



# Beaver River Park Plant Management and Public Access Plan

September 2022

**Prepared for** 

Town of Richmond Richmond Conservation Commission 5 Richmond Townhouse Rd. Richmond, RI 02898

# Beaver River Park Plant Management and Public Access Plan

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# 1.0 INTRODUCTION

The Horsley Witten Group, Inc. (HW) developed this Beaver River Park Plant Management and Public Access Plan to serve as a guidance document to the Town of Richmond for facilitation in the establishment, re-establishment, and/or maintenance of the Beaver River Park's native grassland habitats and public recreational amenities (i.e., grass pathways). The primary objective of this plan is to establish procedures for managing invasive plants and woody species that have begun to overtake the high-value grassland communities, in order to promote and increase native habitat at the park and contribute to the overall ecological health of the Beaver River watershed.

# 2.0 BACKGROUND

# 2.1 Beaver River Park

Beaver River Park is approximately 18 acres in total size, located between Beaver River Road and Beaver River in Richmond, Rhode Island. The Town of Richmond owns the park, and the Richmond Department of Public Works (DPW) is responsible for the routine maintenance of the park and also provides assistance in managing the plant communities within the grassland habitat areas and along the park foot trails. The Richmond Conservation Commission (RCC) provides assistance in maintaining a public informational walk with a kiosk, informational stations, and guide for users to learn about the ecology of the Beaver River, its surrounding habitats, and species that use the park. The RCC also provides periodic information on rare species to the Rhode Island Natural History Survey (RINHS) and U.S. Fish and Wildlife Service (USFWS) that are present at the Beaver River site.

The park has amenities and features that provide important passive recreation opportunities to residents and visitors alike, which include playground use, walking trails, and picnicking in the maintained lawn or playground areas. There is also direct, on-site access to the Beaver River, via the park's trail system. The central portion of the park includes an open grassland area, which gradually transitions to upland scrub/shrub habitat, and then to forested swamp wetland, moving from west to east toward the Beaver River. The open grassland and scrub/shrub areas are referred to as the "North Cell" and "South Cell" (see map in **Attachment A**), with the North Cell located directly east of the park playground and mowed field and the South Cell located southeast of the North Cell.

### 2.2 Beaver River Watershed

The Beaver River is located in the Wood-Pawcatuck Watershed. It is a small, second-order stream that flows from James Pond in Exeter south to the Pawcatuck River. The 12 mi<sup>2</sup> Beaver River watershed is mostly undeveloped, with the remaining land used for agriculture (e.g., turf

farms), a golf course, and some residential and commercial development. Much of the river's 11 miles flows through protected forested areas.

The Beaver River Watershed supports a diverse range of aquatic and terrestrial species, including healthy populations of wild brook trout, a coldwater-dependent species. In 2019, the Wood-Pawcatuck Watershed, including the Beaver River, was nationally designated by the National Park Service as Wild and Scenic. In addition to its ecological values, Beaver River was also designated as Wild and Scenic due to cultural values – as an example, Hillsdale Historic and Archaeological District is the site of a former mill that used Beaver River for water power starting around 1800.

In 2021, HW completed an assessment of the Beaver River Watershed for the Town of Richmond, which generally discusses the importance of preserving/restoring open grassland within the watershed and specifically recommends the development of a grassland management plan for the Beaver River Park site. Open grassland areas provide habitat for important wildlife and plant species, which includes State- and Federally-listed species as wells as Species of Greatest Conservation Need (SGCN) per the 2015 Rhode Island Wildlife Action Plan (RI WAP). Additionally, the open grassland areas of Beaver River Park are located directly upgradient of a forested wetland buffer to the Beaver River. The grasslands and forested wetland habitats are distinct and important, but are also physically, chemically, and biologically connected in ways that are meaningful to the integrity of the Beaver River. Restoration of these areas has potential to benefit the water quality, stream hydrology and temperature, and wildlife habitat (aquatic and terrestrial) within the whole Beaver River system.

# 2.3 Grassland Protection and Management

Grasslands within Rhode Island are a rare, early successional habitat type that provides opportunities for a variety of wildlife and plant species. Grassland habitats were historically developed when natural disturbance events (e.g., fires or severe wind storms) created openings in forests. Now, grasslands are disappearing as fires are suppressed and existing fields are developed or as farmers convert from hayfields to other crops like corn. Currently, most of the grassland habitats are developed and maintained through anthropogenic origins and means, with State management areas or other conservation lands, private properties under management agreements, and utility rights-of-way possessing significant portions of the grassland habitat areas in Rhode Island.

The loss of grassland habitat has resulted in increasing declines in both the range and abundance of many grassland-nesting bird species. Due to their significant population declines, grassland-nesting bird conservation and survey work has been prioritized by the Rhode Island Natural Heritage Program since the program began in 1979. Grassland habitats are also beneficial to a variety of Lepidoptera species (moths and butterflies), bees, and other pollinating species. Grasslands provide these animals with a critical food source and habitat, while addressing the larger issue of decline of many pollinators, some of which are identified in the RI WAP.

Management of open field areas, such as those at Beaver River Park, to control emerging woody and invasive plant species and to re-establish grassland habitat is important in the Wild

and Scenic Beaver River Watershed, the Town of Richmond, and the State of Rhode Island as a whole. This type of management would provide important and declining grassland and meadow habitat for ground-nesting birds (such as the Vesper Sparrow) and pollinators and could potentially expand the range of the federally endangered Sandplain Gerardia. There are a variety of effective treatment approaches, each with varying levels of required expertise, time, and costs. Treatment approaches include mechanical control, hand-pulling or digging, suffocation, cutting or mowing, chemical control, controlled burns, cultural controls, and biological controls. By removing and managing woody and invasive plant species over the longterm, often native grassland species will naturally re-emerge from dormant seed banks in the soil, without the need to re-seed or re-plant the area.

# 3.0 PLANT MANAGEMENT AND PUBLIC ACCESS RECOMMENDATIONS

This section details the recommendations for plant management and public access improvements for the Beaver River Park. These recommendations were developed based on observations and discussions during a field reconnaissance at the site on June 20, 2022. The site visit was performed by a field ecologist certified in invasive species management who documented the existing conditions, the extent of native and invasive plant species within the park, and public amenities. These recommendations outline the most effective methods for re-establishment and on-going maintenance of grassland habitat at this particular site, while also minimizing cost and labor in the long-run for the Town of Richmond.

To make this section easier to use, it is broken out by the park's target areas for management. A description of the existing conditions and the specific recommendations are included for each target area, which include the following:

- North Cell,
- South Cell,
- Woodland Edges, and
- Mowed Trails.

Additional details that complement these recommendations are included in a series of attachments. Many of these attachments are color-coded by target management area to provide a quick reference for users.

- Attachment A provides an overall map of the park and the targeted areas for plant management and public access.
- Attachment B includes an annual schedule of management techniques.
- Attachment C is a table summarizing the management techniques (methods and timing) for different target areas.
- Attachment D provides additional detail on each specified treatment approach.
- Attachment E shows annual cost estimates and assumptions.
- Attachment F includes a photo reference of invasive plants to help with identification.

# 3.1 North Cell

#### **Existing Conditions**

The North Cell is approximately 3.5 acres in total size and is comprised mainly of open grassland/herbaceous meadow vegetation with sections along its perimeter where woody shrubs and trees are becoming dominant, particularly along the eastern boundary. The southeastern corner of the North Cell contains the highest density of woody species and is essentially a young forest. Throughout this area, HW observed a mix of native, weedy non-native, and invasive plants. Of the total species observed, over 60% were natives (30 native species), and dominant types were also native species, which included wrinkle-leaf goldenrod (*Solidago rugosa*), broomsedge bluestem (*Andropogon virginicus*), and northern dewberry (*Rubus flagellaris*). Four of the species observed are listed as invasive plants by the Rhode Island Invasive Species Council (RIISC):

- Autumn olive (*Elaeagnus umbellata*),
- Bittersweet (Celastrus orbiculatus),
- Morrow's honeysuckle (Lonicera morrowii), and
- Multiflora rose (Rosa multiflora).

#### **Management Recommendations**

- 1. Initial Removal of Woody Vegetation and Herbicide Treatment
  - To preserve the high value open grassland/herbaceous meadow habitat in the North Cell area, HW recommends performing an initial removal and herbicide treatment of the woody species that have begun to colonize the area. This work would include removal and treatments of all woody species (native and invasive) within the area (see *Cut & Stump/Stem Treatment* details in **Attachment D Treatment Approaches**).

#### 2. Annual Maintenance Schedule for Herbicide Spot Treatment

Once the currently established woody vegetation has been removed and treated within the North Cell, HW recommends an annual maintenance schedule (**Attachment B – Annual Schedule**) that includes 1-2 sweeps through the area during the growing season to perform foliar spot herbicide treatments of invasive plants as well as a mowing of half of the area (see *Herbicide Spot Treatment & Maintenance Mowing* details in **Attachment D – Treatment Approaches**). The invasive spot treatments will preserve and promote the native diversity of the habitat, and the mowing will prevent woody species from reestablishing in the area. Spot treatments should ideally be scheduled to occur <u>once in early Summer</u> and <u>again in early to late Fall</u>; however, this can be an adaptive process. If the overall presence of invasives in the area is observed to be minor earlier in the growing season, it may be appropriate to only schedule one spot treatment sweep during the Fall.

#### 3. Annual Mowing

The annual mowing should be scheduled to occur outside of the growing season (late Winter to early Spring). This will help to maintain and promote the native herbaceous plants within the area while preventing the woody species from reestablishment. Only half the area should be mowed during any given year, alternating halves each year. This will maintain areas of refuge for overwintering wildlife on a continuous basis. Mowing each half every other year will also ensure control of woody species, without allowing re-

sprouts or seedlings to grow to sizes that would be problematic to mowing equipment (Attachment D – Treatment Approaches).

### 3.2 South Cell

#### **Existing Conditions**

The South Cell is approximately 2.5 acres in total size and is predominantly vegetated with woody shrub and tree species, with smaller sections of open grassland/herbaceous meadow remaining. The southeastern portion of the South Cell supports a high density of larger tree species. The woody vegetation is most dense within the southern and eastern sections of the Cell. HW observed a mix of native, weedy non-native, and invasive plants. Of the total species observed, over 70% were natives (33 species). Commonly observed species within the South Cell included autumn olive, black cherry (*Prunus serotina*), bittersweet, and winged sumac (*Rhus copallinum*). Observed species listed as invasive by RIISC include:

- Autumn olive,
- Bittersweet,
- Morrow's honeysuckle,
- Multiflora rose, and
- European buckthorn (*Rhamnus cathartica*).

#### **Management Recommendations**

#### 1. Phased Removal and Herbicide Treatment for Woody Species

To preserve and re-establish the high value open grassland/herbaceous meadow habitat in the South Cell area, HW recommends performing phased removal and herbicide treatment of the woody species that have colonized the area. The phased approach would entail partial removal and treatment of the existing woody species on an annual basis, until the full area has been cleared of woody species. Each year's removal effort will be based on the Town's given budget/resource constraints, with the goal of removing/treating as large an area as is feasible for the Town's specific budget and resource availability each year. This work would include removal and treatments of all woody species (native, invasive, etc.) within the area (see *Cut & Stump/Stem Treatment* details in **Attachment D – Treatment Approaches**).

#### 2. Annual Maintenance Schedule for Herbicide Spot Treatment

For any areas where woody vegetation has been removed and treated within the South Cell, HW recommends an annual maintenance schedule that includes 1-2 sweeps through the area during the growing season to perform foliar spot herbicide treatments of invasive plants as well as a mowing of half of the open grassland/herbaceous meadow areas (see *Herbicide Spot Treatment & Maintenance Mowing* details in **Attachment D** – **Treatment Approaches**). The invasive spot treatments will preserve and promote the native diversity of the habitat, and the mowing will prevent woody species from reestablishing in the area. Spot treatments should ideally be scheduled to occur once in <u>early to mid-Summer</u> and again in <u>early to late Fall</u>; however, this can be an adaptive process. If overall presence of invasives in the area is observed to be minor earlier in the growing season, it may be appropriate to only schedule one spot treatment in the Fall.

#### 3. Annual Mowing

The annual mowing should be scheduled to occur outside of the growing season (late Winter to early Spring). This will help to maintain and promote the native herbaceous plants within the area while preventing the woody species from reestablishment Only half the area should be mowed during any given year, alternating halves each year. This will maintain areas of refuge for overwintering wildlife on a continuous basis. Mowing each half every other year will also ensure control of woody species, without allowing resprouts or seedlings to grow to sizes that would be problematic to mowing equipment (see Attachment C – Targeted Area Management Approaches Summary Table).

# 3.3 Woodland Edges/Hedgerows

#### **Existing Conditions**

There is a hedgerow between the trail on the west side of the North Cell and the open mowed field north of the playground. Additionally, the perimeter trails around both the North and South Cells are bordered by woodland edges for most of their duration. The hedgerow and woodland edges were observed to contain a high density of invasive plant species including:

- Autumn olive,
- Bittersweet,
- Morrow's honeysuckle,
- Multiflora rose, and
- European buckthorn.

#### Management Recommendations

Based on field observations, HW used 10 feet as the average width for management recommendations of the hedgerow and woodland edge areas; however, the actual width where invasives may be present will vary for these areas. Removal and management efforts should use the assumed 10-foot width as a guideline, but HW recommends performing removal and management efforts beyond 10 feet as is logical for budget/time constraints and in-field observations.

#### 1. Initial Removal and Herbicide Treatment of Invasives

To preserve and enhance the habitat value of the site, HW recommends performing an initial removal and herbicide treatment of the invasive species that are present in these areas. This work would include removal and treatments of all invasive species within the area (see *Cut & Stump/Stem Treatment* details in **Attachment D – Treatment Approaches**). If necessary, this work can also be phased in a similar manner to that of the recommendations for the South Cell area above.

<u>Phased Approach</u>: If phased, HW recommends starting at the northeastern end of the North Cell, where trail borders the woodland adjacent to the Beaver River, and work clockwise along the woodland edge until the removal/treatment effort has been completed for both Cells.

#### 2. Annual Maintenance and Spot Treatments

Once the currently established invasive vegetation has been removed and treated within these areas, HW recommends an annual maintenance schedule that includes 1-2 sweeps through the area during the growing season to perform foliar spot herbicide treatments of invasive plants (see *Herbicide Spot Treatment* details in **Attachment D** – **Treatment Approaches**). The invasive spot treatments will preserve and promote the native diversity of the habitat. Spot treatments should ideally be scheduled to occur once in early to mid-Summer and again in early to late Fall; however, this can be an adaptive process. If overall presence of invasives in the area is observed to be minor earlier in the growing season, it may be appropriate to only schedule one spot treatment sweep during the Fall (see **Attachment C – Targeted Area Management Approaches Summary Table**).

# 3.4 Mowed Trails

#### **Existing Conditions**

The Town maintains mowed grass trails for passive recreation and public access around and through the North and South Cells. Along certain stretches, the mowed path is as wide as 10-12' (northwestern perimeter trail of the North Cell), while most of the other mowed path sections are approximately 8 feet wide.

#### **Management Recommendations**

#### 1. Reduce the Mowing Width

To maintain the passive recreation opportunities that the mowed trails provide to the public, while also increasing and improving the overall habitat value of the site, HW recommends reducing the width of the mowed trails to <u>6 feet</u>. Over 3,000 linear feet of mowed trail are present in and around the North and South Cell areas. If the width of the trails can be reduced by an average of 4 feet, an additional 12,000 SF (more than <sup>1</sup>/<sub>4</sub> acre) of high value habitat could be gained at the site.

#### 2. Maintain Overhead Clearance along Trails

In addition to the recommended reduction in trail width, HW also recommends maintaining a 7-8-foot overhead clearance of any overhanging vegetation. This would require at least one trail maintenance visit each year to perform pruning as necessary to maintain the overhead clearance (see Attachment C – Targeted Area Management Approaches Summary Table).

# 4.0 SUMMARY

The recommendations from this plan will help to re-establish and preserve high-value open grassland/herbaceous meadow habitat in the Beaver River Park, while maintaining passive recreation opportunities and an important access point to the Beaver River. While there are other available techniques to obtain these objectives, the recommendations included here were chosen to be the most effective while reducing the amount of effort and cost over the long-run for the Town of Richmond. The recommendations focus on removal, treatment, and on-going maintenance of all woody species (native and invasive) and spot treatments of invasive non-

woody species within the two cells to preserve and promote a diverse, native grassland habitat. The treatment methods and timing were specifically chosen to maximize efficiency and to minimize impact to existing wildlife (including breeding and nesting birds) and public use of the park. Although controlled burning of the North and South Cell areas is an option for management of the woody and invasive species at the Beaver River Park site, HW believes that the recommended approaches are the most cost-effective, safe, and functional relative to the project's goals and available resources. By enhancing the grassland habitat and public access in Beaver River Park, the Town of Richmond will be taking an important step towards achieving the goals for the Wild and Scenic Beaver River Watershed.

# 5.0 **REFERENCES**

- Atwood, J., J. Collins, L. Kidd, M. Servison, and J. Walsh, 2017. Best Management Practices for Nesting Grassland Birds. Mass Audubon; Lincoln, Massachusetts. 10 pp. (available at: www.massaudubon.org)
- Grassland Birds, Fish and Wildlife Management Leaflet #8. 1999. Natural Resource Conservation Service Wildlife Habitat Management Institute, Wildlife Habitat Council. (available at: <u>www.nrcs.usda.gov</u>)
- Horsley Witten Group, Inc. 2021. Final Beaver River Watershed Assessment, Narragansett Bay Estuary Program.
- Rhode Island Wildlife Action Plan. 2015. Rhode Island Department of Environmental Management Natural Heritage Program, The Nature Conservancy of Rhode Island, University of Rhode Island (available at: <u>www.rihns.org</u>)

# Attachment A – Targeted Areas for Plant Management Map



Path: H:\Projects\2020\20022 Beaver River Watershed Assessment\GIS\Maps\20022 InvasivesFieldwork.mxd



**Beaver River Park** Richmond, RI.

Attachment B – Annual Schedule

#### ATTACHMENT B

#### Annual Timetable and Recommended Methods for Vegetation Management at Beaver River Park

TREATMENT APPROACHES		Jan Feb Ma		ar	A	Apr May		ay	Jun		Jul Aug		ug	Sep		Oct		Nov		De	÷C			
ut & Stump/Stem Treatments - Woody Areas																								
NORTH CELL																	C,H	C,H	C,H					
SOUTH CELL																	C,H	C,H	C,H					
WOODLAND EDGES/HEDGEROWS																	C,H	C,H	C,H					
Herbicide Spot Treatments - Open Meadow Areas																								
NORTH CELL											н	н	н				н	н	н					
SOUTH CELL											Н	Н	Н				Н	Н	н					
WOODLAND EDGES/HEDGEROWS											н	н	Н				н	н	н					
Maintenance Mowing - Open Meadow Areas																								
NORTH CELL			М	М	М																			
SOUTH CELL			М	М	М																			
Maintenance Mowing																								
MOWED TRAILS							М	М	М	М	М	М	М	М	М	М	М	М	М	М				
MOWED TRAILS							Т	т	т	т	Т	Т	т	Т	т	т	т	Т	Т	Т				

<u>KEY</u>

C = Cut & Stump/Stem Treatments - Woody Areas

H = Herbicide Spot Treatments - Open Meadow Areas

M = Maintenance Mowing - Open Meadow Areas

T = Maintenance Trimming

# Attachment C – Targeted Area Management Approaches Summary

# ATTACHMENT C

Targeted Area Management Approaches Summary: Recommended Methods & Timing for Management of Invasive Species at Beaver River Park

TARGETED AREA(s) MANAGEMENT TECHNIQUE TARG		TARGETED SPECIES	TIMING	NOTES						
NORTH CELL										
Woody Areas	Cut & Stump/Stem Treatments	Autumn Olive, Bittersweet, Shrub (Morrow's) Honeysuckle, Multiflora Rose, and any additional woody species identified	Fall (September 1 - October 15)	Perform this technique on all woody species larger than 0.5-inches in diameter. For best results perform in the Fall, before first frost; however, can be anytime during growing season. The herbicide application MUST be applied immediately after cutting occurs, regardless of time of year/season. NOTE that this technique will likely only be needed once in areas where ongoing/yearly maintenance mowing is implemented moving forward.						
Open Meadow (Herbaceous) Areas	Herbicide Spot Treatments	Autumn Olive, Bittersweet, Shrub (Morrow's) Honeysuckle, Multiflora Rose, and any additional invasive species identified	Perform Annually - Early to Mid Summer (June 1 - July 15) and/or Fall (September 1 - October 15)	If invasive species are at low densities, one sweep through the site in the fall may be enough to provide sufficient control; however multiple sweeps during the growing season will likely be beneficial for the first few seasons of this type of management						
	Maintenance Mowing	All species within area	Perform Annully - Late Winter to Early Spring (February 15 - April 1)	Mowing should be performed on half (50%) of the area on an annual, rotating basis. Mow the first half during year 1 and then every odd year of the managment (years 3, 5, 7, etc.) moving forward. Mow the second half during year 2 and then every even year of management (years 2, 4, 6, etc.) moving forward.						
SOUTH CELL										
Woody Areas	Cut & Stump/Stem Treatments	Autumn Olive, Bittersweet, Shrub (Morrow's) Honeysuckle, Multiflora Rose, European Buckthorn, and any additional woody species identified	Fall (September 1 - October 15)	For best results perform in the Fall, before first frost; however, can be anytime during growing season. The herbicide application MUST be applied immediately after cutting occurs, regardless of time of year/season. NOTE that this technique will likely only be needed once in areas where ongoing/yearly maintenance mowing is implemented moving forward.						
Open Meadow (Herbaceous) Areas	Herbicide Spot Treatments	Autumn Olive, Bittersweet, Shrub (Morrow's) Honeysuckle, Multiflora Rose, European Buckthorn, and any additional invasive species identified	Perform Annually - Early to Mid Summer (June 1 - July 15) and/or Fall (September 1 - October 15)	If invasive species are at low densities, one sweep through the site in the fall may be enough to provide sufficient control; however multiple sweeps during the growing season will likely be beneficial for the first few seasons of this type of management						
	Maintenance Mowing	All species within area	Perform Annully - Late Winter to Early Spring (February 15 - April 1)	Mowing should be performed on half (50%) of the area on an annual, rotating basis. Mow the first half during year 1 and then every odd year of the managment (year 3, 5, 7, etc.) moving forward. Mow the second half during year 2 and then every even year of management (year 2, 4, 6, etc.) moving forward.						
WOODLAND EDGES/HEDGEV	WROWS									
	Cut & Stump/Stem Treatments	Autumn Olive, Bittersweet, Shrub (Morrow's) Honeysuckle, Multiflora Rose, European Buckthorn, and any additional woody species identified	Fall (September 1 - October 15)	Perform this technique on all woody species larger than 0.5-inches in diameter. For best results perform in the Fall, before first frost; however, can be anytime during growing season. The herbicide application MUST be applied immediately after cutting occurs, regardless of time of year/season. NOTE that this technique will likely only be needed once in areas where ongoing/yearly maintenance mowing is implemented moving forward.						
	Herbicide Spot Treatments	Autumn Olive, Bittersweet, Shrub (Morrow's) Honeysuckle, Multiflora Rose, European Buckthorn, and any additional invasive species identified	Perform Annually - Early to Mid Summer (June 1 - July 15) and/or Fall (September 1 - October 15)	If invasive species are at low densities, one sweep through the site in the fall may be enough to provide sufficient control; however multiple sweeps during the growing season will likely be beneficial for the first few seasons of this type of management						
MOWED TRAILS										
	Maintenance Mowing	All species within area	As needed to provide for public accessibility							
	Maintenance Trimming	All species overhanging trail	As needed to maintain 8-foot overhead clearance over trails							

Attachment D – Treatment Approaches

# Beaver River Park, Richmond, Rhode Island

### Cut & Stump/Stem Treatments (plants of any size)

- **APPROACH**: Cut stem/stump to 2-4" of soil surface and treat stem/stump herbicide. Note that stems/stumps should be cut as low as is necessary to facilitate maintenance mowing equipment cutting height.
- **EQUIPMENT**: Use power tools (brush saws, chainsaws, etc.) or hand tools (handsaws, loppers, etc.) to create a clean-cut stump/stem surface for herbicide application. Backpack sprayers or smaller spray bottles can be used to apply the herbicide.
- **MATERIALS**: Apply aquatic approved glyphosate (e.g., AquaNeat) or triclopyr (e.g., Garlon 3a) formulations to cut stems/stumps (typically 25-50% active ingredient solutions).
- **TIMING**: For best results, perform in the Fall; however, can be anytime during growing season. The herbicide application MUST be applied immediately after cutting occurs, regardless of time of year/season (see Attachments B & C).
- **PERSONNEL**: Herbicide treatments should only be performed by trained individuals that possess or are under supervision of a licensed Rhode Island pesticide applicator, in accordance with Rhode Island's Rules and Regulations Relating to Pesticides (250-RICR-40-15-2). Treatments should only be made with a low-volume sprayer device (e.g. backpack sprayer), with precision applications to a limited number of targeted invasive species. The applicator should always be mindful of the potential for encountering wildlife and avoid any applications that would result in direct herbicide contact with sensitive wildlife, such as nesting birds. This will result in a very limited/minimal disturbance to the area and should not negatively impact nesting birds.
- NOTES:
  - Cut material can be bucked/limbed (or chipped) and stockpiled in strategic locations for onsite decomposition and monitored/managed during subsequent growing seasons OR disposed of at an appropriate offsite facility. Disposal facility should be contacted in advance to confirm acceptance and transfer protocols of any invasive materials.
  - Work recommendations have been made to avoid negative impacts to nesting birds and other sensitive wildlife/areas.

# **Herbicide Spot Treatments**

- **APPROACH**: Perform foliar herbicide spot treatments on targeted species
- **EQUIPMENT**: Backpack sprayers can be utilized to perform foliar treatments within the targeted areas.
- **MATERIALS**: Foliar treatments with aquatic-approved glyphosate (e.g., AquaNeat) or triclopyr (e.g., Garlon 3a) formulations should be applied (typically 2-5% active ingredient concentration by volume).
- TIMING: Early to mid-Summer and/or early to mid-Fall (see Attachments B & C).
- **PERSONNEL**: Herbicide treatments should only be performed by trained individuals that possess or are under supervision of a licensed Rhode Island pesticide applicator, in

accordance with Rhode Island's Rules and Regulations Relating to Pesticides (250-RICR-40-15-2). Treatments should only be made with a low-volume sprayer device (e.g. backpack sprayer), with precision applications to a limited number of targeted invasive species. The applicator should always be mindful of the potential for encountering wildlife and avoid any applications that would result in direct herbicide contact with sensitive wildlife, such as nesting birds. This will result in a very limited/minimal disturbance to the area and should not negatively impact nesting birds.

- NOTES:
  - REGARDING PESTICIDE (HERBICIDE) USE RECOMMENDATIONS: Any pesticide treatment approaches and rates provided as recommendations herein are not meant to override the instructions provided on each individual herbicide label. The label is the law; follow all label instructions.
  - Work recommendations have been made to avoid negative impacts to nesting birds and other sensitive wildlife/areas.

### **Maintenance Mowing**

- **APPROACH**: Mow/cut vegetation down to within 4-8" of soil surface.
- **EQUIPMENT**: Work should be performed with a mower sufficient to cut tall, thick herbaceous meadow vegetation, but also be able to handle small woody species (seedlings/saplings) that will be sprouting each year. Note that the mower deck/cutting height needs to be able to clear any previously cut woody stumps. Areas inaccessible to mower equipment should be cut with hand tools (e.g., a brushsaw with grass blade, weed trimmer, etc.).
- TIMING: late Winter to early Spring (see Attachments B & C).
- **NOTES**: Work recommendations have been made to avoid negative impacts to nesting birds and other sensitive wildlife/areas.

# Attachment E – Cost Estimates

# Beaver River Park, Richmond, Rhode Island

# **Annual Cost Estimates**

TARGETED AREAS	Per Acre Est	Frequency		
	LOW	HIGH		
North Cell				
Cut & Stump/Stem Treat	\$ 2,016	\$ 5,040	initial/one-time	
Herbicide Spot Treat (full area)	\$ 1,400	\$ 2,100	annual/ongoing	
Herbicide Spot Treat (only current meadow area)	\$ 220	\$ 330	annual/ongoing	
Maintenance Mow (half of area)	\$ 263	\$ 525	annual/ongoing	
Maintenance Mow (only current meadow area)	\$ 110	\$ 165	annual/ongoing	
South Cell				
Cut & Stump/Stem Treat	\$ 2,340	\$ 5,850	initial/one-time	
Herbicide Spot Treat (full area)	\$ 1,000	\$ 1,500	annual/ongoing	
Herbicide Spot Treat (only current meadow area)	\$ 220	\$ 330	annual/ongoing	
Maintenance Mow (half of area)	\$ 188	\$ 375	annual/ongoing	
Maintenance Mow (only current meadow area)	\$ 42	\$ 83	annual/ongoing	
Hedgerow				
Cut & Stump/Stem Treat	\$ 72	\$ 180	initial/one-time	
Herbicide Spot Treat	\$ 24	\$ 36	annual/ongoing	
Woodland Edge				
Cut & Stump/Stem Treat	\$ 672	\$ 1,680	initial/one-time	
Herbicide Spot Treat	\$ 224	\$ 336	annual/ongoing	

\*See assumptions on following page

### **Target Area Summary**

Location	Total Area (acres)	Currently Woody Invasives (acres)	Currently Herbaceous Meadow (acres)
North Cell	3.5	1.68	1.82
South Cell	2.5	1.95	0.55
Hedgerow*	0.06	0.06	N/A
Woodland Edge*	0.56	0.56	N/A

\* HW assumed a 10-foot width for the hedgerow and woodland edge areas

### **Cost Estimate Assumptions**

TREATMENT APPROACH TYPE	Per Acre Estimate Range								
	LOW	HIGH							
Cut & Stump/Stem Treat	\$ 1,200	\$ 3,000							
Herbicide Spot Treat	\$ 400	\$ 600							
Maintenance Mow	\$ 150	\$ 300							

#### CUT & STUMP/STEM TREATMENTS (woody areas, includes cutting/felling)

- 8-12 hrs/acres (cutting & treating)
- 4-8 hrs/acres (disposal methods that include onsite and offsite approaches. The low end of the range represents onsite disposal; the high end represents offsite)
- 12-20 TOTAL HRS/ACRE
- \$100-150/hr rates would cover labor, material, and equipment costs
- COST RANGE ESTIMATE: \$1,200-3,000/acre

#### HERBICIDE SPOT TREATMENTS (subsequent year maintenance visits for all areas)

- 4-6 hrs/acre (backpack sprayers)
- \$100-150/hr rates would cover labor, material, and equipment costs
- **COST RANGE ESTIMATE**: \$400-600/acre

#### MAINTENANCE MOWING

- 1.5-2 hrs/acre (assuming 48-inch mower deck mowing between 3-5 miles per hour)
- \$100-150/hr rates would cover labor, material, and equipment costs
- COST RANGE ESTIMATE: \$150-300/acre

Attachment F – Invasive Plants Photo Reference

# Beaver River Park, Richmond, Rhode Island

**Bittersweet (Celastrus orbiculatus)** 



Photo 1. Bittersweet vine with developing fruits.



Photo 2. Tangle of bittersweet growing on the hedgerow near the Beaver River Park playground.

# Autumn Olive (Elaeagnus umbellata)



Photo 3. Autumn olive leaves. Pale green above and silvery/whitish color underneath.



Photo 4. Autumn olive shrubs growing in the South Cell at Beaver River Park.

# Morrow's honeysuckle (Lonicera morrowii)



Photo 5. Honeysuckle shrub in flower.



Photo 6. Example of a cluster of honeysuckle shrubs.

# Multiflora Rose (Rosa multiflora)



Photo 7. Multiflora rose in flower.



Photo 8. Multiflora rose with maturing fruits.

# **European buckthorn (***Rhamnus cathartica***)**



Photo 9. A large buckthorn shrub/tree growing in the open.



Photo 10. Close-up of buckthorn leaves and maturing fruits.