

Working Towards an Invasive Plant Strategy for RBG Natural Lands

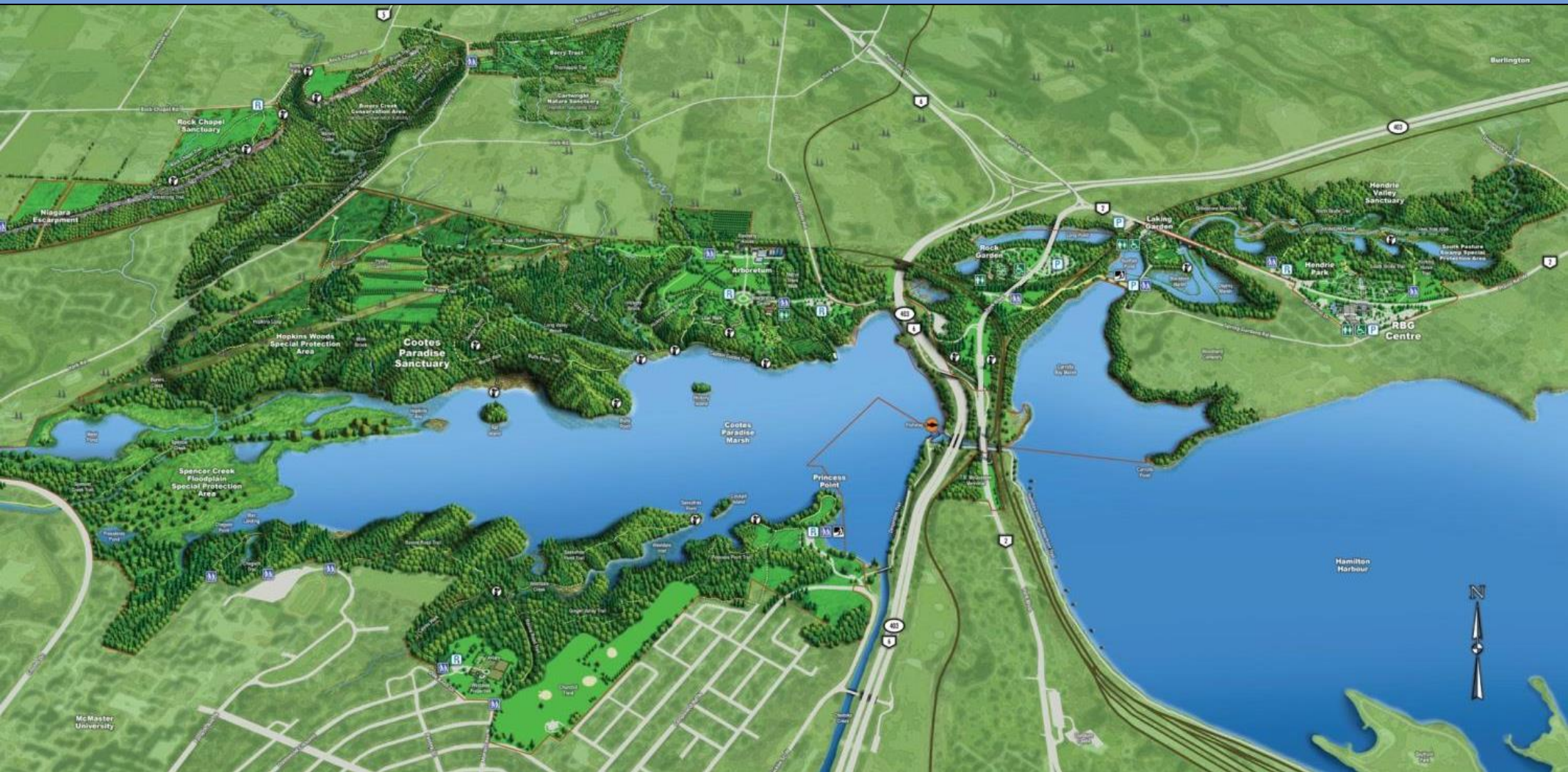


**ROYAL
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Terrestrial Ecologist
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Photo credit: Dave d'Entremont

Royal Botanical Gardens (RBG) is the **largest botanical garden in Canada** with over 900 hectares of **protected natural areas** and 100 hectares of **display gardens and horticultural collections**. We are a registered charitable organization with a mandate to **bring together people, plants and nature**.





Canada's Biodiversity Hotspot

RBG has 38% of Ontario's and 23% of Canada's native flora living in environmentally sensitive ecosystems

- UNESCO World Biosphere Reserve
- Important Bird Area (IBA)
- Important Area for Reptiles and Amphibians (IMPARA)
- Provincial Area of Natural and Scientific Interest (ANSI)
- Environmentally Sensitive Area
- Provincially Significant Wetlands
- National Historic Site



Controlling invasive species is a top priority in maintaining and protecting RBG's native plant and wildlife biodiversity.

An invasive plant strategy is necessary so that there is a uniform and well guided approach to managing invasive plants within RBG's natural lands.

This presentation will outline the steps RBG is taking towards developing an invasive plant strategy:

Step 1 – Survey

Step 2 – Identify Priority Species

Step 3 – Map Priority Species

Step 4 – Identify Priority Areas for Management

Step 5 – Manage (control/eradication plan)

Step 6 – Moving Forward (monitoring, prevention, outreach, adaptive management)



STEP 1. Survey

Determine what invasive plants are present, where are they located and the severity of their infestation.

RBG is already performing Ecological Land Classification (ELC) throughout the natural lands, therefore ELC is used as a tool to complete this step.

The Ontario Ministry of Natural Resources and Forestry defines ecological units on the basis of bedrock, climate, physiography (soils, slope, aspect) and corresponding vegetation, creating an Ecological Land Classification System. This classification of the landscape enables planners and ecologists to organize ecological information into logical integrated units to enable landscape planning and monitoring. (OMNR, 2007)

ELC is not the only type of survey used by RBG for invasive species. For example, additional surveys are conducted by RBG's Species at Risk Biologist around plant SAR populations (ex. Few-flowered Club-rush, American Colombo and Red Mulberry) and *Phragmites australis* has been surveyed and mapped by RBG's aquatic ecologist.

**ELC
PLANT
SPECIES
LIST**

SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER
 ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER				COL.	SPECIES CODE	LAYER				COL.	
	1	2	3	4			1	2	3	4		

During ELC field surveys, all species of plants are recorded for each vegetation layer (Canopy, Sub-canopy, Understorey, Ground Layer). Abundance is estimated for each species for every layer.

Abundance Rating	Definition
Rare	represented in the polygon by less than about three to five individuals or small clumps
Occasional	present as scattered individuals throughout the polygon or represented by one or more large clumps of many individuals; most species will fall into this category
Abundant	represented throughout the polygon by large numbers of individuals or clumps; likely to be encountered anywhere in the polygon usually forming >10% ground cover
Dominant	represented throughout the polygon by large numbers of individuals or clumps; visually more abundant than other species; forming >10% ground cover and <35% cover in any one stratum

Ecological Land Classification for Southern Ontario (Lee et al, 1998)

STEP 1. Survey

There are both advantages and disadvantages to using ELC as a tool to help survey for invasive plants. It is best used for large natural areas with diverse ecosystems. It is important to choose the right type of survey methods for your project.

Advantages

Codes help estimate abundance and are standard for all plants recorded

Saves time and effort not having to specifically survey for invasive plants over a large area

Additional habitat information is gained

All information is accessible in a database

Polygons can be easily used to map invasive plant distribution

Disadvantages

Abundance codes are subjective to the surveyors, exact numbers are not recorded

Can be time and resource intensive if ELC is not already a part of the work plan

Small populations of plants could be missed depending on the intensity of the survey

Need to have staff that are trained and capable of conducting ELC surveys



STEP 2. Identify Priority Species

RBG takes a number of factors into consideration when assigning invasive plants to our priority list. It is always important to cross reference your list with Ontario's list of priority invasive plants.

- **Species characteristics** (what is the level of threat of this species to native biodiversity based on its biology?)
- **Abundance and distribution** (information gathered from ELC, small numbers may be just as important as large numbers when ranking importance for management)
- **Control measures available** for the invasive species of concern and resources available for its management
- **Proximity and level of threat to species at risk** and/or critical habitat for species at risk

STEP 2. Identify Priority Species

RBG's Priority List of Invasive Plants

(working list)

Priority 1 - Top Invaders

Top priority for management, these species are being managed either throughout the property or in defined areas at RBG depending on their abundance and distribution. Ideally each species should have a management plan for control.

Common Buckthorn (*Rhamnus cathartica*)

Invasive Honeysuckles (*Lonicera* spp.)

White mulberry (*Morus alba*)

Kobus Magnolia (*Magnolia kobus*)

Norway Maple (*Acer plantanoides*)

Garlic Mustard (*Alliaria petiolata*)

Dog Strangling Vine (*Vincetoxicum rossicum*)

Giant Hogweed (*Heracleum mantegazzianum*)

Non-native grasses (ex. *Poa nemoralis*)

Common Reed (*Phragmites australis*)

Giant Reed Mannagrass (*Glyceria maxima*)

Yellow Flag Iris (*Iris pseudacorus*)

Flowering Rush (*Butomus umbellatus*)



Priority 2 – New Invaders

Eradication of these species from the natural lands is a possibility. They tend to be found in small concentrations but show evidence of spreading. These species may be in the process of assessment with a management plan in the works.

Lesser Celandine (*Ranunculus ficaria*)

Japanese Butterbur (*Petecites japonicus*)

Amur Cork Tree (*Phellodendron amurense*)

Priority 3 - Secondary Invaders

Species that are likely to be managed if found within a priority area, but do not have a management plan for control specifically.

STEP 2. Identify Priority Species



STEP 3. Map Priority Species

Map the distribution of priority species throughout the property according to the severity of the infestation.

The severity of infestation is determined by assigning numerical values to the abundance codes within the ELC polygon.

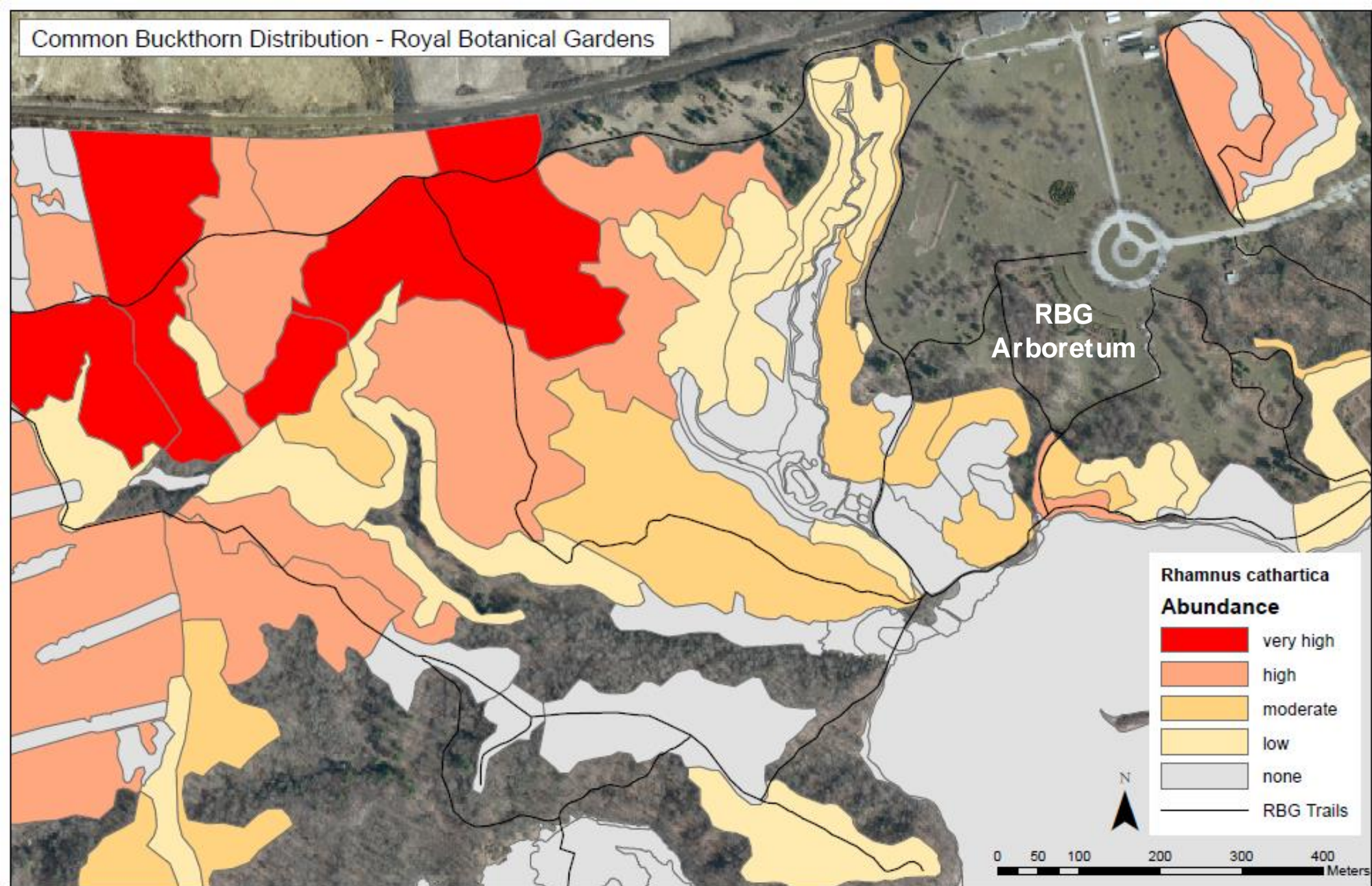
Abundance Code	Point Value	Infestation Level	Point Total
rare	1	low	1-2
occasional	2	moderate	3-4
abundant	3	high	5-8
dominant	4	very high	8-16

Example: Common Buckthorn in ELC Polygon CPNS-2015-105

vegetation layer:	abundance:	points:	
subcanopy	rare	1	TOTAL = 6
understorey	abundant	3	HIGH
ground layer	occasional	2	

STEP 3. Map Priority Species

Common Buckthorn Distribution - Royal Botanical Gardens



STEP 3. Map Priority Species



Step 4. Identify Areas for Management

High Priority

- Areas of high conservation value where species at risk may be present or their critical habitat may be under threat
- Areas in early stages of invasion
- Source populations and pathways of introduction such as waterways
- Areas targeted for restoration

Medium Priority

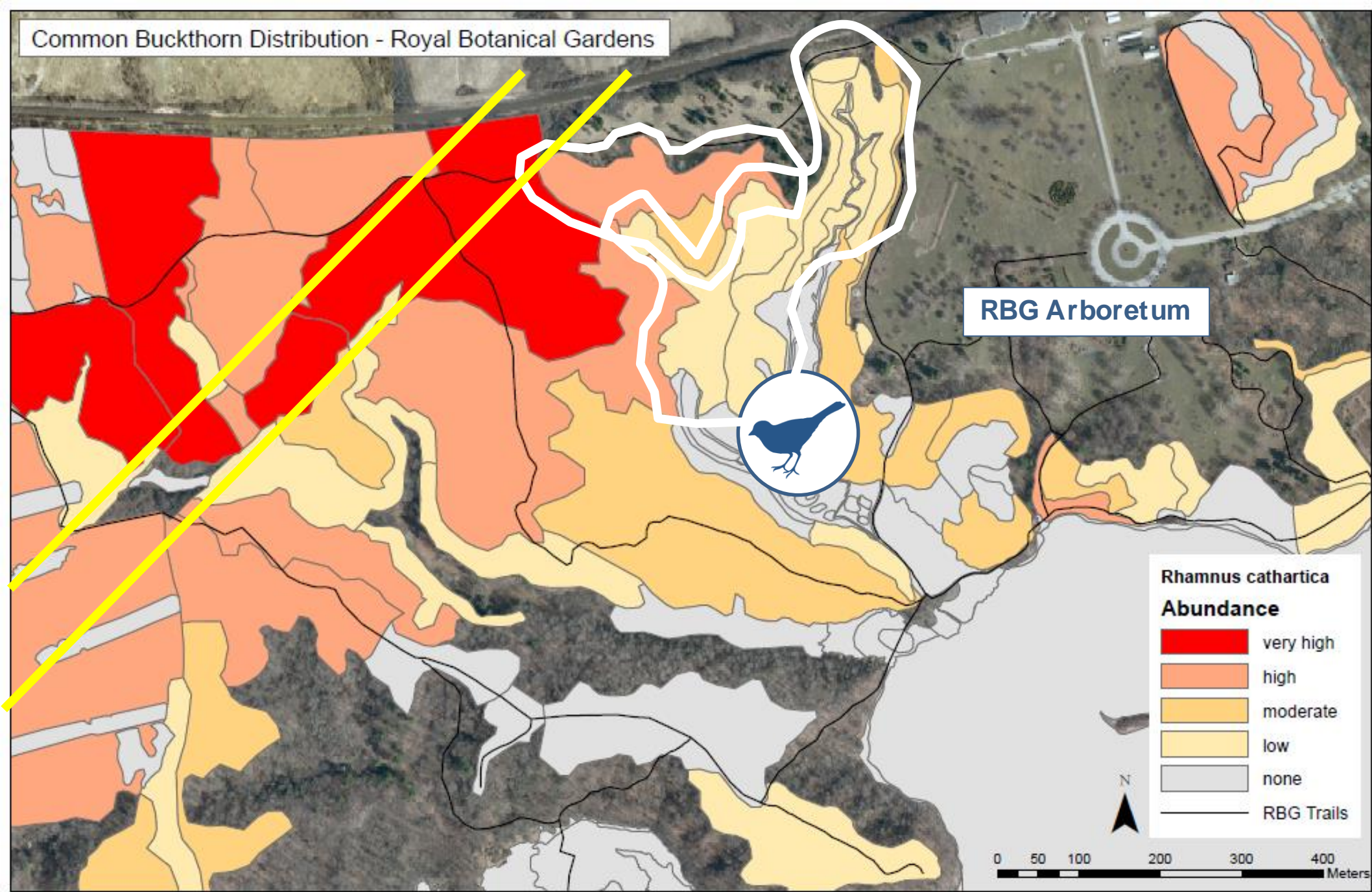
- Sites that border protected areas/areas of high natural heritage value
- Corridors between habitats

Low Priority

- Areas that have low biodiversity or conservation value that are far from protected natural areas or corridors

STEP 4. Identify Areas for Management

Common Buckthorn Distribution - Royal Botanical Gardens



STEP 4. Identify Areas for Management

Invasive Common (European)

Buckthorn

(*Rhamnus cathartica*)

Best Management Practices in Ontario



ontario.ca/invasivespecies



Invasive Dog-strangling Vine

(*Cynanchum rossicum*)

Best Management Practices in Ontario



ontario.ca/invasivespecies



STEP 5. Manage

Develop a management approach/plan for each priority species.

Refer to the Best Management Practices (BMP) documents developed by the OIPC for the invasive plants on your priority list. If there hasn't been one developed, could the BMPs of a similar species be applied?

Consider including the following as part of your management plan:

- **Goals for management**
- **Priority areas**
- **Control methods**
 - Choose the control methods appropriate for the location, the level of the infestation and the aggressiveness of the species
- **Workforce**
 - Build your team! Consider including staff, volunteers and contractors
- **Timeline**
- **Budget**
 - Highlight projects that require additional funds or would be good candidates for grant proposals so that funding opportunities can be sought

STEP 5. Manage



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Most importantly... TAKE ACTION



STEP 5. Manage

INVASIVE SPECIES LIST



Phragmites australis subsp. australis

Compiled by: Corey Burt
2015 Botany Summer Student

Step 6 – Moving Forward

Monitor

Monitor managed areas for further spread of priority invasive plants. Stay vigilant, continue to monitor the spread of known invasive plants and look for newly introduced invasive plants.

Prevent further spread

- Remove the source population of the invading plant, or
- Eliminate the reproductive capacity of the invading plant
 - Stop the seeds from spreading and discard them responsibly
 - Keep the plant maintained by cutting back vegetative expansion
- Avoid the purchase of species that have been identified as invasive in neighbouring provinces and states
 - At RBG we are working together to establish guidelines for new plant acquisitions that minimise the risk of introducing new invasive plants



Ontario
Invasive Plant Council



Hamilton

Conservation
ONTARIO
Natural Champions



Ministry of Natural Resources

Outreach

Collaborate with other organizations, landowners, botanical gardens, the horticultural industry and governments to:

- promote awareness about invasive plants
- teach plant identification
- demonstrate invasive species removal techniques
- advise and create policy

Together we can help prevent the further spread of known invasive plants and stop the introduction of new invasive plants.

STEP 6. Moving Forward



Thank you

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