

Concord Natural Resources Commission
141 Keyes Road
Concord, MA 01742

Re: Invasive Species Management Plan
166 Commonwealth Ave, Concord, MA 01742 (DEP File #137-1729)

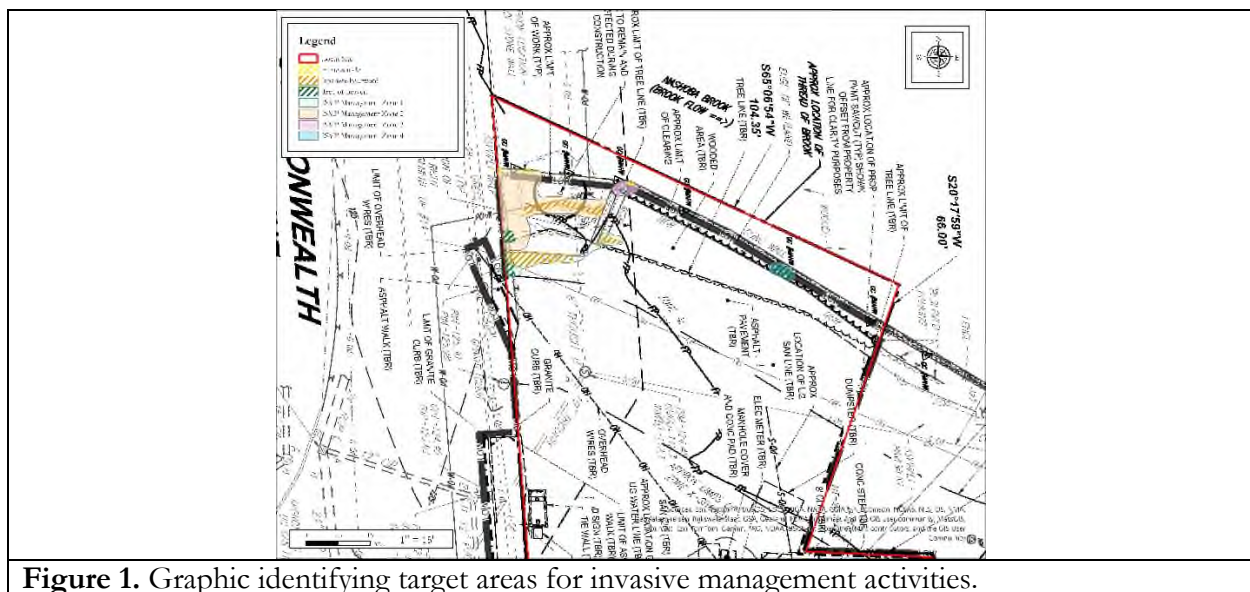
Dear Concord Natural Resources Commission,

1.0 INTRODUCTION

Goddard Consulting, LLC (Goddard) is pleased to submit this Invasive Species Management Plan (ISMP) on behalf of the applicant, Concord Country Store, LLC, for the property known as 166 Commonwealth Ave in Concord (Parcel ID: 9D-2184-2). The purpose of this ISMP is to outline the current site conditions and provide a comprehensive plan to manage invasive species within Riverfront Area and the 25-foot No Disturb Zone on site. The work outlined herein will be completed in compliance with the Wetlands Protection Act (WPA) and the Town of Concord Wetlands Bylaw (the Bylaw).

1.1 SITE ASSESSMENT

Goddard visited the site on February 2nd, 2026, to inventory invasive species present on the site at this time. It was discovered that tree-of-heaven (*Ailanthus altissima*), Japanese knotweed (*Reynoutria japonica*), and honeysuckle (*Lonicera spp.*) were located on site. A graphic identifying locations of the invasive species instances is provided below. This graphic is intended to be illustrative for the purposes of focusing invasive species management efforts. Invasive coverage as identified in this graphic totals approximately 0.0023 acres/99 sf of the approximately 0.48-acre site (+/- 0.5% invasive cover).



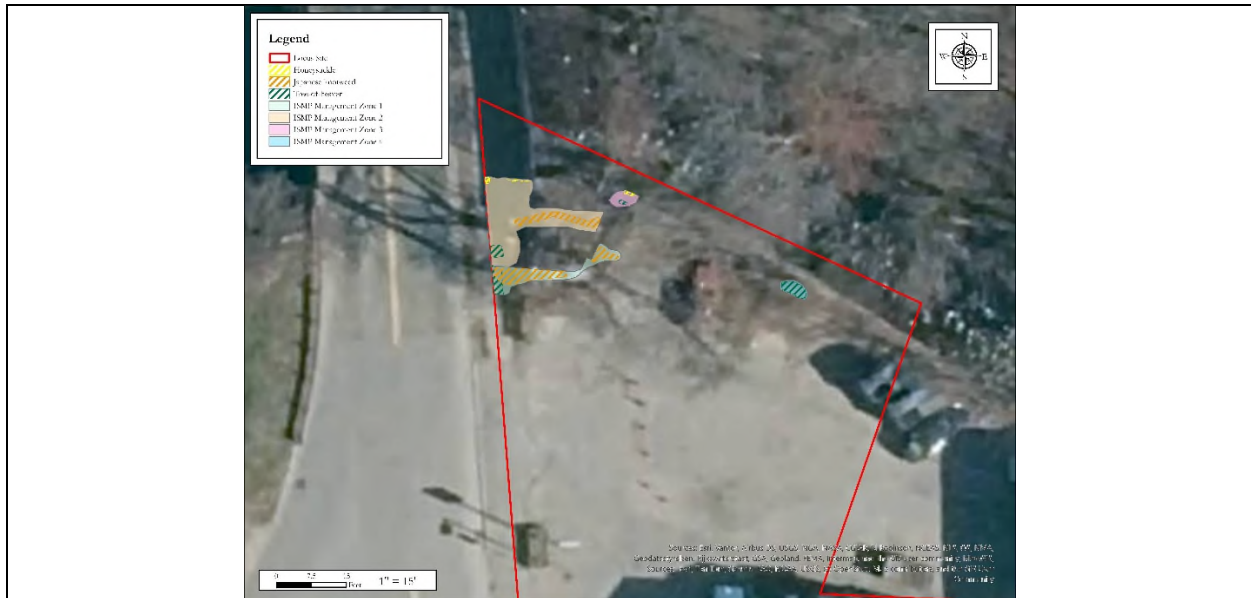


Figure 2. Aerial identifying target areas for invasive management activities.



Photo 1. Photo taken of ISMP Management Zone 1 showing tree-of-heaven saplings.



Photo 2. Photo taken of ISMP Management Zone 1 showing Japanese knotweed.



Photo 3. Photo taken of ISMP Management Zone 2 showing Japanese knotweed and tree-of-heaven saplings.



Photo 4. Photo taken of ISMP Management Zone 2 showing honeysuckle sapling.



Photo 5. Photo taken of ISMP Management Zone 3 showing honeysuckle growing out of concrete wall abutting Nashoba Brook.



Photo 6. Photo taken of ISMP Management Zone 1 showing Japanese knotweed.



Photo 7. Photo taken of ISMP Management Zones 2 (right), 3 (right along stone wall), and 4 (left along stone wall) showing locations with tree-of-heaven and honeysuckle.

1.2 EXISTING INVASIVE SPECIES ON SITE

Target plant species for invasive management are those species identified on the Massachusetts Prohibited Plant List. Goddard found a total of 3 different invasive plant species on-site. These invasive species are listed below:

Invasive Species:

- Shrubs and Trees
 - Tree-of-heaven (*Ailanthus altissima*)

- Japanese knotweed (*Reynoutria japonica*)
- Honeysuckle (*Lonicera spp.*)

1.3 MANAGEMENT ZONES

The site shall be split into 4 management zones, as follows: Management Zone 1 includes the area of vegetation located to the south of the metal guard rail closest to Commonwealth Ave and the edge of the existing parking lot, Management Zone 2 includes the area of vegetation to the north of the metal guard rail closest to Commonwealth Ave up to the stone wall abutting Nashoba Brook, Management Zone 3 includes portions of the stone wall to the west along Nashoba Brook and along the eastern guard rail abutting the parking lot, and Management Zone 4 includes portions to the south of the stone wall along Nashoba Brook to the east of Management Zone 3. As seen in Figure 1 and 2, the invasive species on site are concentrated in 4 invasive management zones. All zones are within 200-foot Riverfront Area and the 25-foot No Disturb Zone.

Invasive Management Zone 1: This area is located along the western property line to the north of the parking lot on-site. It is located to the south of the of the metal guard rail closest to Commonwealth Ave. The management zone is within the 200-foot Riverfront Area and the 25-foot No Disturb Zone. It contains primarily woody vegetation, with a dominance of Japanese knotweed and tree-of-heaven.

Existing ISMP Management Zone 1 Coverage:

Japanese knotweed coverage: +/- 36 sf

Tree-of-heaven coverage: +/- 12 sf

Total invasive coverage in Zone 1: +/- 48 sf

ISMP Management Zone 1 Area: +/- 78 sf

Percentage invasive coverage in ISMP management area: +/- 62%

Invasive Management Zone 2: This area is located to the north of ISMP Management Zone 1, to the north of the existing guard rail and up to the stone wall abutting Nashoba Brook. The management zone is within the 200-foot Riverfront Area and the 25-foot No Disturb Zone and contains primarily woody vegetation.

Existing ISMP Management Zone 2 Coverage:

Japanese knotweed coverage: +/- 26 sf

Tree-of-heaven coverage: +/- 7 sf

Honeysuckle coverage: +/- 2 sf

Total invasive coverage: +/- 35 sf

ISMP Management Zone 2 Area: +/- 212 sf

Percentage invasive coverage in ISMP management area: +/- 17%

Invasive Management Zone 3: This area is located along and within the stone wall abutting Nashoba Brook and along the eastern metal guard rail adjacent to the on-site parking lot. The management zone is within the 200-foot Riverfront Area and the 25-foot No Disturb Zone. This area is sparsely vegetated with primarily woody vegetation.

Existing Management Zone 3 Coverage:

Tree-of-heaven: +/- 2 sf

Honeysuckle: +/- 2 sf

Total invasive coverage: +/- 4 sf

ISMP Management Zone 3 Area: +/- 17 sf

Percentage invasive coverage in ISMP management area: 24%

Invasive Management Zone 4: This area is located to the south of stone wall abutting Nashoba Brook, to the east of Management Zone 3. The management zone is within the 200-foot Riverfront Area and the 25-foot No Disturb Zone. This area is sparsely vegetated with a dominance of tree-of-heaven.

Existing Management Zone 4 Coverage:

Tree-of-heaven: +/- 12 sf

Total invasive coverage: +/- 12 sf

ISMP Management Zone 3 Area: +/- 17 sf

Percentage invasive coverage in ISMP management area: 70%

1.4 MANAGEMENT GOAL DEFINITIONS

The invasive plant species within the study area have varying densities, distributions, and effects on the natural ecosystem. As a result, we will have different management goals for each species and area. The management goals fall into two categories, defined below:

Eradication: The complete destruction of existing invasive plants and monitoring/management for the length of time the remaining seeds are viable. This is the ideal situation as it restores the ecosystem to its more natural state and allows native species to replenish and thrive with a low possibility that the invasive species will return in the near future. It is feasible for invasive species which only exist on-site in small patches or a few individual plants.

Control: The reduction of a species' density and abundance to a level that does not compromise the integrity of the ecosystem and allows native species to repopulate and thrive. For invasive plant populations which are large and pervasive, eradication may not be feasible. In this situation, the more realistic management goal is to control the invasive species, primarily to deter the spread into new areas.

1.5 INVASIVE SPECIES DESCRIPTIONS

Tree-of-heaven (*Ailanthus altissima*): Tree of heaven is a deciduous tree that can reach heights of up to 80 feet. It has light gray bark that starts off smooth with lenticels and develops fissures as it ages. Its leaves are pinnately compound, with 11-41 leaflets which often have several small teeth at the base of their otherwise smooth margins. In summer they produce dense hanging clusters of yellow-green flowers. Originally from Asia, the tree of heaven was introduced to North America as an ornamental plant and has become invasive throughout most of the United States. It can outcompete native trees by producing root suckers, numerous seeds, and allelopathic chemicals which harm other plants. It grows well in most environments and can regrow from small pieces of roots. Tree of heaven is one

of the preferred hosts of the spotted lanternfly, an invasive insect from Asia which also harms grapes, hops, fruit trees, and numerous non-agricultural trees.

Goal: Eradication. Tree of heaven plants onsite consist of multiple sporadic patches within Invasive Management Areas 1, 2, 3, and 4. The densest patch is within Invasive Management Area 1 which consists of a patch of tree-of-heaven saplings. The largest tree-of-heavens were found in Invasive Management Area 4, with three trees identified all with a Diameter at Breast Height (DBH) of 4-5". If these trees are not removed, they will likely interfere with the ability for native trees to regrow onsite. The best method for removing these trees will be to cut and remove the above ground material and dab the cut stump with herbicide. Applying herbicide directly to the cut stump limits exposure to non-target plants. Weed wrenches and hand removal can also be used on smaller plants, but care must be taken to remove the entire plant, or it can regrow from roots which are left behind. All limbs will be bagged and disposed of off-site.

Japanese knotweed (*Reynoutria japonica*): Japanese Knotweed is a dense growing shrub closely resembling bamboo. The stem is semi-woody with a hollow center. The leaves are approximately 6 inches long and 4 inches wide. The leaves alternate on each branch. Japanese Knotweed is native to eastern Asia and was introduced to the United States in the late 1800s. Japanese Knotweed commonly invades disturbed areas with sunlight such as roadsides, stream banks, and shorelines. The species reproduces by both rhizomes and seeds. These reproduction methods make it extremely difficult to eradicate the species.

Goal: Eradication. Sections of Japanese knotweed were found in dense patches in Invasive Management Areas 1 and 2, specifically near the parking lot and against the metal guard rails. All stems will be mechanically cut and directly applied with herbicide. The application of herbicide directly to the cut stems limits exposure to non-target plants and prevents contamination of the stream channel. All cuttings will be properly disposed of off the site. The material will be stored in a black plastic bag to prevent dispersal of the species.

Honeysuckle (*Lonicera spp.*): Honeysuckle is a deciduous, woody-stemmed shrub that can grow up to 10 ft. tall. It can be identified by small 1-2 inch opposite gray green leaves and paired bright red-orange berries. Honeysuckle was imported from Japan in the 1800s for use as an ornamental, for wildlife food and cover as well as for soil erosion control. It is now recognized as a highly invasive species impacting natural areas as well as managed parks, gardens, and other lands. It grows well in most soil types, and invades woodlands, fields, and disturbed areas, displacing native trees, shrubs, and herbaceous plants.

Goal: Control. One large honeysuckle was found growing out of the concrete wall abutting Nashoba Brook in ISMP Management Zone 3. Two small honeysuckle saplings were found in ISMP Management Zone 2 to the south of the concrete wall. These plants will be removed by cutting the above ground material or pulling the plant with a weed wrench. Special care will be taken to not impair the stability of the concrete wall with the removal of the honeysuckle located within this area.

1.6 DESCRIPTIONS OF TREATMENT METHODS

When treating invasive vegetation, mechanical removal methods will be prioritized over herbicidal treatment whenever it can be practicable and effective, however herbicide treatment is expected to be the dominant management technique, particularly for larger tree-of-heavens and Japanese knotweed. Herbicide treatment will selectively target invasive vegetation, taking care to avoid impact to surrounding native vegetation. More detailed information on the proposed removal methods are as follows:

Mechanical Treatment Methods:

- **Hand Removal:** In situations where invasive plants are still at the seedling stage, these plants will be removed by hand. Hand removal will be used across the management areas during both the initial first-year treatment and following years. Hand removal will be prioritized over all chemical treatment methods. The entire plant, including roots, will be pulled or dug out of the ground with hand tools like shovels or weed wrenches. This method can be used for two target species in this study area if the seedling is small enough. Invasive plants to be targeted using this method include tree-of-heaven saplings and honeysuckle.
- **Cutting:** Cutting entails the gross removal of above ground plant material, either by mechanical cutting or mowing. This method only removes the surface vegetation and, in most circumstances, invasive plants re-grow from the rootstock or latent seeds. Treatments using only this method will usually require repeated follow-up treatments. The timing of cutting should occur and be species specific to avoid inadvertent spread of any mature seed. Invasive plants to be targeted using this method include tree-of-heaven and honeysuckles. Mechanical cutting may be utilized as a dormant-season treatment method such that resprouting vegetation may be more easily treated with other methods during the growing season. When cutting, care must be taken that viable vegetative material, or material with viable seeds, is not left behind to regrow. Vegetative material that is not capable of regrowing either vegetatively or via seed may be left onsite.
- **Weed Wrench:** The weed wrench is a tool which is used to uproot saplings of woody plants. The weed wrench grasps the base of the plant and uses a lever to uproot the entire plant including the roots. Using the weed wrench results in minimal disturbance to the surrounding soil and plants and is usually successful at removing the majority of the target plant's roots. Invasive plants to be targeted using this method include tree-of-heaven and honeysuckles.

Herbicidal Treatment Methods:

Herbicidal application is the most effective way to ensure the long-term removal of target species. All use of this method would be conducted by a licensed herbicide applicator. The herbicides typically recommended for the target species in this management plan include Glyphosate (RoundUp Custom or equivalent) and Triclopyr (Garlon 4 or equivalent). Glyphosate is recommended for most cut-stem applications and as a foliar application for Japanese knotweed. Triclopyr is preferred for foliar applications of most other invasive trees and shrubs, such as honeysuckle and tree-of-heaven because it primarily affects broadleaf plants and not grasses or

conifers. Appropriate use by a licensed herbicide applicator will have limited impact on surrounding non-target vegetation.

- Cutting and Dabbing with Herbicide: Cutting & dabbing involves removing most of the above-ground plant material as described above, and then immediately treating the remaining cut surface with herbicide. This is the easiest and most efficient method to remove invasive trees and shrubs with woody stems. It is also a very controlled treatment method, leaving the surrounding non-target native vegetation unaffected. This method also decreases the likelihood of regrowth and the need for repeated treatments. This treatment method will be used on tree-of-heaven and honeysuckle if hand removal is not possible and/or effective.
- Basal Bark Application: This method involves spraying the lower sections of a tree trunk with an oil-soluble herbicide mixture to penetrate the bark of a target tree or shrub. This treatment is most effective when the target tree or shrub density is moderate to low. It can be used selectively to target specific plants with little to no damage to surrounding vegetation. This treatment method can be used on tree-of-heaven.
- Stem Injection Herbicide Application: Stem injection involves the use of an injector gun with a hollow needle to inject herbicide directly into the inside of plants with hollow stems. Examples of these injector guns include JK Injector Systems. Injecting the herbicide directly inside the plant stem is a very controlled method of herbicide application and significantly limits risk of herbicide exposure to non-target plants. This treatment method will be used on Japanese knotweed. Following herbicide application, the knotweed will be dug up with the entire root structure and disposed of in black plastic bags.
- Foliar Herbicide Application (Spray): Foliar herbicide application is a method of control which involves a tank-mixed solution of herbicide diluted with water to a concentration specified by the herbicide's label. This treatment method will be used as a last resort only, after all other treatments are considered and eliminated as viable options. A non-ionic surfactant is added to improve coverage and penetration of the herbicide. A non-toxic forestry dye is also added to allow for visibility of treated areas. This solution is sprayed from a backpack tank sprayer to thoroughly wet the majority of the target plants' leaves. Application will be carefully targeted to invasive vegetation and will cease before herbicide drips from leaves. The herbicide is absorbed through the leaves and transported into the plant's tissues. This treatment method will be conducted by an herbicide applicator trained to use foliar spray appropriately and will have limited impact on surrounding non-target vegetation. All invasive plant species in this management plan will likely be targeted using foliar spray, primarily for repeat or follow-up treatments or when preferred methods are not successful.

2.0 PROPOSED INVASIVE SPECIES MANAGEMENT PLAN

2.1 MANAGEMENT PROTOCOLS

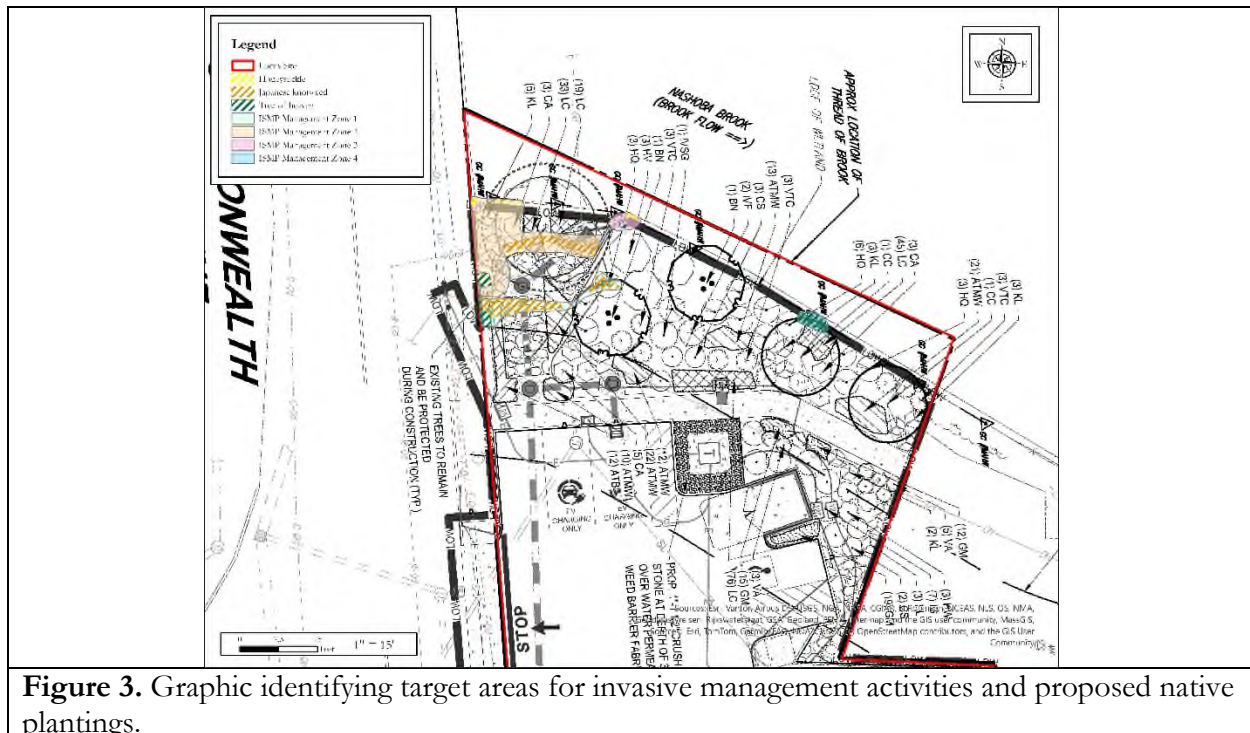
During all management efforts, general good housekeeping practices will be implemented to prevent the spread of invasive species seeds/root material to unoccupied areas. These housekeeping practices include, but are not limited to, truck washing and inspections prior to the movement of equipment to other areas. All vehicles and equipment used in the ISMP will be thoroughly cleaned and inspected before and after use. Cleaning will only take place within staging areas. Any soil

and/or fill material that is transported within the site or brought into the site will be inspected prior to use. Any invasive species or other material removed from the study area will be loaded into a truck and disposed of off-site or stockpiled in an area to be excavated.

Invasive species management will involve mechanical control methods and chemical control methods. The method chosen for a given vegetation management problem will attempt to achieve a long-term, low-maintenance invasive species management program through the encouragement of a stable native plant community. Vegetation management includes hand-cutting, hand-pulling, and herbicide treatments such as cut and dab treatment. Herbicide treatments will be conducted by a licensed herbicide applicator and overseen by a qualified wetland scientist to ensure treatments are being done only on the target species.

Target vegetation includes the following invasive plant species: Tree-of-heaven, honeysuckle, and Japanese knotweed.

The proposed native landscaping overlaps with the ISMP Management Zones and thus, additional plantings outside the current scope are not necessary or feasible (see Figure 3). Proposed plantings include native species such as cardinal flower, mountain laurel, summersweet clethra, winterberry, American cranberry bush, river birch, witch hazel, hydrangea, butterfly milkweed, and red twig dogwood.



2.2 MANAGEMENT TIMING

Management shall consist of twice-annual treatments for two years or until no signs of invasive species within the management areas are present. Management will occur in late spring to early

summer, and again in late summer or early fall, for the duration of the management plan. The Commission will receive notification of the occurrence of each treatment no later than 15 days after it has occurred, detailing what methods of treatment were utilized and where treatment was completed.

Timing of management activities shall be as follows:

Late Spring/Early Summer (ongoing, no later than June 15): Herbicide and/or additional mechanical treatment as determined to be appropriate by herbicide applicator and supervising wetland scientist. Shall be conducted during spring growing season.

Late Summer/Early Fall (ongoing, no later than October 15): Herbicide and/or additional mechanical treatment as determined to be appropriate by herbicide applicator and supervising wetland scientist. Shall be conducted during fall growing season before dormancy.

2.3 SUPERVISION & MONITORING

Invasive management activities on the site shall be supervised by a qualified wetland scientist. Monitoring of the management areas will be conducted once a year. This will begin to take place following the first management activities performed under this ISMP. This will provide information on the overall effectiveness of management and assist in determining necessary treatment focuses moving forward.

Monitoring reports shall be prepared by a qualified wetland scientist once per year with the results of the inspection and submitted by November 15th. Monitoring reports shall include photographs and details about the vitality of the success of management on site and shall be submitted to the Commission each monitoring year. Monitoring reports shall describe (using narratives, plans, and color photographs) the physical characteristics of the management areas on site. Invasive species present will be noted and identified to be treated at the next treatment.

2.4 SUCCESS CRITERIA

In order to establish a site that has no more than 25% invasive cover within Management Zones, management goals shall be as follows:

- Areas identified in Figure 1 as having 50% or more invasive coverage (ISMP Management Zone 1 & 4) shall be brought to 25% or less invasive coverage
- Areas identified in Figure 1 as having up to 25% invasive coverage (ISMP Management Zone 2 & 3) shall be brought to 10% or less invasive coverage.
- The site as a whole shall have no expansion in the total footprint of invasive-dominant areas.

The focus for the first year after approval of this plan will be the removal and prevention of re-sprouting of mature invasive species by cut and dab treatments and mechanical control. Following that, re-sprouting will be managed by hand cutting or pulling where necessary in the 200-foot Riverfront Area and 25-foot No Disturb Zone. Herbicide treatments should be used on woody plants that are not easily removed by hand.

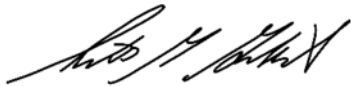
By the second application in the fall, the invasive plant species presence on site should be reduced significantly and the seed bank worn down, with native plant species dominating the management zones. At this time, the extent of invasive species cover on site shall become a new baseline. Continued management in the future shall employ the same procedures outlined in this document to maintain this new baseline condition and prevent future expansion of invasive species dominance. Further reduction of invasive species cover is encouraged but not required.

3.0 CONCLUSION

This ISMP is to outline the current site conditions, with a goal of establishing a primarily native plant community and improving wildlife habitat. To achieve these goals, this plan has proposed an approach consisting of mechanical removal methods to limit impact, and herbicide treatments to maximize effectiveness. It is our professional opinion that the distinction in removal methods between the areas specified previously in this report will allow for the efficient removal of invasives from within the area, while affording maximum protection to wetland resource areas, wildlife, and native plants.

Sincerely,

Goddard Consulting, LLC



Scott Goddard, PWS, CWS
Principal



Sophie Esdale
Wetland Scientist

Cc:

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