue hand pulling and herbicide application methods on re sprouting invasive plant species
- Spot water native shrubs and trees through dry months for plant establishment
- Seasonally mow pasture where Black Swallowwort is established to prevent it from going to seed.

Fall 2023

- Continue utilizing control methods of invasive plant management to exhaust seed bank
- Followup treatment to Japanese Knotweed

2023

Ongoing Maintenance and Monitoring:

- After the treatments of 2023, the management plan should be re-evaluated. If management treatments have been successful, only monitoring and minimal hand removal should be required to keep species from being reintroduced



Arrowwood
Viburnum
(Viburnum
dentatum)
established
amongst removed
invasive species

