

September 27, 2021

Town of Wakefield Conservation Commission  
1 Lafayette Street  
Wakefield, MA 01880

**RE: Camp Curtis Guild – 5-Year Invasive Plant Management Plan  
Notice of Intent Application**

803 Summer Street  
Boston, MA 02127

Tel: 617-896-4300  
800-288-8123

[www.bscgroup.com](http://www.bscgroup.com)

Dear Members of the Wakefield Conservation Commission:

BSC Group, Inc., on behalf of the Massachusetts Army National Guard (MAARNG - the Applicant), respectfully submits this Notice of Intent (NOI) application for the above referenced project located at Camp Curtis Guild, parcel #1A-023-18B. This NOI is being submitted in accordance with the Massachusetts Wetlands Protection Act (M.G.L. Ch.131, S.40) (WPA), and its implementing regulations (310 CMR 10.00). This project is being filed under the Ecological Restoration Limited Project provisions in the WPA regulations found at 310 CMR 10.53 (4) (e) 5. as an “*Other Restoration Project*”.

A copy of this NOI has been sent to the Northeast Regional Office of the Massachusetts Department of Environmental Protection. Abutters within 100-feet of the project have also been notified of this filing, and the certified mail receipts are included with this application. In support of the application, we are providing the Commission with two (2) copies of the following materials:

- Signed WPA Form 3 – Notice of Intent and Wetland Fee Transmittal Form
- Signed WPA Form 3 – Appendix A: Ecological Restoration Limited Project Checklist
- **Attachment A** – Project Narrative
- **Attachment B** – USGS Locus Map, Environmental Resources Map, and Invasive Vegetation Map.
- **Attachment C** – Site Photos
- **Attachment D** – Certified Abutters List, Abutter Notification Letter, Mail Receipts.
- **Attachment E** – Invasive Species Management Plan.
- **Attachment F** – Environmental Monitor Public Notice (published 09/22/2021).

We respectfully request that this project be heard at your next regularly scheduled Conservation Commission hearing. If you have any questions, please feel free to contact me at (617) 896-4594.

Very truly yours,



Matt Burne, PWS, Senior Ecologist  
BSC Group, Inc.

cc: MassDEP Northeast Regional Office (NERO); Erin C. Hilley NFG NG MAARNG

Engineers

Environmental  
Scientists

Custom Software  
Developers

Landscape  
Architects

Planners

Surveyors

**Camp Curtis Guild**  
**5-Year Invasive Plant Management Plan**

**Notice of Intent Application**

**Wakefield, MA**  
**Conservation Commission**  
**September 2021**

Prepared for:  
MA National Guard - Camp Curtis Guild  
28 Haverhill St,  
Reading, MA 01867

BSC Project No. 89705.00

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Prepared by:



803 Summer Street  
Boston, MA 02127

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Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

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FORMS	WPA FORM 3: NOTICE OF INTENT  Appendix A: ECOLOGICAL RESTORATION LIMITED PROJECT CHECKLIST AND MESA EXEMPTION LETTER
ATTACHMENT A	PROJECT NARRATIVE
ATTACHMENT B	USGS SITE LOCUS MAP ENVIRONMENTAL RESOURCES MAP INVASIVE VEGETATION MAP
ATTACHMENT C	SITE PHOTOS
ATTACHMENT D	ABUTTERS NOTIFICATION CERTIFIED LIST OF ABUTTERS CERTIFICATES OF MAILING
ATTACHMENT E	INVASIVE SPECIES MANAGEMENT PLAN
ATTACHMENT F	ENVIRONMENTAL MONITOR NOTICE



**Massachusetts Department of Environmental Protection**  
Bureau of Resource Protection - Wetlands

**WPA Form 3 – Notice of Intent**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

**Important:**

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note:  
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

**A. General Information**

1. Project Location (**Note:** electronic filers will click on button to locate project site):

Camp Curtis Guild - 0 Main Street

a. Street Address

Wakefield

b. City/Town

01867

c. Zip Code

Latitude and Longitude:

42.528881

d. Latitude

-71.075183

e. Longitude

1A-1

f. Assessors Map/Plat Number

1A-023-18B

g. Parcel /Lot Number

2. Applicant:

Jacob

a. First Name

McCumber

b. Last Name

MA Army National Guard

c. Organization

Building 3468, Beaman Street

d. Street Address

Camp Edwards

e. City/Town

MA

f. State

02452

g. Zip Code

339-202-9343

h. Phone Number

i. Fax Number

jacob.c.mccumber.nfg@mail.mil

j. Email Address

3. Property owner (required if different from applicant):  Check if more than one owner

Colonel Timothy

a. First Name

Mullen

b. Last Name

MA Army National Guard Military Division

c. Organization

2 Randolph Road

d. Street Address

Hanscom Air Force Base

e. City/Town

MA

f. State

01731

g. Zip Code

781-225-1110

h. Phone Number

i. Fax Number

timothy.a.mullen.nfg@mail.mil

j. Email address

4. Representative (if any):

Matt

a. First Name

Burne

b. Last Name

BSC Group, Inc.

c. Company

803 Summer Street

d. Street Address

Boston

e. City/Town

MA

f. State

02127

g. Zip Code

(617) 896-4594

h. Phone Number

i. Fax Number

mburne@bscgroup.com

j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

\$500

a. Total Fee Paid

\$237.50

b. State Fee Paid

\$262.50

c. City/Town Fee Paid





Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

# WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
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Wakefield
City/Town

## A. General Information (continued)

6. General Project Description:

5-year Invasive Plant Management Plan, including the application of herbicides, within wetland resource areas and buffer zones. Resource areas include BVW, vernal pools, and NHESP designated Priority/Estimated Habitats for Rare species.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- 1.  Single Family Home
- 2.  Residential Subdivision
- 3.  Commercial/Industrial
- 4.  Dock/Pier
- 5.  Utilities
- 6.  Coastal engineering Structure
- 7.  Agriculture (e.g., cranberries, forestry)
- 8.  Transportation
- 9.  Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

- 1.  Yes  No      If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

310 CMR 10.53(4)(e)5. Ecological Restoration Limited Project

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Middlesex South

a. County

4936

c. Book

b. Certificate # (if registered land)

301

d. Page Number

## B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- 1.  Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- 2.  Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

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**B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)**

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. <input type="checkbox"/> Bank	1. linear feet	2. linear feet
b. <input checked="" type="checkbox"/> Bordering Vegetated Wetland	7.7 acres (temporary only) 1. square feet	2. square feet
c. <input type="checkbox"/> Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. <input type="checkbox"/> Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. <input type="checkbox"/> Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. <input type="checkbox"/> Riverfront Area	1. Name of Waterway (if available) - <b>specify coastal or inland</b>	

2. Width of Riverfront Area (check one):

- 25 ft. - Designated Densely Developed Areas only
- 100 ft. - New agricultural projects only
- 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: \_\_\_\_\_ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.
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5. Has an alternatives analysis been done and is it attached to this NOI?  Yes  No

6. Was the lot where the activity is proposed created prior to August 1, 1996?  Yes  No

3.  Coastal Resource Areas: (See 310 CMR 10.25-10.35)

**Note:** for coastal riverfront areas, please complete **Section B.2.f.** above.



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**B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)**

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. <input type="checkbox"/> Land Under the Ocean	_____	
	1. square feet	
	_____	
	2. cubic yards dredged	
c. <input type="checkbox"/> Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. <input type="checkbox"/> Coastal Beaches	_____	_____
	1. square feet	2. cubic yards beach nourishment
e. <input type="checkbox"/> Coastal Dunes	_____	_____
	1. square feet	2. cubic yards dune nourishment

	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. <input type="checkbox"/> Coastal Banks	_____	
	1. linear feet	
g. <input type="checkbox"/> Rocky Intertidal Shores	_____	
	1. square feet	
h. <input type="checkbox"/> Salt Marshes	_____	_____
	1. square feet	2. sq ft restoration, rehab., creation
i. <input type="checkbox"/> Land Under Salt Ponds	_____	
	1. square feet	
	_____	
	2. cubic yards dredged	
j. <input type="checkbox"/> Land Containing Shellfish	_____	
	1. square feet	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	_____	
	1. cubic yards dredged	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	_____	
	1. square feet	

4.  Restoration/Enhancement  
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

7.7 acres \_\_\_\_\_  
a. square feet of BVW \_\_\_\_\_ b. square feet of Salt Marsh \_\_\_\_\_

5.  Project Involves Stream Crossings  
\_\_\_\_\_ \_\_\_\_\_  
a. number of new stream crossings \_\_\_\_\_ b. number of replacement stream crossings \_\_\_\_\_



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## C. Other Applicable Standards and Requirements

- This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

### Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to [http://maps.massgis.state.ma.us/PRI\\_EST\\_HAB/viewer.htm](http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm).

- a.  Yes  No **If yes, include proof of mailing or hand delivery of NOI to:**

**Natural Heritage and Endangered Species Program  
Division of Fisheries and Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581**

b. Date of map \_\_\_\_\_

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

- c. Submit Supplemental Information for Endangered Species Review\*

1.  Percentage/acreage of property to be altered:
  - (a) within wetland Resource Area \_\_\_\_\_ percentage/acreage
  - (b) outside Resource Area \_\_\_\_\_ percentage/acreage

2.  Assessor's Map or right-of-way plan of site

2.  Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work \*\*
  - (a)  Project description (including description of impacts outside of wetland resource area & buffer zone)
  - (b)  Photographs representative of the site

\* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <https://www.mass.gov/mas-endangered-species-act-mesa-regulatory-review>).

Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

\*\* MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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## C. Other Applicable Standards and Requirements (cont'd)

(c)  MESA filing fee (fee information available at <https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review>).

Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

*Projects altering 10 or more acres of land, also submit:*

(d)  Vegetation cover type map of site

(e)  Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1.  Project is exempt from MESA review.  
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2.  Separate MESA review ongoing. a. NHESP Tracking # \_\_\_\_\_ b. Date submitted to NHESP \_\_\_\_\_

3.  Separate MESA review completed.  
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a.  Not applicable – project is in inland resource area only      b.  Yes     No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -  
Southeast Marine Fisheries Station  
Attn: Environmental Reviewer  
836 South Rodney French Blvd.  
New Bedford, MA 02744  
Email: [dmf.envreview-south@mass.gov](mailto:dmf.envreview-south@mass.gov)

Division of Marine Fisheries -  
North Shore Office  
Attn: Environmental Reviewer  
30 Emerson Avenue  
Gloucester, MA 01930  
Email: [dmf.envreview-north@mass.gov](mailto:dmf.envreview-north@mass.gov)

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

c.  Is this an aquaculture project?      d.  Yes     No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).



**Massachusetts Department of Environmental Protection**  
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**C. Other Applicable Standards and Requirements (cont'd)**

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
- a.  Yes  No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
- b. ACEC
5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
- a.  Yes  No
6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
- a.  Yes  No
7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
- a.  Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
1.  Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
  2.  A portion of the site constitutes redevelopment
  3.  Proprietary BMPs are included in the Stormwater Management System.
- b.  No. Check why the project is exempt:
1.  Single-family house
  2.  Emergency road repair
  3.  Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

**D. Additional Information**

- This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

**Online Users:** Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1.  USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2.  Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

**Online Users:**  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

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**D. Additional Information (cont'd)**

3.  Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4.  List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title

b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5.  If there is more than one property owner, please attach a list of these property owners not listed on this form.

6.  Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7.  Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8.  Attach NOI Wetland Fee Transmittal Form

9.  Attach Stormwater Report, if needed.

**E. Fees**

1.  Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2724

2. Municipal Check Number

09/16/2021

3. Check date

eDEP payment

4. State Check Number

5. Check date

BSC Companies, Inc.

6. Payor name on check: First Name

7. Payor name on check: Last Name



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

# WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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## F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

MCCUMBER.JACO<sup>B</sup> Digitally signed by  
 B.CHARLES.13624<sup>B</sup> MCCUMBER.JACOB.CHARLES.  
 85513 1362485513  
 Date: 2021.09.23 14:59:17 -0400

1. Signature of Applicant

*Timothy A. Muller*

3. Signature of Property Owner (if different)

2. Date

9/24/21

4. Date

09/20/2021

5. Signature of Representative (if any)

*[Signature]*

6. Date

### For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

### For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

### Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.





**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**NOI Wetland Fee Transmittal Form**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Applicant Information**

1. Location of Project:

<u>Camp Curtis Guild - 0 Main Street</u>	<u>Wakefield</u>
a. Street Address	b. City/Town
<u>N/A - eDEP submission</u>	<u>\$237.50</u>
c. Check number	d. Fee amount

2. Applicant Mailing Address:

<u>Jacob</u>	<u>McCumber</u>	
a. First Name	b. Last Name	
<u>MA Army National Guard</u>		
c. Organization		
<u>Building 3468, Beaman Street</u>		
d. Mailing Address		
<u>Camp Edwards</u>	<u>MA</u>	<u>02452</u>
e. City/Town	f. State	g. Zip Code
<u>339-202-9343</u>	<u>jacob.c.mccumber.nfg@mail.mil</u>	
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

<u>Colonel Timothy</u>	<u>Mullen</u>	
a. First Name	b. Last Name	
<u>MA Army National Guard Military Division</u>		
c. Organization		
<u>2 Randolph Road</u>		
d. Mailing Address		
<u>Hanscom Air Force Base</u>	<u>MA</u>	<u>01731</u>
e. City/Town	f. State	g. Zip Code
<u>781-225-1110</u>	<u>timothy.a.mullen.nfg@mail.mil</u>	
h. Phone Number	i. Fax Number	j. Email Address

**B. Fees**

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

**Step 1/Type of Activity:** Describe each type of activity that will occur in wetland resource area and buffer zone.

**Step 2/Number of Activities:** Identify the number of each type of activity.

**Step 3/Individual Activity Fee:** Identify each activity fee from the six project categories listed in the instructions.

**Step 4/Subtotal Activity Fee:** Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

**Step 5/Total Project Fee:** Determine the total project fee by adding the subtotal amounts from Step 4.

**Step 6/Fee Payments:** To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**NOI Wetland Fee Transmittal Form**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Fees** (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 2h	1	1	\$500
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**Step 5/Total Project Fee:** \_\_\_\_\_

**Step 6/Fee Payments:**

Total Project Fee:	\$500
State share of filing Fee:	\$237.50
City/Town share of filing Fee:	\$262.50
	a. Total Fee from Step 5
	b. 1/2 Total Fee <b>less</b> \$12.50
	c. 1/2 Total Fee <b>plus</b> \$12.50

**C. Submittal Requirements**

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection  
 Box 4062  
 Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

**To MassDEP Regional Office** (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

### Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Checklist

This Ecological Restoration Limited Project Eligibility Checklist guides the applicant in determining if their project is eligible to file as an Inland or Coastal Ecological Restoration Limited Project (310 CMR 10.53(4) or 310 CMR 10.24(8) respectively). These criteria must be met when submitting the Ecological Restoration Limited Project Notice of Intent to ensure that the restoration and improvement of the natural capacity of a Resource Area(s) to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

**Important:**  
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**Note:**  
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

#### Regulatory Features of All Coastal and Inland Ecological Restoration Limited Projects

- (a) May result in the temporary or permanent loss of or conversion of Resource Area: An Ecological Restoration Limited Project that meets the requirements of 310 CMR 10.24(8) may result in the temporary or permanent loss of Resource Areas and/or the conversion of one Resource Area to another when such loss is necessary to the achievement of the project's ecological restoration goals.
- (b) Exemption from wildlife habitat evaluation: A NOI for an Ecological Restoration Limited Project that meets the minimum requirements for Ecological Restoration Projects and for a MassDEP Combined Application outlined in 310 CMR 10.12(1) and (2) is exempt from providing a wildlife habitat evaluation (310 CMR 10.60).
- (c) The following are considerations for applicants filing an Ecological Restoration Limited Project NOI and for the issuing authority approving a project as an Ecological Restoration Limited Project:
  - The condition of existing and historic Resource Areas proposed for restoration.
  - Evidence of the extent and severity of the impairment(s) that reduce the capacity of the Resource Areas to protect and sustain the interests identified in M.G.L. c. 131, § 40.
  - The magnitude and significance of the benefits of the Ecological Restoration Project in improving the capacity of the affected Resource Areas to protect and sustain the other interests identified in M.G.L. c. 131, § 40.
  - The magnitude and significance of the impacts of the Ecological Restoration Project on existing Resource Areas that may be modified, converted and/or lost and the interests for which said Resource Areas are presumed significant in 310 CMR 10.00, and the extent to which the project will:
    - a. avoid adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that can be avoided without impeding the achievement of the project's ecological restoration goals.
    - b. minimize adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that are necessary to the achievement of the project's ecological restoration goals.
    - c. utilize best management practices such as erosion and siltation controls and proper construction sequencing to avoid and minimize adverse construction impacts to resource areas and the interests identified in M.G.L. c. 131, § 40.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8))

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

Complete this Eligibility Criteria Checklist **before** filling out a Notice of Intent Application to determine if your project qualifies as a Coastal Ecological Restoration Limited Project. (310 CMR 10.24(8)) Sign the Eligibility Certification at the end of Appendix A, and attach the checklist with supporting documentation and the Eligibility Certification to your Notice of Intent Application.

#### General Eligibility Criteria for All Coastal Ecological Restoration Limited Projects

Notwithstanding the requirements of 310 CMR 10.25 through 10.35, 310 CMR 10.54 through 10.58, and the Wildlife Habitat evaluations in 310 CMR 10.60, the Issuing Authority may issue an Order of Conditions permitting an Ecological Restoration Project listed in 310 CMR 10.24(8)(e) as an Ecological Restoration Limited Project and impose such conditions as will contribute to the interests identified in the WPA M.G.L. provided that the project meets all the requirements in 310 CMR 10.24(8).

- The project is an Ecological Restoration Project as defined in 310 CMR 10.04 and is a project type listed below [310 CMR 10.24(8)(e)].
- Tidal Restoration.
- Shellfish Habitat Restoration.
- Other Ecological Restoration Limited Project Type.
- The project will further at least one of the WPA (M.G.L. c. 131, § 40) interests identified below.
  - Protection of public or private water supply.
  - Protection of ground water supply.
  - Flood control.
  - Storm damage prevention.
  - Prevention of pollution.
  - Protection of land containing shellfish.
  - Protection of fisheries.
  - Protection of wildlife habitat.
- If the project will impact an area located within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands, a NHESP preliminary written determination is attached to the NOI submittal that the project will not have any adverse long-term and short-term effects on specified habitat sites of Rare Species or the project will be carried out in accordance with an approved NHESP habitat management plan.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

#### General Eligibility Criteria for All Coastal Ecological Restoration Limited Projects (cont.)

- If the project is located in a Coastal Dune or Barrier Beach, the project avoids and minimizes armoring of the Coastal Dune or Barrier Beach to the maximum extent practicable.
- The project complies with all applicable provisions of 310 CMR 10.24(1) through (6) and 310 CMR 10.24(9) and (10).

#### Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

These additional criteria must be met to qualify as an Ecological Restoration Limited Project to ensure that the restoration and improvement of the natural capacity of a Resource Area to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

- This Ecological Restoration Limited Project application meets the eligibility criteria for Ecological Restoration Limited Project [310 CMR 10.24(8)(a) through (d) and as proposed, furthers at least one of the WPA interests is for the project type identified below.

##### Tidal Restoration Projects

- A project to restore tidal flow that will not significantly increase flooding or storm damage impacts to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.

##### Shellfish Habitat Restoration Projects

- The project has received a Special Projects Permit from the Division of Marine Fisheries or, if a municipality, has received a shellfish propagation permit.
- The project is made of cultch (e.g., shellfish shells from oyster, surf or ocean clam) or is a structure manufactured specifically for shellfish enhancement (e.g., reef blocks, reef balls, racks, floats, rafts, suspended gear).

##### Other Ecological Restoration Projects that meet the criteria set forth in 310 CMR 10.24(8)(a) through (d).

- Restoration, enhancement, or management of Rare Species habitat.
- Restoration of hydrologic and habitat connectivity.
- Removal of aquatic nuisance vegetation to impede eutrophication.
- Thinning or planting of vegetation to improve habitat value.
- Fill removal and re-grading.
- Riparian corridor re-naturalization.
- River floodplain re-connection.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

#### Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

- In-stream habitat enhancement.
- Remediation of historic tidal wetland ditching.
- Eelgrass restoration.
- Invasive species management.
- Installation of fish passage structures.
- Other. Describe: \_\_\_\_\_
- This project involves the construction, repair, replacement or expansion of public or private infrastructure (310 CMR 10.24(9)).
  - The NOI attachment labeled \_\_\_\_\_ is an operation and maintenance plan to ensure that the infrastructure will continue to function as designed.
  - The operation and maintenance plan will be implemented as a continuing condition in the Order of Conditions and the Certificate of Compliance.
  - This project proposes to replace an existing stream crossing (310 CMR 10.24(10)). The crossing complies with the Massachusetts Stream Crossing Standards to the maximum extent practicable with details provided in the NOI. The crossing type:
    - Replaces an existing non-tidal crossing that is part of an Anadromous/Catadromous Fish Run (310 CMR 10.35)
    - Replaces an existing tidal crossing that restricts tidal flow. The tidal restriction will be eliminated to the maximum extent practicable.
  - At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the following criteria have been consider site constraints in meeting the standard, undesirable effects or risk in meeting the standard, and the environmental benefit of meeting the standard compared to the cost, by evaluating the following:
    - The potential for downstream flooding;
    - Upstream and downstream habitat (in-stream habitat, wetlands);
    - Potential for erosion and head-cutting;
    - Stream stability;
    - Habitat fragmentation caused by the crossing;
    - The amount of stream mileage made accessible by the improvements;
    - Storm flow conveyance;



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

#### Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

- Engineering design constraints specific to the crossing;
- Hydrologic constraints specific to the crossing;
- Impacts to wetlands that would occur by improving the crossing;
- Potential to affect property and infrastructure; and
- Cost of replacement.

### Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4))

Complete this Eligibility Criteria Checklist **before** filling out a Notice of Intent Application to determine if your project qualifies as an Inland Ecological Restoration Limited Project. (310 CMR 10.53(4)) Sign the Eligibility Certification at the end of Appendix A, and attach the checklist with supporting documentation and the Eligibility Certification to your Notice of Intent Application.

#### General Eligibility Criteria for All Inland Ecological Restoration Limited Projects

Notwithstanding the requirements of any other provision of 310 CMR 10.25 through 10.35, 310 CMR 10.54 through 10.58, and 310 CMR 10.60, the Issuing Authority may issue an Order of Conditions permitting an Ecological Restoration Project listed in 310 CMR 10.53(4)(e) as an Ecological Restoration Limited Project and impose such conditions as will contribute to the interests identified in M.G.L. c. 131, § 40, provided that:

- The project is an Ecological Restoration Project as defined in 310 CMR 10.04 and is a project type listed below [310 CMR 10.53(4)(e)].
  - Dam Removal
  - Freshwater Stream Crossing Repair and Replacement
  - Stream Daylighting
  - Tidal Restoration
  - Rare Species Habitat Restoration
  - Restoring Fish Passageways
  - Other (describe project type): Invasive species management. Portions of the project are within NHESP habitat areas.



**WPA Form 3 – Notice of Intent**  
**Appendix A: Ecological Restoration Limited**  
**Project Checklists**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**Eligibility Criteria - Inland Ecological Restoration Limited Project (310**  
**CMR 10.53(4)) (cont.)**

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

**General Eligibility Criteria for All Inland Ecological Restoration Limited Projects**

- The project will further at least one of the WPA (M.G.L. c. 131, § 40) interests identified below.
  - Protection of public or private water supply
  - Protection of ground water supply
  - Flood control
  - Storm damage prevention
  - Prevention of pollution
  - Protection of land containing shellfish
  - Protection of fisheries
  - Protection of wildlife habitat
- If the project will impact an area located within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands, a NHESP preliminary written determination is attached to the NOI submittal that the project will have no adverse long-term and short-term effects on specified habitat sites of Rare Species or the project will be carried out in accordance with an approved NHESP habitat management plan.
- The project will be carried out in accordance with any time of year restrictions or other conditions recommended by the Division of Marine Fisheries for coastal waters and the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3).
- If the project involves the dredging of 100 cubic yards of sediment or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification has been applied for or obtained.
- The project complies with all applicable provisions of 310 CMR 10.53(1), (2), (7), and (8).





# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

#### Additional Eligibility Criteria for Specific Inland Ecological Restoration Limited Project Types

These additional criteria must be met to qualify as an Ecological Restoration Limited Project to ensure that the restoration and improvement of the natural capacity of a Resource Area to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

- This project application meets the eligibility criteria for Ecological Restoration Limited Project in accordance with [310 CMR 10.53(4)(a) through (d) and as proposed, furthers at least one of the WPA interests is for the project type identified below:
- Dam Removal**
    - Project is consistent with MassDEP's 2007 Dam Removal Guidance.
  - Freshwater Stream Crossing Repair and Replacement.** The project as proposed and the NOI describes how:
    - Meeting the eligibility criteria set forth in 310 CMR 10.13 would result in significant stream instability or flooding hazard that cannot otherwise be mitigated, and site constraints make it impossible to meet said criteria.
    - The project design ensures that the stability of the bank is NOT impaired.
    - To the maximum extent practicable, the project provides for the restoration of the stream upstream and downstream of the structure as needed to restore stream continuity and eliminate barriers to aquatic organism movement.
    - The project complies with the requirements of 310 CMR 10.53(7) and (8).
  - Stream Daylighting Projects**
    - The project meets the eligibility criteria for Ecological Restoration Limited Project [310 CMR 10.53(4)(a) through (d)] and as proposed the NOI describes how the proposed project meets to the maximum extent practicable, consistent with the project's ecological restoration goals, all the performance standards for Bank and Land Under Water Bodies and Waterways.
    - The project meets the requirements of 310 CMR 10.12(1) and (2) and a wildlife habitat evaluation is not included in the NOI.
  - Tidal Restoration Project**
    - Restores tidal flow.
    - the project, including any proposed flood mitigation measures, will not significantly increase flooding or storm damage to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

- Other Ecological Restoration Projects** that meet the criteria set forth in 310 CMR 10.53 (4) (a) through (d).
  - Restoration, enhancement, or management of Rare Species habitat.
  - Restoration of hydrologic and habitat connectivity.
  - Removal of aquatic nuisance vegetation to impede eutrophication.
  - Thinning or planting of vegetation to improve habitat value.
  - Riparian corridor re-naturalization.
  - River floodplain re-connection.
  - In-stream habitat enhancement.
  - Fill removal and re-grading.
  - Flow restoration.
  - Installation of fish passage structures.
  - Invasive species management.
  - Other. Describe: \_\_\_\_\_
- This project involves the construction, repair, replacement or expansion of public or private infrastructure. (310 CMR 10.53(7))
  - The NOI attachment labeled \_\_\_\_\_ is an operation and maintenance plan to ensure that the infrastructure will continue to function as designed.
  - The operation and maintenance plan will be implemented as a continuing condition in the Order of Conditions and the Certificate of Compliance.
- This project replaces an existing stream crossing (310 CMR 10.53(8)). The crossing type:
  - Replaces an existing non-tidal crossing designed to comply with the Massachusetts Stream Crossing Standards to the maximum extent practicable with details provided in the NOI.
  - Replaces an existing tidal crossing that restricts tidal flow. The tidal restriction will be eliminated to the maximum extent practicable.



**WPA Form 3 – Notice of Intent**  
**Appendix A: Ecological Restoration Limited**  
**Project Checklists**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**Eligibility Criteria - Inland Ecological Restoration Limited Project (310**  
**CMR 10.53(4)) (cont.)**

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

- At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the following criteria have been consider site constraints in meeting the standard, undesirable effects or risk in meeting the standard, and the environmental benefit of meeting the standard compared to the cost, by evaluating the following:
  - The potential for downstream flooding;
  - Upstream and downstream habitat (in-stream habitat, wetlands);
  - Potential for erosion and head-cutting;
  - Stream stability;
  - Habitat fragmentation caused by the crossing;
  - The amount of stream mileage made accessible by the improvements;
  - Storm flow conveyance;
  - Engineering design constraints specific to the crossing;
  - Hydrologic constraints specific to the crossing;
  - Impacts to wetlands that would occur by improving the crossing;
  - Potential to affect property and infrastructure; and
  - Cost of replacement.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

### Massachusetts Wetlands Protection Act M.G.L. c. 131, §40 Required Actions (310 CMR 10.11)

Complete the Required Actions before submitting a Notice of Intent Application for an Ecological Restoration Project and submit a completed copy of this Checklist with the Notice of Intent.

**Massachusetts Environmental Policy Act (MEPA) / Environmental Monitor**  
<https://www.mass.gov/service-details/the-environmental-monitor>

For Ecological Restoration Limited Projects, there are no changes to MEPA requirements.

Submit written notification at least 14 days prior to the filing of a Notice of Intent (NOI) to the Environmental Monitor for publication. A copy of the written notification is attached and provides at minimum:

- A brief description of the proposed project.
- The anticipated NOI submission date to the conservation commission.
- The name and address of the conservation commission that will review the NOI.
- Specific details as to where copies of the NOI may be examined or acquired and where to obtain the date, time, and location of the public hearing.

**Massachusetts Endangered Species Act (MESA) /Wetlands Protection Act Review**

Preliminary Massachusetts Endangered Species Act Review from the Natural Heritage and Endangered Species Program (NHESP) has been met and the written determination is attached.

Supplemental Information for Endangered Species Review has been submitted.

1.  Percentage/acreage of property to be altered:
  - a. Within Wetland Resource Area \_\_\_\_\_  
Percentage/acreage
  - b. Outside Wetland Resource Area \_\_\_\_\_  
Percentage/acreage
2.  Assessor's Map or right-of-way plan of site
3.  Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work.
4.  Project description (including description of impacts outside of wetland resource area & buffer zone)
5.  Photographs representative of the site
6.  MESA filing fee (fee information available at <https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review>)



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
**Required Actions (310 CMR 10.11) (cont.)**

Provided by MassDEP:
MassDEP File Number
Document Transaction Number
Wakefield
City/Town

Make check payable to “Commonwealth of Massachusetts - NHESP” and mail to NHESP:

**Natural Heritage & Endangered Species Program**

MA Division of Fisheries & Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581

- 7. Projects altering 10 or more acres of land, also submit:
  - a.  Vegetation cover type map of site
  - b.  Project plans showing Priority & Estimated Habitat boundaries

OR Check One of the Following:

- 1.  Project is exempt from MESA review.

Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <https://www.mass.gov/service-details/ma-endangered-species-act-mesa-overview>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59 – see C4 below)

- 2.  Separate MESA review ongoing.

\_\_\_\_\_ a. NHESP Tracking #

\_\_\_\_\_ b. Date submitted to NHESP

- 3.  Separate MESA review completed. Include copy of NHESP “no Take” determination or valid Conservation & Management Permit with approved plan.

**Estimated Habitat Map of State-Listed Rare Wetlands Wildlife**

If a portion of the proposed project is located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP), complete the portion below. To view habitat maps, see the **Massachusetts Natural Heritage Atlas** or view the maps electronically at: <https://www.mass.gov/guides/masswildlife-publications#-massachusetts-natural-heritage-atlas->

- A preliminary written determination from Natural Heritage and Endangered Species Program (NHESP) must be obtained indicating that:

Project will NOT have long- or short-term adverse effect on the actual Resource Area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP.

Project will have long- or short-term adverse effect on the actual Resource Area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP. A copy of NHESP’s written preliminary determination in accordance with 310 CMR 10.11(2) is attached. This specifies:

Date of the map: \_\_\_\_\_



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Required Actions (310 CMR 10.11) (cont.)

Provided by MassDEP:

MassDEP File Number

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- If the Rare Species identified is/are likely to continue to be located on or near the project, and if so, whether the Resource Area to be altered is in fact part of the habitat of the Rare Species.
- That if the project alters Resource Area(s) within the habitat of a Rare Species:
- The Rare Species is identified;
- NHESP's recommended changes or conditions necessary to ensure that the project will have no short or long term adverse effect on the habitat of the local population of the Rare Species is provided; or
- An approved NHESP habitat management plan is attached with this Notice of Intent.

Send the request for a preliminary determination to:  
Natural Heritage & Endangered Species Program  
MA Division of Fisheries & Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581

#### Division of Marine Fisheries

- If the project will occur within a coastal waterbody with a restricted Time of Year, [see Appendix B of the Division of Marine Fisheries (DMF) Technical Report TR 47 "Marine Fisheries Time of Year Restrictions (TOYs) for Coastal Alteration Projects" dated April 2011 <https://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/MA/TR-47.pdf>].
- Obtain a DMF written determination stating:
  - The proposed work does NOT require a TOY restriction.
  - The proposed work requires a TOY restriction. Specific recommended TOY restriction and recommended conditions on the proposed work is attached.
- If the project may affect a diadromous fish run [re: Division of Marine Fisheries (DMF) Technical Reports TR 15 through 18, dated 2004: <https://www.mass.gov/service-details/marine-fisheries-technical-reports>]
- Obtain a DMF written determination stating:
  - The design specifications and operational plan for the project are compatible with the passage requirements of the fish run.
  - The design specifications and operational plan for the project are not compatible with the passage requirements of the fish run.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
**Required Actions (310 CMR 10.11) (cont.)**

Send the request for a written or electronic determination to:

South Shore – Cohasset to Rhode Island border,  
and the Cape & Islands:  
Division of Marine Fisheries –  
South Coast Field Station  
Attn: Environmental Reviewer  
836 South Rodney French Blvd.  
New Bedford, MA 02744  
Email: [DMF.EnvReview-South@state.ma.us](mailto:DMF.EnvReview-South@state.ma.us)

North Shore – Hull to New Hampshire border:  
Division of Marine Fisheries –  
North Shore Field Station  
Attn: Environmental Reviewer  
30 Emerson Avenue  
Gloucester, MA 01930  
Email: [DMF.EnvReview-North@state.ma.us](mailto:DMF.EnvReview-North@state.ma.us)

- Division of Fisheries and Wildlife** – <https://www.mass.gov/orgs/division-of-fisheries-and-wildlife>
  - Projects that involve silt-generating, in-water work that will impact a non-tidal perennial river or stream and the in-water work will not occur between May 1 and August 30.
    - Obtain a written determination from the Division of Fisheries and Wildlife (DFW) as to whether the proposed work requires a TOY restriction.
      - The proposed work does NOT require a TOY restriction.
      - The proposed work requires a TOY restriction. The DFW determination with TOY restriction and other conditions is attached.

**MassDEP Water Quality Certification**

- Project involves dredging of 100 cubic yards or more in a Resource Area or dredging of any amount in an Outstanding Resource Water (ORW). A copy and proof of the MassDEP Water Quality Certification pursuant to 314 CMR 9.00 is attached to the NOI.
- This project is a Combined Permit Application for 401 Dredging and Restoration (BRP WW 26).

**MassDEP Wetlands Restriction Order**

Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

Yes     No

**Department of Conservation and Recreation**

**Office of Dam Safety**

- For Dam Removal Projects, obtain a written determination from the Department of Conservation and Recreation Office of Dam Safety that the dam is not subject to the jurisdiction of the Office under 302 CMR 10.00, a written determination that the dam removal does not require a permit under 302 CMR 10.00 or a permit authorizing the dam removal in accordance with 302 CMR 10.00 has been issued.



# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

### Massachusetts Wetlands Protection Act M.G.L. c. 131, §40 Required Actions (310 CMR 10.11) (cont.)

#### Areas of Critical Environmental Concern (ACECs)

Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

- Yes     No    If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations).

\_\_\_\_\_  
Name of ACEC

#### Minimum Required Documents (310 CMR 10.12)

Complete the Required Documents Checklist below and provide supporting materials before submitting a Notice of Intent Application for an Ecological Restoration Project.

- This Notice of Intent meets all applicable requirements outlined in for Ecological Restoration Projects in 310 CMR 10.12. Use the checklist below to ensure that all documentation is included with the NOI.

At a minimum, a Notice of Intent for an Ecological Restoration Project shall include the following:

- Description of the project’s ecological restoration goals;
- The location of the Ecological Restoration Project;
- Description of the construction sequence for completing the project;
- A map of the Areas Subject to Protection Under M.G.L. c. 131, § 40, that will be temporarily or permanently altered by the project or include habitat for Rare Species, Habitat of Potential Regional and Statewide Importance, eel grass beds, or Shellfish Suitability Areas.
- The method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.) is attached with documentation methodology.
- List the titles and dates for all plans and other materials submitted with this NOI.

#### Environmental Resources Map

a. Plan Title	_____	N/A
b. Prepared by	BSC Group, Inc.	c. Signed and Stamped by
d. Final Revision Date	08/30/2021	e. Scale
		1" = 200'

f. Additional Plan or Document Title	_____	08/30/2021
		g. Date

- If there is more than one property owner, attach a list of these property owners not listed on this form.
- Attach NOI Wetland Fee Transmittal Form.





**WPA Form 3 – Notice of Intent**  
**Appendix A: Ecological Restoration Limited**  
**Project Checklists**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**Minimum Required Documents (310 CMR 10.12)**

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Wakefield

City/Town

- An evaluation of any flood impacts that may affect the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure as well as any proposed flood impact mitigation measures;
- A plan for invasive species prevention and control;
- The Natural Heritage and Endangered Species Program written determination in accordance with 310 CMR 10.11(2), if needed;
- Any Time of Year restrictions and/or other conditions recommended by the Division of Marine Fisheries or the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3), (4), (5), if needed;
- Proof that notice was published in the Environmental Monitor as required by 310 CMR 10.11(1);
- A certification by the applicant under the penalties of perjury that the project meets the eligibility criteria set forth in 310 CMR 10.13;
- If the Ecological Restoration Project involves the construction, repair, replacement or expansion of infrastructure, an operation and maintenance plan to ensure that the infrastructure will continue to function as designed;
- If the project involves dredging of 100 cubic yards or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification issued by the Department pursuant to 314 CMR 9.00;
- If the Ecological Restoration Project involves work on a stream crossing, information sufficient to make the showing required by 310 CMR 10.24(10) for work in a coastal resource area and 310 CMR 10.53(8) for work in an inland resource area; and
- If the Ecological Restoration Project involves work on a stream crossing, baseline photo-points that capture longitudinal views of the crossing inlet, the crossing outlet and the upstream and downstream channel beds during low flow conditions. The latitude and longitude coordinates of the photo-points shall be included in the baseline data.
- This project is subject to provisions of the MassDEP Stormwater Management Standards. A copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) is attached.
- Provide information as to whether the project has the potential to impact private water supply wells including agricultural or aquacultural wells or surface water withdrawal points.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

Provided by MassDEP:
MassDEP File Number
Document Transaction Number

# WPA Form 3 – Notice of Intent

## Appendix A: Ecological Restoration Limited Project Checklists

Wakefield  
City/Town

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

### Certification that the Ecological Restoration Project Meets the Eligibility Criteria

I hereby certify under penalties of perjury that the Ecological Restoration Project Notice of Intent application does not meet the Eligibility criteria for an Ecological Restoration Order of Conditions set forth in 310 CMR 10.13, but does meet the Eligibility Criteria for a Ecological Restoration Limited Project set forth in 10.24(8) or 10.53(4) whichever is applicable. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

Signature of Applicant or Authorized Agent

**Matt Burne**

Printed Name of Applicant or Authorized Agent

09/20/2021

Date

The certification must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 2) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application.



MASSWILDLIFE

## DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

MASS.GOV/MASSWILDLIFE

September 8, 2021

Matt Burne  
BSC Group, Inc  
803 Summer Street  
Boston, MA 02127

RE: Project Location: Camp Curtis Guild; Reading/Lynnfield/North Reading/Wakefield  
Project Description: Invasive Plant Management  
NHESP Tracking No.: **21-40427**

Dear Applicant:

Thank you for submitting the "Camp Curtis Guild Five Year Invasive Plant Adaptive Management Plan Massachusetts Army National Guard 2021-2025", Habitat Management Project Review Checklist, and supporting documentation to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The Division hereby approves the submitted management plan.

Therefore, the proposed activities are **exempt from MESA review** pursuant to 321 CMR 10.14 which states: "[t]he following Projects and Activities shall be exempt from the requirements of 321 CMR 10.18 through 10.23...".

(15) The active management of State-listed Species habitat, including but not limited to mowing, cutting, burning, or pruning of vegetation, or removing exotic or invasive species, for the purpose of maintaining or enhancing the habitat for the benefit of rare species, provided that the management is carried out in accordance with a habitat management plan approved in writing by the Division"

Any changes to the proposed project or any additional work beyond that provided may require a filing with the Division pursuant to the MESA regulations. If you have any questions about this letter, please contact Melany Cheeseman, Endangered Species Review Assistant, at (508) 389-6357.

Sincerely,

A handwritten signature in black ink, reading "Everose Schlüter".


Everose Schlüter, Ph.D.  
Assistant Director

cc: Jacob McCumber, MA Army National Guard

MASSWILDLIFE

2726

**BSC COMPANIES, INC.**  
803 SUMMER STREET  
BOSTON, MASSACHUSETTS 02127

 53-179/113

DATE 9/16/21

PAY TO THE ORDER OF

Wakefield Daily Item

\$ 112.00

One hundred twelve dollars 0/100 DOLLARS

 Eastern Bank  
Boston, MA 02110  
easternbank.com  
1-800-EASTERN

TWO SIGNATURES REQUIRED OVER \$2,500  
NOT VALID AFTER 180 DAYS



FOR


89705.00-5

*[Signature]*



2724

**BSC COMPANIES, INC.**  
803 SUMMER STREET  
BOSTON, MASSACHUSETTS 02127

 53-179/113

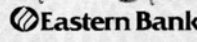
DATE 9/16/21

PAY TO THE ORDER OF

Town of Wakefield

\$ 262.50

Two hundred sixty-two dollars 50/100 DOLLARS

 Eastern Bank  
Boston, MA 02110  
easternbank.com  
1-800-EASTERN

TWO SIGNATURES REQUIRED OVER \$2,500  
NOT VALID AFTER 180 DAYS



FOR

89705.00-5

*[Signature]*



# **Attachment A**

Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

PROJECT NARRATIVE

## 1 Introduction

BSC Group, Inc. (BSC) is filing this Notice of Intent (NOI) on behalf of the Massachusetts Army National Guard (MAARNG - the Applicant), for the implementation of a 5-Year Invasive Plant Management Plan on the MAARNG property at Camp Curtis Guild. The Camp Curtis Guild property is a 702-acre base that lies within the municipal boundaries of Reading, Wakefield, North Reading, and Wakefield, Massachusetts. The Applicant is proposing to conduct invasive plant management, including the application of herbicide and mechanical removal of invasive vegetation, within jurisdictional Wetland Resource Areas and their Buffer Zones within the Town of Wakefield.

Specifically, the overall goals of the 5-Year Invasive Plant Management Plan are:

1. Conduct targeted invasive plant management, focusing on the control of invasive plants within previously identified “Priority Management Areas” (see **Attachment E** for further details on how Priority Management Areas were determined). Priority Management Areas include sensitive wetland habitats which are currently under threat from invasive plant encroachment, and which would benefit from invasive plant control. These include:
  - a. Red Maple Swamp and Cedar Swamp habitats, of which an isolated area of Red Maple Swamp is located within the Project parcel in Wakefield; and,
  - b. Vernal pools (both Natural Heritage and Endangered Species Program (NHESP) Certified and Potential Vernal Pools), including two (2) which are located within the Project parcel in Wakefield.
2. Conduct targeted invasive plant management, focusing on previously identified “Vigilance Areas”. Vigilance Areas include habitats which are particularly exposed and prone to invasive plant establishment, including roadsides, transmission line right-of-ways, and frequently disturbed areas near the developed campus area of the base. Vigilance areas encompass/transect various habitats, including Wetland Resource Areas and their Buffer Zones. Removal of invasive plant species from these highly trafficked areas, before they are transported into more remote and sensitive areas of the Camp Curtis Guild Property, is an essential component of the Management Plan.
3. Where resources allow, target management to reduce the expansion of existing, established invasive plant populations. Target areas may include the roadside areas around the Campus, with activities focused on monitoring and documenting the extent of established invasive plant populations, and using herbicide and mechanical approaches to try and limit the expansion of these areas.

Due to their presence and threat to habitat, the top priority species identified for management by MAARNG and BSC include Garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergii*), common barberry (*Berberis vulgaris*), Japanese stiltgrass (*Microstegium vimineum*), swallow-wort (*Cynanchum louiseae*), Asiatic bittersweet (*Celastrus orbiculatus*), Tree-of-heaven (*Ailanthus altissima*), black locust (*Robinia pseudoacacia*), Common reed (*Phragmites australis*), Glossy buckthorn (*Frangula alnus*) and common buckthorn (*Rhamnus cathartica*). Several of these species are associated with Wetland Resource Areas throughout the base, particularly common reed, and common and glossy buckthorn.

This NOI is being submitted in accordance with the Massachusetts Wetlands Protection Act (M.G.L. Ch.131, S.40) (WPA), and its implementing regulations (310 CMR 10.00). This project is being filed under the Ecological restoration Limited Project provisions in the WPA regulations found at 310 CMR 10.53 (4) (e) 5. as an “*Other Restoration Project*”. This provision provides for projects that will improve the capacity of a Resource Area to protect the interests identified in M.G.L. c. 131, section 40. This project may be permitted as an Ecological Limited Restoration Project provided that the project meets the eligibility criteria set forth in 310 CMR 10.53 (4)(a) through (d). Such projects “*include, but are not limited to, the restoration, enhancement or Management of Rare Species habitat...the removal of aquatic nuisance vegetation to retard pond and lake eutrophication, the thinning or*

planting of vegetation to improve habitat value...”. A separate Public Notice for the project has been written and submitted to the Environmental Monitor, which is anticipated to be published in the September 22, 2021 edition, per the requirements for an Ecological Restoration Limited Project.

Best Management Practices (BMPs) will include limiting herbicide use (particularly in proximity to sensitive wetland resource areas), careful, targeted application in all locations, using herbicides approved for use in wetland areas, and using mechanical and biological control methods where appropriate, to minimize adverse impacts to resource areas, while improving the existing habitat conditions. The Applicant is requesting a five-year Order of Conditions, from the Conservation Commission, to conduct vegetation management at Camp Curtis Guild.

## 2 Existing Conditions and Jurisdictional Wetland Resource Areas

Camp Curtis Guild is MAARNGs second largest training site, with an area of 702 acres, of which ~22 acres are located within the Town of Wakefield. Camp Curtis Guild is located in a primarily suburban area, and the base is bisected by two utility right-of-ways (ROWS); a National Grid electrical transmission line that traverses in a North-South direction, and a Kinder Morgan gas pipeline that mostly traverses East to West. Predominant habitat types within Camp Curtis Guild include extensive upland and wetland mixed forest. Within the Wakefield portion of the site, the area is more heavily developed, containing the Camp Curtis Campus Area and associated roads and parking lots. Roughly 35% of the site within Wakefield is wetland, including an isolated area of Red Maple Swamp habitat north of I-95, and a potential vernal pool and associated wetland.

Within Wakefield, the following Environmental Resource Areas were identified:

**Table 2-1: Wetland Resource Areas / Environmental Resource Areas within the Project Area in Wakefield**

Wetlands (acres)	100-ft Buffer Zone (acres)	# of Certified Vernal Pools	# of Potential Vernal Pools	NHESP Priority Habitat 2021 (acres)
7.69	5.30	0	2	17.11

### 2.1 Streams

No perennial or intermittent streams are located within the Wakefield portion of the Camp Curtis Guild property.

### 2.2 Bordering Vegetated Wetlands

BVW within the Wakefield portion of Camp Curtis Guild includes two (2) wetland areas which may be hydrologically connected to the Saugus River, located south of the site, on the opposite side of I-95. Both wetlands are classified as freshwater forested/shrub wetland (PFO1F), and the northern wetland (located within the Campus roadway system), contains a potential vernal pool. Throughout the Camp Curtis Guild property, wetland habitats are under threat from invasive plant species, particularly common reed (*Phragmites australis*), and glossy buckthorn (*Frangula alnus*). Within Wakefield, invasive species are more closely associated with the roadways running along the edges of BVW, but expansion of these populations into the wetland habitats is a management concern.

### 2.3 Vernal Pools

Vernal Pool (VP) Habitat is defined by the WPA as any “confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, § 40 as specified in 310 CMR

10.02(1)”. VPs are typically isolated vegetated wetlands which are not explicitly protected under the WPA Regulations unless they have been certified by NHESP, or are large enough to be considered Isolated Land Subject to Flooding. However, all VPs (whether certified by NHESP or not), will be treated as Priority Management Areas, requiring the highest level of protection during management activities.

VPs provide essential habitat for a number of protected amphibian and invertebrate species in Massachusetts, and as such invasive plant management within the vicinity of these habitats will require protective in general, and review by NHESP for pools which have been certified through their process. Please refer to Section 3 of this narrative for a summary of precautions to be taken when working in the vicinity of VPs. All VPs (whether certified or not), will be treated with the same protective measures, to ensure that impacts to these valuable habitats are avoided. This information is also covered in detail in the Invasive Plant Management Plan (**Attachment E**).

Based on the 2004 survey of VPs at Camp Curtis Guild (Burne & Kenney, 2004), approximately 40 VPs are located on the property, of which 2 are located within Wakefield. VPs exist in a wide range of landscape settings throughout the property, but the majority are heavily shaded and located within forested habitats. Amphibian and reptile surveys conducted in 2004 found wood frogs (*Rana sylvatica*) to be the most common VP breeding amphibian (occurring in 30 VPs across the entire Camp Curtis Guild property), followed by the spotted salamander (*Ambystoma maculatum*), which was found breeding in 16 VPs. Four (4) rare species were found in VPs within Camp Curtis Guild; one turtle species, two amphibian species, and one aquatic invertebrate. One of the amphibian species had previously been recorded in the Red Maple Swamp Habitat in the southern portion of the site in Wakefield. BSC and MAARNG have coordinated with NHESP to design and implement an Invasive Plant Management Plan which protects these rare species and their habitats, and received approval of the plan on September 8, 2021 (NHESP tracking #21-40427). Please see **Table 2-2** for examples of the precautions currently under discussion with NHESP.

## 2.4 NHESP Exemplary Communities

NHESP has identified several areas within Camp Curtis Guild to be “Exemplary Communities” that are very important for conserving biodiversity within the state of Massachusetts. These communities are generally threatened by development, logging, succession, and invasive species. At Camp Curtis Guild, these exemplary community types also provide suitable habitat for a number of state-listed rare and threatened species. Exemplary communities within the Wakefield portion of the Project area include nutrient-rich Red Maple Swamp, and Scrub Oak Shrublands (Swain, 2005). Red Maple Swamp are located within jurisdictional Wetland Resource Areas and their associated 100-ft Buffer Zones.

## 2.5 NHESP Priority/Estimated Habitat and Rare Species

Within Wakefield, the majority of the Project site is located within NHESP Priority Habitat. Seven (7) State and/or Federally listed species have been recorded at the Camp Curtis Guild site. Tale 2-2 (below) provides a summary of the types of rare species located on Camp Curtis Guild, their known habitat requirements, and proposed precautions which will be taken to protect rare species habitat. **Appendix D** of the Invasive Plant Management Plan provides a more detailed overview of the invasive species management considerations for each rare species. These precautions were reviewed by NHESP as part of the Invasive Plant Management Plan, which received approval on September 8, 2021 (NHESP tracking #21-40427).



**Table 2-2:** Rare species and their habitat requirements within the Camp Curtis Guild Property

Species	Conservation Status MA / Federal	Habitat	Management Precautions During Invasive Plant Treatment
Amphibian	Special Concern / None	Vernal pools (breeding), forested wetlands, and surrounding upland forests. This amphibian may migrate up to 900-ft from their breeding pools, so protection of the surrounding forest as well as the breeding pools is crucial to population survival.	<ul style="list-style-type: none"> <li>• Limited and selective use of herbicides within 100-ft of VPs and red Maple Swamp. Use wetland approved (e.g. non-surfactant) herbicides only.</li> <li>• No hand pulling of vegetation during the spring/summer juvenile migration period. Avoid other forms of ground disturbance.</li> <li>• Avoid disturbance of log and stone piles.</li> <li>• Follow any additional NHESP recommended time-of-year restrictions.</li> </ul>
Upland Invertebrate	Special Concern / None	Pitch pine-scrub oak barrens and sandplains.	<ul style="list-style-type: none"> <li>• Limited and selective use of herbicides within Scrub Oak habitat.</li> <li>• Avoid foliar application of herbicides within Scrub Oak habitat during the flight period (June 15 – July 15).</li> <li>• Follow any additional NHESP recommended time-of-year restrictions.</li> </ul>
Aquatic Invertebrate	Special Concern / None	Vernal pools.	<ul style="list-style-type: none"> <li>• Limited and selective use of herbicides within 100-ft of VPs and red Maple Swamp. Use wetland approved herbicides only.</li> <li>• Follow any additional NHESP recommended time-of-year restrictions.</li> </ul>
Mammal	Endangered / Threatened	Forest habitats. Hibernates in caves or mines. Roosts in trees.	<ul style="list-style-type: none"> <li>• No tree removal (cutting) during the pupping season (June–July).</li> </ul>
Mammal	Endangered / None	Forest habitats. Hibernates in caves or mines, and roosts in buildings, trees and log piles.	<ul style="list-style-type: none"> <li>• No removal of known maternity roost trees.</li> <li>• Avoid disturbance close to the known hibernaculum.</li> <li>• Avoid disturbance of vegetation over hibernaculum.</li> </ul>
Mammal	Endangered / None	Forest habitats. Hibernates in caves or mines, and roosts in buildings and trees.	<ul style="list-style-type: none"> <li>• Avoid disturbance of log and stone piles.</li> <li>• Follow any additional NHESP recommended time-of-year restrictions.</li> </ul>
Bird	Threatened / None	Wet woodlands, particularly Red Maple and White Cedar Swamp. Nests May – June. Migrates south in September – October.	<ul style="list-style-type: none"> <li>• Selective and limited use of herbicides within Cedar and red Maple Swamp.</li> <li>• Prefer manual cut/paint or hand pulling of woody invasive plants over herbicide use.</li> <li>• Limit disturbance within Cedar and Red Maple Swamp during May – June nesting season.</li> <li>• Follow any additional NHESP recommended time-of-year restrictions.</li> </ul>

## 2.6 Invasive Plant Species

Invasive plant surveys were conducted by BSC Group in October 2020, and the results of these surveys are presented in the Invasive Plant Management Plan in **Attachment E**. The entire Camp Curtis Guild property was surveyed, with survey effort focused on areas of disturbance including: parking lots, day use areas, fields/meadows, forest roads, ROWs, and open canopy areas shown on aerial imagery. Invasive plant species data was collected using a tablet, an Arrow GNSS receiver and the ARC GIS collector application. Species sightings were recorded as one of three feature types: points, lines, or polygons. Quantitative information including abundance and distribution, and species location information such as habitat type (wetland, bank, field, woods, etc.) was also collected to aid in determining a recommended management strategy. Finally, a survey area polygon was drawn over areas reviewed for the presence of invasive plant species. ArcCollector field survey data, including invasive species survey points, lines and polygons, photo documentation of invasive species, and notes on the growth stage of invasive species stands (young/seedlings, mature plants, or mixed), will be made available to Camp Curtis Guild to help guide management in the field.

In total, twenty-one (21) plant species classified as “invasive” on the MIPAG species list (MIPAG - Massachusetts Invasive Plant Advisory Group, n.d.), were identified within the Camp Curtis Guild Property. Within the Wakefield portion of the property, the most commonly occurring invasive species within Wetland Resource Areas and Buffer Zones included Asiatic bittersweet (*Celastrus orbiculatus*), tree-of-heaven (*Ailanthus altissima*), glossy buckthorn (*Frangula alnus*) and honey locust (*Gleditsia triacanthos*). Please refer to the Invasive Vegetation map in **Attachment B**. Invasive plants were most densely clustered along the roadways with the Camp Curtis Guild Property. Due to the number of roadways and extent of disturbance within the Wakefield portion of the Camp Curtis Guild property, this area has been designated as a “Vigilance Area” for invasive species management. This means that, although the area does not contain as many of the pristine habitat types prioritized for invasive plant control, the area represents a high-risk pathway for invasive species to enter and become established within the wider site. As such, management of invasive plants before they spread from this area into more pristine portions of the site is a management priority.

**Table 2-3** (below) provides details of the invasive plant species identified within the Wakefield portion of the site, and the estimated population extent (i.e. the total area over which invasive species populations were observed during the field survey), as a percentage of the site area within Wakefield. Please note that the “areas occupied” by an invasive species may overlap. “Population extent” reflects only the occurrence of an invasive plant species within an area, regardless of percent coverage or population density within that area. More detailed information on invasive plant percent coverage and growth form (saplings, mature plants etc.), is provided in the Management Plan in **Attachment E**, and will be provided to MAARNG in the interactive WebMap “Camp Curtis Guild Data Viewer”.

**Table 2-3:** Population extent of Invasive Plant Species within Wakefield portion of the Camp Curtis Guild Property

Species	Area occupied (acres)	Population Extent (%)
Asiatic Bittersweet	6.2	27.7
Autumn Olive	0.1	0.3
Black Locust	0.8	3.6
Common Barberry	0.1	0.3
Common Buckthorn	1.5	6.8
Common Reed	0.2	0.9
Garlic Mustard	0.9	4.0
Glossy Buckthorn	4.6	20.5
Honey-locust	4.6	20.5
Japanese Barberry	0.1	0.3

Species	Area occupied (acres)	Population Extent (%)
Japanese Knotweed	1.2	5.4
Multiflora rose	1.4	6.5
Norway Maple	0.2	0.9
Reed Canary Grass	0.1	0.4
Spotted Knapweed	0.1	0.6
Swallow-wort	0.6	2.6
Tree of Heaven	2.9	13.2
Other	0.9	4.1
Total Site Area within Wakefield	22.2	

### **3 Proposed Activities and Best Management Practices for Work Within Wetland Resource Areas**

The applicant is proposing to conduct Invasive Plant Management activities, including the mechanical removal of invasive plants and herbicide applications, as part of a 5-year long adaptive management plan for the Camp Curtis Guild property. The aims of the Invasive Plant Management Plan are to restore wetland and buffer zone habitats and biodiversity which have been degraded by the encroachment of invasive plants, and to protect sensitive habitats (including NHESP Estimated and Priority Habitats, Vernal Pools and Exemplary Community Types), from further disruption from invasive plants.

Management techniques which may be used on the Camp Curtis Guild Property are outlined in detail in Appendix C of the Invasive Plant Management Plan (**Attachment E**). Methods may include mechanical hand-pulling, cutting, or mowing of invasive plants, and girdling of invasive trees, as well as chemical treatments such as foliar spraying, cut stem/cut-and-paint, basal bark painting, herbicide injections, or “hack and squirt” treatment of invasive trees. All management methods will be conducted by licensed professionals, and conducted in accordance with applicable safety standards, and additional requirements outlined in the Invasive Plant Management Plan, or by NHESP. All treatment areas will be monitored throughout the 5-year management period to measure the success of invasive species treatments, ensure no damage to native species or wetland resource areas is occurring, and to inform subsequent years management techniques.

Management may include removal or alteration of invasive vegetation in individual, targeted areas, across the 7.7 acres of wetlands and the 5.3 acres of 100-ft Buffer Zone. As noted in the Invasive Plant Management Plan, the mechanical management of some species would be most effective when combined with limited shoveling and removal of root systems. Therefore, there may also be small, scattered, hand-shoveled holes in jurisdictional areas. These will be smoothed and filled over to the extent feasible, and will comply with all TOY restrictions outlined in the Management Plan for protecting rare amphibian habitat.

In order to implement an effective Invasive Plant Management Plan, the Applicant retained the services of BSC group to design an adaptive 5-year Management Strategy (**Attachment E**). Key aspects of this strategy include;

**A)** Measures to help prioritize invasive plant management (to maximize effectiveness while setting realistic management goals), and;

**B)** Measures to ensure that invasive plant management (including mechanical and herbicide-based approaches), do not impact wetland resource areas, or the habitat of NHESP listed rare species.

To address **item A**, wetland and ecological scientists from BSC worked to identify **Priority Management Areas** for targeted invasive plant management. These were designated based on ecological sensitivity of the resource area (for example, prioritizing protecting Vernal Pools and rare species habitats), and on the potential for successful management of invasive plants (focusing on habitats where management could realistically remove or substantially control invasive plant populations, rather than on areas where plants are already so well established that successful management is unlikely). Invasive plant **Vigilance Areas** were also flagged as a priority for invasive plant management – these areas include frequently disturbed habitats and active corridors for invasive plant dispersal, such as roadsides.

In order to address **item B**, a number of Best Management Practices (BMPs) will be implemented to protect Wetland Resource Areas. The most widely applicable of these include:

- All chemical herbicide applications will be conducted by licensed applicators, and in conformance with safety labels and environmental guidance.
- All herbicides will be properly contained, and applied in a manner so as to minimize the risk of drift (as described in the Invasive Plant Management Plan).
- The use of herbicides within 100-ft of Vernal Pools and Wetland Resource Areas will be limited, and mechanical methods (such as hand-pulling or cutting), will be prioritized, where appropriate.
- Where herbicide application is required within 100-ft of Wetlands or Vernal Pools, only wetland approved herbicides, such as Garlon 3A or Rodeo, will be used.
- Where herbicide application is required within 100-ft of Wetlands or Vernal Pools, herbicide use will be restricted to selective methods such as the cut-and-paint method (for shrubs and woody vines), or directed spot spraying using a low power spray and tight directional spray nozzle. Examples of situations where herbicide application may be required within Wetland Resource Areas include certain invasive plant growth forms (some cannot be effectively pulled by hand, as they can re-sprout from fragments of root material), or restrictions on ground disturbance due to rare species / time of year (TOY) restrictions - for example, avoiding soil disturbance near vernal pools during juvenile amphibian migration.
- Following all TOY and rare species restrictions outlined by NHESP (see NHESP approved Invasive Plant Management Plan in **Attachment E**).
- Vehicle or mechanized equipment access will not be allowed within BVWs, or in other locations where ruts and soil disturbance would occur.

**Table 3-1** (below) provides an overview of the proposed treatment windows (and associated TOY or habitat restrictions), for each invasive plant species on Camp Curtis Guild, within Wetland Resource Areas and their 100-ft Buffer Zones. A full description of all proposed invasive plant management techniques and species-specific treatment recommendations is provided in Appendix C of the Invasive Plant Management Plan (**Attachment E**).

*Table 3-1: Excerpt from Appendix B – Invasive Plant Management Plan (Attachment E). Time of Year treatment table for Priority Management Areas (100-ft Buffer Zones to Vernal Pools and Wetlands).*

Species	Growth Form	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common reed	Grass										Until FF		
Japanese knotweed	Grass										Until FF		
Reed Canary Grass	Grass												
Garlic mustard	Herb												
Purple loosestrife	Herb												
Spotted knapweed	Herb										Until FF		
Swallow-wort	Herb												
Locust spp.	Tree												
Norway maple	Tree												
Tree of heaven	Tree												
Large grey willow	Woody												
Asiatic bittersweet	Woody												
Autumn olive	Woody												
Burning bush	Woody												
Barberry spp.	Woody												
Buckthorn spp.	Woody												
Bush honeysuckle spp.	Woody												
Multiflora rose	Woody												

**Legend:**

- Treatment window
- Best time for treatment
- Basal growth treatment only as rest has seeded (Biannual species)
- No treatment - no herbicide application or hand-pulling (ground disturbance)
- Limited herbicide treatment only. No hand-pulling (ground disturbance)
- "Until FF" - Until First Frost



## 4 Conformance with the Performance Standards of the WPA

### 4.1 WPA - Ecological Restoration Limited Project

The proposed Project is being filed under the Limited Project provisions in the WPA regulations found at 310 CMR 10.53 (4) (e) 5. as an “Other Restoration Project”. This provision provides for projects that will improve the capacity of a Resource Area to protect the interests identified in M.G.L. c. 131, section 40. This project may be permitted as an Ecological Restoration Project provided that the project meets the eligibility criteria set forth in 310 CMR 10.54 (4)(a) through (d). Such projects “include, but are not limited to, the restoration, enhancement or Management of Rare Species habitat...the removal of aquatic nuisance vegetation to retard pond and lake eutrophication, the thinning or planting of vegetation to improve habitat value...”.

The Project will impact areas designated as NHESP Priority/Estimated Habitat, as well as Certified and Potential Vernal Pool Habitats. BSC and MAARNG have been working with NHESP to design an Invasive Plant Management Plan that will protect these sensitive habitats, and the rare species which they support. All rare species and time-of-year (TOY) restrictions outlined by NHESP will be followed during implementation of the management plan. No permanent impacts to wetland resource areas are proposed. During mechanical or hand pulling of vegetation, no vegetation will be removed that would result in stream bank de-stabilization or disturbance. If invasive plants are encountered within banks, non-ground disturbing management techniques will be employed to treat these plants (such as herbicide cut-and-paint).

### 4.2 WPA - Bordering Vegetated Wetland (BVW) – 310 CMR 10.55(4)(a-e)

*[310 CMR 10.55(4)(a)] – Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a BVW shall not destroy or otherwise impair any portion of said area.*

The wetland impacts proposed as part of the Project are temporary in nature. Monitoring of treatment areas will be conducted throughout the 5-year treatment period to ensure that no permanent impacts (other than the intended reduction in invasive plant species), occurs within BVW.

*[310 CMR 10.55(4)(b)] – Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5,000 square feet of BVW when said area is replaced (in accordance with 310 CMR 10.55(4)(b)).*

Not applicable; no permanent loss of BVW is proposed.

*[310 CMR 10.55(4)(c)] – Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of a portion of BVW when said portion has a surface area less than 500 square feet; said portion extends in a distinct linear configuration (“finger like”) into adjacent uplands; and in the judgment of the issuing authority it is not reasonable to scale down, redesign or otherwise change the proposed work so that it could be completed without loss of said wetland.*

Not applicable.

*[310 CMR 10.55(4)(d)] – Notwithstanding the provisions of 310 CMR 10.55(4)(a), (b) or (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.*

Portions of the Project are located within areas of NHESP Priority and Estimated Habitat. BSC submitted an Invasive Plant Management Plan to NHESP, to ensure that activities will not impact rare species or impair the quality of their habitats. The plan received approval on September 8, 2021 (NHESP tracking #21-40427). The intent

is also to improve overall habitat, removing species that limit diversity of native plant species. With a more robust structure of native species, the ecosystem will support more shelter and food sources for native wildlife, increasing resiliency. All restrictions and recommendations made by NHESP, including any location or time-of-year restrictions, will be adhered to during invasive plant treatment activities.

*310 CMR 10.55(4)(e)J – Any proposed work shall not destroy or otherwise impair any portion of BVW that is within an Area of Critical Environmental Concern designated by the Secretary of Environmental Affairs under M.G.L. c.21A, s.2(7) and 301 CMR 12.00.*

Not applicable; the Project is not located within an Area of Critical Environmental Concern.

## 5 Conclusion

The information contained in this Notice of Intent application sufficiently describes the existing site conditions, proposed activities, and anticipated impacts to wetland resource area and buffer zones protected under the WPA. The application further demonstrates that the Project can be completed in accordance with the applicable general performance standards for the affected resource areas. As an Ecological Restoration Limited Project which is proposed to restore and improve the function of the wetland resource areas and buffer zones at the site, the Applicant respectfully requests the Wakefield Conservation Commission issue a five-year Order of Conditions to accomplish invasive vegetation management.

## 6 References

- Burne, M., & Kenney, L. (2004). *Vernal Pools, Amphibians, and Reptiles of Camp Curtis Guild* (Report to Massachusetts NHESP No. 1).
- MIPAG - Massachusetts Invasive Plant Advisory Group. (n.d.). *MIPAG Invasive Species List*. Retrieved September 20, 2021, from <https://www.massnrc.org/mipag/>
- Swain, P. (2005). *Inventory of Exemplary and Priority Natural Community Occurrences: Camp Curtis Guild 2003-2004* (Report to the Massachusetts Army National Guard No. 1). NHESP.

# **Attachment B**

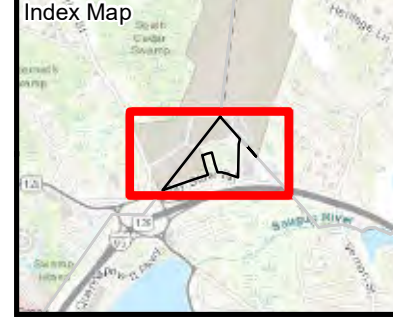
Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

USGS SITE LOCUS MAP  
ENVIRONMENTAL RESOURCES MAP  
INVASIVE VEGETATION MAP





Resource Areas Reviewed:  
 MADEP Tier Classified Oil and/or Hazardous Material Sites (21E); MADEP Oil and/or Hazardous Material Sites with Activity and Use Limitations; Certified Vernal Pools; Potential Vernal Pools; NHESP Priority Habitats; NHESP Estimated Habitats; NHESP Restricted Data; Wild & Scenic Rivers; NHD Hydrography; Census 2000 Streams; MADEP Hydrologic Connections; MADEP Wetlands; FEMA 100yr Floodplain; NRCS Hydric Soils; Public Water Supply; Zone II Wellhead Protection Area; Interim Wellhead Protection Area; Surface Water Protection Zone; Outstanding Resource Water; Areas of Critical Environmental Concern; Watershed Protection Act Zones; Ch. 91 Tidelands Jurisdiction; Article 97 Land; Landfills ([Not]Capped, [Un]Lined, [In]Active, Closed)



**Legend**

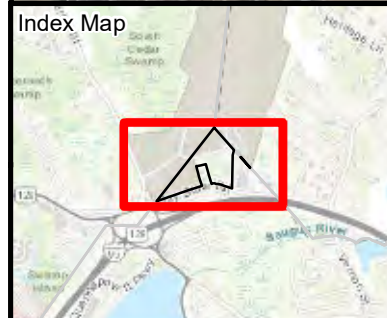
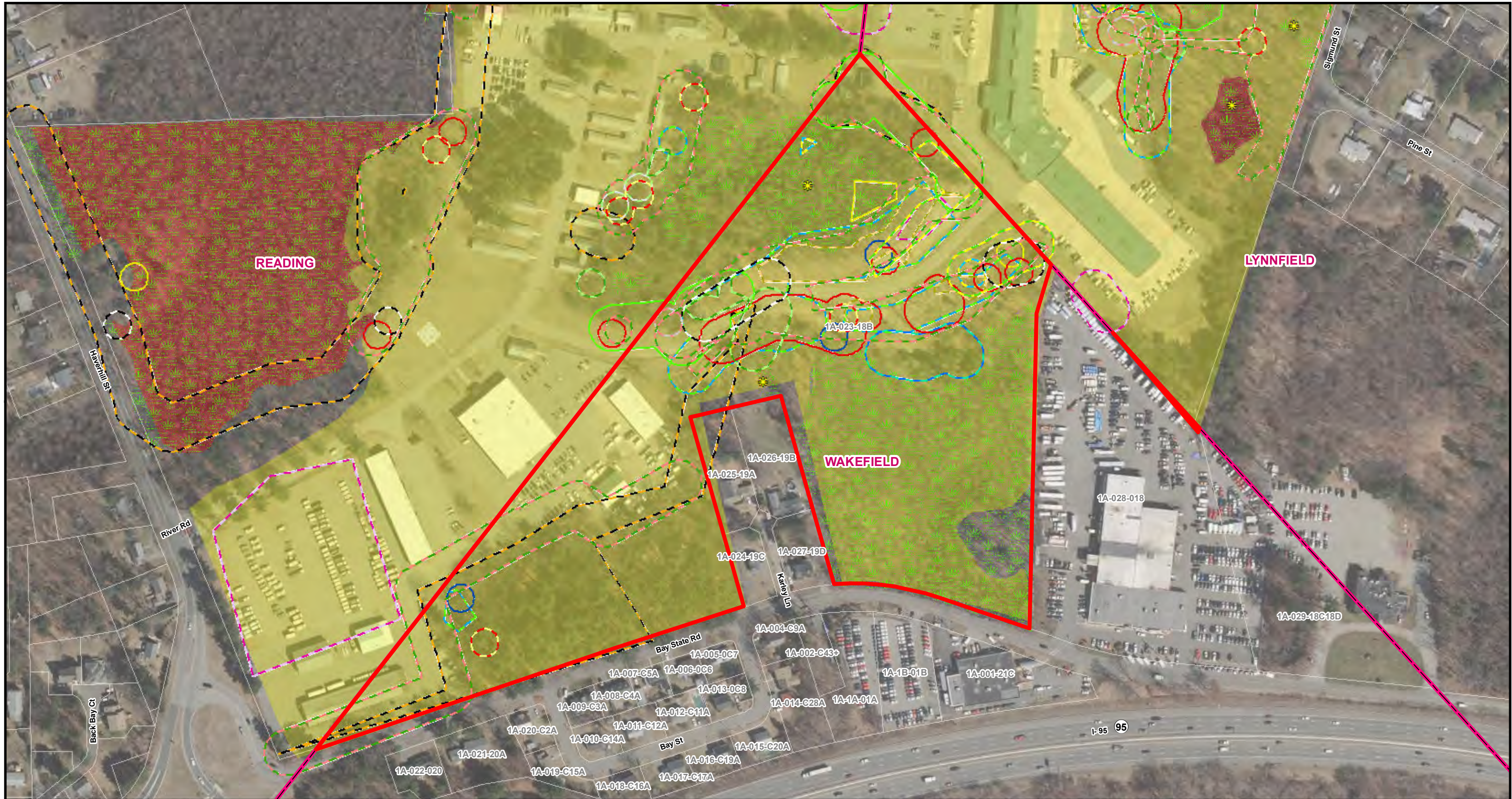
Camp Curtis Guild Project Area	Town Boundary	MADEP AUL Site
Field Delineated Wetlands	Parcel Boundaries	Potential Vernal Pool
100ft Buffer to Wetlands & Streams	<b>Article 97 Lands</b>	
25ft Zone of Natural Vegetation	Municipal	
NHESP Priority Habitats	Private	
FEMA 100yr Floodplain*		

1 inch = 200 feet  
 0 100 200  
 Feet  
 \*Indicates Layers Set to Transparency

**CAMP CURTIS GUILD**  
 Environmental Resources Map  
 Wakefield, MA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community





**Legend**

Camp Curtis Guild Project Area	<b>Surveyed Invasive Species</b>	Common reed	Multiflora rose	<b>Priority Management Areas</b>
Field Delineated Wetlands	Asiatic bittersweet	Garlic mustard	Norway maple	Priority Management Area
Town Boundary	Autumn olive	Glossy buckthorn	Reed Canary Grass	Secondary Management Area
Parcel Boundaries	Barberry	Honeylocust	Spotted knapweed	Vigilance Area
Potential Vernal Pool	Black locust	Japanese knotweed	Swallow-wort	
	Common buckthorn	Large gray willow	Tree of heaven	

1 inch = 200 feet  
 0 100 200  
 Feet

**CAMP CURTIS GUILD**  
**Invasive Vegetation Map**  
 Wakefield, MA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



# Attachment C

Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

SITE PHOTOS



**Photo #1:** View of potential VP and associated BVW within the Campus area of Camp Curtis Guild, within Wakefield. Invasive species in this area include reed canary grass (pictured), common reed, common buckthorn, multiflora rose and swallow-wort.



**Photo #2:** View of potential VP and associated BVW within the Campus area of Camp Curtis Guild, within Wakefield. Invasive species in this area include reed canary grass, common reed (pictured), common buckthorn, multiflora rose and swallow-wort.





**Photo #3:** View of red maple swamp BVW in the southern portion of the Camp Curtis Guild site. Common invasive plants in this area include multiflora rose and swallow-wort.



**Photo #4:** View of 100-ft Buffer Zone to BVW in the southern portion of the Camp Curtis Guild site. Common invasive plants in this area include multiflora rose and swallow-wort, with garlic mustard (pictured) in more open, dry areas.

# Attachment D

Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

ABUTTERS NOTIFICATION LETTER  
CERTIFIED LIST OF ABUTTERS  
MAILING CERTIFICATE



**WAKEFIELD  
Abutters List**

**Subject Parcel ID: 1A-023-18B**

**Subject Property Location: MAIN ST**

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
1A-001-21C	81 BAY STATE RD	81 BAY STATE LLC		90 BAY STATE RD	WAKEFIELD	MA	01880
1A-002-C43+	49 BAY STATE RD	KITTERY JAMES K		49 BAY STATE RD	WAKEFIELD	MA	01880
1A-004-C9A	47 BAY STATE RD	MASELLA CAROL A		47 BAY STATE RD	WAKEFIELD	MA	01880
1A-005-0C7	43 BAY STATE RD	CHAMBERS MAUREEN A	CHAMBERS RICHARD J	43 BAY STATE RD	WAKEFIELD	MA	01880
1A-006-0C6	39 BAY STATE RD	CHIPMAN JR SCOTT		39 BAY STATE RD	WAKEFIELD	MA	01880
1A-007-C5A	35 BAY STATE RD	COLACHICO TRS, A CHARLES	C & M REALTY TRUST	35 BAY STATE RD	WAKEFIELD	MA	01880
1A-008-C4A	33 BAY STATE RD	BOF, NICHOLAS J & LISA A		33 BAY STATE RD	WAKEFIELD	MA	01880
1A-009-C3A	29 BAY STATE RD	JOHNSON SANDRA L	JOHNSON NORMAN O JR	29 BAY STATE RD	WAKEFIELD	MA	01880
1A-020-C2A	23 BAY STATE RD	DOW, KEVIN M	JOAN M DOW	23 BAY STATE RD	WAKEFIELD	MA	01880
1A-021-20A	19 BAY STATE RD	GALLUGI GREGORY P	GALLUGI ASHLEY M	19 BAY STATE RD	WAKEFIELD	MA	01880
1A-022-020	15 BAY STATE RD	BORGES JOSEPH R TR	BORGES MARY E TR	15 BAY STATE RD	WAKEFIELD	MA	01880
1A-023-18B	MAIN ST	COMMONWEALTH OF, MASS	CAMP CURTIS GUILD	P O BOX 212	READING	MA	01867
1A-024-19C	48 BAY STATE RD	MAIOLINO PETER W	MAIOLINO ERIN E	48 BAY STATE RD	WAKEFIELD	MA	01880
1A-025-19A	3 KEARLEY LN	HARDY, BRUCE E	J B HARDY TRS HARDY REP	3 KEARLEY LN	WAKEFIELD	MA	01880
1A-026-19B	2 KEARLEY LN	LEDoux, KATHY H	WINIFRED H LEDoux	2 KEARLEY LN	WAKEFIELD	MA	01880
1A-027-19D	52 BAY STATE RD	COOPER, ROGER B	MARCIA E COOPER	52 BAY STATE RD	WAKEFIELD	MA	01880
1A-028-018	90 BAY STATE RD	MANNING TR JEFFREY	CHARLES E KNOPF JR CHA	90 BAY STATE RD	WAKEFIELD	MA	01880
1A-1A-01A	75 BAY STATE RD	81 BAY STATE LLC		90 BAY STATE RD	WAKEFIELD	MA	01880
1A-1B-01B	77 BAY STATE RD	81 BAY STATE LLC		90 BAY STATE RD	WAKEFIELD	MA	01880

Parcel Count: 19

*End of Report*

Wakefield Abutters within 100ft of the Subject Parcel ID

Requested by: Matt Burne of BSC Group, Inc.

38 Arbutus Rd

Worcester, MA 01606

Ph: 617-896-4594

*Scott W. Morrison*

**BOARD OF ASSESSORS**

## NOTIFICATION TO ABUTTERS

### Under the Massachusetts Wetlands Protection Act

**(This form must be completed and copies sent, by certified mail or hand-delivered, to all abutters within 100 feet of the location of the project.)**

In accordance with the second paragraph of *Massachusetts General Laws, Chapter 131, Section 40*, you are hereby notified of the following:

The name of the applicant is MA Army National Guard - Camp Curtis Guild

The applicant has filed with the **Wakefield Conservation Commission** for a: (Please check applicable filing.)

- Notice of Intent, seeking permission to alter an area subject to protection under the Wetlands Protection Act.
- Request to amend an existing Order of Conditions.
- Notice of Resource Area Delineation, seeking to determine the extent of areas subject to protection under the Wetlands Protection Act.

The proposed work includes 5-year Invasive Plant Management Plan, including the application of herbicides within wetland resource areas (BVW, buffer zones, vernal pools, and NHESP designated Priority Habitat). Herbicide will be applied using selective measures to minimize application rates and target invasive plant species only. If approved, the 5-year period allows MAARNG a broad time window for conducting strategic invasive plant management projects for ecological benefit.

Site location Camp Curtis Guild - 0 Main Street, Wakefield, MA

Copies of the Notice of Intent may be examined or obtained (for a fee) from:

(Check all that apply)

Applicant at \_\_\_\_\_

Representative at BSC Group, Inc. Attn: Matthew Burne (mburne@bscgroup.com)  
between the hours of 9 and 5 on the following days: Monday - Friday.

Conservation Department – Wakefield Town Hall 1 Lafayette Street, 2<sup>nd</sup> floor, Wakefield, MA - Tuesdays between 9:00 a.m. and 1:00 p.m., Thursdays between 9:00 a.m. and 6:00 p.m. and Fridays between 9:00 a.m. and 11:30 p.m. Please call the Conservation office at 781-224-5015 to verify arrangements prior to visiting.

Electronic copies of these filings may also be available through the Conservation Department. To request an e-copy, please email [concom@wakefield.ma.us](mailto:concom@wakefield.ma.us) or call the Conservation Office directly at 781-224-5015.

**Note:** Notice of the public hearing, including its date, time and place will be published in the **Wakefield Daily Item** at least five (5) business days prior to the public hearing date.

**Note:** Notice of the public hearing, including its date, time and place will be posted in **Wakefield Town Hall** at least 48 hours prior to the public hearing date. This information will also be listed on the town website at [www.wakefield.ma.us](http://www.wakefield.ma.us) at the home page under Upcoming Meetings.

**Note:** You may also contact the **Department of Environmental Protection** (DEP) Regional Office for more information about this application or the Wetlands Protection Act. To contact the DEP, Northeast Region, call (978) 694-3200.

Certificates of  
Mailing to be  
provided prior  
to hearing



# **Attachment E**

Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

INVASIVE SPECIES MANAGEMENT PLAN

# Camp Curtis Guild

## Five Year Invasive Plant Adaptive Management Plan



Massachusetts Army National Guard  
2021-2025



*Atlantic white cedar swamp in the northwest portion of the Camp Curtis Guild Property.*

Prepared by: BSC Group Inc.  
33 Waldo Street,  
Worcester, MA 01608



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Figure 2: Invasive Species Field Survey Results
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Appendix A: Detailed Field Survey Result Tables
Appendix B: Time of Year Restrictions and Monthly Schedule Tables
Appendix C: Best Management Practices, Treatment Guides, Additional References
Appendix D: NHESP Rare Species and Invasive Plant Management Precautions



## 1.0 INTRODUCTION

### 1.1. *Project Need and Purpose*

The Massachusetts Army National Guard (MAARNG) retained BSC Group, Inc. (BSC) to conduct an invasive plant species survey and devise a management plan for the Camp Curtis Guild – a 702-acre property (the base) that lies within the municipal boundaries of Reading, Lynnfield, North Reading, and Wakefield, Massachusetts. Specifically, BSC has been asked to:

- Provide detailed mapping of the invasive plant species present on the site;
- Provide management recommendations for the treatment of invasive species, dependent upon site conditions and the need to protect sensitive resource areas and rare species habitats, while meeting management goals;
- Provide a prioritized adaptive 5-Year Management Plan (2021 – 2025), which balances the need to manage invasive species populations with the need to protect sensitive resource areas and habitats, and,
- Discuss likely future scenarios, including the potential need for future management beyond the initial 5-year Management Plan.

In accordance with MAARNG’s request, BSC has prepared this 5-year Adaptive Management Plan to help guide decisions for managing and removing invasive plant populations on the property. “Invasive plants” are defined by the Massachusetts Invasive Plants Advisory Group (MIPAG) as “*non-native species that have spread into native or minimally managed plant systems in Massachusetts. These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.*”

Invasive plants can have a variety of negative impacts on native ecosystems and species; they may out-compete native plant species for resources including water, light and nutrients (Broadbent et al., 2018; Vilà & Weiner, 2004), reducing overall biodiversity of plant communities over time; they can alter soil conditions in ways that are unfavorable for native plant species (Cipollini & Wagner, 2011; Ehrenfeld et al., 2001); they may interact with invasive animals in ways that could impact ecosystem stability (Belote & Jones, 2009); and they can negatively impact native animal species if they do not provide suitable food or habitat conditions compared to the native plants which they have displaced (Davis et al., 2015). As such, the early detection and management of invasive plants is crucial for protecting native species and ecosystems.

During the initial consultation and project planning phase with MAARNG, a target list of 27 invasive plant species was drawn-up, based on known invasive species distributions across Massachusetts, and within the area surrounding Camp Curtis Guild. The top priority species for management identified by MAARNG, due to their presence and threat to habitat, are:

- 1) Garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergii*), common barberry (*Berberis vulgaris*), Japanese stiltgrass (*Microstegium vimineum*), swallow-wort (*Cynanchum louiseae*), and Asiatic bittersweet (*Celastrus orbiculatus*). All occur throughout the base.
- 2) Tree-of-heaven (*Ailanthus altissima*) and black locust (*Robinia pseudoacacia*). These species occur in the disturbed portion of the training area. These species should be treated before they invade the intact forest.

- 3) Common reed (*Phragmites australis*). This species is threatening habitat quality in several wetlands on base.
- 4) Glossy buckthorn (*Frangula alnus*) and common buckthorn (*Rhamnus cathartica*). BSC has added these two species to the initial priority species list due to their proximity to important habitat types and their potential for negative impacts to these areas.

While it is important to manage invasive plant populations as rapidly and completely as possible, it is also important to ensure that management practices do not inadvertently cause harm to native species and habitats. In particular, invasive plant management techniques need to be compatible with maintaining rare species habitat within Camp Curtis Guild. In particular, management must preserve the habitat of the one (1) federally and two (2) state-listed mammal species, one (1) state-listed bird species, one (1) state-listed amphibian species, and two (2) istate-listed invertebrate species.

### *1.2. Site Description: Land Use and Wetland / Waterways Resource Areas*

Camp Curtis Guild is MAARNGs second largest training site, with resources including 15 training areas; two bivouac sites for up to company-sized elements; a land navigation course; Engagement Skills Trainer; vehicle recovery training site; engineer dig training site; and a helipad. The site is divided into 15 training areas, which for the purposes of this report, have been grouped broadly into three sectors – a north sector (training areas B-8, B-9, C-1 shown in **Figure 3**), central sector (training areas A3, A-4, B-7, shown in **Figure 4**), and a south sector (training areas A-1, A-2, B-1, B-2, B-3, B-4, B-5, B-6, and the Campus, shown in **Figure 5**). Please refer to **Figure 1** for an overall depiction of these locations, and the natural communities found in each. Due to safety concerns, training area A4 (which is down-range of the Reading Rifle and Revolver Club), is inaccessible for the purposes of invasive plant surveys or management.

Camp Curtis Guild is located in a primarily suburban area, and the base is bisected by two utility right-of-ways (ROWs); a National Grid electrical transmission line that traverses in a North-South direction (crossing training areas C1 and B9), and a Kinder Morgan gas pipeline that mostly traverses East to West (along the border between training areas C1 and B9). Predominant habitat types within Camp Curtis Guild include extensive upland and wetland mixed forest. The uplands throughout the base support vegetation typical of the region, mostly variations within the general Central Hardwoods – Hemlock - White Pine Forest type, with White Pine Oak Forest and Mixed Oak Forest predominating (Swain, 2005). Roughly 33% of the site is wetland; a wetland survey conducted by Normandeau Environmental Consultants (2014) identified a total of 36 wetlands within the site, of which three were classified as Bordering Vegetated Wetland (BVW). The largest of these BVWs (identified as wetland 101 in the Normandeau report, also known as Cedar Swamp on the USGS topographic map), extends along the entire western side of Camp Curtis Guild, as well as covering a large part of the northern sector. The wetland is classified by U.S. Fish & Wildlife Service (2020) as Palustrine Forested Broad-leaved Deciduous (PFO1), and is associated with Bear Meadow Brook, a tributary of the Ipswich River which flows north through the wetland. Wetlands 162 and 68, also identified as BVWs, are connected to Wetland 101 by an intermittent ditched stream. BVWs and the area within 100-feet of the edge of the BVW (known as the “100-foot buffer zone”), are jurisdictional resource areas regulated by the Massachusetts Wetland Protection Act (WPA). Some towns have local wetland bylaws and regulations that, in addition to the WPA, extend wetland resource area definitions and regulations.

In addition to BVW and their associated streams, Normandeau identified 33 isolated wetlands within the Camp Curtis Guild property. Depending on their size and degree of ponding, isolated wetlands may meet

the state criteria as Isolated Land Subject to Flooding (ILSF). Please refer to *Section 1.4. Regulatory Compliance*, for further details.

Based on publicly available NHESP MassGIS datalayers, four (4) NHESP Certified Vernal Pools and 11 Potential Vernal Pool are mapped within Camp Curtis Guild. However, a total of 51 vernal pools were field-verified during earlier survey work (Normandeau Associates, 2013), and should all be treated with the same precautions as Certified Vernal Pools.

### ***1.3. Site Description: Exemplary Communities and NHESP Rare Species Habitat***

#### ***1.3.1. Exemplary Communities***

Three natural communities of conservation interest have previously been identified within the Camp Curtis Guild property; Atlantic White Cedar Swamp, nutrient-rich Red Maple Swamp, and Scrub Oak Shrublands (Swain, 2005). These communities are considered by NHESP to be “Exemplary Communities” that are very important for conserving biodiversity within the state of Massachusetts. These communities are generally threatened by development, logging, succession, and invasive species. At Camp Curtis Guild, these exemplary community types also provide suitable habitat for a number of state-listed rare and threatened species.

The Atlantic White Cedar Swamp in the northern portion of the base is an uncommon community type north of Boston, and good examples of this habitat type are tracked by NHESP. Swain’s 2005 report noted that this uncommon habitat type may be a remnant of a previously much larger Cedar Swamp, and that the area should be maintained and protected. NHESP also noted that species composition within the Red Maple Swamp on the Camp Curtis Guild property indicates nutrient richness, which is uncommon for this community-type. Swain (2005) noted that the Red Maple Swamp was at risk from buckthorn incursion (both glossy buckthorn and common buckthorn). The Red Maple Swamp habitats located on and adjacent to Camp Curtis Guild, on Town of Reading conservation land located to the west, are known to support populations of state-listed amphibians, making them a priority for careful management (Burne & Kenney, 2004, and Matt Burne, pers. comm.). As such, invasive species management within Red Maple Swamp and Atlantic White Cedar Swamp areas should be a priority but must take precautions to avoid harm to sensitive amphibian populations, particularly concerning the use of herbicides.

The third exemplary community type identified by Swain included Scrub Oak Shrublands. These shrubland/early successional areas are located throughout the Camp Curtis Guild property, forming a mixed mosaic that provides small patches of open habitat important for many species of native moth and butterfly. In particular, there is one (1) state-listed species of invertebrate which relies on early successional Scrub Oak habitat. The species was recorded as a single specimen in 2004 at Camp Curtis Guild. The total area of Scrub Oak Shrublands within Camp Curtis Guild is relatively small, and opportunistic non-native plant species are abundant. Care would need to be taken when carrying out invasive plant management in open shrubland to prevent new invasions and successful recolonization of invasive and non-desirable plant species.

Table 1.1 provides a summary of the exemplary communities and important rare species habitat areas within Camp Curtis Guild, and their locations within the different training areas. An expanded version of this Table is provided in **Appendix A - Table A-1**. Please note that Scrub Oak Shrubland has not been included in either table due to the difficulty of quantifying this habitat area. Small patches of Scrub Oak Shrubland

are interspersed throughout the Camp Curtis Guild, including within some forest canopy openings, open areas of ROW, and forest edges.

**Table 1.1: Summary of Key Habitat Areas within each Sector in Camp Curtis Guild**

		NORTH SECTOR	CENTRAL SECTOR	SOUTH SECTOR
<b>Training Area</b>		B-8, B-9, C-1	A-3, B-7, A-4**	A-1, A-2, B-1, B-2, B-3, B-4, B-5, B-6, Campus
<b>Wetland (acres)</b>		200	4	32
<b>100-ft Buffer Zone (acres)</b>		67	11	44
<b>NHESP Priority Habitat (acres)</b>		180	78	76
<b>Amphibian Habitat</b>	<b># of CVPs</b>	2	0	0
	<b># of PVPs</b>	9	5	18
	<b>Red Maple Swamp (acres)</b>	146	2	22
<b>Upland Habitat * (acres)</b>		151	76	119
<b>Atlantic White Cedar Swamp (acres)</b>		16	0	0
<p>* Upland habitat includes scrub-oak habitat areas, but specific locations of scrub-oak habitat are unknown due to survey restrictions and small, interspersed patches.</p> <p>** Training Area A-4 not included as it was not part of the survey. Based on previous data, this training area contains 20 vernal pools, as well as areas of Red Maple Swamp and Scrub Oak Shrubland uplands.</p>				



**1.3.2. Rare Species**

Seven (7) State and/or Federally listed species have been recorded at the Camp Curtis Guild site. Table 1.2 provides a summary of these species and their known habitat requirements. **Appendix D** provides a more detailed overview of these species, and the invasive species management considerations for each.

**Table 1.2: Rare species and their habitat requirements within the Camp Curtis Guild Property**

Species	Conservation Status MA / Federal	Habitat
Amphibian	Special Concern / None	Vernal pools (breeding), forested wetlands, and surrounding upland forests. Salamanders may migrate up to 900-ft from their breeding pools (NHESP, 2007), so protection of the surrounding forest as well as the breeding pools is crucial to population survival.
Invertebrate	Special Concern / None	Pitch pine-scrub oak barrens and sandplains (NHESP, 2019d).
Invertebrate	Special Concern / None	Vernal pools (NHESP, 2015a).
Mammal	Endangered / Threatened	Forest habitats, in particular foraging over vernal pools and forest edges. Hibernates in caves or mines, with a known hibernaculum located to the southeast of Camp Curtis Guild. Roosts in trees, and pups are reared between May – July (NHESP, 2019b).
Mammal	Endangered / None	Forest habitats, in particular foraging over forest roads, trails, and water bodies (although can be found anywhere insects are abundant). Hibernates in caves or mines, and roosts in buildings, trees and log piles (NHESP, 2015b).
Mammal	Endangered / None	Similar to above, although tends to shelter in buildings in summer and caves/mines in the winter. Generally found in western MA, restricted to caves in the foothills of mountains rising to 2,000 feet, with hemlock, spruce, and white cedar predominating among the conifers (NHESP, 2019a).
Bird	Threatened / None	Wet woodlands, particularly Red Maple and White Cedar Swamp. Nests May – June. Migrates south in September – October (NHESP, 2019c).

\* Species for which time-of-year restrictions will be required during invasive plant management.

## **1.4. Regulatory Compliance and Permitting Strategy**

### **1.4.1. Regulatory Compliance**

#### Bordering Vegetated Wetlands and their 100-ft Buffer Zones

Bordering vegetated Wetland (BVW) is defined by the WPA as “*freshwater wetlands which border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants*”. Where activities that would alter a BVW are proposed (including activities outside of BVW which could cause alteration of the BVW), a Notice of Intent must be filed with the local Conservation Commission (see 1.4.2 Permitting Strategy section). In addition to the WPA regulation of BVW, some Towns regulate the 100-ft Buffer Zone surrounding BVW as a jurisdictional resource area, including the Towns of Reading, North Reading and Lynnfield. The Town of Wakefield does not have a Wetlands Bylaw, and as such defers to the WPA for regulation of wetland resource areas.

#### Isolated Land Subject to Flooding (ILSF)

Isolated Land Subject to Flooding is defined by the WPA as “*an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches*”. However, some towns recognize smaller areas of ILSF / isolated wetlands as jurisdictional resource areas:

- **North Reading** (which covers the upper northwest corner of the Camp Curtis Guild Property), recognize any land subject to flooding and any vernal pool, as well as the 100-ft Buffer Zone to these resource areas, as jurisdictional (North Reading Wetland Rules and Regulations, 1993).
- **Reading** (covering the western half of the central and south sectors), recognize any land subject to flooding and any vernal pool, as well as the 100-ft Buffer Zone to these resource areas, as jurisdictional (Reading Wetlands Protection Regulations, 2012).
- **Lynnfield** (covering the eastern half of the central and south sectors), regulates Vernal Pools “containing at least 200 cubic feet of water at some time during most years”, whether or not they have been certified by the Massachusetts Department of Fisheries & Wildlife, as well as the 100-ft boundary from the mean annual high-water line of such vernal pools (Lynnfield Wetland Protection Bylaw, 2005).
- **Wakefield** does not have a Wetlands Bylaw, and as such defers to the WPA for regulation of wetland resource areas.

#### Vernal Pools

Vernal Pool Habitat is defined by the WPA as any “*confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, § 40 as specified in 310 CMR 10.02(1)*”.

Vernal pools provide essential habitat for a number of protected amphibian and invertebrate species in Massachusetts, and as such invasive plant management within the vicinity of these habitats will require protective measures and review by NHESP.

Due to the difficulty in determining when isolated wetlands are functioning as vernal pool habitat without repeated monitoring over several years, and because the towns on which Camp Curtis Guild is located differ in their regulation of isolated wetlands, for the purposes of management recommendations these habitats are conservatively treated with the same precautions as vernal pools. All jurisdictional resource areas, local and state defined, are shown on the attached figures.

#### NHESP Habitats and Exemplary Communities

Due to the presence of exemplary community types and rare species habitat within Camp Curtis Guild, coordination with NHESP will be required to develop an appropriate management plan for invasive species control within Priority Habitat Areas. NHESP recommendations will be built into this plan following consultation and review.

#### ***1.4.2. Permitting Strategy***

When herbicide application is proposed within wetland resource areas and buffer zones, a Notice of Intent (NOI) will need to be submitted to the Town Conservation Commission (Reading, North Reading, Wakefield and Lynnfield), to receive an Order of Conditions (OOC) allowing the work to proceed within that town.

Once an OOC has been granted, the permit is valid for three (3) years, during which time the approved management plan, including herbicide application, may be carried out in accordance with any conditions specified by the Town. Extensions to OOCs are possible and should be requested at least 30 days prior to the expiration of the current OOC.

## 2.0 SURVEY METHODOLOGY

After consultation and approval of the selected survey areas shown on **Figure 1**, and discussion and field review of data collection strategies, the entire Camp Curtis Guild property (with the exception of training area A4), was surveyed between October 14 – 22, 2020. Training Area A4 was designated as a No-Survey Zone due to safety concerns associated with the private gun range off property. More detailed surveys were completed in areas of disturbance where invasive plant species were also more likely to be observed. These included: parking lots, day use areas, fields/meadows, forest roads, ROWs, and open canopy areas shown on aerial imagery.

Invasive plant species data was collected using a tablet, an Arrow GNSS receiver and the ARC GIS collector application. Species sightings were recorded as one of three feature types: points, lines, or polygons. Quantitative information including abundance and distribution, and species location information such as habitat type (wetland, bank, field, woods, etc.) was also collected to aid in determining a recommended management strategy. Finally, a survey area polygon was drawn over areas reviewed for the presence of invasive plant species. ArcCollector field survey data, including invasive species survey points, lines and polygons, photo documentation of invasive species, and notes on the growth stage of invasive species stands (young/seedlings, mature plants, or mixed), will be made available to Camp Curtis Guild to help guide management in the field.

### 3.0 FINDINGS: INVASIVE SPECIES DISTRIBUTION

#### 3.1. Overview

Of the 27 invasive species known to occur within the area of Camp Curtis Guild, BSC field identified twenty-one (21) invasive plant species. Table 3.1 lists the invasive species identified within Camp Curtis Guild, the sector / training area where they occur, and their MIPAG status. Priority Species as identified by MAARNG are highlighted in orange. BSC has also prioritized glossy and common buckthorn.

**Table 3.1: Invasive plant species occurring on the Camp Curtis Guild Property.**

Species	Sector	Training Area	MIPAG Status*
Asiatic Bittersweet ( <i>Celastrus orbiculatus</i> )	N, C, S	A-1, A-2, A-4, B-1, B-2, B-4, B-6, B-7, B-8, B-9, C-1, Campus	I
Autumn Olive ( <i>Elaeagnus umbellata</i> )	N, S	A-1, B-1, B-2, B-9, Campus	I
Black Locust ( <i>Robinia pseudoacacia</i> )	S	A-1, B-1, Campus	I
Burning Bush ( <i>Euonymus alatus</i> )	N	C-1	I
Common Barberry ( <i>Berberis vulgaris</i> )	N, C, S	A-1, A-2, A-4, B-2, B-6, B-7, B-8, B-9, C-1, Campus	LI
Common Buckthorn ( <i>Rhamnus cathartica</i> )	N, S	A-1, A-2, B-2, B-6, C-1, Campus	I
Common Reed ( <i>Phragmites australis</i> )	N, S	A-1, A-2, B-1, B-2, B-9, C-1, Campus	I
Garlic Mustard ( <i>Alliaria petiolata</i> )	N, S	A-1, B-1, B-2, B-6, C-1, Campus	I
Glossy Buckthorn ( <i>Frangula alnus</i> )	N, C, S	A-1, A-3, A-4, B-2, B-3, B-5, B-6, B-7, B-8, B-9, C-1, Campus	I
Honey-locust ( <i>Gleditsia triacanthos</i> )	S	A-1, B-1, B-2, B-4, Campus	Not listed/ reviewed
Honeysuckles (shrub) <i>Lonicera</i> spp.	N, S	A-1, A-2, B-9, C-1	I
Japanese Barberry ( <i>Berberis thunbergii</i> )	N, C, S	A-4, B-1, B-2, B-6, B-7, B-9, C-1, Campus	I
Japanese Knotweed ( <i>Polygonum cuspidatum</i> / <i>Fallopia japonica</i> )	S	A-1, A-2, B-1, B-2, Campus	I
Large Grey Willow ( <i>Salix atrocinerea</i> / <i>Salix cinerea</i> )	N, S	B-9, Campus	I
Multiflora rose ( <i>Rosa multiflora</i> )	N, C, S	A-1, A-2, A-4, B-1, B-2, B-4, B-6, B-7, B-9, C-1, Campus	I
Norway Maple ( <i>Acer platinoides</i> )	N, S	A-1, B-2, B-6, C-1, Campus	I

Species	Sector	Training Area	MIPAG Status*
Purple loosestrife ( <i>Lythrum salicaria</i> )	N	B-9, C-1	I
Reed Canary Grass ( <i>Phalaris arundinacea</i> )	N, S	A-1, A-2, B-1, C-1, Campus	I
Spotted Knapweed ( <i>Centaurea biebersteinii</i> / <i>Centaurea maculosa</i> )	C, S	A-1, A-3, B-1, B-2, B-3, B-6, B-7, Campus	LI
Swallow-wort ( <i>Cynanchum rossicum</i> / <i>Vincetoxicum rossicum</i> )	N, S	A-1, B-1, C1	LI
Tree of Heaven ( <i>Ailanthus altissima</i> )	N, S	A-1, A-2, B-1, B-2, C-1, Campus	I

\* I = Invasive; LI = Likely Invasive. Black locust is “I” and is a priority species, whereas honey-locust is not listed/reviewed and is not a priority species.

Table 3.2 summarizes the population extent (i.e. the total area over which invasive species populations were observed during the field survey), as a percentage of each sector. These population extent percentages do not factor in the percent cover of individual populations of invasive species. For example, Asiatic bittersweet had a population extent of two acres, within the 200-acre central sector. As such, Asiatic bittersweet has a population extent covering approximately 1% of the central sector. Within these populations, Asiatic bittersweet was observed at percent cover classes between 16-25% cover.

The most abundant invasive plant species on Camp Curtis Guild were glossy buckthorn, Asiatic bittersweet, multiflora rose, Japanese and common barberry, and common reed. Invasive plant species tended to cluster around the developed and frequently disturbed areas within the south sector of the property, and along the electrical and gas ROWs within the central and north sectors.

**Table 3.2: Summary of invasive plant species Population Extent within each sector in Camp Curtis Guild.**

(Expanded table provided in Appendix A – Table A-2)

<b>Sector Summary</b>			
	<b>NORTH SECTOR</b>	<b>CENTRAL SECTOR</b>	<b>SOUTH SECTOR</b>
<b>Training Area</b>	B-8, B-9, C-1	A-3, A-4**, B-7	A-1, A-2, B-1, B-2, B-3, B-4, B-5, B-6, Campus
<b>Sensitive Resource Areas***</b>	<i>W, BZ, NHESP, 2 CVP, 9 PVP, RM, UP, C</i>	<i>W, BZ, NHESP, 5 PVP, RM, UP</i>	<i>W, BZ, NHESP, 18 PVP, RM, UP</i>
<b>Area (acres)</b>	<b>351.3</b>	<b>200.6</b>	<b>150.5</b>
<b>Population Extent (as a % of the sector) *</b>			
<i>Asiatic Bittersweet</i>	3.42	1.09	13.54
<i>Autumn Olive</i>	0.03	0.03	0.34
<i>Black Locust</i>	0.29		1.62
<i>Burning Bush</i>	0.02		
<i>Common Barberry</i>	0.57	0.20	0.96
<i>Common Buckthorn</i>	7.07	0.04	6.07
<i>Common Reed</i>	5.40		0.99
<i>Garlic Mustard</i>	0.96	0.01	1.93
<i>Glossy Buckthorn</i>	32.27	8.35	12.02
<i>Honey-locust</i>	0.01		1.27
<i>Honeysuckles (shrub)</i>	0.49		0.48
<i>Japanese Barberry</i>	5.39	0.03	0.60
<i>Japanese Knotweed</i>			1.11
<i>Large Grey Willow</i>	0.01		0.16
<i>Multiflora rose</i>	3.08	0.05	3.05
<i>Norway Maple</i>	0.07		0.57
<i>Purple loosestrife</i>	0.69		
<i>Reed Canary Grass</i>	0.04		0.14
<i>Spotted Knapweed</i>		0.52	6.47
<i>Swallow-wort</i>	0.02		0.42
<i>Tree of Heaven</i>	0.02		2.84
<i>Japanese Stiltgrass</i>	****	****	****

\* These values represent the Population Extent (i.e. the total area over which invasive species populations were observed during the field survey).

\*\* Training Area A-4 not surveyed.

\*\*\* Wetland (W), 100-Foot Buffer Zone to BVW (BZ), NHESP Priority Habitat (NHESP), Counts of Potential Vernal Pools (PVP) and Certified Vernal Pools (CVP), Red Maple Swamp (RM), Upland habitat (UP), Atlantic White Cedar Swamp (C)

\*\*\*\* Although not observed in the 2020 surveys, Japanese stiltgrass has been noted as potentially present on the Camp Curtis Property in the past. As such it should be considered as potentially present.

Within the north sector (**Figure 3**), glossy buckthorn was the most abundant invasive plant observed, with a population extent covering 32% of the north sector, with individual plant populations ranging between 20 - 50% cover. Glossy buckthorn was also the predominant roadside species throughout much of Camp Curtis. However, the access road extending south from Lowell Street had a wide variety of roadside invasive

species, including barberry species, Norway maple, multiflora rose, buckthorn species, black locust, and garlic mustard. Buckthorn populations along the edges of the electrical and gas ROWs within the north sector were dominated by young to mature shrubs. Young to mature buckthorn shrubs also occur throughout the understory of the Cedar Swamp to the north of the electrical ROW, with populations typically between 20-50% cover, while a more sparse distribution of young plants and seedlings was observed within the Red Maple Swamp to the south of the electrical ROW. Dense stands of common reed were found within the electrical ROW, where vegetation management below the power lines has maintained open conditions. Smaller patches of other invasive species, including Japanese and common barberry, garlic mustard, multiflora rose, and black locust, tend to cluster within the northeast of the sector, along the gas pipeline and close to suburban areas.

Within the surveyed areas of the central sector (**Figure 4**), glossy buckthorn was one of the more common and abundant species. Along the roadsides within the central sector, glossy buckthorn and barberry were the most common species. The highest densities of buckthorn occur between the intersection of the gas pipeline and the electrical transmission ROW, close to the border with the north sector. More isolated occurrences of invasive shrubs (buckthorn and barberry) and herbs (garlic mustard) were found within close proximity to a number of vernal pools within the central sector. *Note: training area A-4, located within the central sector, was not surveyed due to safety concerns. However, NHESP mapping suggests that this training area contains multiple vernal pools, which are a priority habitat for management of invasive species.*

The south sector of Camp Curtis Guild (**Figure 5**), is a more heavily developed and regularly disturbed area of the site. Within this sector, a more diverse array of invasive species was found, particularly along the eastern edge of the property (bordering suburban development) and within more open/disturbed areas including roads, parking lots and cultural grassland areas. Glossy buckthorn and common reed were particularly abundant along wetland edges, while Asiatic bittersweet tended to be found more towards the eastern edge of the sector, close to suburban development. Patches of common barberry, spotted knapweed, black locust, garlic mustard, and tree of heaven, tend to cluster around the roadside edges and open grassland areas.



## 4.0 PLANT MANAGEMENT WITHIN DESIGNATED MANAGEMENT AREAS

Because Camp Curtis Guild supports exemplary community types, and rare species and their habitats (described in more detail in **Appendix D**), invasive plant management techniques need to be targeted towards protecting these areas. As such, and to help guide the designation of time, energy and resources so that invasive species management may have the greatest benefit, Camp Curtis Guild has been divided into different Priority Management Areas (**Figure 6**). The management priority of an area was determined based on its current ecological value (including presence of rare species habitats or exemplary community types), combined with the potential for successful invasive species management, and benefits trade-off that this would bring to an area.

### 4.1. *Priority Management Areas*

Priority Management Areas include the Cedar Swamp and Red Maple Swamp within the central and north sectors, vernal pools within the central sector, as well as their immediate 100-ft Buffer Zone. Select areas of Red Maple swamp are also part of the priority management area in the south sector. These habitat types were designated as priority management areas for the following reasons:

- They represent exemplary community types and important habitats, which are uncommon or threatened across Massachusetts.
- The Red Maple Swamp in the northern sector of Camp Curtis is both an exemplary community type, and may support populations of State-protected amphibian.
- The Cedar Swamp and Red Maple Swamp are under threat from invasive plant species encroachment (particularly glossy buckthorn), which appears to be spreading into these wetlands from nearby ROWs. However, percentage cover of buckthorn populations within these habitats is still low to moderate, and there is good potential for significantly reducing the spread of this species through careful invasive plant management.
- Vernal pools within the central sector provide important habitat for amphibians, and currently have relatively low densities of invasive plant species. As such, these areas could be quickly and effectively treated, and managed as restored habitats in the long-term. Vernal pools within the south sector have been classified as a lower priority for management, as invasive plants are more thoroughly established in many of these sites, making effective management difficult. However, these pools could also be managed in the future, should resources allow.

### 4.2. *Invasive Plant Management within Priority Management Areas*

Considerations for invasive species management within Priority Management Areas should include limiting the use of herbicide as far as practicably possible (including avoiding the use of foliar spray within 100-ft of wetlands), minimizing ground disturbance to protect micro-habitats and reduce the risk of erosion, and following time of year restrictions for amphibians. Please refer to **Appendix D - Rare Species and Invasive Plant Management Precautions**, for further details of these restrictions within Priority Management Areas. Precautions should include:

- **Limited use of herbicides within wetlands and their 100-ft buffer zones:**
  - Prioritize hand-pulling or cutting (where appropriate for the invasive plant species).
  - Restrict herbicide use to selective methods that use less herbicide and minimize potential effects to non-target plants and organisms, such as the cut and paint method.

- Foliar spray within 100-ft of wetlands or vernal pools should be avoided, although a directed foliar spot spray on certain invasive species (where indicated) and/or stages of management (i.e., follow-up treatment to woody shrubs) may be considered.
- **Time of year restrictions** (within 100-feet of wetlands and vernal pools – see Table 4-1 below):  
*Factors contributing to time-of-year restrictions: Hand pulling disturbs the soil surface, which could disrupt adult amphibian and young metamorphs’ ability to migrate to vernal pools and wetland habitats safely. Also, both the adults and metamorphs are more vulnerable to being stepped on during their migration periods.*
  - No hand-pulling during Spring (*mid-February to late April*) or Summer (*early July to mid-September*) migration periods within 100 feet of vernal pools.
    - If vernal pools are observed to be dry at the time of treatment (more likely during the summer period), no restrictions within 100-feet on hand-pulling is necessary, although it is good practice to minimize disturbance as much as possible.
  - No herbicide application during Spring breeding period (*mid-February to late April*). Where possible, avoid herbicide application during Summer migration period within 100-feet, (*early July to mid-September*).
    - If there are no other suitable treatment windows, careful herbicide application during the summer migration period is possible, as this is less likely to cause disturbance than hand-pulling of vegetation.

**Table 4.1: Time of year restrictions specific to Priority Management Areas**

	Priority Management Areas: Vernal Pools and Red Maple Swamp											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hand-pulling												
Herbicide application (cut/paint)												



### 4.3. Secondary Management Areas

Secondary Management Areas include Scrub Oak Shrublands, which are predominantly interspersed among the upland mixed forest on the west side and central areas of Camp Curtis Guild (Swain, 2005). The majority of this area is within training area A4, which was not surveyed. As such, the whole area between Grant St. and Long St. has been broadly highlighted as a “Secondary Management Area”, although the specific goal within this region should be targeted towards management of invasive species within Scrub Oak Shrublands to improve the plant species composition and potential habitat for rare invertebrates. This habitat area was designated a lower management priority due to its relative inaccessibility (both for survey purposes and for future management), the fact that only one single observation of the rare invertebrate species has been recorded, and the fact that these fragmented habitat patches that have not been managed are likely succeeding to forest.

#### **4.4. Invasive Plant Management within Secondary Management Areas**

Considerations/restrictions on invasive species management within Secondary Management Areas should include:

- **Target management** to protect and restore Scrub Oak Shrubland communities. Where invasive plant species occur within scrub oak communities, use hand pulling or selective herbicide methods (e.g., cut and paint), to limit impacts to native species.
- **Avoid foliar spray** application in close proximity to Scrub Oak Shrublands where there is a possibility of drift impacting scrub oak trees.
- **Time of year restrictions:** Avoid all foliar spray application within scrub oak shrublands during the invertebrate's flight period (June 15 – July 15)

#### **4.5. Vigilance Areas**

Vigilance Areas represent habitats where frequent disturbance and proximity to suburban development pose a particular threat of new invasive species arrivals. The south sector of the property is a particularly high-risk area, and numerous invasive species already occur here. As such, management priorities within this Vigilance Area should focus on the rapid identification and eradication of new invasive plant species and/or populations, rather than attempting to eradicate already established populations of known invasives (particularly where these have already spread across the site).

In addition to the larger south sector vigilance area, the access road corridors throughout Camp Curtis Guild should also be regularly monitored and managed for invasive plant species. Roads can provide excellent pathways for the spread of invasive species, due to the movement of wildlife, people, equipment, and sediment along the roads (which may disperse invasive plant propagules), and the open, disturbed roadside habitat, which favors the establishment of opportunistic invasive species. As such, road margins should be regularly monitored for newly arriving invasive plants (species moving into Camp Curtis Guild from outside of the site), and for established invasive populations spreading within the site. The roadsides located in the central and northern sectors have been included as part of the vigilance area. A 50-foot buffer on either side of the access roads in the north and central sectors is shown on **Figure 6**. The areas within this buffer are considered the Roadside Vigilance Area. This designation reflects the potential threat that roadside populations pose to the surrounding habitat area. Given the ease of access and relatively reduced effort required to treat roadside invasive populations, targeting these areas on a regular basis, regardless of any other associated underlying management area designations, may help to reduce spread of invasive plants from the road network into other areas.

Lastly, where invasive species have already established dominant populations, for example dense stands of common reed/phragmites within the electrical ROW in the north sector, or extensive patches of barberry species along the east border of the south and central sectors, attempts at management should focus on reducing future spread of these populations, rather than attempting complete eradication or removal. As such, these heavily impacted areas have not been classified within the Priority Management Areas – efforts should be made (where resources allow), to restrict the spread of these species, but this should be of a lower management priority than protecting/restoring more minimally impaired priority habitats.

## 5.0 5-YEAR ADAPTIVE MANAGEMENT PLAN

Managing invasive plant species requires time, energy, and resources. Many of the recommended management strategies may require years of management and monitoring to achieve a significant reduction in population presence. Some invasive plants will require management and monitoring in perpetuity, and will likely never result in complete eradication of the population, but may provide a more balanced ecosystem that allows for a high degree of biodiversity, increased native plant abundance, species diversity, and improved habitat quality (Massachusetts DCR, 2011; MIPAG, 2005; Quirion et al., 2018). In order to achieve the best possible results, invasive species management requires defined (achievable) goals, a commitment to vigilance and action in perpetuity, and an emphasis on prevention over eradication of already established populations (MIPAG, 2005). The following sections outline the proposed goals for Camp Curtis Guild invasive plant management, recommended techniques for managing specific species to achieve these goals, and measures which will need to be put in place for continued long-term success.

### 5.1 Overall Management Goals for Camp Curtis Guild

- 1) Focus management effort on the control of invasive plants within the **Priority Management Areas**: north and central Red Maple Swamp and Cedar Swamp; north, central, and south sector Red Maple Swamp; and central sector vernal pools. These habitats are particularly valuable, and currently have lower densities of invasive plants, making them good candidates for effective management.
- 2) Targeted invasive species management within **Secondary Management Areas** should focus on protecting Scrub Oak Shrubland Habitats.
- 3) On-going vigilance for new invasive species which could arrive at the site, particularly focused on the **Vigilance Area** highlighted in the south sector, in addition to the associated **Roadside Vigilance Areas** located in the central and north sectors. The focus here should be on regular monitoring of frequently disturbed areas for new invasions and treating/controlling early.
- 4) Finally, as resources allow, invasive species management should focus on trying to control the spread from already heavily invaded areas. This should involve monitoring the extent of existing invasive stands, and focusing treatment around the edges of these areas to try and prevent expansion, rather than expecting to fully eradicate the existing populations.

### 5.2 Management Techniques and Time Frames

Invasive plant species may be controlled through manual, mechanical, chemical, and biological methods to reduce their extent, influence on habitat function, and competition with native plant species. Additional management methods include prescribed burns and the use of livestock such as goats. Management techniques recommended for Camp Curtis Guild have been chosen to protect rare species and exemplary community types while meeting invasive species management goals. In particular, highly targeted techniques which minimize impacts to native species and habitats are favored, including manual hand-pulling (for small forbs and seedling shrubs), cut-and-paint application of herbicides (for larger shrubs and small saplings), or girdling (for invasive trees). More generalized application of herbicides (foliar spray) is generally discouraged and should be avoided within 100-ft of wetland habitats or other exemplary community types (Oak Scrub Shrublands), where possible. Managed populations should continuously be monitored to determine success and management efficacy. Personnel and materials involved in invasive species management on the Camp Curtis Guild property will utilize existing roads, established access

routes, and Rights of Way to access treatment areas throughout the site but no wheeled or tracked vehicles will be used off-road to conduct treatments without prior approval from NHESP and local Conservation Commissions (within jurisdictional areas).

While all locations should be considered a priority for invasive plant management over the next five years, as resources are limited, prioritization will be necessary due to limitations that include time, money, practicability, avoidance and minimization measures, or permitting constraints within sensitive and protected resource areas. Prioritization of management should be based on the following:

- Ranking of Priority Management Areas / Secondary Management Areas / Vigilance Areas (described in Section 4);
- Time of year restrictions for rare species and exemplary community types (Table 5.3, and summarized in **Appendix B** Table B-2 and B-3);
- Biological restrictions specific to the target invasive plant species (for example, some species will require annual treatments, while others will benefit from bi-annual treatments), and;
- Consulting Table 5.2 and **Appendix B** - Suggested year-by-year treatment schedule by species.

Detailed species-specific best management practices (**Appendix C**) and time of year constraints (**Appendix B**), should be consulted prior to starting any invasive plant treatments. The following Sections 5.2.1 – 5.2.3 should be followed in order, to help determine the most appropriate management technique for a given species. Section 5.2.1 provides recommendations for how to treat different invasive plant growth forms, including mature trees, ‘woody’ vegetation (woody shrubs, thick woody vines and small tree saplings), vines (non-woody), grasses, and forbs. Once appropriate treatment option(s) have been determined, Section 5.2.2 provides a year-by-year treatment schedule for the invasive species found on Camp Curtis Guild. Section 5.2.3 details any additional site-specific restrictions on invasive plant treatments, due to rare species habitat, or presence of exemplary community types.

MAARNG will continually assess the invasive species management program prior to implementing these management strategies, as adaptive and flexible management is essential for ensuring that invasive species are effectively controlled and that valuable native habitats are protected. Continued monitoring is a recommendation for all invasive species management.

### **5.2.1. Treatment Recommendations by Growth Form**

Categorizing the type/growth form of plant species can be useful in simplifying the approach to vegetation management, as categorically similar plants typically require the same variations in technique for management. For the purpose of this report and management strategies, plants are categorized into five groups: grasses, vines, forbs (non-graminoid herbaceous species), shrubs, and trees (**Figure 2A**). Note that plant maturity is a factor in determining which group/growth form some species fall into. Table 5.1 (below), summarizes the treatments recommended for different plant growth forms encountered on Camp Curtis Guild. Both shrubs and woody vines have been grouped together in Table 5.1 as they typically share the same treatment methods. To determine which of the five categories each species has been classified as, refer to Appendix C, Species Specific Management Recommendations.

For ease of treatment, tree species growing less than 4’ tall should be considered ‘shrub’ and treated following woody vegetation techniques below (select the most appropriate woody vegetation technique from fully mature, sapling, or seedling, depending on the size of the tree). Note the ‘exceptions’ column within the treatment table, that lists species where non-chemical treatments are discouraged.



Where seedlings, saplings, or grasses/forbs are removed by hand, it is important to ensure that all parts of the plant are removed (roots, rhizomes, stem and leaves). Many species can rapidly re-sprout from remnant roots/rhizomes left underground, or from stem fragments left on-site. In particular, bittersweet and reed canary grass are not recommended to be removed by hand for this reason. Where possible, cutting should be conducted when plants are not flowering or setting seed, reducing the risk of spreading propagules during management. If plants have seeds or berries at the time of cutting, material should be carefully bagged for disposal, either on or off site, or burned near the collection area. For species which can spread or re-sprout readily from cut stem fragments (such as common reed, reed canary grass, and garlic mustard), all material should be bagged or burned near the collection area to reduce the risk of spread.

**Table 5.1: Recommended treatment type by plant growth form.**

(Note on chemicals: Other glyphosate or triclopyr-based formulations may be used if labeled for the site. For wetland use, formulations and any adjuvants must be water-safe and approved for use in or near wetlands.)

(Refer to **Figure 2A** for a map of the locations of these invasive species groupings by growth form.)

Growth Form	Maturity Level	Recommended Treatment Type	Secondary Herbicide Recommendations	Non-Chemical Treatment	Exceptions to Non-chemical Treatment**
Tree	Fully Mature	Girdle or Partial Girdle and Spray (See Appendix C)	Basal Bark (Garlon 4 Ultra)	Girdling with no chemical	Tree of Heaven, Locust, Gray Willow
	Sapling	Cut & Paint (Garlon 3A/Rodeo)	Foliar (Garlon 3A/Rodeo)	Shovel excavate (all root material)	Tree of Heaven, Locust
	Seedling	Foliar* (Garlon 3A/Rodeo)	Hand wick (Garlon 3A/Rodeo)	Weed wrench or hand removal	Tree of Heaven, Locust
Shrubs / woody vines	Fully Mature	Cut & Paint (Garlon 3A/Rodeo)	N/A (too much risk of collateral spray)	Shovel excavate (all root material)	Bittersweet, Honeysuckle
	Sapling	Cut & Paint (Garlon 3A/Rodeo)	N/A (too much risk of collateral spray)	Hand pull or shovel excavate (all root material)	Bittersweet, Honeysuckle
	Seedling	Foliar* (Garlon 3A/Rodeo)	Hand wick (Garlon 3A/Rodeo)	Weed wrench or hand removal	Bittersweet
Grass	All Stages	Foliar* (Garlon 3A/Rodeo)	N/A	Hand removal/shovel excavate/mowing routinely	Common reed, Reed canary grass
Forb	All Stages	Foliar* (Second year Garlic Mustard <sup>†</sup> ) (Garlon 3A/Rodeo)	Garlon 3A (Broadleaf specific)	Hand removal, Mowing	

**NOTE:** differences in the recommended treatment type (highlighted in green) may occur for work within exemplary communities and rare species habitat.

- \* Restricted use of foliar spray within 100-ft of wetlands or Scrub Oak Shrubland Habitat. Defer to secondary recommendation or non-chemical option.
- \*\* “Exceptions” to the generally recommended treatment type (highlighted in orange). These species require specific treatment measures above and beyond the generic treatment type. Refer to **Appendix C** Management Guides for specific requirements for these species.
- † Treatment is preferred when plant is in basal stage or prior to seeding for biannual species.

### 5.2.2. Treatment Recommendation Adjustments within Wetlands and Buffer Zones

In general, foliar application of herbicides should be avoided where possible, and **should be used only when necessary within 100-ft of wetlands or vernal pools**. Any foliar application should be carefully targeted by adjusting nozzle size, using a low spray-pressure, and using careful application to reduce drift and overspray as much as possible. No herbicide application (foliar, cut/paint or hand wick), should be conducted when rain or fog is forecast, particularly for applications within 100-ft of wetlands. Be sure to follow the instructions on the herbicide label regarding application windows prior to, or after, any

precipitation events. Priority Management Areas (**Figure 6**) are primarily threatened by encroachment of glossy and common buckthorn, and some other invasive shrub (woody) species. Due to the exemplary communities and rare species habitats found in these areas, as well as their wetland nature, low-herbicide use will be required. Specific treatment recommendations for Priority Management Areas can be referenced in Section 4.0.

### ***5.2.3. Five Year Adaptive Management Schedule***

Once an appropriate treatment type for the plant growth form and species in question has been determined (based on Table 5.1, and review of any species specific requirements in **Appendix C**), Table 5.2 should be consulted to determine an appropriate year-to-year treatment schedule. The schedule outlined here takes into consideration factors such as plant growth rate, the need for repeated applications of herbicide or repeated removal of new seedlings emerging from the seedbank, and the need to allow gap years for some species (to allow any re-sprout/suckering to be large enough to treat). As such, treatment gaps between years should be maintained, if the year of initial treatment is altered (for example, a species requiring two years of consecutive treatments could be treated in years 1 and 2 or in years 2 and 3, but should not be treated in year 1 and year 4).

**Please note that monitoring and assessment after treatment will inform the need for adaptive management recommendations when applying this schedule – if new plants are identified between treatment years, or if re-growth occurs past the anticipated end date for treatment, management will need to be adjusted to meet these changes. Successful removal of invasive plants is a multi-year commitment and follow-up monitoring and management may need to be ongoing for at least 3-5 years and often longer. should be used as a guideline for management, rather than a definitive schedule.**

**Table 5.2: Suggested year-by-year treatment schedule by species**

Species*†	Growth Form	Year 1	Year 2	Year 3	Year 4	Year 5
Common reed	Grass	x	x	x	x	x
Japanese knotweed	Grass	x	x	x	x	x
Reed canary grass	Grass	x	x	x	x	x
Japanese stiltgrass	Grass	x	x	x	x	x
Garlic mustard	Herb	x	x	x	x	x
Purple loosestrife	Herb		x	x		
Spotted knapweed	Herb		x	x	x	x
Swallow-wort	Herb	x	x	x		
Locust spp.	Tree	x		x		
Large gray willow	Tree/ shrub	x		x	x	
Norway maple	Tree	x		x		
Tree of heaven	Tree	x		x		
Asiatic bittersweet	Shrub	x	x	x	x	x
Autumn olive	Shrub	x	x			
Burning bush	Shrub	x	x			
Barberry spp.	Shrub	x	x			
Buckthorn spp.	Shrub	x	x	x	x	x
Honeysuckles	Shrub		x	x	x	
Multiflora rose	Shrub	x	x	x	x	x

\* **NOTE:** For species with treatment gaps, the year in which treatment is administered can be flexible, but the time between treatments should be maintained. This schedule allows for re-growth in between treatments, which can be important for overall eradication of the plant.

† Priority Species as identified by MAANRG are highlighted in orange.

**5.2.4. Site Specific Considerations**

Large areas of Camp Curtis Guild are within wetlands and/or their buffer zones. Within these areas, herbicide use should be restricted to selective methods such as cut and paint or hand wick and in certain situations directed spot foliar treatment. Herbicide treatment of invasive plants within 100-ft of wetlands or vernal pools will also require approval from the Town Conservation Commission (refer to Section 1.4). In addition to the broad restriction of herbicide use within proximity to wetlands, Table 5.3 below summarizes additional site restrictions associated with rare species habitats and exemplary vegetative community types.

**Table 5.3: Summary of habitat and species-specific restrictions on invasive species management.**

(These restrictions are covered in more detail in **Appendix D**. Please also consult the table of time of year restrictions in **Appendix B**. This includes restrictions within certain habitat types due to rare species activity.)

Protected Species or Habitat	Habitat	Recommendations
Rare invertebrate and Scrub Oak Habitat	Pitch-pine and scrub oak habitats, typically in sandy soils	<ul style="list-style-type: none"> <li>Review sites for scrub oak prior to treatment for avoidance, flag/map</li> <li>Avoid flight period (<i>Mid-June to mid-July</i>) in upland habitats</li> <li>Selective treatment within priority habitat (scrub oak)</li> <li>If target plants are interspersed amongst scrub oaks, use selective manual and/or cut and paint methods</li> </ul>
Rare amphibian and aquatic invertebrate	Vernal pools, Red Maple Swamp, Cedar Swamp, and adjacent uplands ( <b>Management recommendations include the 100-foot buffer to wetlands</b> ).	<ul style="list-style-type: none"> <li>Prioritize treatments within portions of the site with less disturbance, to maintain more pristine habitat: vernal pools in central sector and Red Maple Swamp in north sector.</li> <li>Avoid foliar spray within 100-ft of wetlands. Use wetland-approved herbicide and surfactants, and selective methods and application equipment (e.g. hand-held squirt and spray bottles, wicking glove, injection gun, backpack sprayer with low-volume nozzle).</li> <li>No herbicide application during breeding season (<i>mid-February to late April</i>).</li> <li>No hand-pulling vegetation during spring and summer migration (<i>Mid-February to late April, and early July to mid-September</i>).</li> </ul>
Rare bird	Red Maple Swamp and Cedar Swamp	<ul style="list-style-type: none"> <li>Limit disturbance during nesting season (<i>May – June</i>).</li> </ul>
Rare mammals	Mature roosting trees, and rock or wood piles.	<ul style="list-style-type: none"> <li>If tree cutting is proposed, no cutting of maternity roost trees, and no tree cutting during pupping season (<i>May – July</i>).</li> <li>Avoid disturbance near NLEB hibernaculum in south east corner of the site.</li> </ul>
Atlantic White Cedar Swamp	Atlantic White Cedar Swamp ( <b>Management recommendations include the 100-foot buffer to wetlands</b> ).	<ul style="list-style-type: none"> <li>Avoid foliar spray within 100-ft of wetlands</li> <li>Selective treatment (e.g. hand-held squirt and spray bottles, wicking glove, injection gun, backpack sprayer with low-volume nozzle).</li> </ul>



## 6.0 FUTURE CONSIDERATIONS

Camp Curtis Guild offers several potential treatment issues which raise concerns for the future management. These site-specific concerns are unique to the base and should be noted and monitored with any adaptive strategy.

Naturally occurring wetlands and vernal pools are located throughout the site, supporting multiple species of concern, while also providing important ecosystem services such as groundwater recharge. As such, use of herbicide in these sensitive areas should be limited, and incorporate selective methods and application techniques, as well as the protective measures outlined in this plan. Continued monitoring of the health and vigor of native plant populations, invasive plant presence, and protection from other disturbances and impacts, should be ongoing. Invasive plant management techniques may need to be adapted to achieve the greatest reduction in invasive plant presence, while avoiding impacts to native communities.

Several features of Camp Curtis Guild's site use are likely contributing to current invasive plant problems, as well as increasing the risk of future invasions:

- The Camp's role as an active training ground (regular ground disturbance, movement of equipment around and between sites), provides ideal conditions for invasive plant establishment.
- The Camp's location within a predominantly suburban area leads to a high risk of invasive species establishment from neighboring gardens (particularly from ornamental species popular with homeowners and gardeners).
- The utility ROWs which bisect Camp Curtis Guild provide a potential pathway for both the spread of already established species (e.g. common reed), and the introduction of new species via machinery and equipment being brought onto the site.
- Use of portions of the Camp by hunters (and associated vehicle and ATV use), which can also contribute to the spread of invasive plants within the Camp.

To best mitigate for these issues, awareness, coordination, and cooperation between all groups who access the Camp Curtis Guild Site will be necessary. While the nature of the site means that disturbance and machinery access cannot be avoided, risks can be mitigated through careful cleaning of machinery both before entering and prior to leaving the site. Coordination between Camp Curtis Guild and neighboring property owners will be important to increase awareness of the risks posed by invasive species, and to promote understanding of the pathways by which they are spread (movement of soil, vegetation fragments, dumping of cut material from other areas, accidental garden escapes of ornamental species etc.)

Monitoring and containing invasive species within areas of heavy use and impact will be important. The utility ROWs, fording locations/wetland crossings, roadways, and excavation training areas, will be particularly important to monitor for the spread and establishment of new or existing invasive species. While complete eradication of well-established populations is less likely to be successful, efforts should be made to contain their spread, in particular preventing establishment within exemplary community types and rare species habitats. Continued maintenance of any areas treated will be needed to address inevitable re-growth, and to ensure re-invasion does not occur. For the management plan to be effective, repeated treatments and varied control methods will be needed.

### 6.1 *Future Pathways of Invasion*

**Seed bank:** The local seed bank poses a threat for management of invasive species by providing a pathway for re-establishment. Mature populations of invasive plant species at Camp Curtis Guild are contributing to

the local seed bank. Invasive plant seeds can remain viable in the ground for 8+ years, germinating when conditions are favorable. This is often exacerbated by the removal of invasive plants, particularly dense invasions and mature trees, which open up canopy gaps for seedlings to become established. To best mitigate the seed bank effect, ongoing monitoring, and repeated treatment of impacted areas, over the course of several years, is recommended. It should be noted that many native species also have an established and long-lasting seedbank, which can help in the restoration of native vegetation once invasive plants are on a trajectory to being removed. Repeated and carefully targeted treatment of invasive plants (so that they do not reach maturity and set seed), will gradually reduce the invasive : native seedbank ratio, promoting the re-establishment of desirable native species over the more competitive invasive species. Once native vegetation becomes established, it will be better able to compete with invasive plants for resources such as available water, sunlight, nutrients, and ultimately growing space, reducing the ability for invasive seeds to germinate successfully.

**Neighboring properties:** Camp Curtis Guild is bordered by private residences, a shooting range, town conservation areas, utility ROWs, town/state roadways, and other land uses. All pose as potential sources for invasive plant species spread onto Camp Curtis Guild. As Camp Curtis does not have the rights to these properties, direct control of any invasive presence associated is not feasible. A containment approach regarding this is potentially the only solution. This will require annual monitoring of growth or bordering populations and treatment, should they encroach onto Camp Curtis Guild land. Additionally, root barriers could be installed along large bordering populations of rhizomatic-spread species. Unfortunately, species whose seeds can be dispersed via wind or fauna will require larger areas of monitoring, as the spread will not be contained to immediate border area. Creating a dialogue with neighboring properties, in particular the utility ROWs and shooting range, may allow for addressing these source populations. Neighboring conservation areas may be keen to collaborate on preventing the spread of invasive species into their property, and they may already have some invasive plant management initiatives (including volunteer groups for hand pulling of some species).

**Training Area A-4:** Training area A-4, within Camp Curtis Guild, is a large area (approx. 121 acres, 17% of the Camp Curtis Guild property), that is off limits and unable to be surveyed or managed due to safety concerns associated with a neighboring off-property gun range. Due to A-4's proximity to surveyed invasive plant populations, it is likely that A-4 contains potential sources for the spread of invasive species. This training area also contains vernal pools, which should be prioritized for management where and when feasible. If access to A-4 remains off-limits, then monitoring and management of the boundary may be required.

**Wildlife:** Wildlife can spread invasive plant material (particularly seeds), via fecal transport. The most likely wildlife impact comes from seed-eating birds, which consume invasive seeds and release them throughout the site. Squirrels and other rodents can likewise spread invasive plant material. Impacts from the spread of invasive plant material via wildlife are likely to be far lower than those associated with the movement of machinery/equipment/people, however, they may affect a wider and less accessible area. Although there is no feasible way to address the spread of invasive plants via fauna, an awareness of this pathway and appreciation that continued monitoring may be required (even in relatively inaccessible habitats), is valuable.

**Machinery/human transport through land use:** As described previously, several of the site uses at Camp Curtis Guild mean that the widescale movement of machinery and equipment, both within the site and from outside the site, provides a major pathway for invasive species dispersal. This is reflected in the high association between invasive plant locations and access routes/roadways. Thoroughly cleaning all

machinery and outerwear can help prevent the spread of invasive plants. Be sure to clean all machinery and clothing used in known invasive areas, both prior to and when leaving the Camp Curtis Guild management area. Seed brushes for boots, and Velcro and sticky tape for removing seeds from clothing, can help reduce the spread of invasive plant material by people. Equipment should be pressure washed away from sensitive resource areas, paying particular attention to wheels/tracks, where soil and plant fragments tend to collect.

## *6.2. Monitoring for New Invasive Species Populations*

In addition to monitoring and control of documented and established invasive species within Camp Curtis Guild, there is need for continued vigilance for newly arriving invasive species. These may include plants (for example Kudzu, an invasive vine found elsewhere in Massachusetts, but not yet reported on Camp Curtis Guild), animals, fungi or pathogens (bacteria and viruses). Species to be particularly vigilant for include:

**Plants:** (Comprehensive lists of invasive plant species to watch out for in Massachusetts can be found on the Mass.gov website (<https://www.mass.gov/service-details/invasive-plants>), and from MIPAG (<https://www.mass.gov/doc/invasive-plant-list/download>):

- Kudzu – Kudzu is an invasive vine found across central and eastern Massachusetts. It can grow nearly a foot per day, and its tuberous rootstocks enable it to accumulate carbon and conserve water (Mass Audubon, n.d.).
- Japanese Stilt Grass- An invasive grass which often established large carpets with dense seed banks. Stilt grass has been found throughout Massachusetts and, whilst unconfirmed during BSC Group’s 2020 survey, has been potentially spotted at Camp Curtis. If found report to MA DEP and the USDA. Identification can be found here:  
<https://www.invasivespeciesinfo.gov/terrestrial/plants/japanese-stiltgrass>
- Dames Rocket- An invasive flower that has been spotted near Camp Curtis Guild. The species poses a distinct threat to the camp’s forest edge habitat where it could thrive and establish dominance.  
Identification can be found here:  
<https://dnr.wisconsin.gov/topic/Invasives/fact/DamesRocket.html>
- Mile-a-minute- Recently Identified in Massachusetts, this plant grows aggressively, carpeting impacted areas and plants in a similar fashion to kudzu. If found, the issue will have to be immediately addressed and reported to MA DEP and MA DAR.  
Identification can be found here:  
[http://nyis.info/invasive\\_species/mile-a-minute/](http://nyis.info/invasive_species/mile-a-minute/)

### **Invertebrates:**

- Asian Longhorn Beetle (ALB)- ALB is a beetle originally from Asia that attacks and kills host tree species. An adult beetle can fly up to one mile to establish itself on a new host plant where it will burrow and lay eggs. The larva will then destroy the host. ALB should be monitored for, with infected trees being removed prior to larval flight. Any sightings of ALB should be reported to MA DEP and the USDA. At Camp Curtis Guild, all maple, tree of heaven, and elm trees provide potential hosts. Identification can be found here: <https://www.dec.ny.gov/animals/7255.html>

- Emerald Ash Borer- A small, invasive beetle that is devastating to all ash tree species in MA. It is currently present in eleven MA counties and continues to spread. If identified, report it to MA DEP: <https://www.mass.gov/guides/emerald-ash-borer-in-massachusetts#-slowing-the-spread->
- Woolly hemlock adelgid- An adelgid that attacks hemlock trees. The adelgid has been found in Massachusetts and should be monitored for in large stands at Camp Curtis. Identification can be found here:  
[https://www.canr.msu.edu/resources/how\\_to\\_treat\\_hemlock\\_trees\\_for\\_hemlock\\_woolly\\_adelgid](https://www.canr.msu.edu/resources/how_to_treat_hemlock_trees_for_hemlock_woolly_adelgid)
- Spotted Lantern Fly- An insect that attacks and destroys trees in the region. This species has been found in Massachusetts and is a concern to any fruit trees on site. If identified, report it to MA DEP and USDA.  
Identification can be found here:  
<https://www.aphis.usda.gov/aphis/resources/pests-diseases/hungry-pests/the-threat/spotted-lanternfly/spotted-lanternfly>

#### **Pathogens:**

- Chronic Wasting- A prion infection affecting ungulates. In the case of Camp Curtis Guild, White tailed deer are at risk. The best prevention is monitoring for the disease and removing any diseased animals. DEP should be notified of any potential Chronic Wasting cases.  
Identification can be found here:  
<https://www.cdc.gov/prions/cwd/index.html>
- White nose syndrome- A fungal disease impacting bats. The disease has been noted to be moving north. Monitoring of Camp Curtis Guild bat population will be key. Any potential cases should be reported to MA DEP and the USDA.  
Identification can be found here:  
<https://www.nps.gov/articles/what-is-white-nose-syndrome.htm>
- Ranavirus: This is a viral infection that affects amphibians and reptiles. The disease causes 90 – 100% mortality among larval amphibians, causing hemorrhaging and edema of the legs and body. Although the disease appears to be relatively widespread across the US, cases are poorly documented. Biosecurity is paramount for protecting amphibian and reptile populations, and all boots/equipment should be thorough cleaned and dried when moving between wetland sites.  
Identification information is available from:  
<https://www.extension.purdue.edu/extmedia/FNR/FNR-485-W.pdf>.  
Any potential cases should be reported to MA DEP.

*While this list highlights several species of high concern, it by no means encompasses all potential species. To get a better understanding of new species to watch for, it is best to consult with Massachusetts DEP or NHESP. Additionally, consulting with other states (NY, VT, NH, ME, VI, CO, TX, CA to name a few), in which your personnel train could better prepare Camp Curtis Guild for new threats.*

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# FIGURES

## Camp Curtis Guild: Five Year Invasive Species Adaptive Management Plan

Massachusetts Army National Guard  
2021 – 2025

**Figure 1:** Project Overview Map

**Figure 2:** Invasive Species Field Survey Results

**Figure 2A:** Invasive Species Groupings

**Figure 3:** Invasive Species Field Survey Results – North Sector

**Figure 4:** Invasive Species Field Survey Results – Central Sector

**Figure 5:** Invasive Species Field Survey Results – South Sector

**Figure 6:** Priority Management Areas



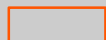

# CAMP CURTIS GUILD

FIGURE 1: PROJECT OVERVIEW MAP



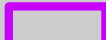
## Legend

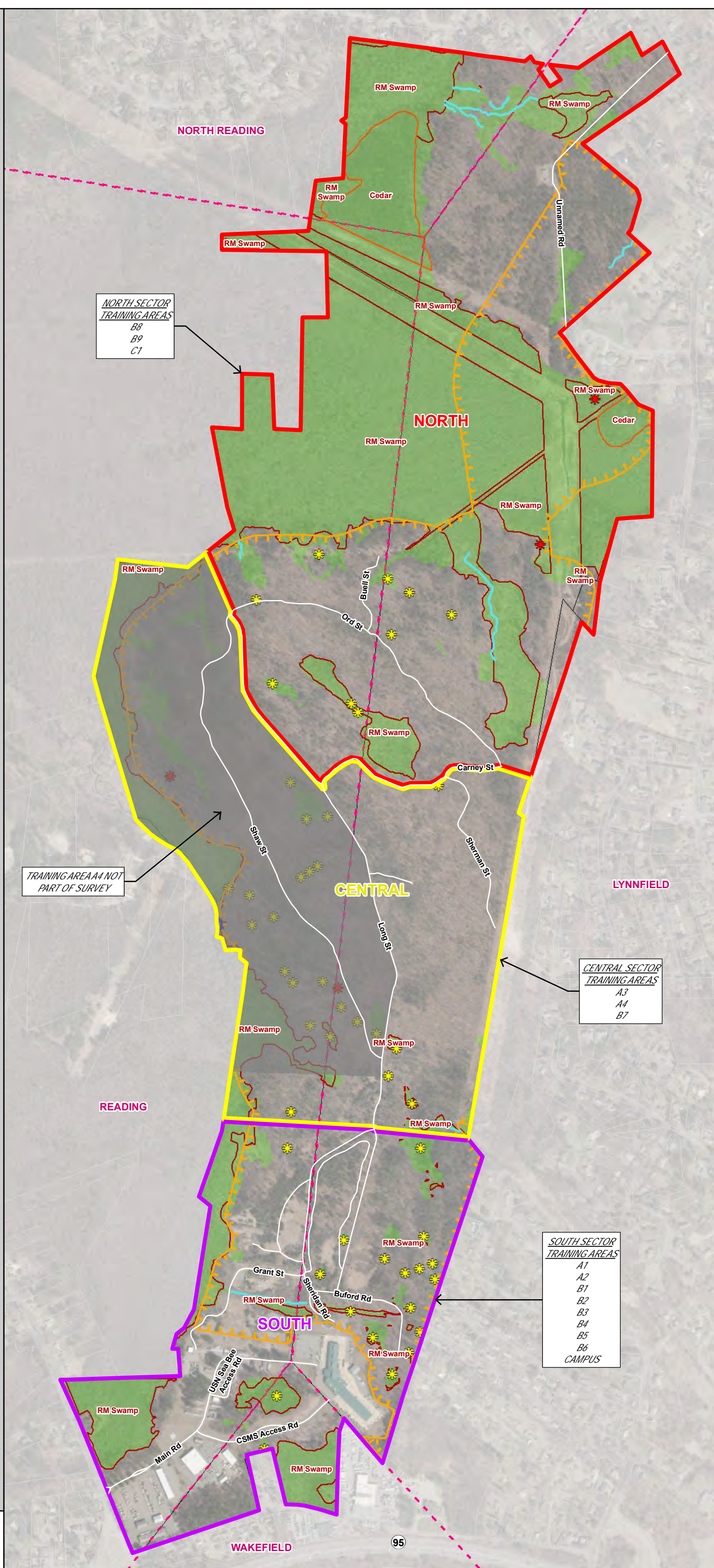
-  Access Roads
-  Intermittent Stream
-  Perennial Stream
-  Delineated Wetlands
-  NHESP Priority Habitats
-  Town Boundary
-  Certified Vernal Pool
-  Potential Vernal Pool

## Natural Communities

-  Cedar
-  Red Maple Swamp

## Project Sectors

-  North
-  Central
-  South

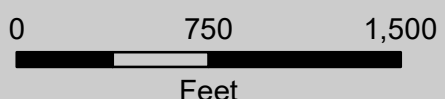


*NORTH SECTOR TRAINING AREAS*  
B8  
B9  
C1

*TRAINING AREA A4 NOT PART OF SURVEY*

*CENTRAL SECTOR TRAINING AREAS*  
A3  
A4  
B7

*SOUTH SECTOR TRAINING AREAS*  
A1  
A2  
B1  
B2  
B3  
B4  
B5  
B6  
CAMPUS



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS



**CAMP CURTIS GUILD**  
**FIGURE 2: INVASIVE SPECIES**  
**FIELD SURVEY RESULTS**

**Legend**

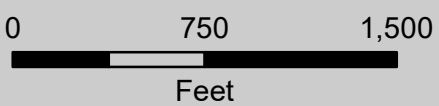
- Access Roads
- Intermittent Stream
- Perennial Stream
- Delineated Wetlands
- NHESP Priority Habitats
- - - Town Boundary
- ✳ Certified Vernal Pool
- ✳ Potential Vernal Pool

**Project Sectors**

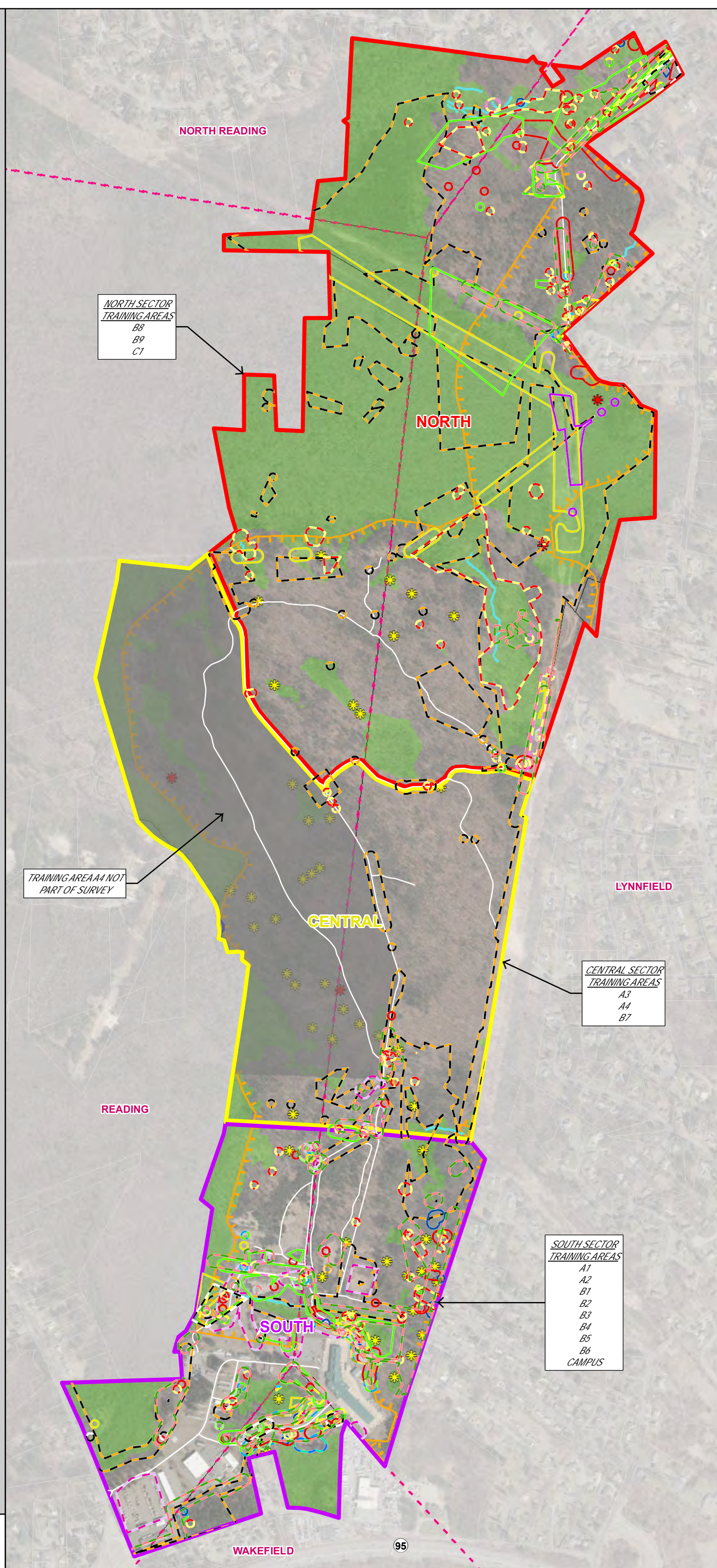
- North
- Central
- South

**Surveyed Invasive Species**

- Asiatic bittersweet
- Autumn olive
- Barberry
- Black locust
- Burning bush
- Common buckthorn
- Common reed
- Garlic mustard
- Glossy buckthorn
- Honeylocust
- Honeysuckles
- Japanese knotweed
- Large gray willow
- Multiflora rose
- Norway maple
- Purple loosestrife
- Reed Canary Grass
- Spotted knapweed
- Swallow-wort
- Tree of heaven



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS
















# CAMP CURTIS GUILD

## FIGURE 2A: INVASIVE SPECIES GROUPINGS

### Legend

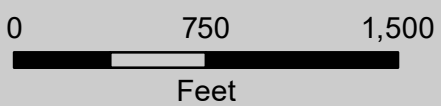
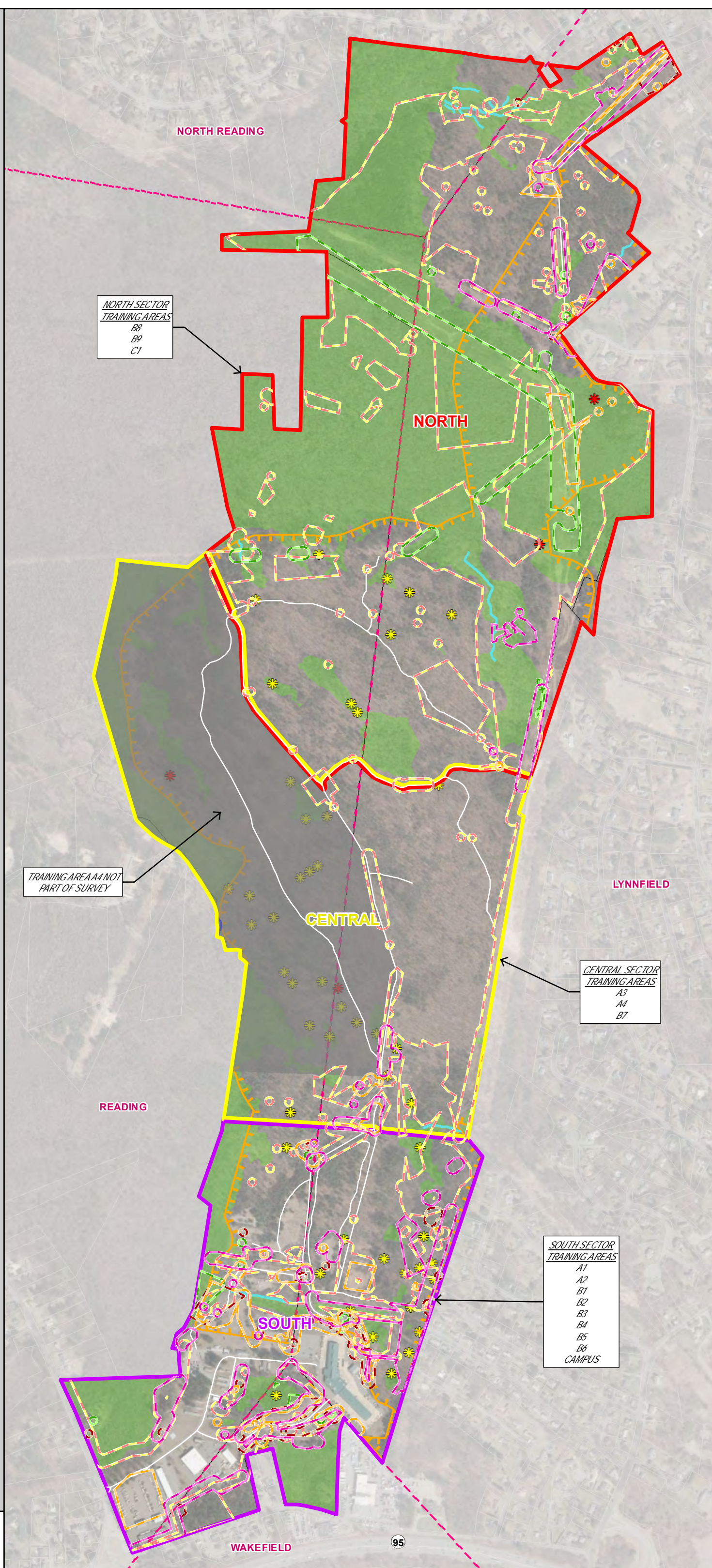
-  Access Roads
-  Intermittent Stream
-  Perennial Stream
-  Delineated Wetlands
-  NHESP Priority Habitats
-  Town Boundary
-  Certified Vernal Pool
-  Potential Vernal Pool

### Project Sectors

-  North
-  Central
-  South

### Surveyed Invasive Species Groups

-  Grass
-  Vine
-  Forb
-  Shrub
-  Tree



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS



# CAMP CURTIS GUILD

FIGURE 3: INVASIVE SPECIES FIELD SURVEY RESULTS - NORTH

0 237.5 475  
Feet

## Legend

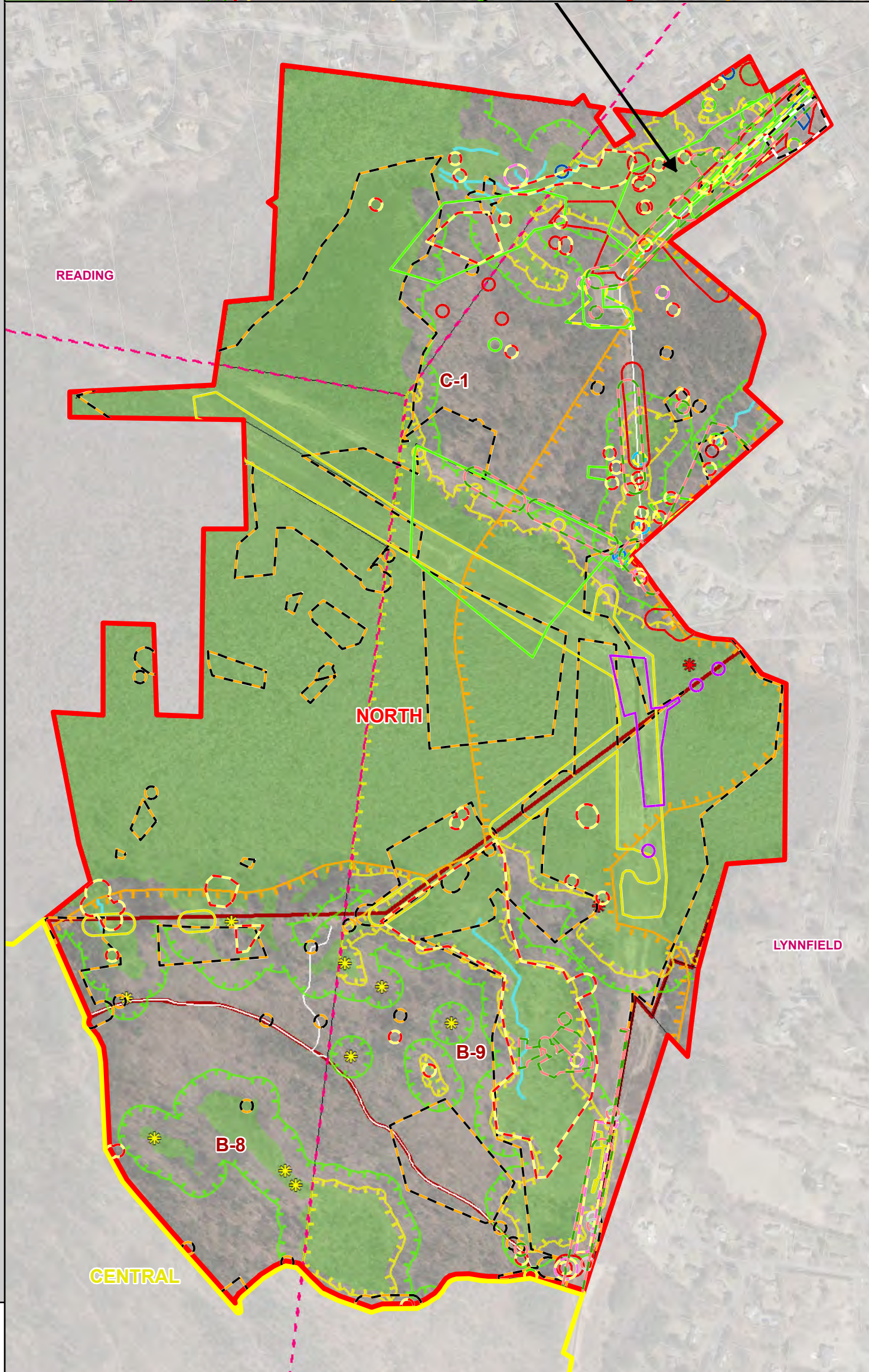
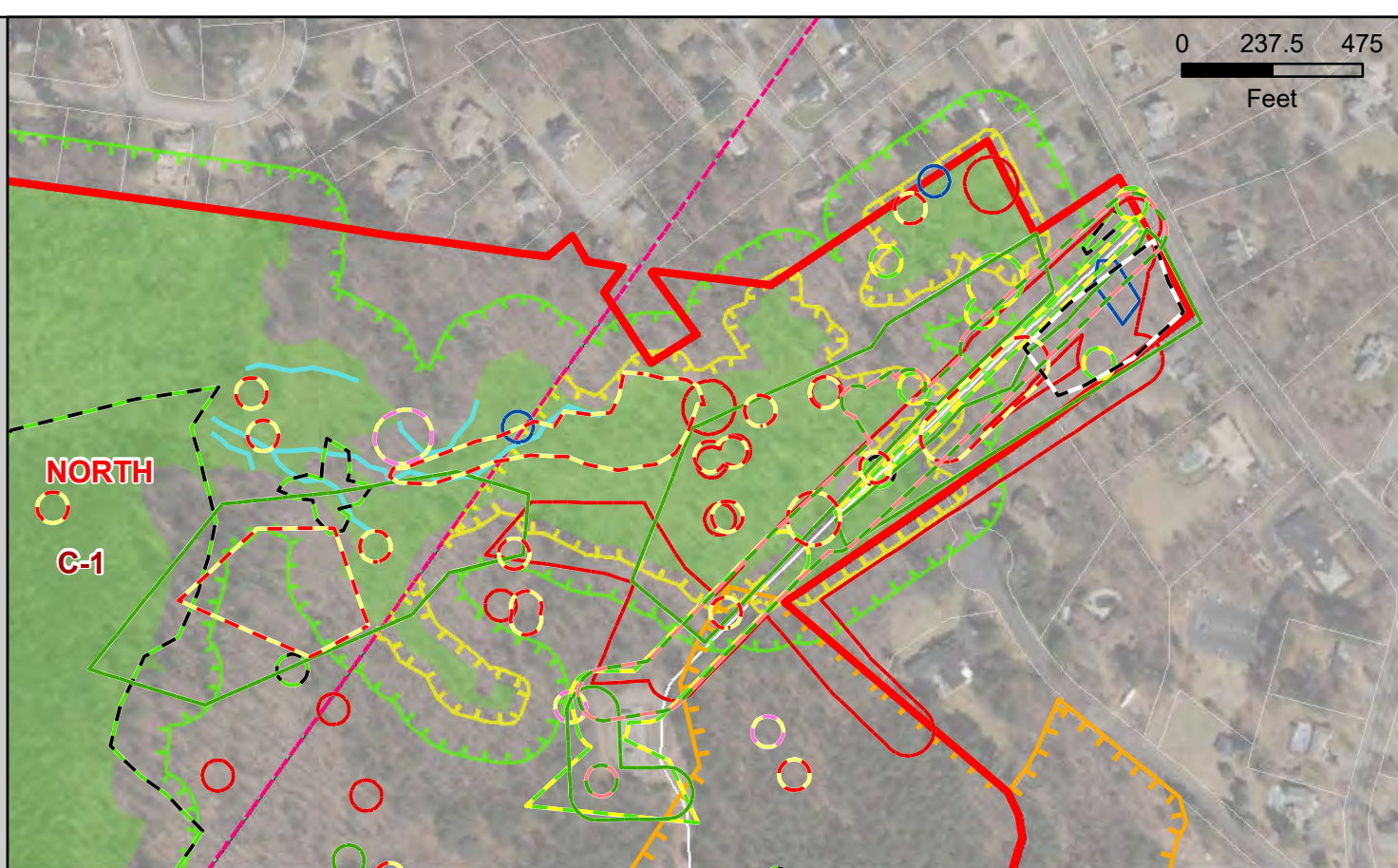
- Access Roads
- Intermittent Stream
- Delineated Wetlands
- 100ft Buffer to Wetlands & Streams
- 25ft No Disturb Zone (Lynnfield)
- NHESP Priority Habitats
- Town Boundary
- Training Areas
- Certified Vernal Pool
- Potential Vernal Pool

## Project Sectors

- North
- Central

## Surveyed Invasive Species

- Asiatic bittersweet
- Autumn olive
- Barberry
- Black locust
- Burning bush
- Common buckthorn
- Common reed
- Garlic mustard
- Glossy buckthorn
- Honeylocust
- Honeysuckles
- Large gray willow
- Multiflora rose
- Norway maple
- Purple loosestrife
- Reed Canary Grass
- Swallow-wort
- Tree of heaven



0 550 1,100  
Feet

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS



# CAMP CURTIS GUILD

FIGURE 4: INVASIVE SPECIES FIELD SURVEY RESULTS - CENTRAL

## Legend

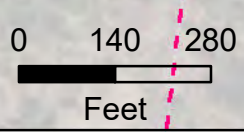
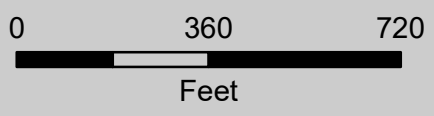
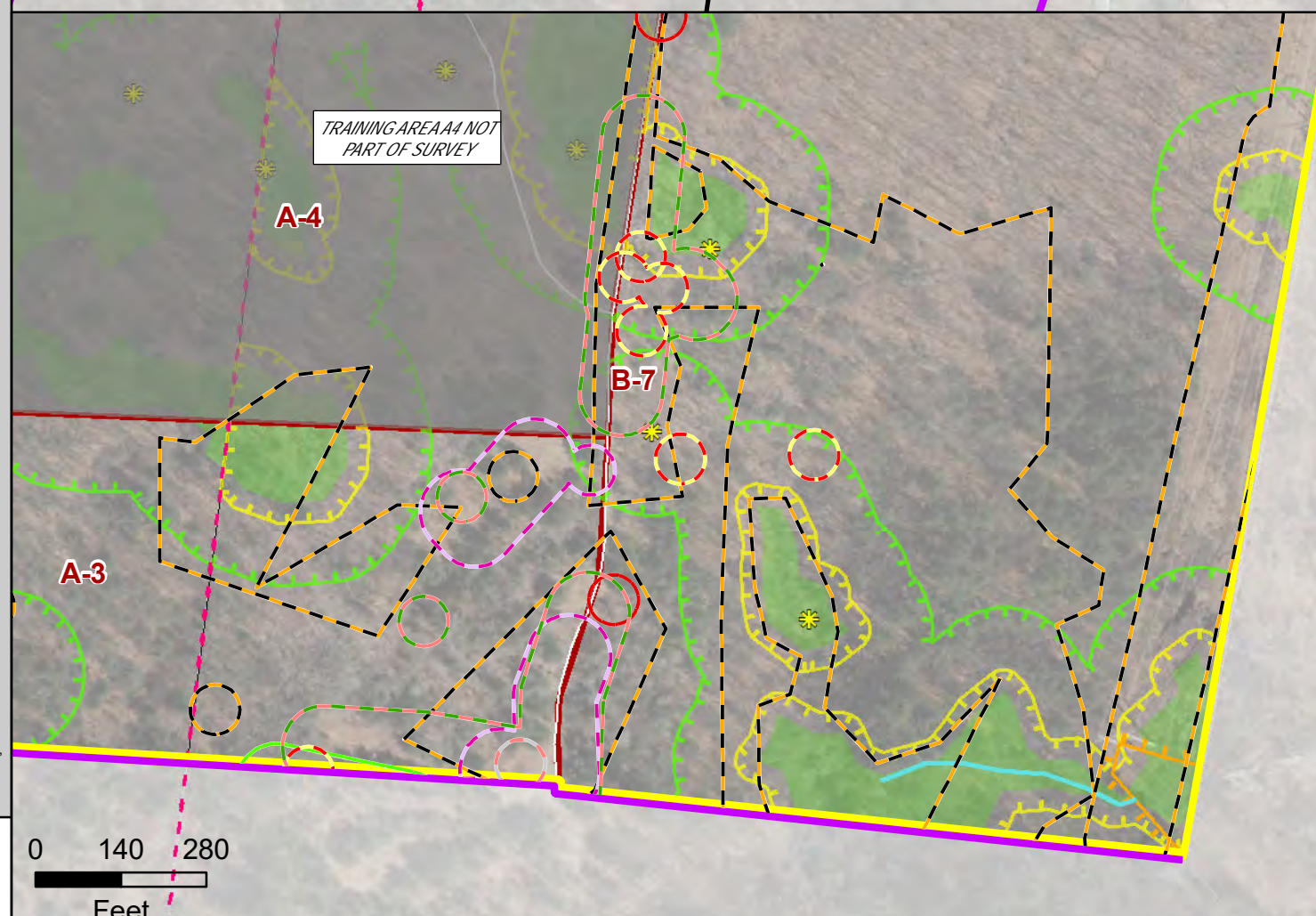
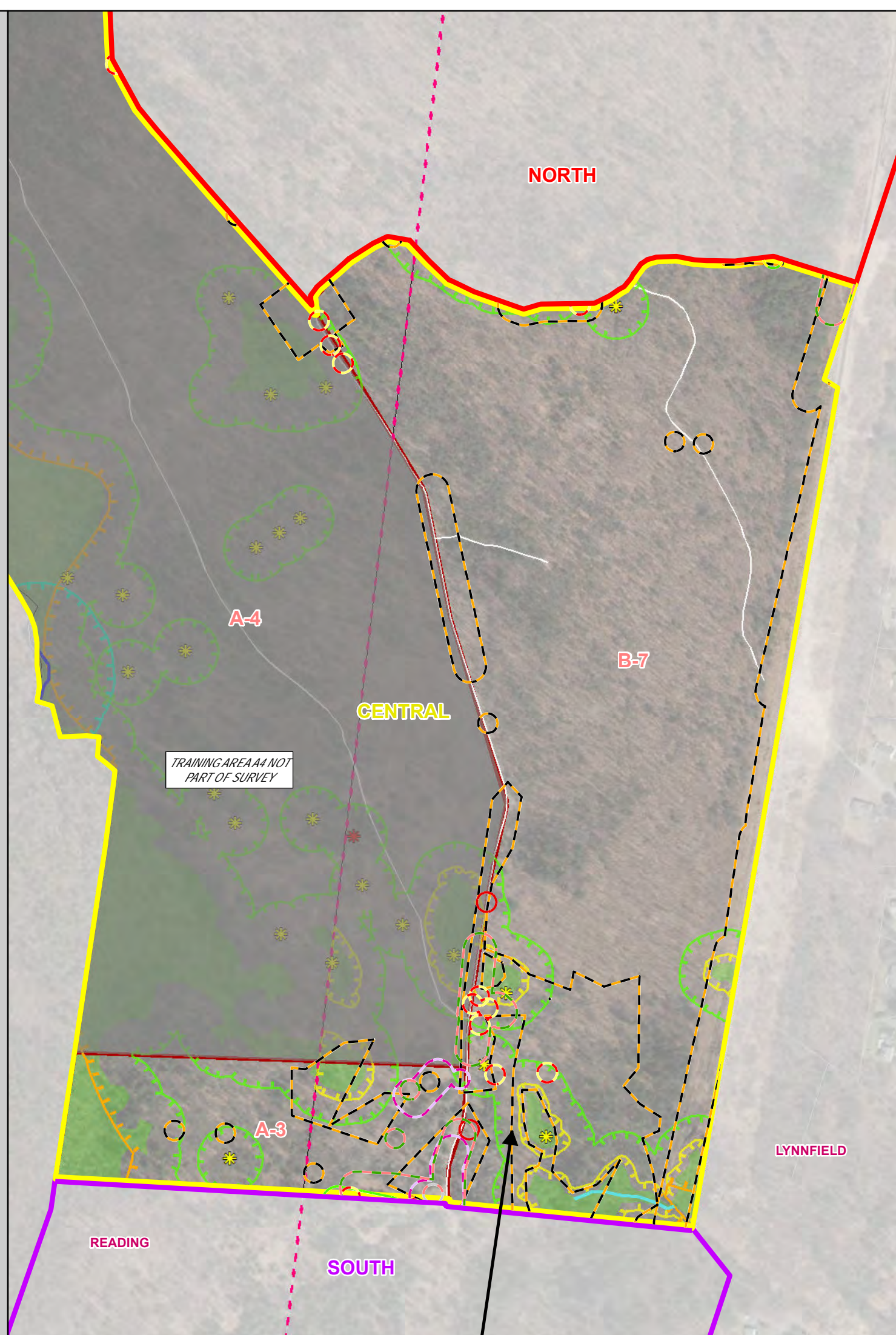
- Access Roads
- Intermittent Stream
- Perennial Stream
- Delineated Wetlands
- 100ft Buffer to Wetlands & Streams
- 200ft Riverfront Area
- 25ft No Disturb Zone (Lynnfield)
- NHESP Priority Habitats
- Town Boundary
- Training Areas
- Certified Vernal Pool
- Potential Vernal Pool

## Project Sectors

- North
- Central
- South

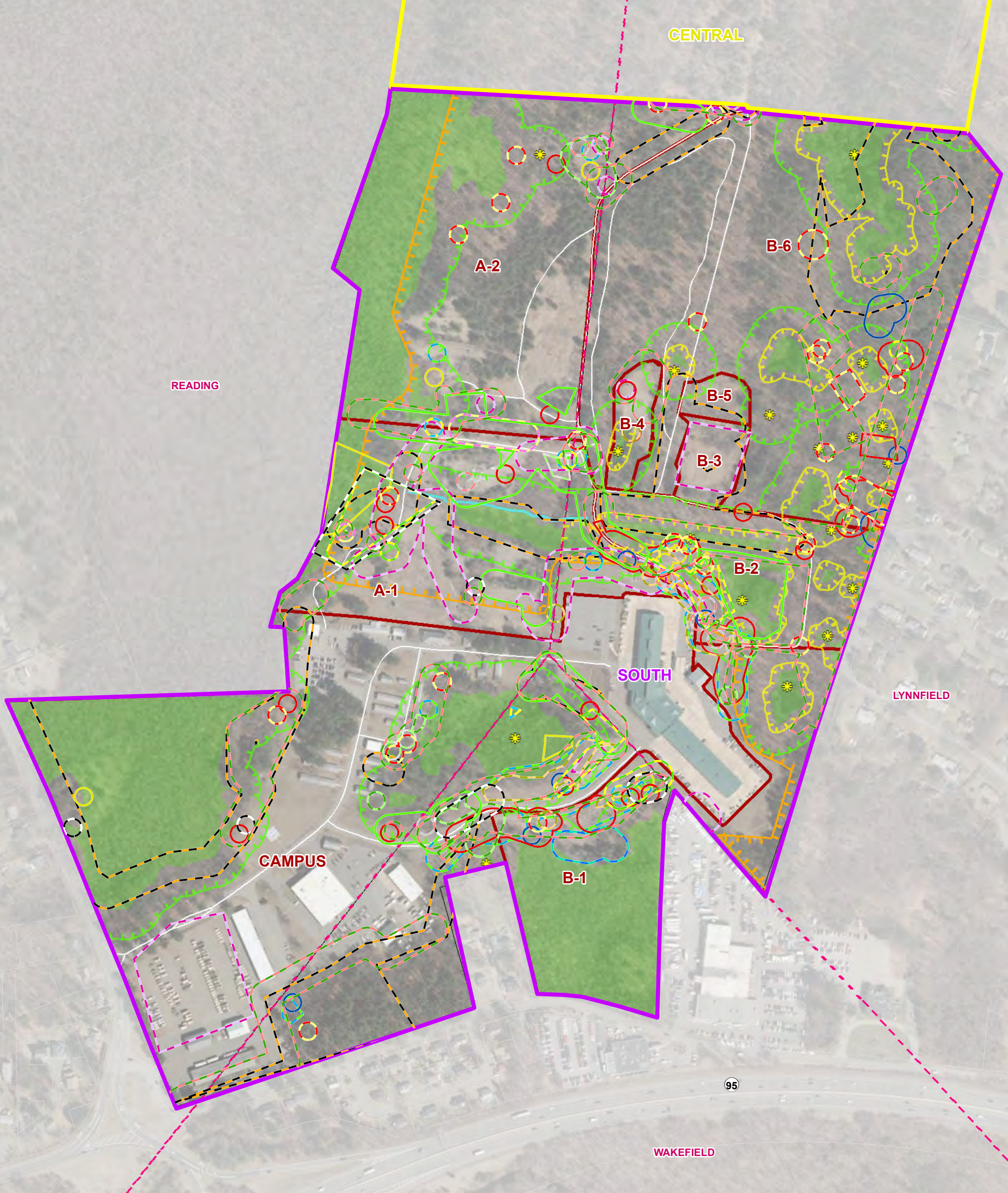
## Surveyed Invasive Species

- Asiatic bittersweet
- Autumn olive
- Barberry
- Common buckthorn
- Garlic mustard
- Glossy buckthorn
- Multiflora rose
- Spotted knapweed



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS





**CAMP CURTIS GUILD**  
**FIGURE 5: INVASIVE SPECIES**  
**FIELD SURVEY RESULTS - SOUTH**



0      320      640  
 Feet

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS

**Legend**

- Access Roads
- Intermittent Stream
- Delineated Wetlands
- 100ft Buffer to Wetlands & Streams
- 25ft No Disturb Zone (Lynnfield)
- NHESP Priority Habitats
- Town Boundary
- Training Areas
- Potential Vernal Pool

**Project Sectors**

- Central
- South

**Surveyed Invasive Species**

- Asiatic bittersweet
- Autumn olive
- Barberry
- Black locust
- Common buckthorn
- Common reed
- Garlic mustard
- Glossy buckthorn
- Honeylocust
- Honeysuckles
- Japanese knotweed
- Large gray willow
- Multiflora rose
- Norway maple
- Reed Canary Grass
- Spotted knapweed
- Swallow-wort
- Tree of heaven







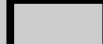


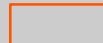










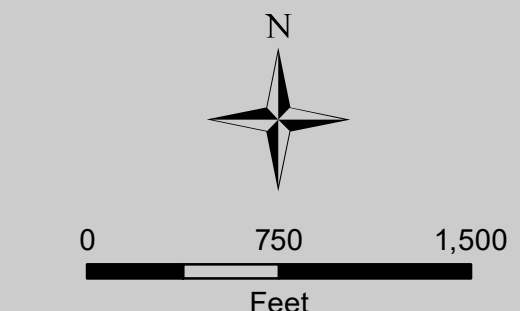


# CAMP CURTIS GUILD

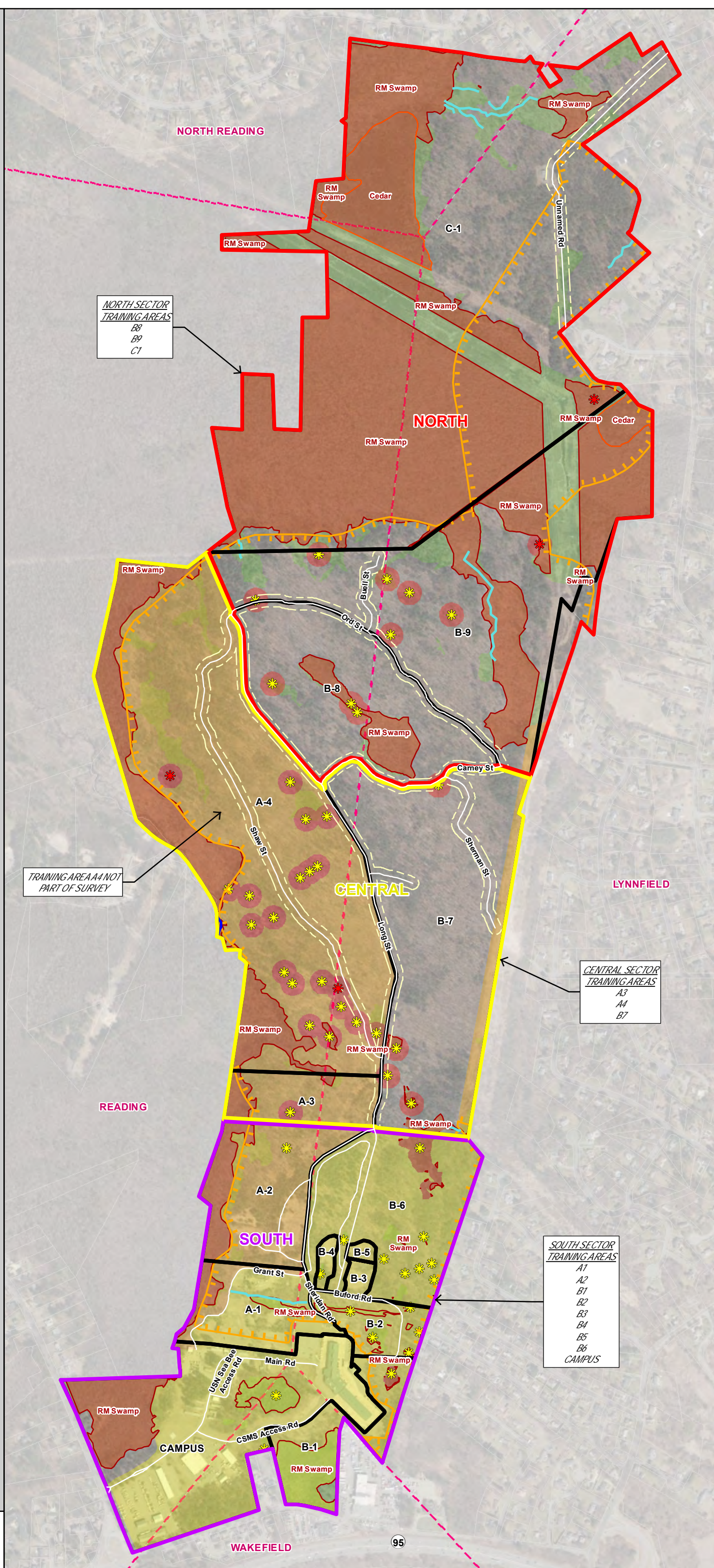
FIGURE 6:  
PRIORITY MANAGEMENT AREAS

## Legend

-  Access Roads
  -  Intermittent Stream
  -  Perennial Stream
  -  Delineated Wetlands
  -  NHESP Priority Habitats
  -  Town Boundary
  -  Training Areas
  -  Certified Vernal Pool
  -  Potential Vernal Pool
- ### Natural Communities
-  Cedar
  -  Red Maple Swamp
- ### Priority Management Areas
-  Priority Management Area
  -  Secondary Management Area
  -  Vigilance Area
  -  Roadside Vigilance Area (50ft)
- ### Project Sectors
-  North
  -  Central
  -  South



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, MassGIS





# **APPENDIX A**

## **Camp Curtis Guild: Five Year Invasive Species Adaptive Management Plan**

Massachusetts Army National Guard  
2021 – 2025

### **Detailed Field Survey Results Tables**

Table A-1: Existing Conditions Summary

Training Area	Wetland (acres)	100-ft Buffer Zone (acres)	NHESP Priority Habitat (acres)	Amphibian Habitat			Upland Habitat * (acres)	Atlantic White Cedar Swamp (acres)
				# of CVPs	# of PVPs	Red Maple Swamp (acres)		
<b>NORTH SECTOR</b>								
B-8	6.9	10.9	42.2		3	4.9	35.5	
B-9	45.2	25.3	80.7	1	6	37.5	45.5	2.7
C-1	148.0	30.4	57.5	1		103.4	70.4	13.7
<b>Totals</b>	<b>200.0</b>	<b>66.7</b>	<b>180.4</b>	<b>2</b>	<b>9</b>	<b>145.8</b>	<b>151.3</b>	<b>16.5</b>
<b>CENTRAL SECTOR</b>								
A-3	1.9	3.6	10.1		1	1.7	9.5	
A-4**								
B-7	1.6	7.8	68.2		4	0.2	66.9	
<b>Totals</b>	<b>3.5</b>	<b>11.4</b>	<b>78.4</b>	<b>0</b>	<b>5</b>	<b>1.9</b>	<b>76.4</b>	<b>0</b>
<b>SOTUH SECTOR</b>								
A-1	2.6	6.0	11.0			0.8	12.6	
A-2	7.2	4.4	17.7		1	4.8	15.8	
B-1	6.1	3.9	3.3		1	0.4	7.3	
B-2	1.6	5.8	7.5		5	0.7	6.3	
B-3			1.4				1.4	
B-4	0.1	0.9	1.2		1		1.2	
B-5		0.2	0.8				0.8	
B-6	2.7	12.4	33.1		8		30.5	
Campus	11.4	10.1			2	15.5	42.9	
<b>Totals</b>	<b>31.7</b>	<b>43.8</b>	<b>76.0</b>	<b>0</b>	<b>18</b>	<b>22.1</b>	<b>118.8</b>	<b>0</b>

\* Upland habitat includes scrub-oak habitat areas, but specific locations of scrub-oak habitat are unknown (due to survey restrictions).

\*\* Training Area A-4 not included as it was not part of the survey. Based on previous data, this training area contains 20 vernal pools, as well as areas of Red Maple Swamp and Scrub Oak Shrubland uplands.



Table A-2: Survey Results Summary

Training Areas	Sensitive Resource Areas***	Area (acres)	Population Extent (as a % of each training area)*																					
			Asiatic Bittersweet	Autumn Olive	Black Locust	Burning Bush	Common Barberry	Common Buckthorn	Common Reed	Garlic Mustard	Glossy Buckthorn	Honey-locust	Honeysuckles (shrub)	Japanese Barberry	Japanese Knotweed	Large Grey Willow	Multiflora rose	Norway Maple	Purple loosestrife	Reed Canary Grass	Spotted Knapweed	Swallow-wort	Tree of Heaven	Japanese Siltgrass
<b>NORTH SECTOR</b>																								
B-8	W, BZ, NHESP, 3 PVP, RM, UP	42.3	0.06		0.00		0.22			0.04	4.73		0	0.21				0.00						
B-9	W, BZ, NHESP, 1 CVP, 6 PVP, RM, UP, C	90.7	3.13	0.13	0.00		0.08		6.57	0.03	57.07		1.46	15.75		0.05	1.53		1.45					
C-1	W, BZ, NHESP, 1 CVP, RM, UP, C	218.4	4.19		0.47	0.03	0.84	11.38	5.97	1.53	27.32	0.02	0.18	2.10			4.33	0.11	0.50	0.06		0.03	0.03	
<b>Totals</b>	<b>W, BZ, NHESP, 2 CVP, 9 PVP, RM, UP, C</b>	<b>351.3</b>	<b>3.42</b>	<b>0.03</b>	<b>0.29</b>	<b>0.02</b>	<b>0.57</b>	<b>7.07</b>	<b>5.40</b>	<b>0.96</b>	<b>32.27</b>	<b>0.01</b>	<b>0.49</b>	<b>5.39</b>		<b>0.01</b>	<b>3.08</b>	<b>0.07</b>	<b>0.69</b>	<b>0.04</b>		<b>0.02</b>	<b>0.02</b>	<b>****</b>
<b>CENTRAL SECTOR</b>																								
A-3	W, BZ, NHESP, 1 PVP, RM, UP	11.4	7.60	0.50			0.23	0.66			18.27												7.13	
<b>A-4**</b>		120.7																						
B-7	W, BZ, NHESP, 4 PVP, RM, UP	68.5	1.94				0.55	0.00		0.04	21.42			0.09			0.14						0.33	
<b>Totals</b>	<b>W, BZ, NHESP, 5 PVP, RM, UP</b>	<b>200.6</b>	<b>1.09</b>	<b>0.03</b>			<b>0.20</b>	<b>0.04</b>		<b>0.01</b>	<b>8.35</b>			<b>0.03</b>			<b>0.05</b>					<b>0.52</b>		<b>****</b>
<b>SOUTH SECTOR</b>																								
A-1	W, BZ, NHESP, RM, UP	15.2	9.14	0.59	11.20		0.63	24.29	6.47	9.37	17.45	1.21	2.61		0.01	0.71	3.00	0.42		0.43	31.53	0.42	1.34	
A-2	W, BZ, NHESP, 1 PVP, RM, UP	23.0	6.83	0.31			1.38	6.85	0.56		2.43		1.41		2.53		0.56			0.14	1.30		0.56	
B-1	W, BZ, RM, UP	13.4	14.77	0.27	1.95				0.48	3.73		1.81		0.66	1.36		10.36	0.48		0.48	0.95	4.26	10.65	
B-2	W, BZ, NHESP, 5 PVP, RM, UP	7.8	53.09	3.11			1.65	21.71	1.61	11.21	23.91	10.61		2.47	0.68		13.95	1.76		0.42	1.98		13.35	
B-3	NHESP, UP	1.4									94.51										70.76			
B-4	W, BZ, NHESP, 1 PVP, UP	1.2	41.70									5.18					10.36				5.18		5.18	
B-5	BZ, NHESP, UP	0.8									36.06													
B-6	W, BZ, NHESP, 8 PVP, UP	33.3	13.36				2.19	0.45		0.33	20.14			1.68	0.07		3.32	1.63			0.75			
Campus	W, BZ, 2 PVP,	54.4	11.63	0.12	0.87		0.31	3.70	0.35		8.70	1.09		0.12	1.51	0.24	0.53	0.08		0.02	5.65		2.57	
<b>Totals</b>	<b>W, BZ, NHESP, 17 PVP, RM, UP</b>	<b>150.5</b>	<b>13.54</b>	<b>0.34</b>	<b>1.62</b>		<b>0.96</b>	<b>6.07</b>	<b>0.99</b>	<b>1.93</b>	<b>12.02</b>	<b>1.27</b>	<b>0.48</b>	<b>0.60</b>	<b>1.11</b>	<b>0.16</b>	<b>3.05</b>	<b>0.57</b>		<b>0.14</b>	<b>6.47</b>	<b>0.42</b>	<b>2.84</b>	<b>****</b>

\*These values represent the Population Extent (i.e. the total area over which invasive species populations were observed during the field survey).

\*\*Training Area A-4 not surveyed.

\*\*\*Wetland (W), 100-Foot Buffer Zone to BVW (BZ), NHESP Priority Habitat (NHESP), Counts of Potential Vernal Pools (PVP) and Certified Vernal Pools (CVP), Red Maple Swamp (RM), Upland habitat (UP), Atlantic White Cedar Swamp (C)

# **APPENDIX B**

## **Camp Curtis Guild: Five Year Invasive Species Adaptive Management Plan**

Massachusetts Army National Guard  
2021 – 2025

### **Time of Year Restrictions and Monthly Schedule Tables**

**Table B-1: Time of Year Treatment** (for upland habitats outside of the 100-ft Buffer Zone to wetlands and vernal pools, and outside of Rare Species Habitat).

Species	Growth Form	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common reed	Grass								Best time for treatment	Best time for treatment	Until FF		
Japanese knotweed	Grass				Treatment window	Treatment window				Best time for treatment	Until FF		
Reed Canary Grass	Grass				Treatment window	Treatment window	Treatment window	Best time for treatment	Best time for treatment				
Garlic mustard	Herb				Best time for treatment	Best time for treatment	Treatment window	Basal growth treatment only as rest has seeded (Biannual species)	Basal growth treatment only as rest has seeded (Biannual species)	Basal growth treatment only as rest has seeded (Biannual species)			
Purple loosestrife	Herb				Treatment window	Treatment window	Treatment window	Best time for treatment	Treatment window				
Spotted knapweed	Herb				Best time for treatment	Best time for treatment	Treatment window	Treatment window			Until FF		
Swallow-wort	Herb						Treatment window	Treatment window	Best time for treatment	Best time for treatment			
Locust spp.	Tree	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Best time for treatment	Best time for treatment	Best time for treatment	Treatment window	Treatment window
Norway maple	Tree	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Tree of heaven	Tree	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Best time for treatment	Best time for treatment	Best time for treatment	Treatment window	Treatment window
Large grey willow	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Asiatic bittersweet	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Autumn olive	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Burning bush	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Barberry spp.	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Buckthorn spp.	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window
Bush honeysuckle spp.	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window		Best time for treatment	Best time for treatment	Treatment window	Treatment window
Multiflora rose	Woody	Treatment window	Treatment window			Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window	Treatment window






**Legend:**

- Treatment window
- Best time for treatment
- Basal growth treatment only as rest has seeded (Biannual species)
- "Until FF" - Until First Frost

**Table B-2: Time of Year Treatment for Priority Management Areas** (for 100-ft Buffer Zone to Vernal Pools and Wetlands)

Species	Growth Form	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common reed	Grass										Until FF		
Japanese knotweed	Grass										Until FF		
Reed Canary Grass	Grass												
Garlic mustard	Herb												
Purple loosestrife	Herb												
Spotted knapweed	Herb										Until FF		
Swallow-wort	Herb												
Locust spp.	Tree												
Norway maple	Tree												
Tree of heaven	Tree												
Large grey willow	Woody												
Asiatic bittersweet	Woody												
Autumn olive	Woody												
Burning bush	Woody												
Barberry spp.	Woody												
Buckthorn spp.	Woody												
Bush honeysuckle spp.	Woody												
Multiflora rose	Woody												





**Legend:**

-  Treatment window
-  Best time for treatment
-  Basal growth treatment only as rest has seeded (Biannual species)
-  No treatment - no herbicide application or hand-pulling (ground disturbance)
-  Limited herbicide treatment only. No hand-pulling (ground disturbance)
- "Until FF" - Until First Frost

**Table B-3: Time of Year Treatment for Secondary Management Areas** (for Scrub Oak Shrubland and Sandplain Grassland-type Habitats)

Species	Growth Form	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Common reed	Grass										Until FF		
Japanese knotweed	Grass										Until FF		
Reed Canary Grass	Grass												
Garlic mustard	Herb												
Purple loosestrife	Herb												
Spotted knapweed	Herb										Until FF		
Swallow-wort	Herb												
Locust spp.	Tree												
Norway maple	Tree												
Tree of heaven	Tree												
Large grey willow	Woody												
Asiatic bittersweet	Woody												
Autumn olive	Woody												
Burning bush	Woody												
Barberry spp.	Woody												
Buckthorn spp.	Woody												
Bush honeysuckle spp.	Woody												
Multiflora rose	Woody												

**Legend:**

-  Treatment window
-  Best time for treatment
-  Basal growth treatment only as rest has seeded (Biannual species)
-  No herbicide application
- "Until FF" - Until First Frost



## **APPENDIX C**

Camp Curtis Guild:  
Five Year Invasive Species Adaptive Management Plan

Massachusetts Army National Guard  
2021 – 2025

### **Invasive Plant Management Methods and Guidance & Species-Specific Management Recommendations for Invasive Plants**

## Invasive Plant Management Methods and Guidance

### *Prevention*

**Early Detection and Rapid Response:** preventing the species from arriving into an area and/or preventing the plant from flowering or going to seed is essential. An early detection and rapid response plan is critical in preventing the arrival and spread of invasive species, particularly those on the Camp Curtis Guild invasive plant species list. Once present, an integrated pest management plan (IPM) is critical in ensuring proper management of invasive plants. IPM incorporates a combination of all best management tools provided herein.

### *Integrated Pest Management (IPM)*

#### **Manual Management:**

- **Hand pulling:** Pulling up individual plant stems is an effective control method for many vines, grasses, forbs, and seedling trees and shrubs (please note the exceptions listed below). Careful pulling is also required for certain annual and biennial species, as well as other woody species with resilient root systems, as they may re-sprout from root portions left in the ground. Moist soil can help to loosen roots for more effective pulling and reduces soil and seed bank disturbance.

#### **Mechanical Management:**

- **Cutting:** Individual invasive plants should be cut at ground level using a chainsaw, hand saw, loppers, pruners, shears, or other suitable implement. The cut material should be left elevated off the ground, or removed from site, to avoid re-establishing. Repeated cutting can be an effective means of managing small populations of woody invasive vines and some forbs, but this technique is less effective at removing invasive plant populations entirely. Many of the species found on the Camp Curtis Guild property will re-sprout vigorously from cut stems. Thus, cutting should occur on a repeated basis and/or combined with chemical management (see the next section).
- **Mowing:** Mowing is appropriate for small infestations of invasive plants, or environmentally sensitive areas where herbicides are not preferred and is generally used as a control method rather than an eradication method. Mowing is not generally recommended for plants that re-sprout heavily, unless it can be repeated often, and the area monitored until the targeted species has been exhausted and eliminated. Stems should be cut at least once for control, and preferably multiple times per growing season, and as close to ground level as possible. It often takes multiple years of mechanical management to eradicate an invasive plant population. Mowing and cutting should consider the plants phenology including time of seeding and can be used to reduce seed bank contributions.
- **Girdling:** Girdling (with no addition of chemical) of canopy and sub-canopy trees and some shrubs is an effective management technique for certain species. Girdling not only results in the eventual death of the invasive tree being girdled, but also appears to reduce seedling production while girdling is being conducted, due to the deteriorating health of the individual. Additionally, girdling will usually kill an individual tree over the course of 1-3 years, allowing for understory vegetation to adjust to the changing light conditions.

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To properly girdle a tree, use a chainsaw, axe, or girdling tool, and cut 2 shallow rings through the cambium of the tree. The rings should completely wrap the tree, and be within 2-6 inches of each other, below the lowest branches. Trees with a Diameter at Breast height (DBH) of 4+ inches can be effectively girdled. Girdling is most effective in the spring and can be combined with chemical treatment to further increase effectiveness.

**Chemical Management:** Professional herbicide applicators need to be appropriately licensed by the Massachusetts Department of Agricultural Resources or Department of Defense to apply herbicides or solutions intended to be used as herbicide. Pesticide applicators should read the entire pesticide label carefully, follow all mixing and application instructions and wear all recommended personal protective gear and clothing. Contact the Massachusetts Department of Agriculture's Pesticide Bureau for any additional pesticide use requirements, restrictions, or recommendations. The Massachusetts Pesticide regulations are located at <http://www.mass.gov/eea/agencies/agr/pesticides/pesticide-regulation-in-massachusetts.html>:

- **Foliar:** Foliar herbicide application involves applying a herbicide mix to the leaves of the plant. This method should be considered for large or dense infestations, where the risk to sensitive areas and native plant species is minimal. Foliar spot spray application is a method that directs the application to a small distinct target by using low-pressure application equipment (backpack and hand-pump sprayers), anti-drift adjuvants, and even spray shields, to avoid drift. This method can be carried out with minimal risk of drift, and is generally effective for herbaceous plants and woody shrubs less than six feet tall. The best time to treat is during the growing season and/or during the late fall, when the targeted plant is preparing to overwinter (sending its resources to its root system). For proper foliar methodology consult the pesticide label. Foliar spray should be avoided within 100-ft of wetlands and vernal pools, where possible, otherwise applications must be targeted foliar spot treatments using aquatic safe herbicides and surfactants.
  - **Plants generally unsuitable for foliar herbicide application:** *Plants which are intermixed with native, non-target species (likely to result in accidental die-off of non-target species) and plants which are growing in a wetland or within 100-ft of wetlands or vernal pools (although carefully targeted foliar application of aquatic safe herbicides may be used, if necessary).*
- **Cut Stem / Cut and Paint:** This method involves the application of herbicide directly on the cut end of a plant stem. Although time consuming, this selective method requires a small amount of herbicide and has the potential to greatly reduce effects on non-target species and the environment. Cut stem is recommended for woody plants that tend to re-sprout after cutting, and for use in sensitive areas to minimize risk of contact with non-target plant species. Stems are typically cut near the ground. A good practice is to leave enough above ground stem to perform a follow-up cut and treatment if necessary. Herbicide must be applied immediately after cutting the stem (within minutes) to be effective. Cut stem application can be completed at any time except during the spring when the movement of sap flow is up. Herbicide can be applied to the cut stem using various methods including hand-held spray or squirt bottles and well as paint (or foam) brushes. The active ingredient Glyphosate or Triclopyr is commonly used for this treatment method and is effective for many species, however, the applicator should always check the herbicide label. Applying a dye to the herbicide mix is helpful in keeping track of treated plants.

## Invasive Plant Management Methods and Guidance

- **Bundle Cut and Wipe:** This technique is similar to the cut and wipe method described above, except that multiple stems are bundled together and treated simultaneously. Stems should be bundled with twine at approximately waist height, cut in their bundles, and drip or wiped with herbicide using a hand-held squirt bottle, wick applicator, or injection gun. Mowing in the spring or previous season prior to treatment can help to remove old canes and make application more efficient.
  - **Plants generally suitable for bundle cut and wipe application:** *Common reed, reed canary grass.*
  - **Plants generally unsuitable for bundle cut and wipe application:** *Species and populations of species which do not grow in dense stands. Also, woody plant species.*
- **Basal Bark:** The basal bark technique consists of applying herbicide directly to the bark at the base of the plant. Although time consuming, this method is recommended for large infestations in sensitive areas where the risk of contact with non-targeted species is high. This method is effective throughout the year, provided that the base of the plant is exposed (remove snow, puddling water, dried leaves, etc.). Applying a dye to the herbicide mix is helpful in keeping track of treated plants.
  - **Plants generally suitable for basal bark application:** *Tree of heaven, Norway maple, black and honey locust, large grey willow, common and glossy buckthorn, autumn olive, burning bush.*
  - **Plants generally unsuitable for basal bark application:** *Non-woody and herbaceous species, any individual under 4 inches DBH.*
- **Injection (Herbaceous):** The injection technique is another targeted treatment approach, which involves injection of the herbicide into the hollow portion of certain plant stems, using an injection device. This method is particularly effective for the management of Japanese knotweed and common reed. and although time consuming, could be appropriate for small patches and stray individuals.
  - **Plants generally suitable for injection:** *Japanese knotweed, Common reed, other species with hollow stems.*
  - **Plants generally unsuitable for injection:** *Species that do not have hollow stem cavities.*
- **Injection (Shrub/Tree):** This technique is similar to that described above, except that the injection involves the application of herbicide directly into the cambium of woody/tree plants. Using a tree injector, a series of small, non-overlapping injections is made at the base of the trunk, below all branches. Herbicide is applied to each opening.
  - **Plants generally suitable for injection:** *large gray willow, Norway maple, common and glossy buckthorn, tree of heaven, black and honey locust.*
  - **Plants generally unsuitable for injection:** *Herbaceous plants and individuals smaller than 4 inches DBH.*
- **Bloody Glove/Paint:** The bloody glove / paint method involves the manual application of a herbicide formula directly on the plant's stems and leaves, using an herbicide saturated cotton glove over chemical resistant gloves. The bloody glove/paint method is recommended for use in sensitive areas such as riparian and wetland systems. Direct manual application of the herbicide formula reduces the risk of damaging non-target plant species and helps to protect water quality and wetland habitats, as it eliminates the element of drift involved in foliar application.

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- **Plants generally suitable for bloody glove:** *Common reed, reed canary grass, Asiatic bittersweet, pale and black swallow wort.*
- **Plants generally unsuitable for bloody glove:** *Any plants with thorns, or plants that have not leafed out.*
- **Girdle and Squirt / Hack and Squirt:** This is a combined girdle and chemical treatment approach. Following the guidelines for girdling (described above), immediately apply herbicide to the cut rings using a targeted spray bottle. Alternatively, for the “Hack and Squirt” technique, cut into the cambium around the base of the individual tree, and apply herbicide inside the cuts. Use the label recommended percentages for the species/chemical of choice.
  - **Plants generally suitable for Hack and Squirt:** *Tree of heaven, Norway maple, black and honey locust, large grey willow, common and glossy buckthorn, autumn olive, burning bush.*
  - **Plants generally unsuitable for Hack and Squirt:** *Non-woody and herbaceous species, and any individual less than 4 inches DBH.*

**Biological Pest Control/ Biocontrol:** several biocontrol agents have been approved by the USDA for the management of invasive species. See specific invasive species information below to determine whether a biocontrol is available for management purposes. Please note that biocontrol agents do not eradicate invasive species populations, however, by suppressing the growth and/or spread of the invasive plant, the biocontrol provides opportunities for reduced competition and diverse plant communities.

### *Other types of Management*

- **Prescribed Burns:** Prescribed burns are not currently recommended as a management tool for Camp Curtis Guild, although they may be considered in the future. The Fire Effects Information System (<https://www.feis-crs.org/feis/>) maintained by the US Forest Service provides synthesized information about various fire regimes and effects on specific plant species to help determine the benefits and effectiveness of fire on specific plant species. Some invasive plant species can be managed with controlled burns, typically in combination with one of more of the other management techniques described above. Prescribed fire during the dormant season is generally ineffective for controlling invasive vines, grasses, and forbs.
- **Intensive Grazing:** Grazing is not currently recommended as a management tool for Camp Curtis Guild, although this technique may be considered in the future. Timing of grazing is important (targeting plants before they set seed), but can be difficult to manage, due to the non-selective nature of this technique. In addition, grazing animals will consume both invasive and native plants. In an effort to protect native plants, it is recommended that grazing occur early in the season, prior to the flowering of many native plants. Proper management and handling of the herd is also important to prevent overgrazing of native grasses and forbs, which would lead to soil erosion and reduced diversity.

### *Managing invasive plant material*

**Disposal:** Viable plant propagules, such as roots, rhizomes, and seed heads, should be placed in sturdy plastic bags and disposed of with trash, or taken to a sanitary landfill for disposal. Do not compost or put



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in yard waste. Cut stems of woody plants can often be left on site where they were cut or can be composted or burned.

**Equipment Management:** Clean equipment of all plant pieces before moving the equipment to a new management site. Work boots should also be checked for any potential seed hitchhikers.

### *Managing invasive plants in wetlands and within 100-ft of Wetlands and Vernal Pools*

Wetland resource areas within Camp Curtis Guild primarily consist of wetlands and vernal pools. Not only are these habitats jurisdictions under the WPA and local wetlands bylaws, but many of them also support NHESP listed rare species. The following invasive plant management precautions should be taken when working within 100-ft of wetlands or vernal pools:

- **Limited use of herbicides within all wetlands and their 100-ft buffer zones:**
  - Prioritize hand-pulling or cutting (where appropriate for the invasive plant species).
  - If herbicide use is necessary (mature woody shrubs/vines), restrict to selective methods that use less herbicide and minimize potential effects to non-target plants, such as cut and paint. Foliar spray within 100-ft of wetlands or vernal pools should be avoided, although minimal use of foliar spot spray on certain invasive species (such as low growing herbaceous plants and follow-up treatment to re-sprouting woody plants), may be appropriate.
  - Targeted foliar spot treatments using low-volume application equipment (backpack hand-pump sprayers), can be carried out effectively with minimal risk of drift to nontarget organisms, in areas where invasive plants are not interspersed with non-target plant species. Herbicide and any adjuvants need to be water-safe and approved for use in wetland habitat areas and wetland buffer zones.

### *Monitoring*

Monitoring of treatment areas is essential for successful invasive species management. Treated areas should be monitored for:

- **Success in treating the invasive plants** – is the population declining in area, density, or extent? Do treatments need to be continued or adjusted to further reduce invasive plant populations based on the response to the previous treatments?
- **Failure in treating the invasive plants** – is the invasive population unimpaired by treatment, or even expanding / growing more rigorously? Have cut stumps produced multiple new shoots? Should the current management approach be continued, or should a new approach be implemented?
- **Damage to non-target species** – are native, non-target plants in the vicinity of the treatment area showing signs of stress, or are they responding positively to reduced invasive plant pressure? Has the treatment area become overly exposed / free from all vegetation? If non-target communities

## **Invasive Plant Management Methods and Guidance**

are being negatively impacted, cease the current treatment method and review suitable alternatives.

At the end of each growing season, the success of invasive plant management actions should be evaluated and used to inform the subsequent years management plan. Managing invasive plant species requires time, energy, and resources. Many of the recommended management strategies may require years of management and monitoring to achieve a significant reduction in population presence. Some invasive plants will require management and monitoring in perpetuity, and will likely never result in complete eradication of the population, but may provide a more balanced ecosystem that allows for a high degree of biodiversity, increased native plant abundance, species diversity, and improved habitat quality.

**Species Specific Management Recommendations for  
Invasive Plants Targeted by National Guard for Management**

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## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Asiatic Bittersweet*<sup>1,2,3</sup>, and *Pale and Black Swallowwort*<sup>4</sup>

#### **Woody/Semi Woody and Herbaceous Perennial Vines**

Manual: Manual removal is generally not recommended for most of the commonly occurring vines on Camp Curtis Guild, except for small infestations of young plants (provided that roots have not yet developed fully, and pull easily and fully out of the ground). Once plants mature, root systems may be expansive and hand pulling could result in soil disturbances or root resprout.

Mechanical: Repeated cutting and/or mowing may be an effective means of controlling the spread of invasive woody and herbaceous vines, but is not a best method for eradication. Management will require repeated cutting to exhaust the plant's energy stores, as cutting / mowing will increase the number of stems produced. Mowing may be required at least twice a week during the growing season. Combining mechanical and chemical management is most effective.

#### Chemical:

- **Cut/paint:** Cutting at the base of woody vines (and established herbaceous vines), and painting the cut surface with a herbicide formula, is an effective means of management especially for vines that have climbed a distance and are hard to reach for a foliar or painting application.
- **Foliar Application:** foliar applications can be effective at managing these vines when the application is completed during the growing season (prior to flowering/seeding) and at the end of the growing season (prior to dormancy). Several herbicidal applications may be required for effective management. Drift is a factor involved in foliar applications, and non-targeted species may be impacted by this type of management. As such, foliar application should be avoided when invasive plants are growing interspersed with native, non-target species.
- **“Bloody Glove”/Paint:** Application of the herbicide formula directly on the foliage is effective when completed during the growing season (and late fall for Japanese honeysuckle). Several applications may be required for effective control.

BioControl: Currently under evaluation for both Swallowwort vines. Biocontrols have not been evaluated for Asiatic bittersweet.

#### Other:

- **Grazing:** grazing could be an option to manage and control the spread of vines in upland habitats, however it is not being recommended at this time.

#### **Best Management Technique:**

- **Cut/paint with herbicide. Applying a dye to the herbicide mix is helpful in keeping track of treated plants.**
- **Glyphosate and/or Triclopyr-based herbicide formulations. If using in wetland sites, use formulations approved for wetland sites such as Rodeo and Garlon 3A respectively.**

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<sup>1</sup> Todd L. Mervosh and David Gumbart, “Cutting and Herbicide Treatments for Control of Oriental Bittersweet, Pale Swallow-Wort and Morrow’s Honeysuckle,” *Natural Areas Journal* 35, no. 2 (April 2015): 256–65, <https://doi.org/10.3375/043.035.0206>.

<sup>2</sup> NRCS, “Brush Management - Invasive Plant Control - Oriental Bittersweet - Celastrus Orbiculatus” (Conservation Practice Job Sheet NH-314), accessed December 11, 2020, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs144p2\\_015111.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_015111.pdf).

<sup>3</sup> Plant Conservation Alliance Alien Plant Working Group, “Oriental Bittersweet Celastrus Orbiculatus” (NPS), accessed December 11, 2020, <https://www.invasive.org/weeded/pdfs/wgw/orientalbittersweet.pdf>.

<sup>4</sup> NRCS, “Brush Management - Invasive Plant Control - Black Swallow-Wort” (Conservation Practice Job Sheet MN-797, 2007), <https://rhodeislandwoods.uri.edu/files/Black-SwallowWort.pdf>.

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Japanese Stiltgrass*<sup>5,6,7</sup>

#### Grass

**Japanese stiltgrass was not observed during BSC's October 2020 surveys. However, it has been documented growing along unimproved forest roads at Camp Curtis Guild in the past, therefore this species could be a future concern at Camp Curtis Guild and management methods have been provided.**

Manual: Practical only for small invasions. Requires multiple visits.

Mechanical: Repeated mowing late in the season when the plant begins to flower but before it goes to seed is an effective management strategy. Mowing must be repeated on a yearly basis for multiple years.

Chemical: Foliar Application: foliar applications of grass specific, pre-emergent and systemic herbicides are effective at eradicating Japanese stiltgrass populations. Pre-emergent herbicides are the most effective, but are not recommended in this management plan as they are non-selective and can prevent germination of native seeds, and they are generally not safe for use near aquatic environments. Glyphosate (a non-selective systemic herbicide), has been shown to be effective at treating stiltgrass - however it will also affect non targeted species.

BioControl: No biocontrols are currently available for this species.

Other:

- Grazing: grazing of stiltgrass by goats may be effective if implemented on a consistent basis but is not recommended as part of this plan.

**Best Management Technique:**

- **Early detection and manual/mechanical removal prior to seeding in areas of small infestations.**
- **Glyphosate is non-selective broad-spectrum herbicide, but is effective for stiltgrass treatment and can be used for targeted spot treatments.**
- **No large infestations of Japanese stiltgrass were found on Camp Curtis Guild during field surveys. However, if large, dense infestations should occur, a grass specific herbicide (such as clethodim or sethoxydim), should be use in areas of large infestations with restricted access for mechanical management (mowing/string trimming).**

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<sup>5</sup> NPS, "Invasive Species Fact Sheets Japanese Stiltgrass," 2018.

<sup>6</sup> "Japanese Stiltgrass Identification and Management | NC State Extension Publications," accessed December 11, 2020, <https://content.ces.ncsu.edu/japanese-stiltgrass-identification-and-management>.

<sup>7</sup> CAREN JUDGE, JOSEPH NEAL, and Jeffrey Derr, "Response of Japanese Stiltgrass (*Microstegium Vimineum*) to Application Timing, Rate, and Frequency of Postemergence Herbicides 1," *Weed Technology - WEED TECHNOLOGY* 19 (October 1, 2005): 912–17, <https://doi.org/10.1614/WT-04-272R.1>.

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Common Reed (Phragmites)*<sup>8,9,10,11</sup> and *Reed Canary Grass*<sup>12,13</sup> Grass

**Common Reed and Reed Canary Grass are commonly found in riparian habitats, wetlands, and their buffers. Therefore, management of these species will likely require coordination with the appropriate Conservation office in order to comply with provisions of the WPA.**

**Manual:** Manual removal of these species is not recommended. These plants don't pull well, and stems readily break off from the rhizomes, leaving behind viable plant propagules. Manual removal can also result in soil disturbance, which may further promote sprouting from grass rhizomes left in the ground.

**Mechanical:** Mowing alone is not recommended to remove common reed, but may be adequate to contain it from rhizomatic spreading. However, mowing followed by a foliar or cut stem herbicide application is more effective. On wet sites, mowing may be feasible in the winter when the ground is frozen. Containment of isolated common reed populations may be possible via use of a "root barrier".

**Chemical:** Late summer application of herbicide maximizes translocation into the rhizomes, helping to reduce re-sprouting and rhizomatic spread. Herbicide application must be done prior to the first frost. Glyphosate may be the most effective herbicide to treat established populations of common reed; use aquatic safe Glyphosate based formulations (e.g. Rodeo/Accord XRT 2) when working in a wetland or within 100-ft of wetlands or vernal pools.

- **Foliar Application:** Foliar applications can be effective at controlling both common reed and reed canary grass. However, due to their location near waterways, foliar applications are not the preferred treatment option (targeted cut stem or cut and wipe techniques are preferred). If foliar spray is necessary, spray close to the leaves using low pressure equipment and nozzles. For common reed, a preparation cut can be used to stimulate a flush of stems and leaves that are shorter and even in height for better foliar application.
- **Cut & Wipe and Bundle Cut & Wipe:** This method involves the application of herbicide directly on the cut end of a plant stem. This selective method requires a small amount of herbicide and has the potential to greatly reduce effects on non-target species and the environment. Stems should be cut leaving enough above ground stem to perform a follow-up cut and treatment if necessary. Herbicide must be applied immediately after cutting the stem (within minutes) to be effective. Herbicide can be applied to the cut stem using various methods, including hand-held spray or squirt bottles and well as paint (or foam) brushes. For dense stands of grasses, multiple stems can be bundled together and treated simultaneously (bundle cut & wipe). Stems should be bundled with twine at approximately waist height, cut in their bundles, and drip or wiped with herbicide using a hand-held squirt bottle, wick applicator, or injection gun. Mowing in the spring or previous season prior to treatment can help to remove old canes and make application more efficient.

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<sup>8</sup> Eric L. G. Hazelton et al., "Phragmites Australis Management in the United States: 40 Years of Methods and Outcomes," *AoB PLANTS* 6 (January 1, 2014), <https://doi.org/10.1093/aobpla/plu001>.

<sup>9</sup> Ralph Tiner, "Phragmites: Controlling the All-Too-Common Common Reed" (Massachusetts Wetlands Restoration Technical Notes, 1995).

<sup>10</sup> Thomas J. Mozdzer et al., "Efficacy of Imazapyr and Glyphosate in the Control of Non-Native Phragmites Australis," *Restoration Ecology* 16, no. 2 (June 2008): 221–24, <https://doi.org/10.1111/j.1526-100X.2008.00386.x>.

<sup>11</sup> Tunyalee Martin, "A Success Story: Phragmites Control at Kampoosa Bog, Massachusetts" (The Nature Conservancy, 2001).

<sup>12</sup> Wisconsin Reed Canary Grass Management Working Group, "Reed Canary Grass (Phalaris Arundinacea) Management Guide: Recommendations for Landowners and Restoration Professionals" (Wisconsin Reed Canary Grass Management Working Group), accessed December 11, 2020, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs144p2\\_035064.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_035064.pdf).

<sup>13</sup> Carrie Reinhardt Adams and Susan M. Galatowitsch, "Increasing the Effectiveness of Reed Canary Grass (Phalaris Arundinacea L.) Control in Wet Meadow Restorations," *Restoration Ecology* 14, no. 3 (2006): 441–51, <https://doi.org/10.1111/j.1526-100X.2006.00152.x>.



## **Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management**

- **Bloody Glove/Paint:** This technique is more efficient than the injection/drip method (below), and better at reducing the risk of damaging non-targeted species than a foliar application. The bloody glove method applies herbicide directly on the plant shoot and leaf. Due to the effort required, this method should be favored in small patches, or areas of heightened sensitivity to chemicals.
- **Injection/Drip:** This is a time-consuming method involving the direct injection of the herbicide into the hollow portion of the grass cane. While time-consuming, it is selective and effective at minimizing the amount of herbicide used and risk to non-target plants.

Biocontrol: There are no biocontrol's available for managing either species.

Other: No other control methods (burning, inundation with salt water, increased freshwater inundation, grazing etc.), would be appropriate at Camp Curtis Guild due to site constraints, sensitive habitats, and rare species.

### **Best Management Techniques:**

- **Reed Canary Grass: Mowing, followed by chemical treatment (bundle cut and wipe or bloody glove preferred, to reduce risk of drift). If mowing is conducted prior to treatment, ensure all equipment is free of grass fragments - including rhizomes - since these can help the grasses spread.**
- **Common Reed: Summer herbicide application. Bloody glove and cut and wipe herbicide application methods are effective. Mowing/cutting followed by selective herbicide application can be effective, however, ensure all equipment is free of grass fragments including rhizomes. Marking the current boundary extent of common reed stands with metal t-posts (spray painted with orange), would provide a visual marker to gauge the spread or reduction of the stand, and whether control efforts are working or require additional effort.**
- **Glyphosate-based herbicides are effective for established populations of phragmites and for reed canary grass. If treatment is within 100 feet of a wetland, use a formulation labeled for wetland use (such as Rodeo, and a wetland safe surfactant such as Cide-Kick), and limit herbicide application to selective methods.**
- **NOTE: Herbicide application should be limited to direct application (e.g., hand wick), in a wetland or within 100-ft of wetlands.**

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Garlic Mustard*<sup>14,15,16</sup> and *Spotted knapweed*<sup>17</sup>

#### **Forbs**

**Manual:** Garlic mustard and spotted knapweed are biennial plants with deep tap roots. Manual removal by hand pulling or digging is recommended for small populations. Watering an area prior to pulling may help to reduce soil disturbance and plant's resistance to pulling, increasing the chances of removing all portions of the root. Because they are biennials, pulling in the first-year basal form, when roots are not fully formed, is preferred or prior to seeding in the second year. All invasive plant material from these two plants should be bagged and removed from site for appropriate disposal. Management should be conducted before the plants set seed (before June). Treated areas should be monitored after pulling, since soil disturbance may encourage seed germination from an exposed seed bank, as well as growth of other invasive plant species. Repeatedly hand pulling of garlic mustard is reported to be effective for control in small areas but has limitations. Because seeds remain viable in the soil for up to 10 years, it is important to pull all garlic mustard plants in an area every year until the seed bank is exhausted and seedlings no longer appear.

**Mechanical:** Frequent short mowing may control and slow down the spread of these species along road sides and other areas. However, spotted knapweed and garlic mustard grow from the crown, thus, mowing alone is not effective at eradicating the populations and may cause them to bolt and seed. Always mow prior to seeding (typically prior to June) to prevent the spread of seeds, and mow in successional years to ensure their depletion of the seed bank.

**Chemical:** Foliar application of systemic herbicides are effective at controlling these species. Be mindful of pollinators and avoid spraying during flowering. Note that while first-year basal rosettes can be sprayed until the first annual frost, second-year growth should only be sprayed up until seeding. After an individual has gone to seed it will die back on its own. Treatment is thus ineffective and should resume on any fresh germinations.

#### **Biocontrol:**

- Knapweed: Three weevil species; the knapweed root weevil (*Cyphocleonus achate*), the blunt knapweed flower weevil (*Larinus obtusus*), and the lesser flower head weevil, (*ILarinu minutus*), have been approved by the USDA for knapweed management and are available for purchase online. Biocontrol via these weevils requires large stands for success.

#### **Other:**

- Grazing is an appropriate management technique for both species of invasive plant, provided grazing is conducted early in the year, prior to native vegetation growth.

#### **Best Management Techniques:**

- **Garlic Mustard: Manual removal of small infestations. Systemic herbicide applications in the late Spring should be considered for large infestations.**
- **Spotted Knapweed: Small populations can be hand pulled or mowed. Systemic herbicide applications in the late Spring should be considered for large infestations. Biocontrol releases are also an option for large and scattered populations.**
- **Glyphosate or Triclopyr should be used for targeted chemical treatments. Triclopyr is selective on broad-leaved plants and can be used for situations in which the target plants are growing intermixed with native grasses. If treatment is within 100 feet of a wetland, use a formulation**

<sup>14</sup> UMass Amherst, *Pesticide Safety Education - Core Manual 3rd Edition* (Amherst: UMass, n.d.).

<sup>15</sup> Penn State University, "Garlic Mustard," Penn State Extension, accessed December 11, 2020, <https://extension.psu.edu/garlic-mustard>.

<sup>16</sup> Adriane M. Carlson and David L. Gorchov, "Effects of Herbicide on the Invasive Biennial *Alliaria Petiolata* (Garlic Mustard) and Initial Responses of Native Plants in a Southwestern Ohio Forest," *Restoration Ecology* 12, no. 4 (December 2004): 559–67, <https://doi.org/10.1111/j.1061-2971.2004.00373.x>.

<sup>17</sup> "Spotted Knapweed | Minnesota Department of Agriculture," accessed December 11, 2020, <https://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/spottedknapweed>.

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

labeled for wetland use, such as Rodeo and a wetland safe surfactant such as Cide-Kick, and limit herbicide application to selective methods.

### *Japanese knotweed*<sup>18,19</sup> and *Purple Loosestrife*<sup>20</sup>

**Due to the location of these species growing in or along wetlands and wet depressions, management of these species will likely require coordination with the appropriate Conservation office in order to comply with provisions of the WPA.**

**Manual:** Manual removal by hand pulling or digging of the early stages of these species is recommended for small manageable populations. Japanese knotweed and purple loosestrife have well-developed root systems, and both can reproduce vegetatively through underground roots and from root fragments left in the ground after hand pulling. All portions of the root/rhizome need to be removed for proper management. Watering an area prior to pulling may assist in reducing soil disturbance and pulling resistance. Areas should be monitored after pulling, since soil disturbance from pulling may encourage the growth of other invasive plants due to the availability of growing space and resources.

**Mechanical:** Frequent short mowing may control and slow down the spread of these species along roadsides and other areas, however, this approach is not effective at eradication. Use caution when removing plant material, as resins in the leaves and rhizomes can cause irritation. Mowing to control spread will be required both in the late spring and in the early fall. Alternatively, a mow and tarp approach can be effective, if the tarp is left in place to smother the knotweed for multiple years, depriving its water and sunlight.

#### **Chemical:**

- **Foliar Application:** Low-pressure foliar applications of systemic herbicides are effective at controlling Japanese knotweed and purple loosestrife. Using low-pressure equipment and conducting a prep cut to knotweed (to stimulate lush re-growth at a reduced height), allows for the spray to be more easily targeted downward, reducing drift. Foliar spot treatments are effective for treating purple loosestrife. Leaf litter should be removed from targeted plants during the rosette stage for contact and effectiveness. For both species, use of foliar spray should be carefully targeted to reduce drift. **Targeted foliar applications will avoid impacts within sensitive areas.**
- **Injection:** The injection method is a targeted and effective method for treating knotweed with canes at or greater than ½ inch in diameter. In late summer, inject 5 cc's of a 5% Glyphosate-based herbicide directly into the hollow stem (see foliar treatment for stems smaller than 1/2 inch in diameter). Injection can be delivered by either using an injection gun that pierces the stem or by cutting the stems 6-12 inches from the ground and directing herbicide down into the hollow stem. Formulations should be injected into the younger nodes (between the first and second nodes up from the bottom). The injection method reduces herbicide contact with non-target species, thus reducing the risk to other plant species.

**Biocontrol:** There are no approved biocontrol's for Japanese Knotweed. For purple loosestrife, two species of leaf-feeding beetles, *Galerucella* spp. can be released which consumes the leaves, buds, and stems. The purple loosestrife biocontrol appeared to be present at all the survey sites where purple loosestrife was observed.

**Other:** None identified.

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<sup>18</sup> Douglas Cygan, "Preventing the Spread of Japanese Knotweed Reynoutria Japonica" (New Hampshire Department of Agriculture, Markets & Food, 2018), <https://www.agriculture.nh.gov/publications-forms/documents/japanese-knotweed-bmps.pdf>.

<sup>19</sup> Art Gover, Jon Johnson, and Jim Sellmer, "Managing Japanese Knotweed," 2007, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_017951.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_017951.pdf).

<sup>20</sup> Department of Natural Resources MN, "What You Can Do to Control Purple Loosestrife," Minnesota Department of Natural Resources, accessed December 11, 2020, <https://www.dnr.state.mn.us/invasives/aquaticplants/purpleloosestrife/control.html>.

## **Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management**

### **Best Management Techniques:**

- **Japanese knotweed:** Frequent mowing can be an effective means of controlling the spread of small to medium sized upland populations. Mowed material should be burned onsite (if feasible), or bagged and taken to a disposal facility capable of handling invasive matter. For larger populations and areas where mowing is not feasible (particularly near wetlands), targeted methods such as stem injection, hand wicking or target spraying are effective for control and eradication.
- **Purple loosestrife:** The biological control agent (the beetle *Galerucella* spp.), is already present on camp Curtis Guild. If the beetle is not successfully controlling populations, targeted application of herbicide (preferably hand wicking), may be an option. Foliar herbicide application should be avoided in wetlands, which is where purple loosestrife is most commonly found.
- **Rodeo or other Glyphosate-based herbicide** approved for use in wetlands with an appropriate wetland safe surfactant (check the label for specifications).



## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Norway Maple* <sup>21,22,23</sup>

#### **Tree**

**Manual:** Manual removal of Norway Maple, other than small seedlings, is not recommended. Soil disturbance resulting from seedling removal and uprooting of overstory trees may enhance germination of Norway maple seeds in the seed bank.

#### **Mechanical:**

- Girdling of canopy and sub-canopy Norway maples is an effective means of killing this invasive tree, and also appears to reduce seedling production as the tree's health declines. Girdling appears to be most effective in the late spring (when sap flow is low). The tree must be girdled through the bark and growing layer (cambium), all around the trunk. To properly girdle a tree, use a chainsaw, axe, or girdling tool, and cut 2 shallow rings through the cambium of the tree. The rings should completely wrap the tree, and be within 2-6 inches of each other, below the lowest branches. Trees with a Diameter at Breast height (DBH) of 4+ inches can be effectively girdled. Girdled trees may take 1-3 years to fully die, allowing the understory time to adjust to changing light levels. The method works best and avoids resprouts when combined with chemical application (see below).
- Cutting: Overstory and sub-canopy Norway maple trees that are cut down may re-sprout from stumps. The effectiveness of managing Norway maple stands exponentially increases when combined with a chemical method.

#### **Chemical:**

- Cut and Paint / Cut Stump: cut the tree and immediately apply a systemic herbicide approved for the species (refer to the herbicide label) - such as Triclopyr or Glyphosate - to the outer ring of the stump.
- Basal Bark Application: Norway maples up to 4-inches in diameter can be controlled by applying a mix of an approved systemic herbicide (such as Triclopyr) mixed with a horticultural oil to the bark of the tree approximately a foot from the base of the trunk.
- Hack and squirt / Girdle and Squirt: Perhaps the most effective method, girdle the tree and fill the exposed lines with chemical as per the label instructions. Best in late spring when sap production lessens allowing chemical to be absorbed.

**Biocontrol:** none

#### **Best Management Technique:**

- **New populations composed of small seedlings: Mechanical and/or hand removal or chemical cut/paint.**
- **Mature trees & larger diameter saplings: A combination of mechanical and chemical control via cut/paint, girdle squirt, or basal bark application will likely result in the most successful management. This type of control diminishes soils disturbance and non-targeted species exposure to chemicals or other damage.**
- **Glyphosate or Triclopyr used in accordance with the label, local regulations, and methodology should be used as the herbicide. If treatment is within 100 feet of a wetland, use a formulation labeled for wetland use (such as Rodeo, and a wetland safe surfactant such as Cide-Kick), and limit herbicide application to selective methods.**

<sup>21</sup> Maine.gov, "Maine Natural Areas Program, Invasive Plants, Norway Maple," 2013, [https://www.maine.gov/dacf/mnap/features/invasive\\_plants/acerplat.htm](https://www.maine.gov/dacf/mnap/features/invasive_plants/acerplat.htm).

<sup>22</sup> UMass Amherst, *Pesticide Safety Education - Core Manual 3rd Edition*.

<sup>23</sup> DCR Pennsylvania, "Norway Maple" (Department of Conservation and Natural Resources), accessed December 11, 2020,

<http://elibrary.dcnr.pa.gov/PDFProvider.ashx?action=PDFStream&docID=1738702&checksum=&revision=0&docName=NorwayMaple&nativeExt=pdf&PromptToSave=False&Size=151292&ViewerMode=2&overlay=0>.

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Tree of Heaven*<sup>24</sup>, *Black and Honey Locusts*<sup>25,26</sup>

#### **Trees**

**Manual:** Manual removal of these species is only recommended when the seedlings are small enough and conditions allow for the entire root system to be pulled. Any pieces of root left behind will re-sprout.

#### **Mechanical:**

- Mowing of seedlings on a consistent and regular basis will deplete the root system. However, this can take multiple years.
- Cutting: Overstory and sub-canopy trees that are cut down will re-sprout from the stump. The effectiveness of mechanical cutting exponentially increases when combined with a chemical method.

#### **Chemical**

- Foliar: Trials of chemical techniques completed by Penn State University recommend foliar applications between the summer and the fall (between full canopy development and fall color) using a combined triclopyr, glyphosate and surfactant solution. See page 3 of the “Managing Tree of Heaven on Roadsides” for a list of herbicide combinations currently used to treat Tree of Heaven: <http://plantscience.psu.edu/research/projects/vegetative-management/publications/roadside-vegetative-management-factsheets/3ailanthus-on-roadsides>.
- Injections, Girdling, Hack and Squirt, and Cut/Paint: These are all effective methods as they result in a high concentration of herbicide being absorbed by the tree. These methods are most successful during the foliar application window when the stump is treated immediately after cutting. Information regarding chemical management provided by the USFS and the USDA can be found here: [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5410131.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410131.pdf). There is still potential for re-sprouting as when damaged, the tree will often attempt to sucker (produce stems from adventitious buds).
- Basal Bark: Most effective for trees that are less than six-inches in diameter. Applications of herbicides on the base of the tree are most effective in the late winter/early spring and in the summer. Prior to application, the base of the tree must be free of snow, ice, or water. If treatment is being conducted on hot summer days (particularly over long periods of time), respirators may be desired, as the treatment mixture can volatilize at relatively low temperatures. The recommended chemical Garlon 4 Ultra (triclopyr) has a vapor/volatilization temperature of around 95 degrees when in a basal bark surfactant. As with all chemical/herbicide treatments, consult the manufacturers label prior to use.

**Biocontrol:** Several biocontrols are currently being tested for Tree of Heaven. *Verticillium nonalfalfae*, a native vascular wilt fungus is being distributed at various test sites within the State of Pennsylvania. In addition, *Eucryptorrhyncus brandti*, a weevil native to China, was approved in 2011 for additional host range testing which is still in progress. [https://www.fs.fed.us/foresthealth/technology/pdfs/FS\\_toh.pdf](https://www.fs.fed.us/foresthealth/technology/pdfs/FS_toh.pdf)

No biocontrol is known for either locust tree.

**Other:** None identified.

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<sup>24</sup> Art Gover, Larry Kuhns, and Jon Johnson, “Managing Tree-of-Heaven (Ailanthus Altissima) on Roadsides,” 2004, <https://plantscience.psu.edu/research/projects/vegetative-management/publications/roadside-vegetative-management-factsheets/3ailanthus-on-roadsides>.

<sup>25</sup> J.M DiTomaso and J.B Kyser, “Robinia Pseudoacacia Black Locust,” in *Weed Control in Natural Areas in the Western United States* (University of California: Weed Research and Information Center, 2013), 544, [https://wric.ucdavis.edu/information/natural%20areas/wr\\_R/Robinia.pdf](https://wric.ucdavis.edu/information/natural%20areas/wr_R/Robinia.pdf).

<sup>26</sup> NRCS, “Brush Management - Invasive Plant Control - Black Locust - Robinia Pseudoacacia” (Job Sheet - Brush Management 314), accessed December 11, 2020, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs144p2\\_015112.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_015112.pdf).

## **Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management**

### **Best Management Technique:**

- **New population composed of small seedlings: Mechanical removal through consistent mowing or chemical foliar treatment.**
- **Established population: A combination of mechanical and chemical control via cut/paint or basal bark application will likely result in the most successful management. This type of control diminishes soils disturbance and non-targeted species exposure to chemicals or other damage.**
- **Triclopyr is the most suitable herbicide for use on Tree of Heaven, and should be used in accordance with the label and any local regulations.**
- **If treatment is within 100 feet of a wetland, use a formulation labeled for wetland use (such as Rodeo, and a wetland safe surfactant such as Cide-Kick), and limit herbicide application to selective methods.**

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Large Grey Willow*<sup>27</sup>

#### Tree/Shrub

*Large grey willows are commonly found in riparian habitats, wetlands and their buffers. Therefore, management of large grey willow will likely require coordination with the appropriate Conservation office to comply with provisions of the WPA. Due to the important ecological function that willow species often provide, a plan to replace the willow with native plants, after removal, may be necessary. The plants chosen should be specific to the ecological function provided by the willow. These could include bank stabilization, shade/weed suppression, and/or wildlife habitat including early flowering nectar and pollen sources for early emerging insects.*

Manual: Manual removal of large grey willow is *only recommended when the seedlings are small enough to pull the full root system or if in combination with mowing*. This way any pieces of root left behind to re-sprout can be managed by regular and consistent mowing/pulling cycles.

#### Mechanical:

- Mowing of seedlings on a consistent and regular basis will deplete the root systems. However, this can take multiple years.
- Cutting: willows are very resilient and will re-sprout from stumps when cut down, thus requiring consistent cutting. The effectiveness of mechanical cutting exponentially increases when combined with a chemical method.

#### Chemical:

- Foliar: application should be completed when willows are in full leaf.
- Cut/Paint: Ideally, this treatment should be implemented prior to fruit production but can occur any time of year except for the early spring sap flow (sap will push the chemical out of the stem). Herbicide application must occur immediately after cutting.
  - Small diameter stems ( $2 \leq$  inch DBH) can be cut several inches above the ground so that both the sides and the cut surface may be treated.
  - Large diameter stems ( $\geq 2$  inch DBH): cuts should be made as close to the ground as possible and only the cambium—the thin layer where active growth occurs, just inside the bark—should be treated.
- Injections: This treatment is most effective during the foliar season and when applied to the base of the tree. The methodology limits herbicide to specific portions of the plant. To properly do this a tree injector is used to create several non-overlapping cuts into the cambium of a tree. Herbicide is then deposited into the openings. This is similar to a hack and squirt technique, but with less apparent gaps. This methodology works with any tree with greater than 4 inches DBH.
- Injections, Hack and Squirt and Cut/Paint techniques are all effective methods for controlling invasive trees, as they result in a high concentration of herbicide being absorbed by the tree. These methods are most successful during the foliar application window when the stump is treated immediately after cutting. Information regarding chemical management provided by the USFS and the USDA can be found here: [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5410131.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410131.pdf). There is still potential for re-sprouting as when damaged, the tree will often attempt to sucker (produce stems from adventitious buds).

Biocontrol: None identified

Other: None identified

#### **Best Management Technique:**

- **Chemical injections: Injections/Hack and Squirt are the best control methods for large grey willow, as they kill the tree slowly (while reducing seed production), retain shade and habitat, and restrict chemical exposure to the plant itself.**

<sup>27</sup> UMass Amherst, *Pesticide Safety Education - Core Manual 3rd Edition*.



**Species Specific Management Recommendations for  
Invasive Plants Targeted by National Guard for Management**

- **Cut and paint treatments for smaller diameter trees and spot spraying any suckers will allow for control of younger populations.**
- **Glyphosate or Triclopyr are recommended herbicides for treating this species, and should be used in accordance with the label, and any local regulations. If treatment is within 100 feet of a wetland, use a formulation labeled for wetland use (such as Rodeo, and a wetland safe surfactant such as Cide-Kick), and limit herbicide application to selective methods.**

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

*Common and Glossy Buckthorns*<sup>28,29,30</sup>, *Autumn Olive*<sup>31</sup>, *Burning Bush*<sup>32,33,34</sup>,  
*Japanese and European Barberry*<sup>35,36</sup>, and *Multiflora Rose*<sup>37,38</sup>

### Shrubs

**Manual:** Manual removal of these shrub species is *only recommended when the seedlings are small enough to pull the full root system, or if in combination with mowing*. This way, any pieces of root left behind to re-sprout can be managed by regular and consistent mowing/pulling cycles.

### Mechanical:

- Mowing of seedlings on a consistent and regular basis has the potential to deplete the root system. However, this can take multiple years.
- Cutting: Shrubs should be cut at or below ground level. Shrubs that are cut down will re-sprout from the stump. The effectiveness of mechanical cutting exponentially increases when combined with a chemical method.

### Chemical:

- Foliar: application should be completed in the Spring after sap flow.
- Cut/Paint and Hack and Squirt: Ideally, these treatments should be implemented prior to fruit production, but can occur any time of year except for the early spring sap flow (sap will push the chemical out of the stem). Herbicide application must occur immediately after cutting.
- Information regarding chemical management provided by the USFS and the USDA can be found here: [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5410131.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410131.pdf). There is still potential for re-sprouting as when damaged, the tree will often attempt to sucker (produce stems from adventitious buds).
- Autumn Olive: Basal bark treatment is most effective when applied in the fall and to stems that are more than 1.5 inches in diameter. Herbicide should be applied to a band of bark around the stem extending 18-inches above the ground. Treatment will be required for several growing seasons until the population is controlled. Triclopyr (Garlon 4) is recommended for basal bark application. Pre-mixed formulations appropriate for basal bark applications are available. Applicators must refer to the chemical label for correct methodology.

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<sup>28</sup> Department of Natural Resources MN, “Buckthorn Management,” Minnesota Department of Natural Resources, accessed December 11, 2020, <https://www.dnr.state.mn.us/invasives/terrestrialplants/woody/buckthorn/control.html>.

<sup>29</sup> L. M. Nagel, R. G. Corace, and A. J. Storer, “An Experimental Approach to Testing the Efficacy of Management Treatments for Glossy Buckthorn at Seney National Wildlife Refuge, Upper Michigan,” *Ecological Restoration* 26, no. 2 (June 1, 2008): 136–42, <https://doi.org/10.3368/er.26.2.136>.

<sup>30</sup> Michigan DNR, “Common Buckthorn *Rhamnus Cathartica*” (Invasive Species - Best Control Practices), accessed December 11, 2020, <https://mnfi.anr.msu.edu/invasive-species/CommonBuckthornBCP.pdf>.

<sup>31</sup> Penn State University, “Autumn Olive,” Penn State Extension, 2020, <https://extension.psu.edu/autumn-olive>.

<sup>32</sup> Penn State University, “Burning Bush,” Penn State Extension, accessed December 11, 2020, <https://extension.psu.edu/burning-bush>.

<sup>33</sup> Douglas Cygan, “Integrated Pest Management for Woody Invasive Plants” (New Hampshire Department of Agriculture, Markets & Food, n/d).

<sup>34</sup> NRCS, “Pest Management - Invasive Plant Control - Burning Bush - *Euonymus Alatus*” (Conservation Practice Job Sheet NH-595), accessed December 11, 2020, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1081645.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1081645.pdf).

<sup>35</sup> Michigan DNR, “Japanese Barberry *Berberis Thunbergii*” (Invasive Species - Best Control Practices, 2012).

<sup>36</sup> NRCS, “Brush Management – Invasive Plant Control Barberries – *Berberis* Sp.” (Conservation Practice Job Sheet NH-314, 2011).

<sup>37</sup> Jon Johnson, Art Gover, and Jim Sellmer, “Managing Multiflora Rose” (Penn State University, 2007), [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_018028.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_018028.pdf).

<sup>38</sup> NRCS, “Brush Management – Invasive Plant Control Multiflora Rose – *Rosa Multiflora*” (Conservation Practice Job Sheet NH-314, 2011).

## **Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management**

Biocontrol: None

Other: None identified, which would be appropriate for Camp Curtis Guild at this time.

### **Best Management Technique:**

- **Small seedlings: Mechanical removal through consistent mowing, or other forms of cutting. Targeted foliar application is also an option, but should be avoided/minimized within 100-ft of wetlands.**
- **Established population: A combination of mechanical and chemical control via cut/paint or basal bark application will likely result in the most successful management. This type of control diminishes soils disturbance and non-targeted species exposure.**
- **Triclopyr should be used for Basal bark application or cut/paint application methods. Glyphosate is the recommended herbicide for all other chemical treatment methods. All pesticide should be used in accordance with the label, and local regulations. If treatment is within 100 feet of a wetland, use a formulation labeled for wetland use (such as Rodeo, and a wetland safe surfactant such as Cide-Kick), and limit herbicide application to selective methods.**
- **NOTE: Herbicide application should be limited to direct application (cut/paint, basal bark) within wetlands and 100-ft of wetlands.**

## Species Specific Management Recommendations for Invasive Plants Targeted by National Guard for Management

### *Non-Native Shrub Honeysuckles*<sup>39, 40</sup>

#### **Shrub**

Manual: Manual removal is only recommended when the seedlings are small enough to pull the full root system. Any pieces of root left behind will re-sprout unless it is managed by regular and consistent mowing cycles.

Mechanical:

- Mowing of seedlings on a consistent and regular basis will deplete the root system. However, this will take multiple years.
- Cutting: Shrubs that are cut down will re-sprout from the cut stump. The effectiveness of mechanical cutting exponentially increases when combined with a chemical method.

Chemical: Chemical treatment methods can be conducted any time of year to control the growth and spread of honeysuckles.

- Foliar: Application should be completed mid-May through onset of fall leaf color.
- Cut/Paint: Ideally, this treatment should be implemented prior to fruit production but can occur any time of year. Herbicide application must occur immediately after cutting

Biocontrol: None

Other: None identified, which would be appropriate for Camp Curtis Guild. Burning and grazing are both options for small upland populations, but these methods would not be suitable at Camp Curtis Guild.

**Best Management Technique:**

- **New population composed of small seedlings: Mechanical removal through consistent mowing, or other forms of cutting.**
- **Established population: A combination of mechanical and chemical control via cut/paint or foliar application will likely result in the most successful management. This type of control diminishes soil disturbance and non-targeted species exposure.**
- **NOTE: Herbicide application should be limited to direct application (cut/paint, foliar), within 100-ft of wetlands.**

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<sup>39</sup> NRCS, "Pest Management - Invasive Plant Control - Shrub Honeysuckles - Lonicera Sp." (Conservation Practice Job Sheet NH-595), accessed December 11, 2020, [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1081648.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1081648.pdf).

<sup>40</sup> "Shrub Honeysuckles," Penn State Extension, accessed December 11, 2020, <https://extension.psu.edu/shrub-honeysuckles>.



## **APPENDIX D**

Camp Curtis Guild:  
Five Year Invasive Species Adaptive Management Plan

Massachusetts Army National Guard  
2021 – 2025

### **Sensitive Resource Areas and Rare Species: Invasive Plant Management Precautions**

Appendix D has been redacted from NOI Applications  
as it contains sensitive species information

# **Attachment F**

Camp Curtis Guild  
5-Year Invasive Plant Management Plan  
Wakefield, Massachusetts  
Notice of Intent Application

ENVIRONMENTAL MONITOR NOTICE

## **Notice of Intent to Initiate an Ecological Restoration Limited Project**

**To:** Environmental Monitor

**From:** BSC Group, Inc.

**Date:** September 09, 2021.

**Anticipated submission dates of NOIs:** October 1, 2021 (Lynnfield); September 29 (Reading); September 28 (North Reading); October 4 (Wakefield).

**RE:** Notification of filing a Notice of Intent (NOI) for the Camp Curtis Guild Invasive Plant Management Project in Lynnfield, Reading, North Reading and Wakefield, MA.

### **Proposed Project:**

The applicant proposes ecological restoration activities involving the management of invasive plant species, within the Camp Curtis Guild National Guard property in Lynnfield, Reading, North Reading and Wakefield, MA. Restoration activities are proposed within wetland resource areas and their buffer zones, vernal pools, and NHESP Priority Habitat. Activities include managing and removing invasive plants through the use of herbicide application; treating and removing invasive plants by hand; and using other cultural or mechanical methods to remove invasive plants. Invasive plant management is proposed to continue throughout a 5-year management period, with integrated monitoring and review of project goals throughout the period.

### **Reviewing Conservation Commissions:**

Lynnfield Conservation Commission, 55 Summer Street, Lynnfield, MA 01940.

Reading Conservation Commission, 16 Lowell Street, Reading, MA 01867.

North Reading Conservation Commission, 235 North Street, North Reading, MA 01864.

Wakefield Conservation Commission, 1 Lafayette Street, Wakefield, MA 01880.

Copies of the NOI may be examined or acquired from the Conservation Commissions, or by contacting the applicant's representative, BSC Group, Inc., at [mburne@bscgroup.com](mailto:mburne@bscgroup.com), or calling (617) 896-4594.

See the Conservation Commission websites or contact your municipality's Conservation Commission at:

Lynnfield: (781) 334-9495

Reading: (781) 942-6616

North Reading: (978) 357-5248

Wakefield: (781) 224-5015