
Fostering Biodiversity:
Reducing the Spread of Invasive Plants
To Protect Ecosystems and Health
Join
Cathy Kavassalis
& Claudette Sims
Lakeshore Eco-Network
Grand Bend Place
Wed., October 23, at 7 p.m.

Invasive Plants

We can stop this!

Full disclosure:

- Many of us have or have had invasive plants
- No shame or blame
- It's about changing how we choose plants going forward
- It's a journey

Tatarian honeysuckle (*Lonicera tatarica*)
Matt Mavin via Flickr CC BY-SA 2.0.

The journey begins…

- The Basics (Cathy)
  - The big picture
  - What it means to be invasive
  - How are they regulated
- How can You help? (Claudette)
  - Advocate for change
  - Know which plants can do harm
  - The path forward

Recognize this is not easy

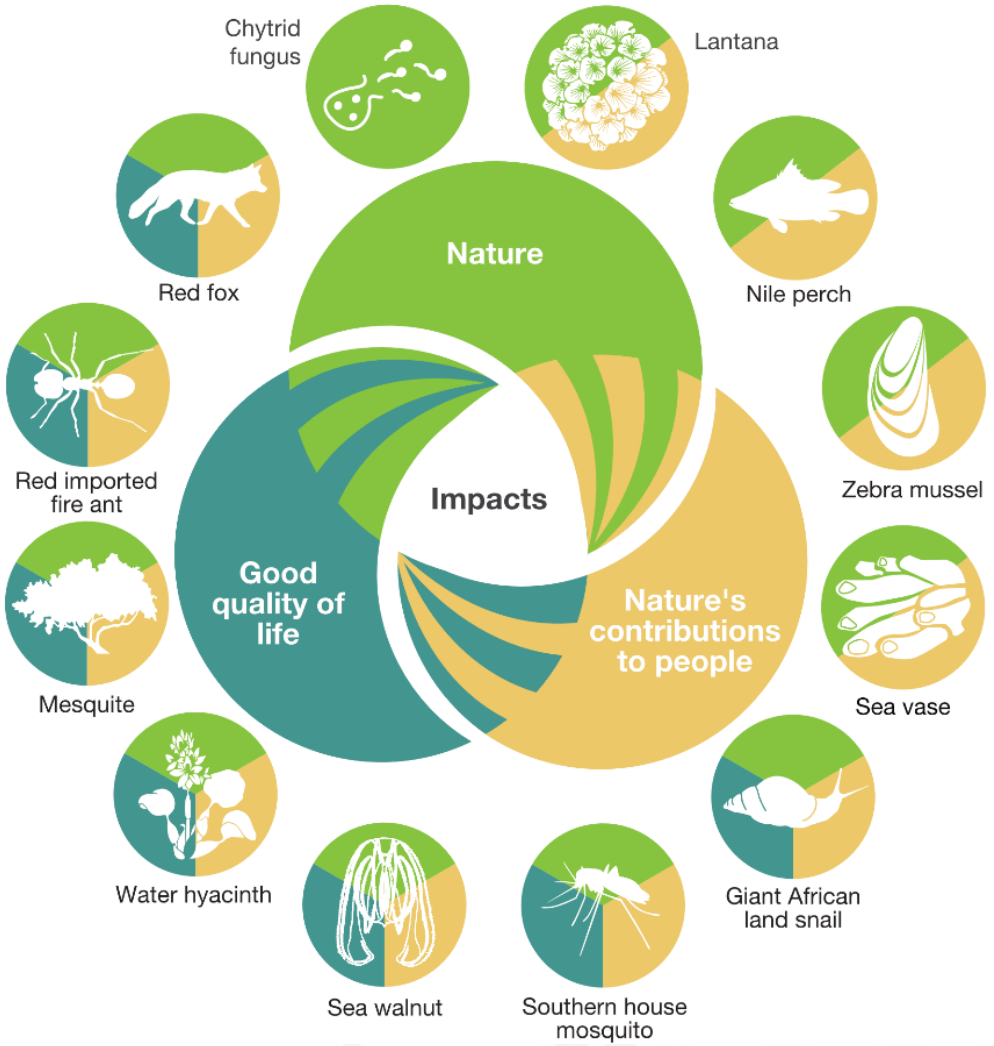
People and nature are threatened by invasive alien species in all regions of Earth

37,000 established alien species have been introduced by human activities worldwide

200 new alien species every year

3,500 invasive alien species, with negative impacts on nature, and also on people

More than 2,300 invasive alien species are found on lands of Indigenous Peoples across all regions of Earth



#InvasiveAlienSpecies Assessment

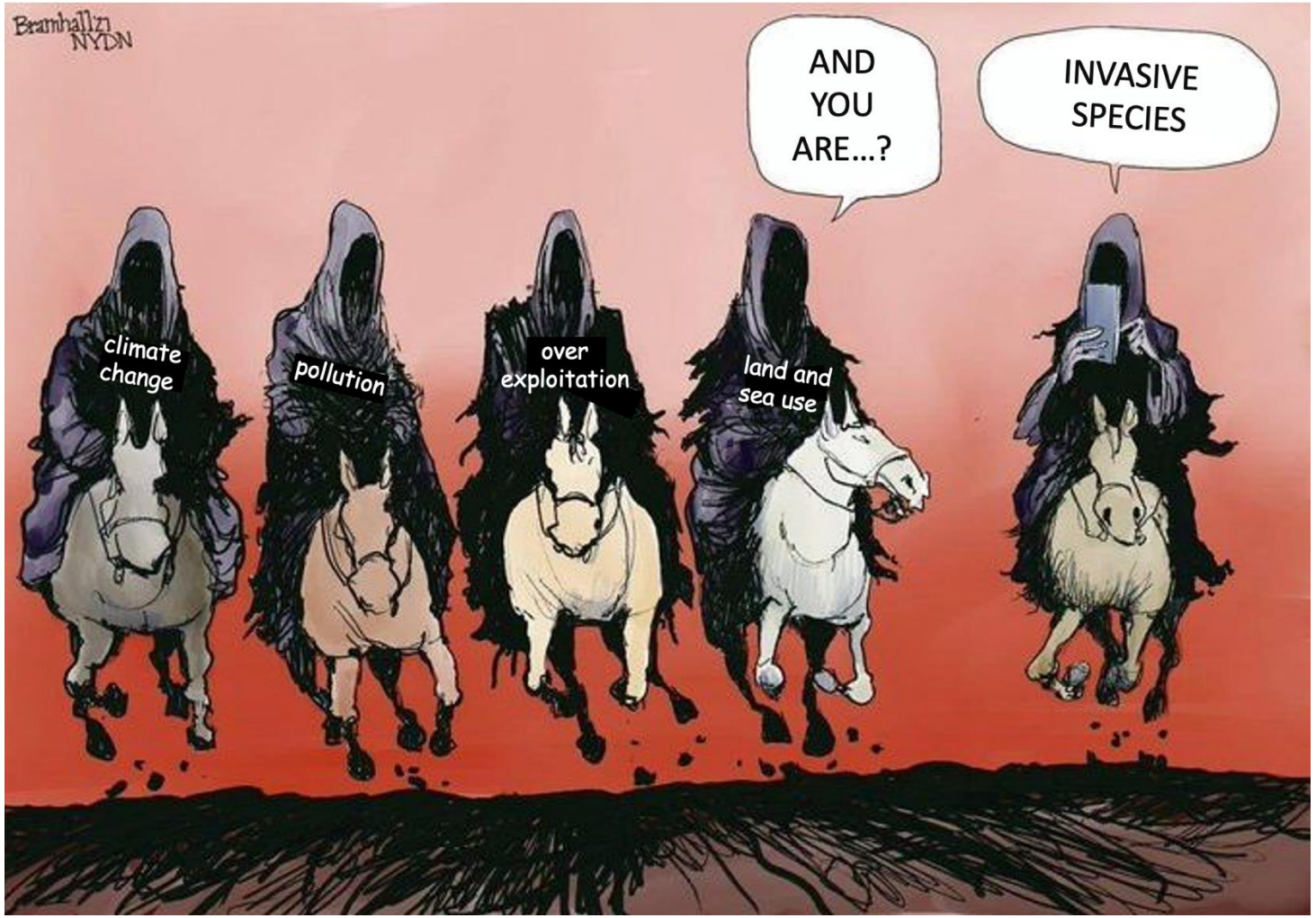
SLIDE from The Intergovernmental Science-Policy Platform (IPBES), "Assessment Report on Invasive Alien Species and their Control," 2024

Invasive Alien Species Pose Major Global Threats to Nature, Economies, Food Security and Human Health (IPBES, 2023)

"Invasive species have become one of the five horsemen of the biodiversity apocalypse that is riding down harder and faster upon the world"
(Inger Andersen, UNEP)

Secretariat for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), "Invasive Alien Species Assessment ," 04-09-23.

Drivers of the biodiversity apocalypse



The five horseman. **Adapted from Bill Bramhall/NYDN**

Artwork by Sarah James

Life is disappearing

- Nature's Dangerous Decline is 'Unprecedented' (IPBES, 2019)
- Almost half the planet's species are experiencing rapid population declines (WWF - *Living Planet Report 2022)*
- The variety of life is diminishing

The Intergovernmental Science-Policy Platform (IPBES), "Global Assessment on Biodiversity and Ecosystem Services," 2019

Biodiversity is at risk

- Genetic diversity – unique individuals
- Species diversity – distinct populations
- Ecosystem diversity – complex communities

Our well-being depends on healthy biodiversity

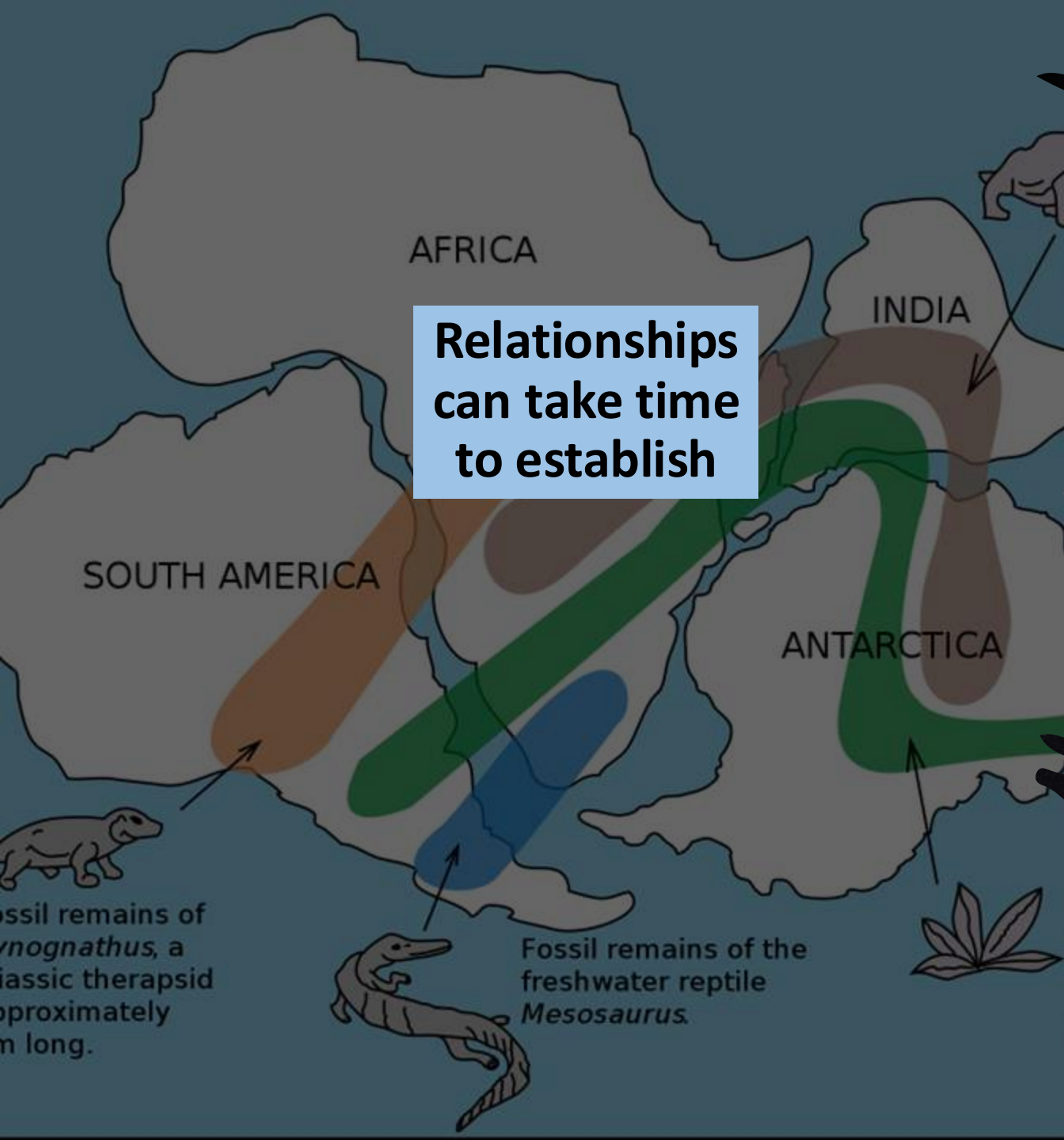
Roberto Cazzolla Gatti, A conceptual model of new hypothesis on the evolution of biodiversity, *Biologia* (2016).

Ontario's Blue Coast

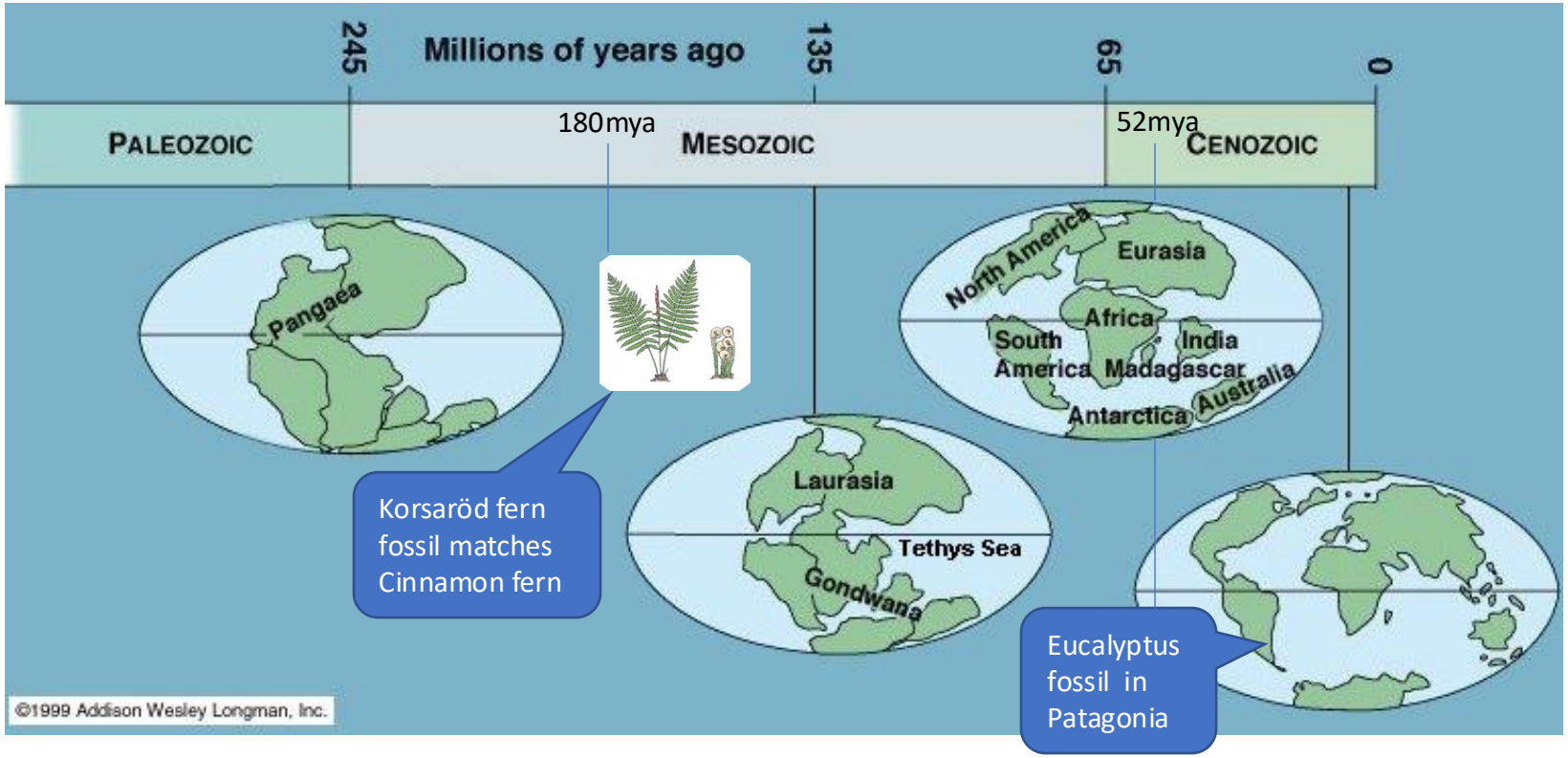
Photo: WWF

Over long periods of time, unique relationships have evolved through complex interactions that have created the web of life as we know it.

Biogeography and time is key



The geographical distribution of plants has ancient roots



Koala is an iconic marsupial native to Australia. It is a hyper-specialist, tied to the fragrant and poisonous eucalyptus trees.

Image: Lianne B Loach

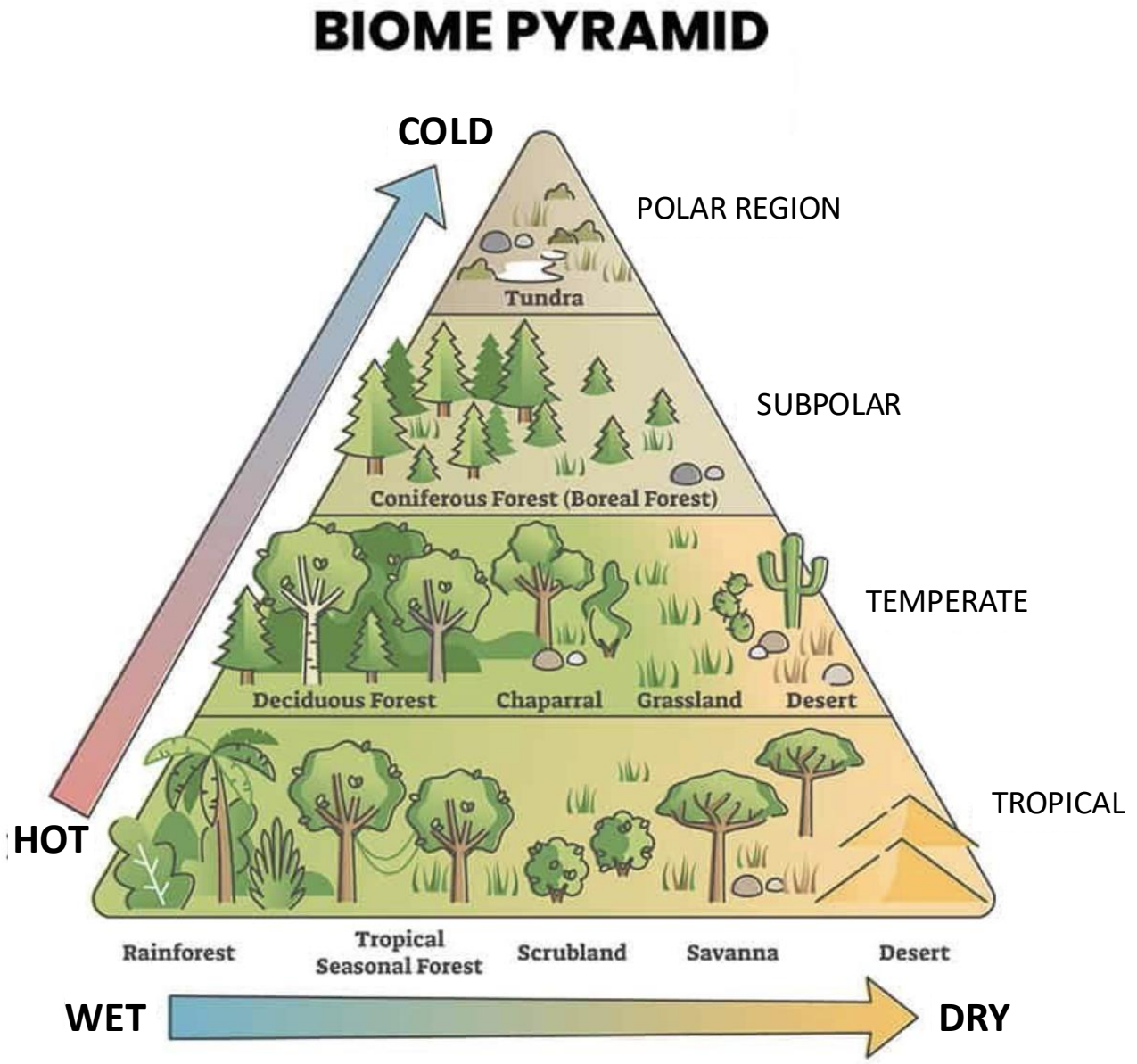
The plants that we recognize as native today are the result of millions of years of evolution

Abiotic and biotic factors work together to shape unique communities

Climatic factors
- **Temperature**
- **Humidity**
- **Precipitation**
- **Winds & ocean currents**
- **Solar radiation**
- **Topography**
- **Latitude & elevation**

Soil conditions
- **Structure**
- **Chemical properties**
- **& more**

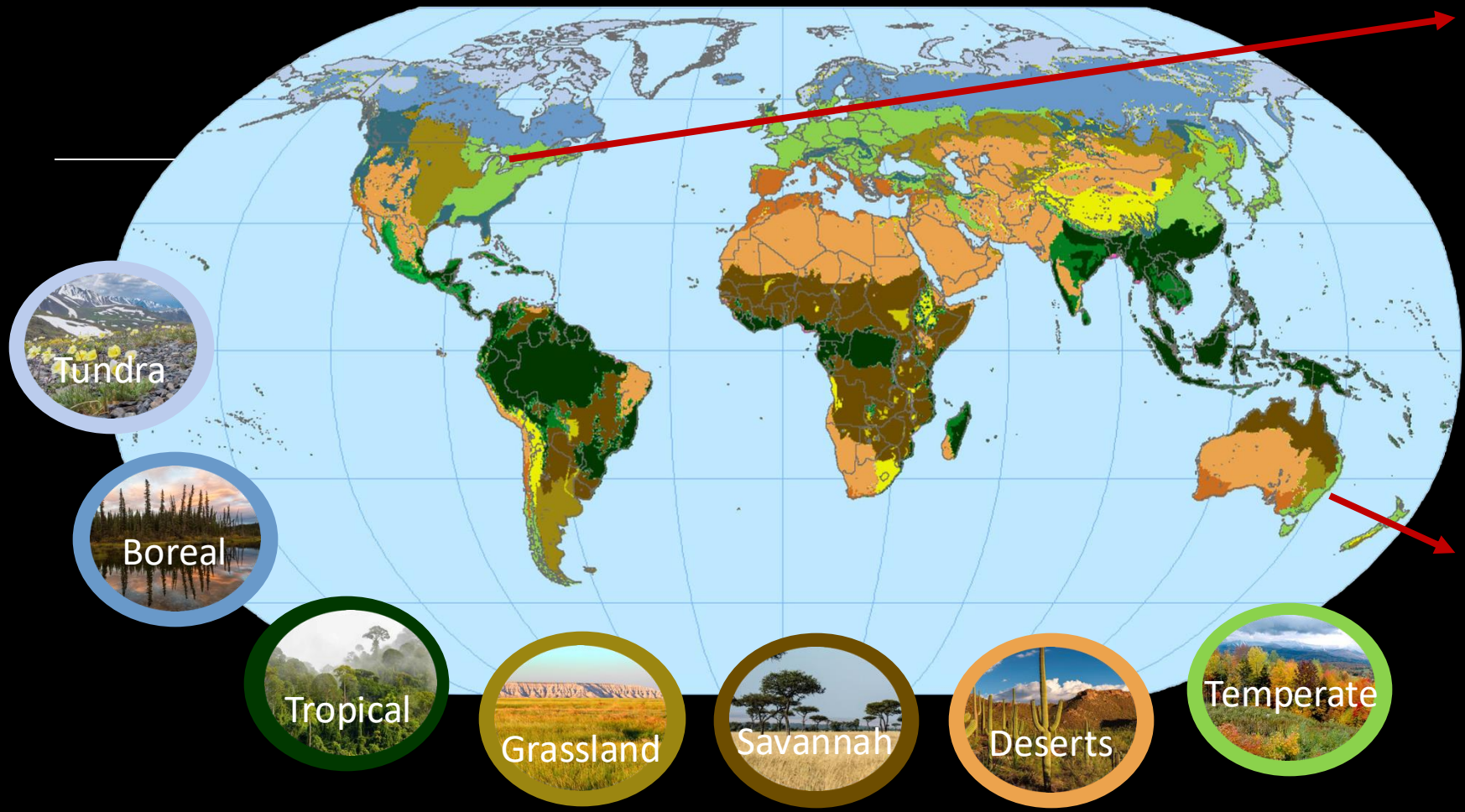
Communities of Plants, Animals, Plants, Protists, Fungi, Bacteria, Archaea, . . .



Biome type in relation to temperature and rainfall (Source: http://www.cengage.com)

Biomes are communities of life

Complex relationships build over geological time scales



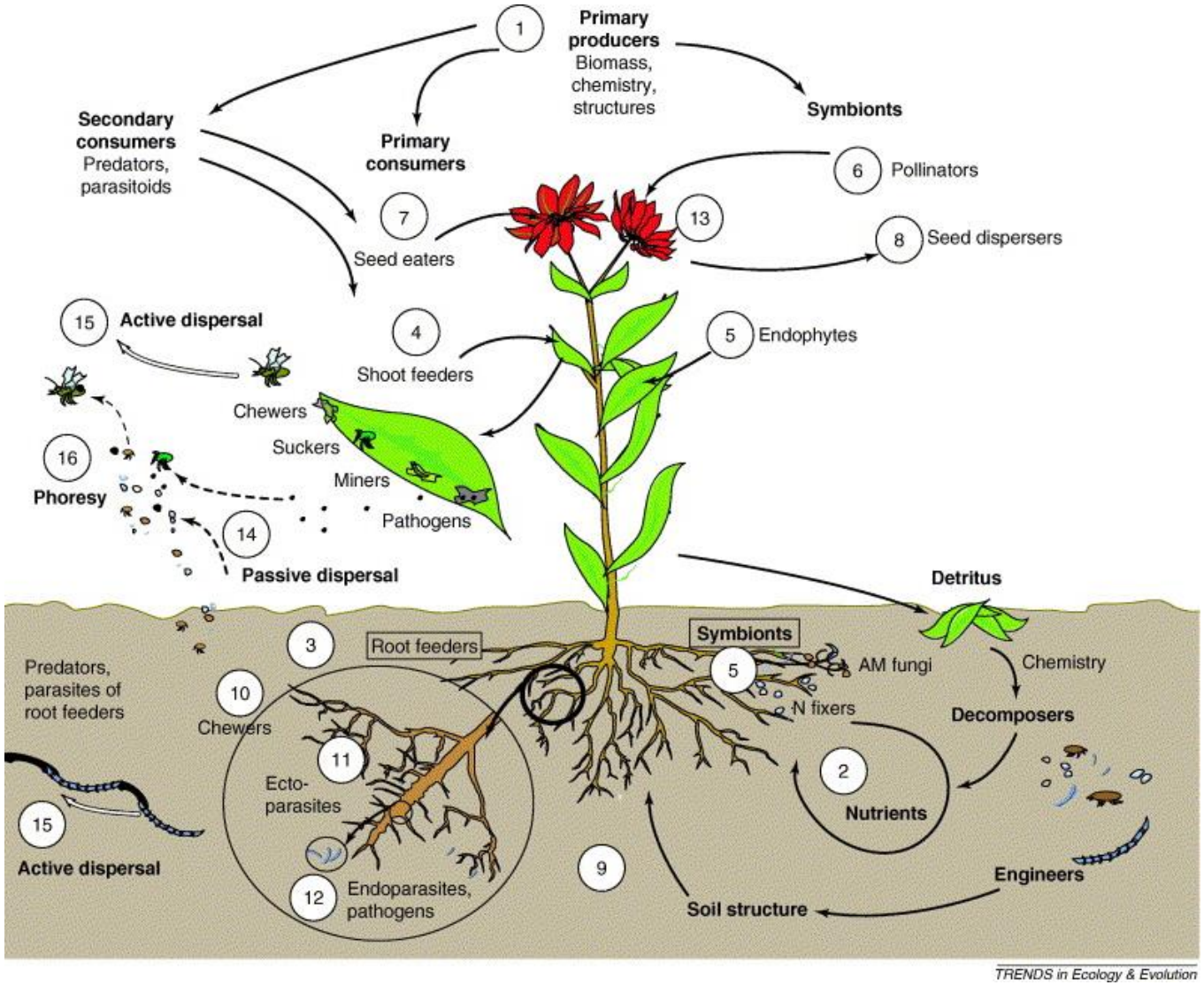
Distinct temperate broadleaf forest biomes support very different species

Biomes. Credit: Center for International Earth Science Information Network 2007

Relationships

- They support species above and **below ground**
- And those species support other species . . .

The interconnected nature of life

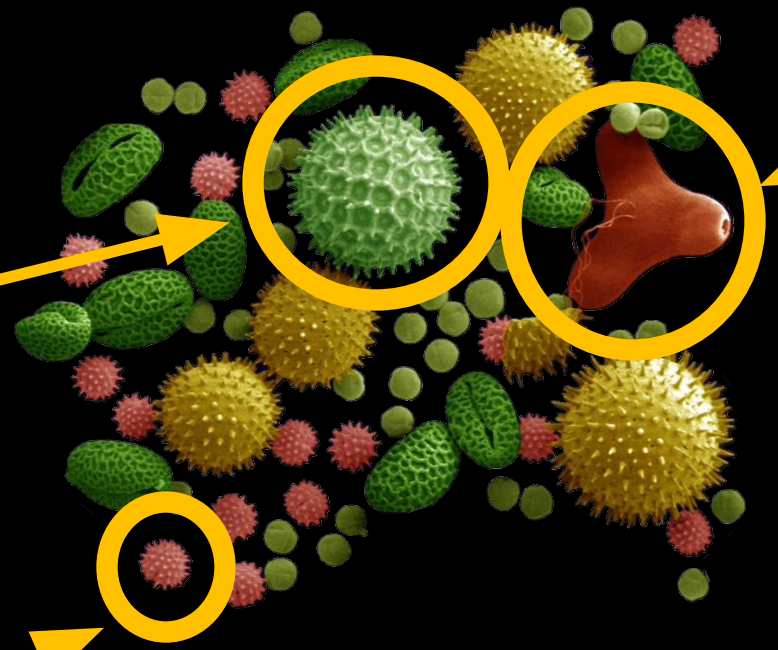


Deyn, G.B. & Putten, Wim. (2005). Linking aboveground and belowground diversity. Trends in ecology & evolution. 20. 625-33. 10.1016/j.tree.2005.08.009.

Just under 30 percent of Ontario bees are specialists and require particular plant species for survival

Pollen specialists

Common Morning Glory (*Ipomoea purpurea*)



Sunflower (*Helianthus annuus*)

Oenothera fruticosa - photo: Glen Mittelhauser

Evening primrose Sweat Bee (*Lasioglossum oenothera)* – photo Jatai via Bugguide

Seeds: Abrahami - CC BY-SA 4.0; Pollen from Dartmouth Electron Microscope - Public Domain

Southern Africa, Botswana credit: micato

Sonoran Desert Photo Britannica.com

Diverse communities of plants and animals have developed dependent on the soil, water, and climate conditions, each influencing the other, but we are changing this . . .

Olden, “Anthropogenic blender” homogenizing earth’s ecosystems, sensu,” 2006.

We are making all the worlds regions more homogenous and reducing biodiversity

We are moving plants around the globe

Turbelin, Anna & Malamud, Bruce & Francis, Robert. (2016). Mapping the global state of invasive alien species: patterns of invasion and policy responses. Global Ecology and Biogeography. 26. 10.1111/geb.12517.

Invasive plants

Pests

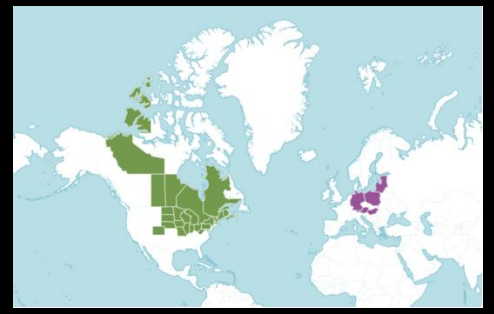
Disease

Some definitions

Native/Indigenous

Plants naturally occurring in **a particular region** that have **evolved in concert** with other species

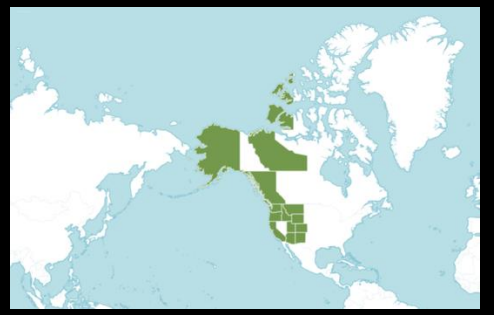
Smooth Rose
Rosa blanda
Photo: Arthur Haines



Alien/Exotic/introduced

Non-native plants introduced **outside their normal distribution** or with no natural distribution

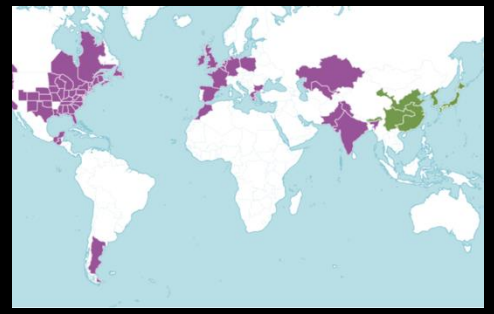
Nootka Rose
Rosa nutkana
Photo: POWO



Invasive Alien Plant

Non-native plants whose introduction or spread threatens the environment, the economy, or society, including human health (Government of Canada, 2004).

Multiflora Rose
Rosa multiflora
Photo: Famartin



Native Introduced

Distribution Maps: POWO

The 150-200 species of roses that grows in the northern hemisphere arose between 33 - 23 million years ago
Fougère-Danezan et al., "Phylogeny and biogeography of wild roses with specific attention to polyploids," 2015.

This hybrid tea rose is often grafted on to *Rosa multiflora* rootstock

Rosa ‘Double delight’ Photo: Geoff McKay

Some plants are native nowhere

- Many plant varieties **CULTIVERS** - are “artificial creations”
- Modern Roses are considered to have originated largely from 10 Species Roses – *R. canina, R. chinenesis, R. foetida, R.gallica, R. gigantea, R. moschata, R. multiflora, R. phoenicia, R. rugosa, and R. wichuraiana*

Let’s play a game.

Where in the world is this garden?

The IUCN Red List of Threatened Species

Okinawa Rail (*Hypotaenidia okinawae*)

Endangered

Did you guess Japan?

Multiflora rose native to Japan

Japanese macaque

Keisei Rose Garden Japan

www.locationscout.net/japan/21138-keisei-rose-garden

Heritage Rose Garden, Ottawa

Millennium Memorial Rose Garden, Barrie

Rose Garden RBG, Burlington

Ontario Rose Gardens

World Federation of Rose Societies Award Winning Gardens

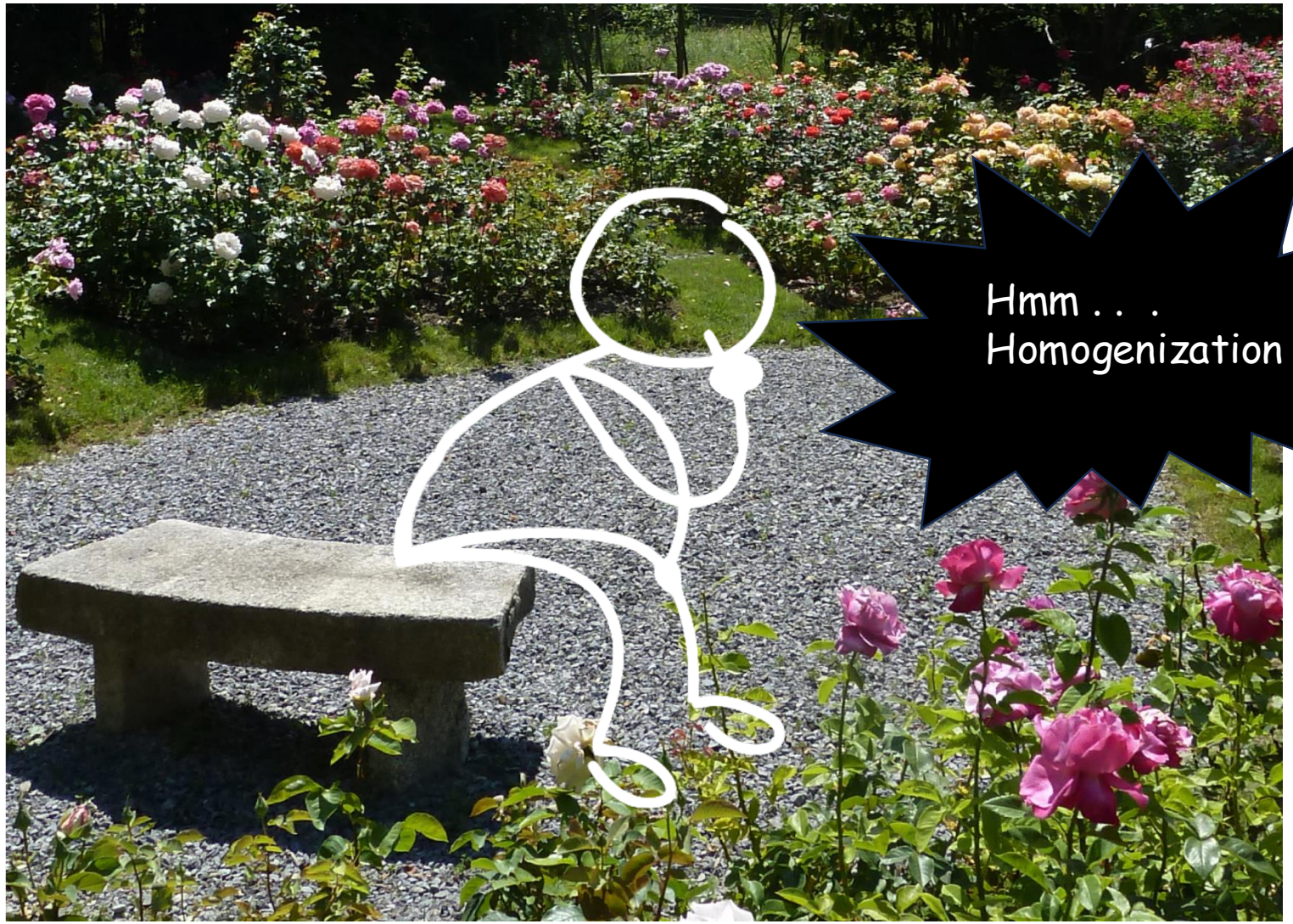
Roseraie at Au Diable Vert, Switzerland

Adelaide International Rose Garden, Australia

Centenary Rose Garden Tamil Nadu, India

"In going about so serious a task as that of remodeling the arrangements of nature herself, we ought, I think, to assert our right to destroy some things for the purpose of smoothing the path of more valuable things." Edward Wilson, head of Victoria's Acclimatisation Society, address to the Royal Colonial Institute in 1875 (Gallacher, 2022)

World Federation of Rose Societies Award Winning Gardens



Roseraie at Au Diable Vert, Switzerland

Olden, “Anthropogenic blender” homogenizing earth’s ecosystems, sensu,” 2006

Multiflora Rose escapes cultivation in Ontario

If they regulate multiflora rose in Canada, how can we continue to grow these non-hardy rose cultivars. . .

Comment at a recent talk

Our colonial past and cultural bias impacts plant selection

- Preferential trade policies and regulations
- Favour the accumulation of similar introduced ornamental plants like roses, daylilies, & bearded iris
- Discourage the study and use of native plants – seen as weeds

ButterflyWEED
PickerelWEED
JewelWEED

This is not about blaming but acknowledging.

Dr. Daru examines species of plants from all over the world. (Reuell “Study uncovers botanical bias,” 2017)

'The world's metropolis', Thomas Hosmer Shepherd, 1855 - Lenzer & Latombe, “European colonialism has had a lasting legacy on how plants are distributed around the world” 2022

How little we know

- Beetles represent ¼ of the animal species we have named ~400,000 with estimates suggesting that there are two to five times more we don't know
- For every beetle there are likely two specialist parasitic wasps (one for eggs; one for larvae)
- For every caterpillar, there are parasitic wasps

Collecting beetles was a hobby in the 1800's

Helmut Newton - Flickr

Parasitic wasps target different types of insects

Pea aphid wasp – L. Kraft; Giant Ichneumon – C. Young;
Emerald cockroach wasp – D. Dadbhawala; Leaf beetle full of wasp larva – G. S. Martin

Some microgastrine wasps and their caterpillar hosts.

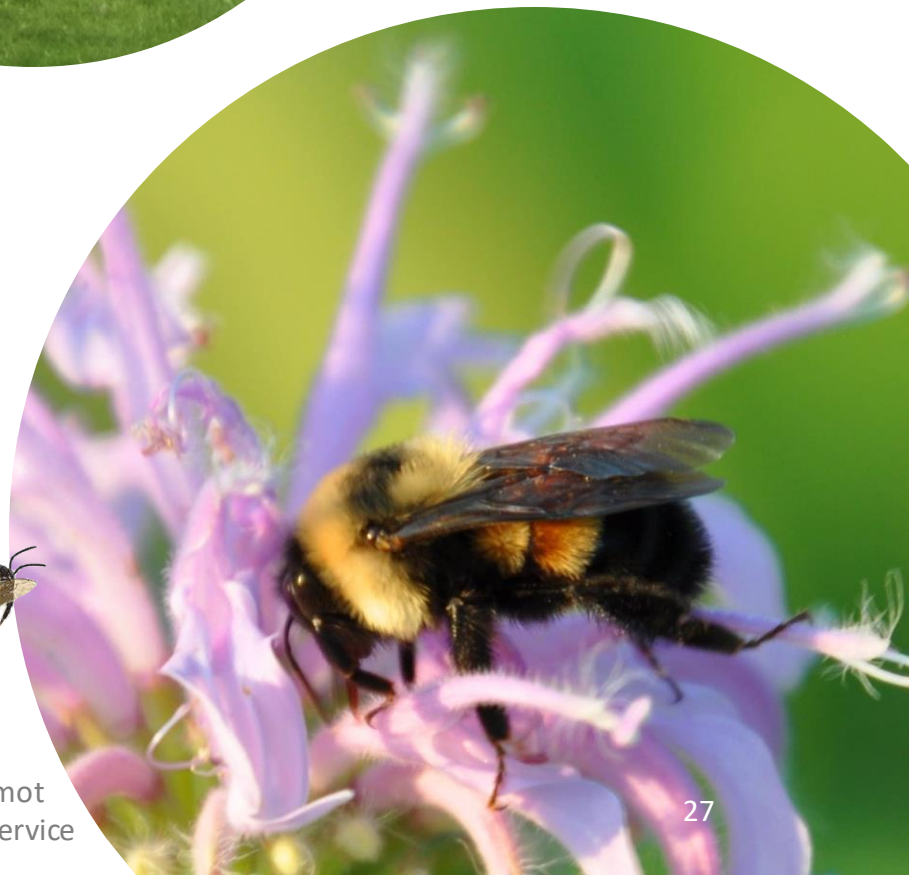
Alex Smith - University of Illinois

Canada goose with gulls in the United Kingdom
CC-BY-SA-4.0

WINNERS

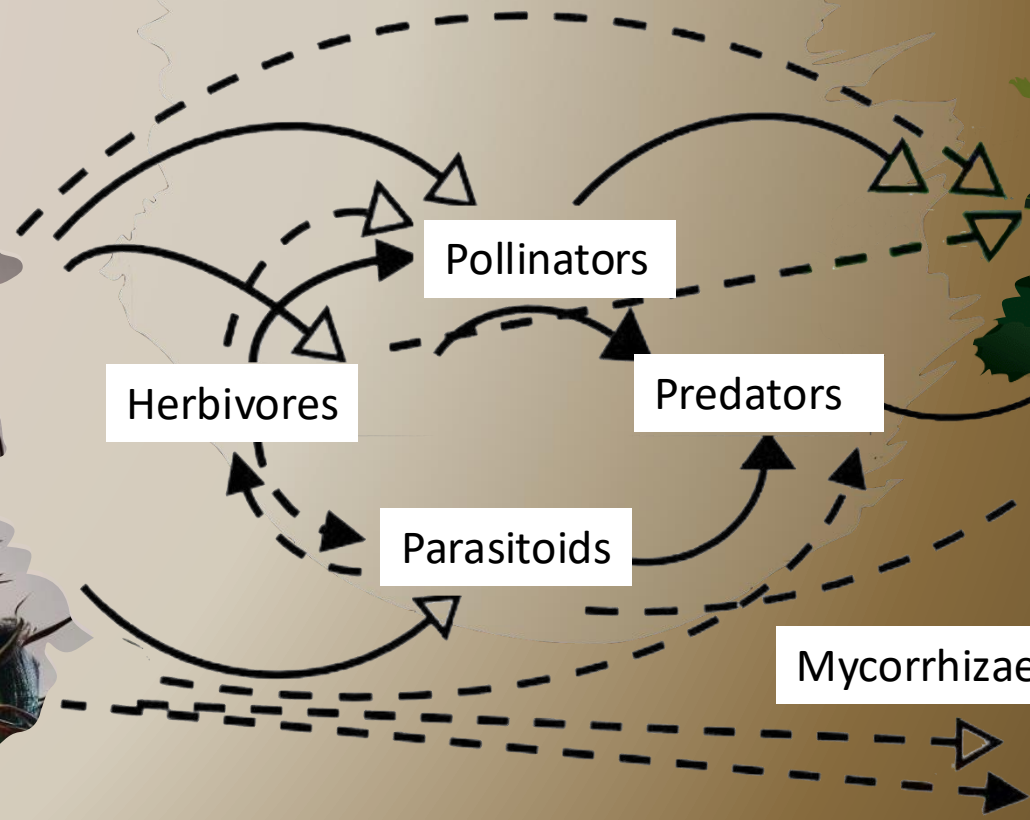
When we introduce garden plants, there are **winners and losers** and lots in between

LOSERS



A rusty patched bumble bee on wild bergamot
Credit: Jill Utrup via U.S. Fish and Wildlife Service

Dornelas, Maria & Gotelli, Nicholas & Shimadzu, Hideyasu & Moyes, Faye & Magurran, Anne & Mcgill, Brian. (2019). A balance of winners and losers in the Anthropocene. Ecology Letters. 22. 10.1111/ele.13242.



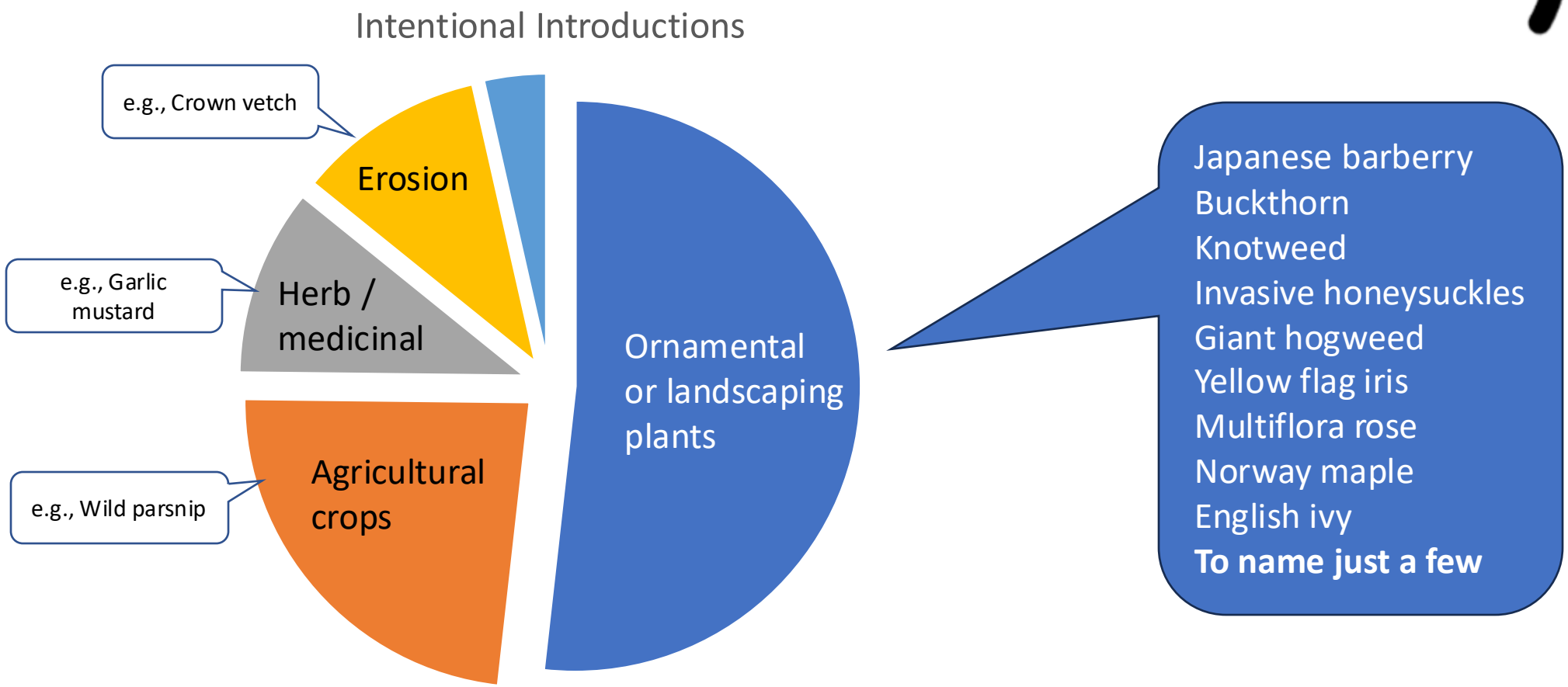
pixabay

Soil nutrients, microbes, water, organic matter

Invasive plants do harm

by disrupting relationships and ecosystems

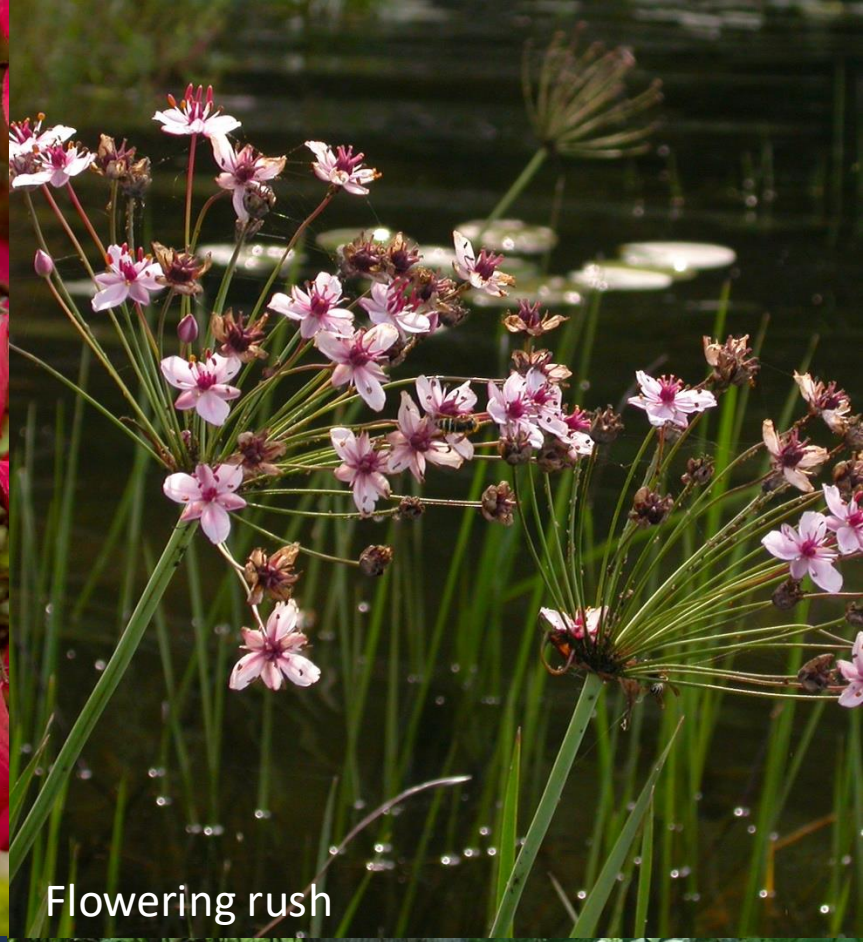
Most invasive plants are introduced intentionally through the **ornamental / horticultural trades**



Invasive Species with Pathway Information (* for 245 out of 486 plants – some plants are introduced both intentionally and unintentionally). Adapted from Canadian Food Inspection Agency, "Invasive Alien Plants in Canada - Technical Report," 2008.


Tartarian honeysuckle


Burning bush


Flowering rush

Many popular garden plants are high-risk invaders in Canada


Goutweed

Once here, plants spread – often unseen

By wind

Along transportation corridors

Intentional and

Unintentional spread

On water

By birds and other wildlife

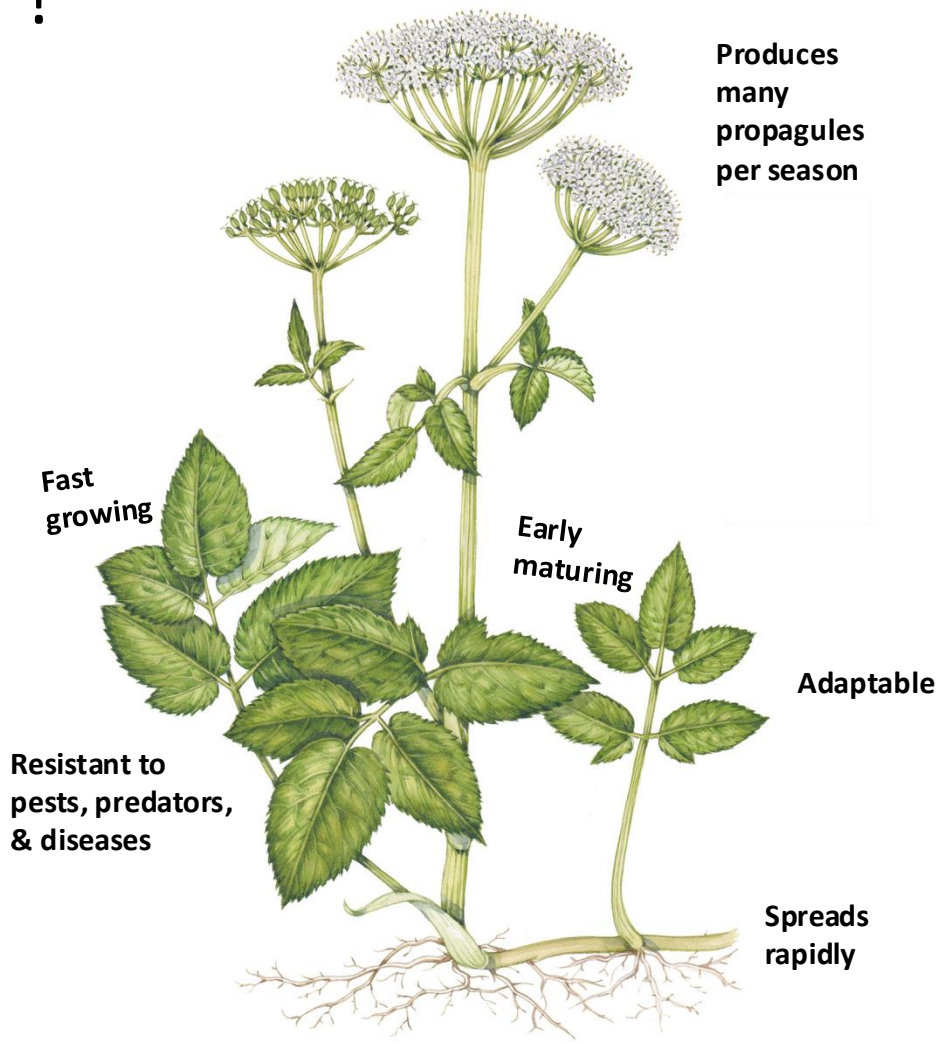
Sales

Planting, sharing, dumping, . . .

Why are invasive plants popular?

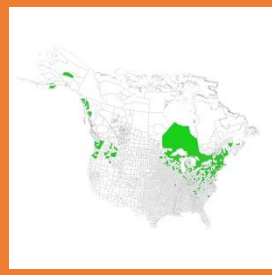
- ✓ Easy to propagate
  - ✓ Low cost to produce
- ✓ Grow or spread rapidly
  - ✓ Attractive to gardeners
- ✓ Disease and pest resistant
  - ✓ Attractive in gardens
- ✓ Adaptable to conditions
  - ✓ Gardeners & growers

✓ Good for sales . . . $$$



Success of a Plant

From home garden to a management problem for conservation authorities and protected areas



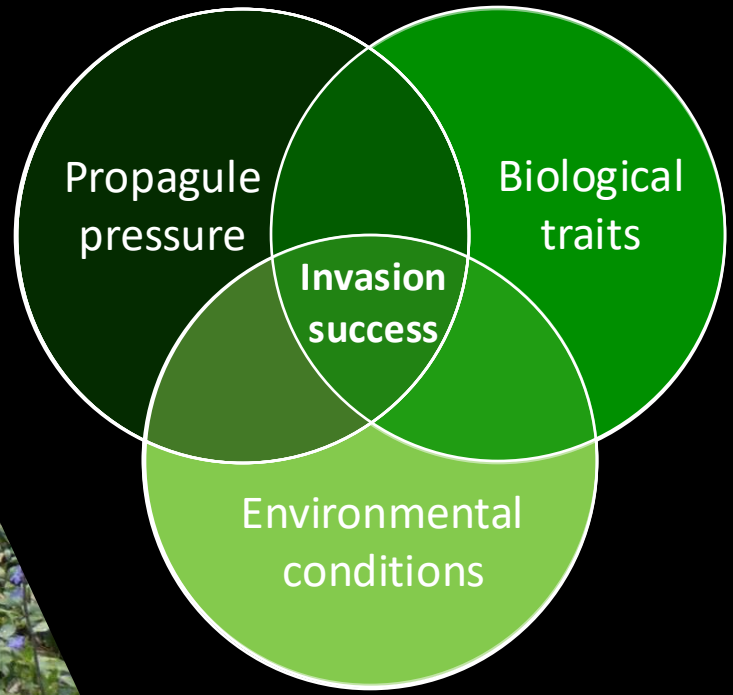
EDDMapS Distribution (based on current reports)

INaturalist reports near Pinery Provincial Park (retrieved Oct. 21, 2024)

US State Regulatory Lists - states that have this species on their invasive species list or law

Each time we plant an invasive species, the chances for invasion success increases.

Plant introductions increase invasion success

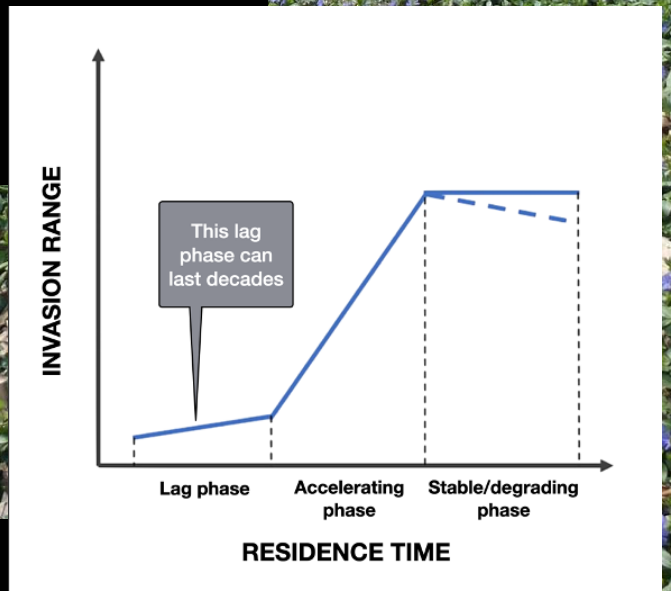


How propagule pressure, biotic characteristics and abiotic conditions interact to drive invasion success
adapted from: Catford, J. A. , Jansson, R. , & Nilsson, C. (2009).

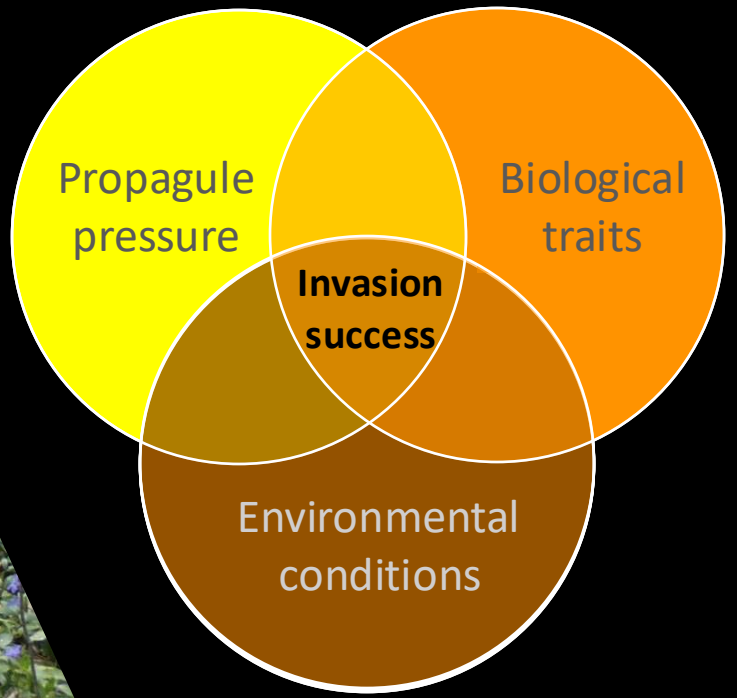
Periwinkle(*Vinca minor*) invading
Beamer Conservation Area Grimsby, Ontario
Image: Marlene Knezevich

We must reduce the sale and use of invasive plants!

Invasive plants + Time = greater ecological impact



Ni, Ming. 2022. Herbarium records reveal multiple phases in the relationship between minimum residence time and invasion ranges of alien plant species.

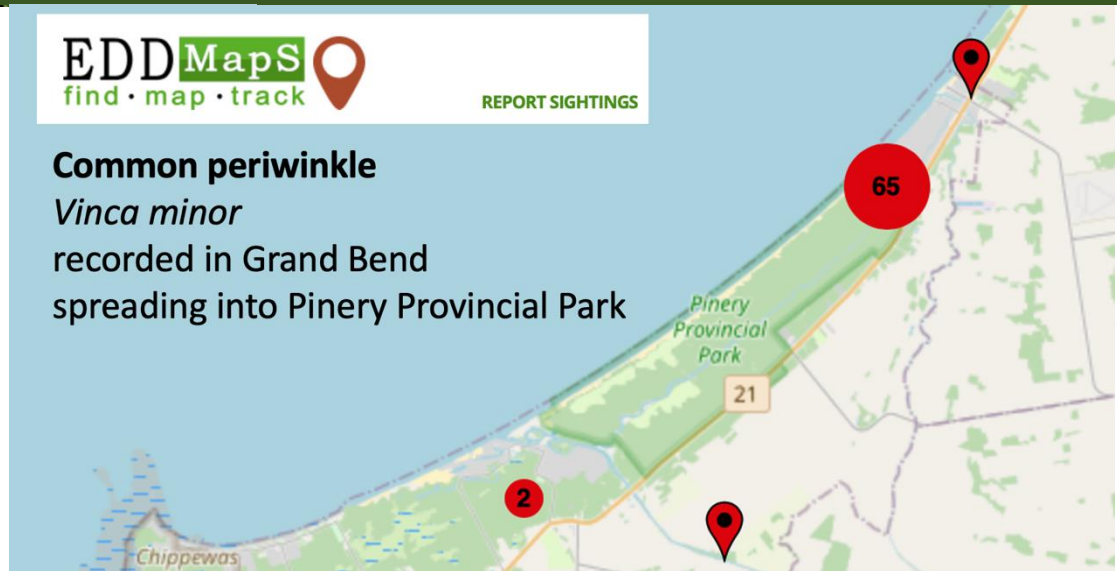


Bruce Peninsula National Park – N. Hart

Inglis Falls – A. Fyon

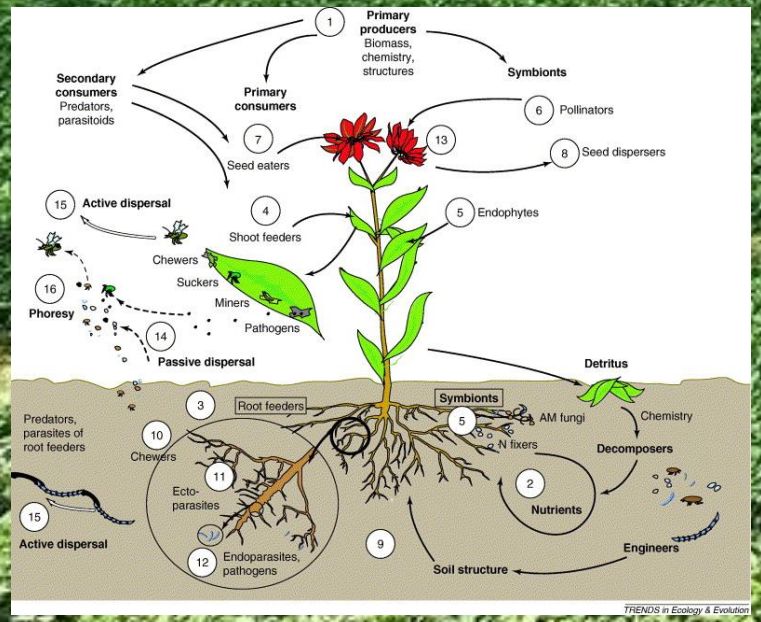
Lambton Shores– T. Berkers [gravestone added]

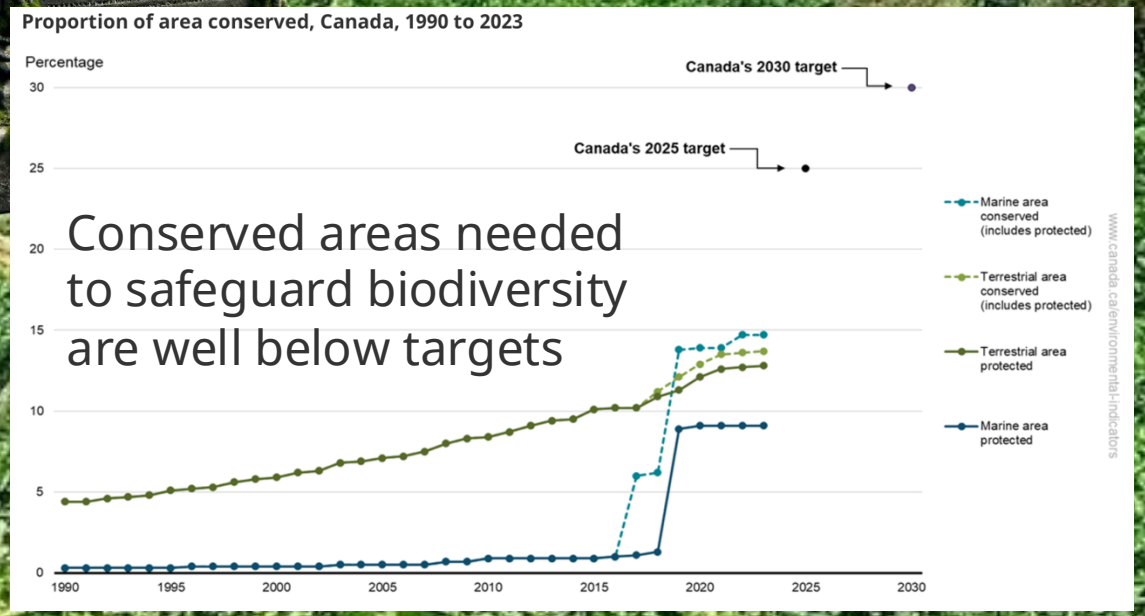
Gardeners are often unaware of the impact as plants like periwinkle spread

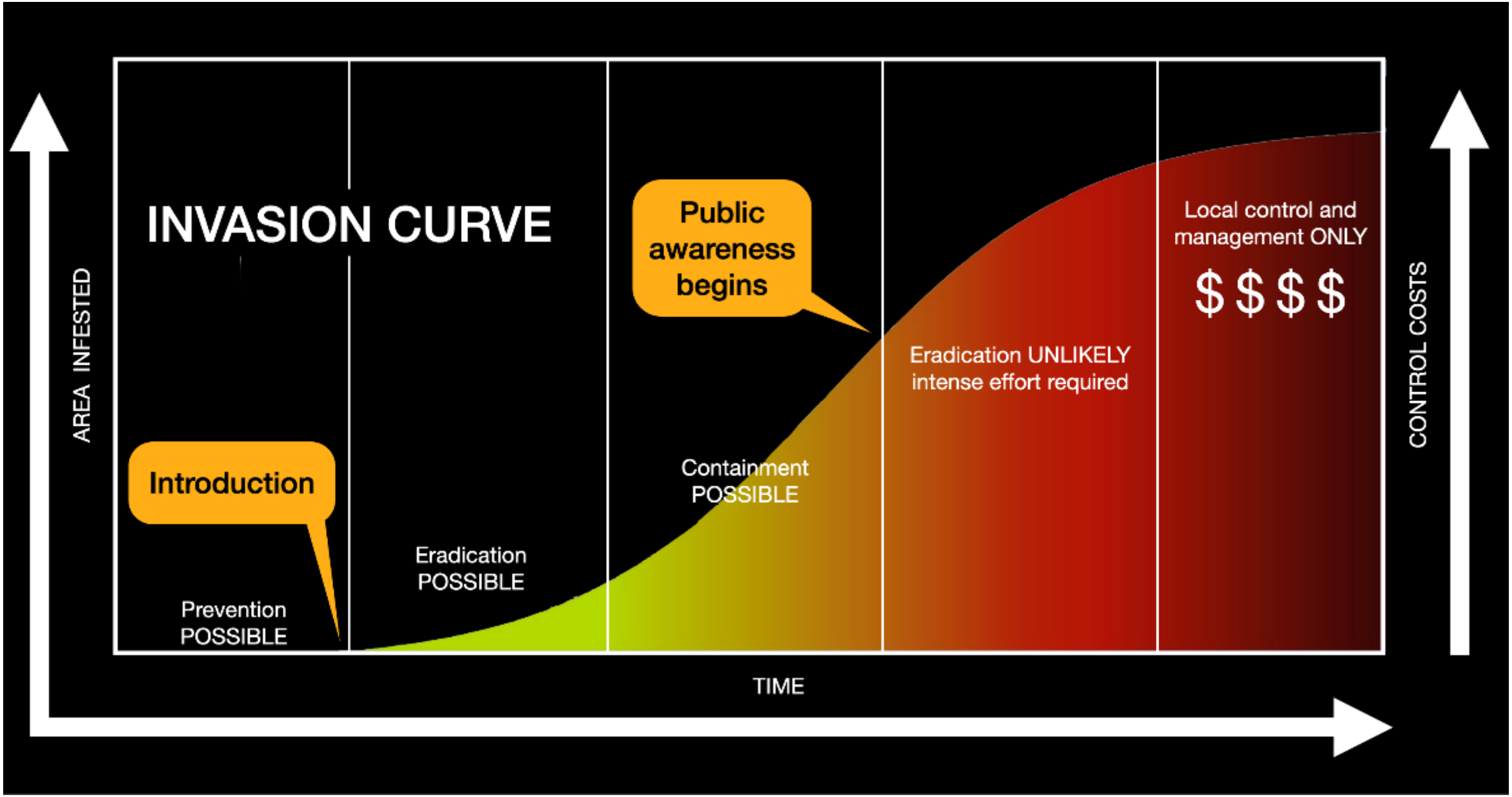


Vinca causes striking changes in spider assemblages (Bultman & DeWitt, 2007)

Vinca has a significant, negative impact on woody seedlings (Darcy & Burkart, 2002)





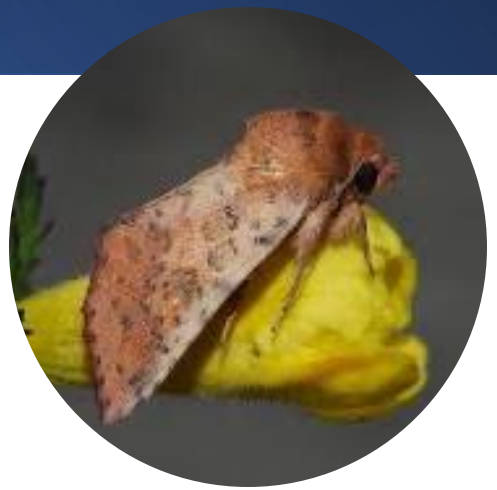

INVASION CURVE
AREA INFESTED
CONTROL COSTS
TIME
Introduction
Prevention POSSIBLE
Eradication POSSIBLE
Public awareness begins
Containment POSSIBLE
Eradication UNLIKELY intense effort required
Local control and management ONLY
$ $ $ $

Recognize the costs

Canada- 135 Species Disappeared
(Wildlife Report, 2020)

Ontario- 2,752 Species are at Risk
(Auditor General, 2021)

American ginseng



Foxglove sun moth

Golden-eye lichen

Acadian flycatcher

Impacts on biodiversity

Impacts on health

Impacts on tourism, fishing, recreation

Mitigation costs

Reduce the rate of **introduction** and establishment of invasive **alien species by half by 2030**.

Canada has pledged to safeguard native biodiversity

– We must help!

UN Convention on Biological Diversity, Kunming-Montreal Global Biodiversity Framework, Target 6, 2022

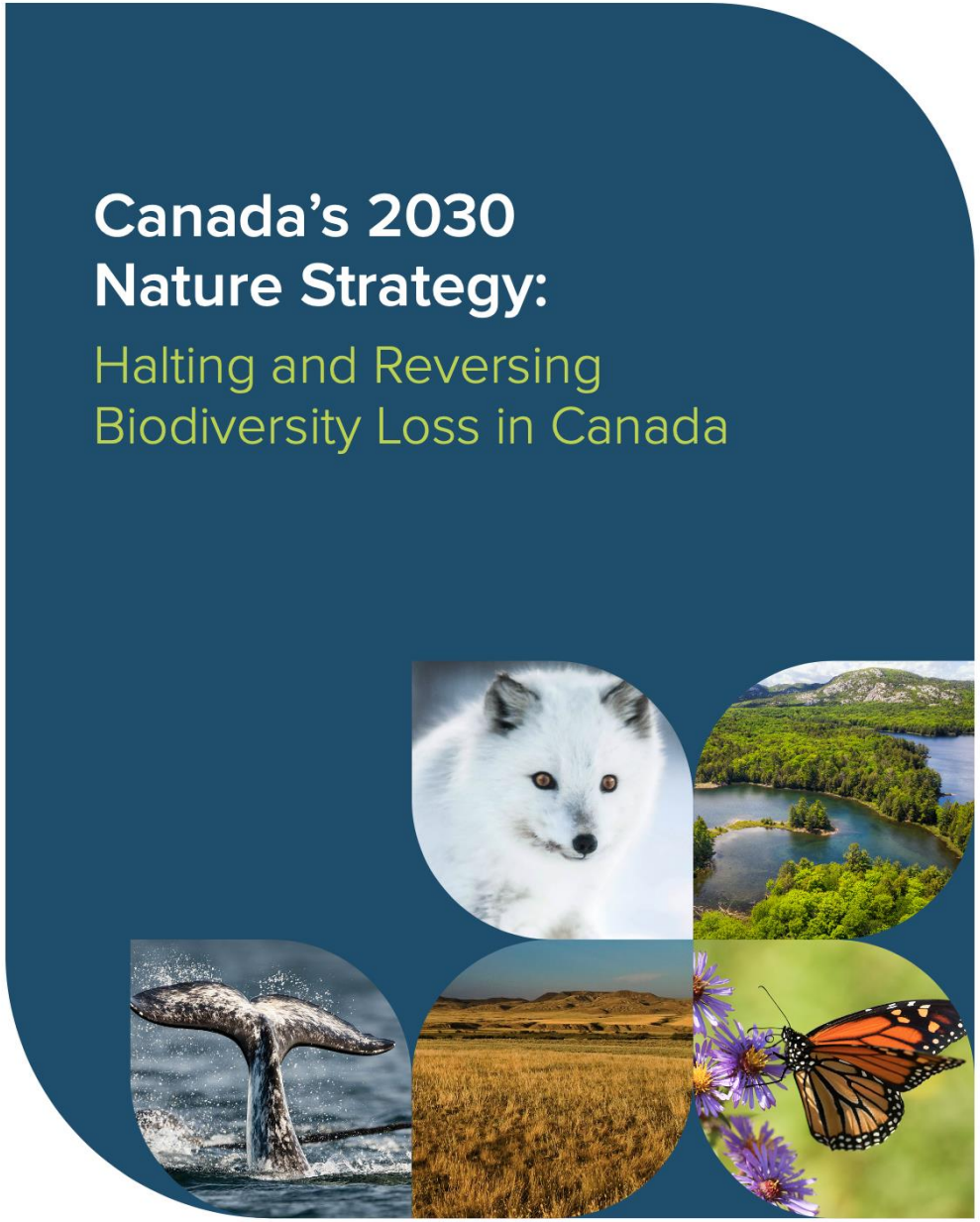
15th Conference of Parties to the UN Convention on Biological Diversity . (2022) Kunming-Montreal Global Biodiversity Framework. Target 6

https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022

Federal recognition of invasive plant threat is low

- ECCC published their Biodiversity Strategy in June 2024 which sadly didn't include any substantive new action on invasive plants

ECCC Minister Steven Guilbeault
Photo N. Bulowski/Canada's National Observer



What's the harm?

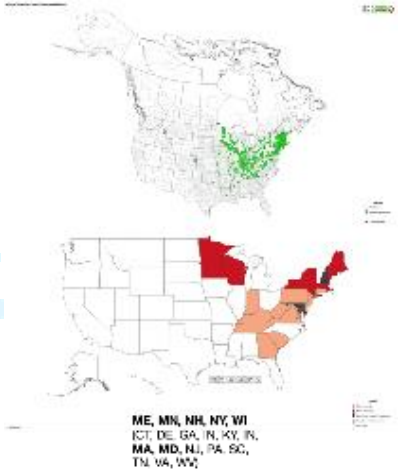
Burning bush

Winged euonymus

Euonymus elatus

- Native to Asia and central Europe.
- Adaptable to wide variety of soils.
- Seeds prolifically
- Highly invasive
  - Tends to dominate only certain niches (lowland forests).
  - Reported in High Park, Toronto
  - Now regulated in border states

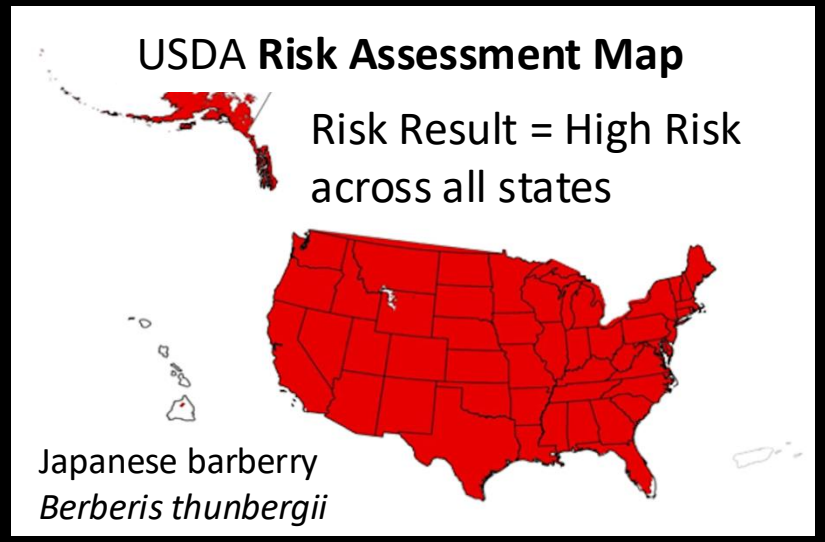
    ME, MN, NH, NY, WI as well as MA and MD

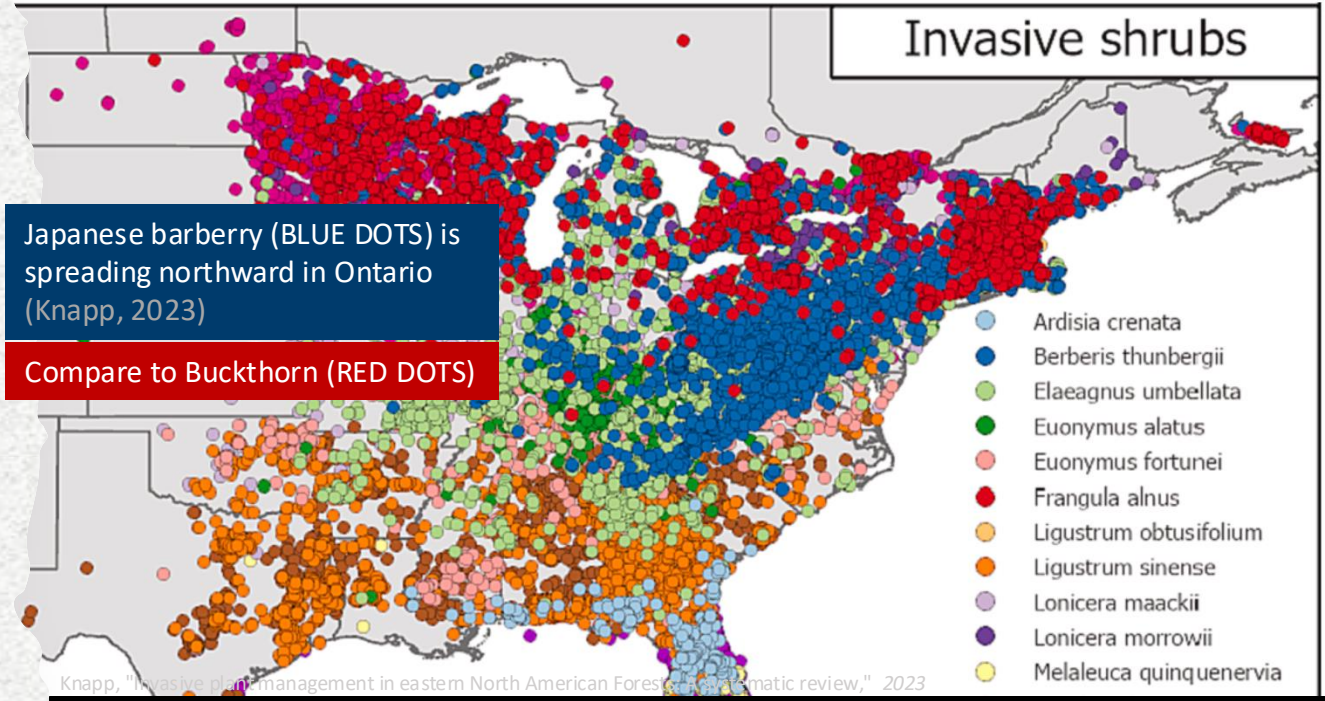


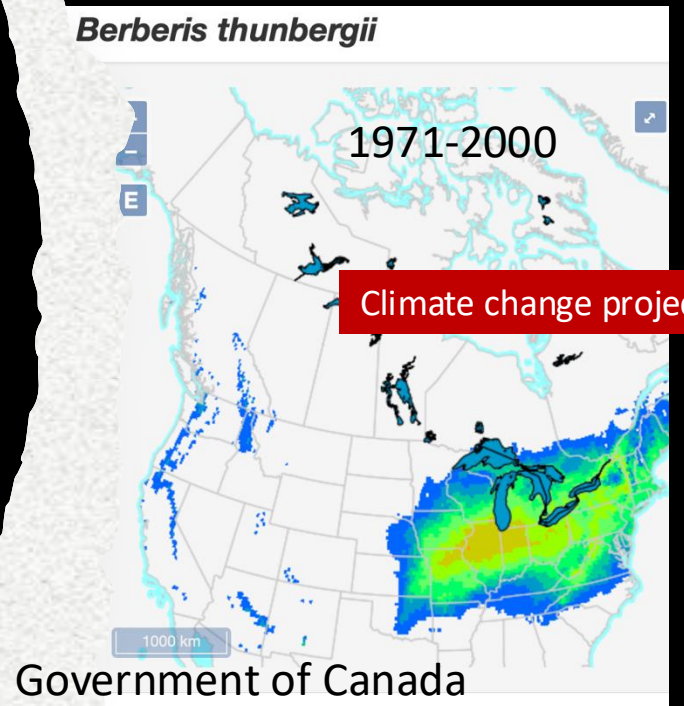
Burning Bush Covers a woodland hillside in North Granby, CT.

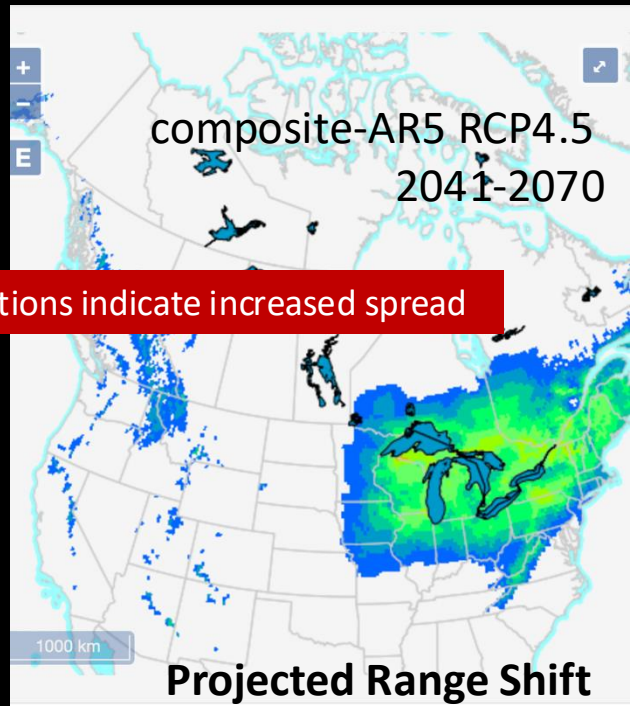
A call to action

Japanese barberry has escaped gardens or become naturalized locally in Ontario, Québec, New Brunswick, Prince Edward Island and Nova Scotia (CFIA, 2022).









Climate change projections indicate increased spread

Japanese barberry was once banned in Canada

- It carries a rust disease that harms grain crops
- In 2001, 11 rust resistant cultivars were allowed for sale … but turns out offspring can carry rust
- The federal government is asking nurseries not to sell these in wheat producing provinces (CFIA, 2022)

What about impacts to public health and the environment?

Barberry 'Tara'

Blackstem rust on wheat

Japanese barberry blanket forest floor near Lyme, Connecticut.

Barberry - impact on health

Japanese barberry thickets support increased populations of deer ticks and are associated with higher incidence of Lyme disease.

(Linske et al. 2018; Ward, 2017; Williams et. al. 2017)

Barberry 'Tara'

Black-legged tick

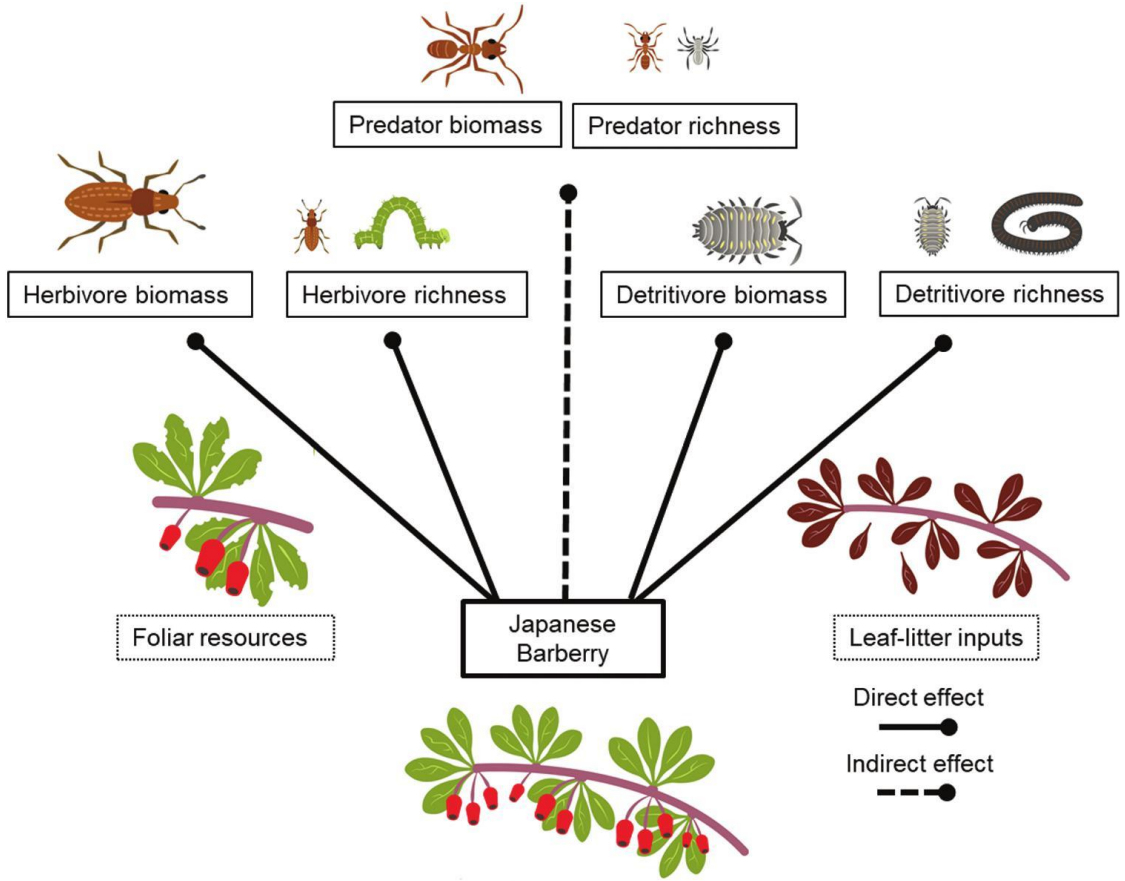
Japanese barberry blanket forest floor near Lyme, Connecticut.

Barberry reduces native diversity

"Infestations cause many detrimental ecological and economic impacts… resulting in a **decrease of native plant and animal biodiversity**."

(Minnesota Dept. of Ag., 2022).

Barberry sales are regulated in ME MN NH NY PA VT WI as well as DE CT MA & IN



Barberry reduces both diversity and population size of arthropods (insects, spiders, centipedes, and millipedes)

Image: Clark, Robert & Seewagen, Chad. (2019). Invasive Japanese Barberry, Berberis thunbergii (Ranunculales: Berberidaceae) Is Associated With Simplified Branch-Dwelling and Leaf-Litter Arthropod Communities in a New York Forest. Environmental Entomology.)

Many high-risk invasive plants are not regulated in Canada or Ontario

Common name	Scientific name	Jurisdictions regulated
Japanese barberry	*Berberis thunbergii*	**CAN (PPA)*** ME NH NY VT NY PA WI (DE IN MN)
Asiatic bittersweet	*Celastrus orbiculatus*	ME MN NH NY OH PA VT WI (DE CT IL MA)
Scotch broom	*Cytisus scoparius*	**BC** ID OH MT PA WA WI (MD)
Russian olive	*Elaeagnus angustifolia*	OH MT WA WI (IL)
Autumn olive	*Elaeagnus umbellata*	**AB** ME MI NH NY OH WI (CT DE MA)
Winged euonymus	*Euonymus alatus*	ME NH NY VT WI (DE MD MA)
Japanese honeysuckle Amur or bush Morrow's Tatarian	*Lonicera japonica* *L. maackii* *L. morrowii* *L. tatarica*	ME MN NH NY OH VT WI (DE CT IL)
Multiflora rose	*Rosa multiflora*	ME NH, NY OH PA WI (IL MA)

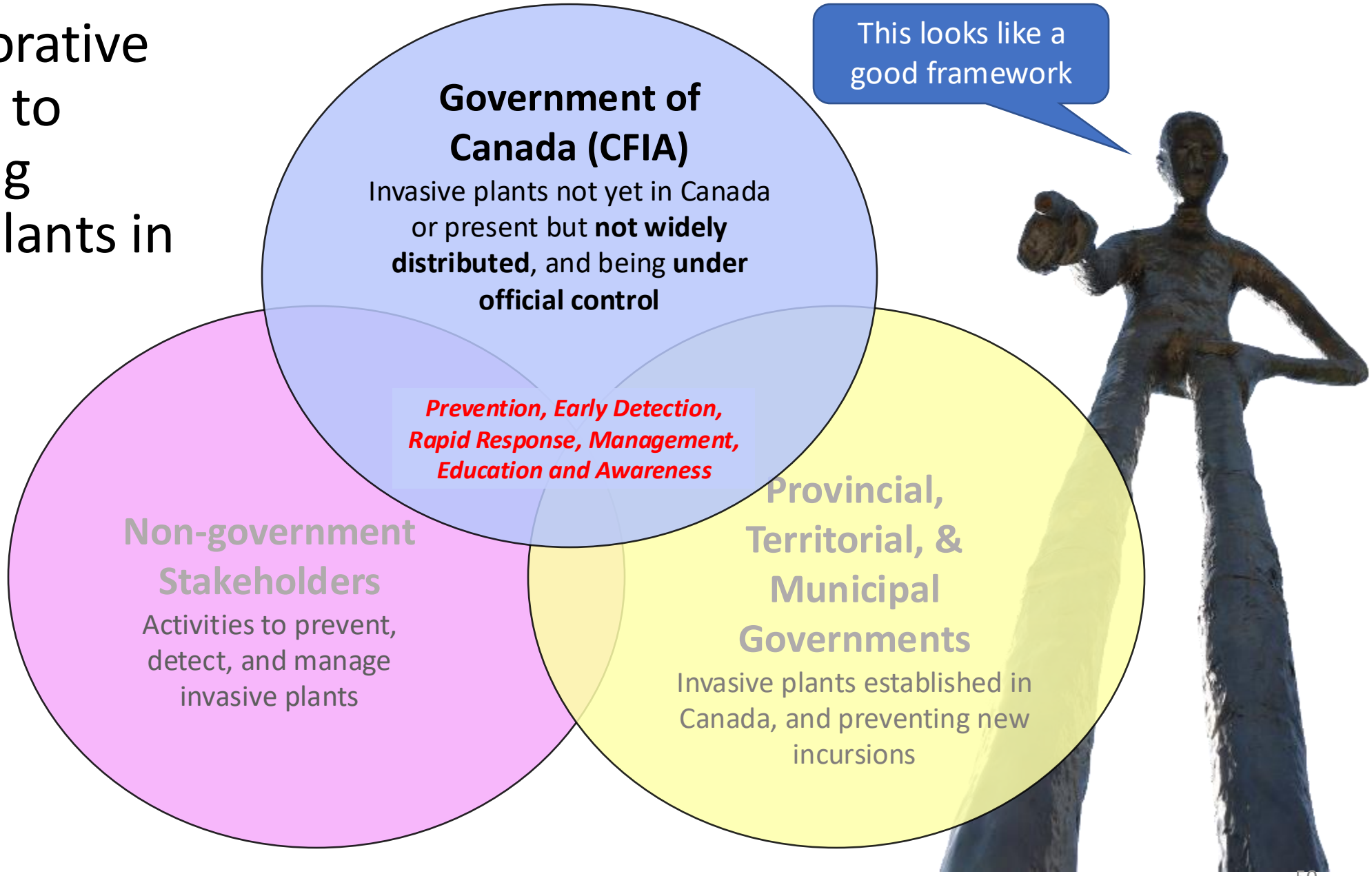
These species are **regulated in at least four border states** and pose threats in Canada.

*cultivars exempted

Why are invasive plants still sold?

Credit: stellalevi getthyimages

"A Collaborative Approach to Addressing Invasive Plants in Canada"



Source: CFIA. 2011. *Canadian Invasive Plant Framework A Collaborative Approach to Addressing Invasive Plants in Canada*

Canadian Food Inspection Agency (CFIA)

Federal Laws

Seeds Act	***Plant Protection Act***
Protect quality of seeds sold in Canada	Protect plants in agriculture & forestry

Neither was intended to protect biodiversity, waterways or human well-being

Regulated as a noxious weed	Prohibit sale of plants "Quarantine pest"
Limits the amount by weight of noxious seed	1. Impacts of economic importance? 2. Widely distributed? 3. Are there control measures in place?
Seeds contamination not a significant pathway of spread	No regulatory action

Purple loosestrife
(*Lythrum salicaria*)

Purple loosestrife
(*Lythrum salicaria*)

Plants Prohibited in Canada –currently 25 taxa

Aegilops cylindrica	**Jointed goatgrass**
Alopercurus myosuroides	**Slender foxtail**
Arundo donax	**Giant Reed (can be a threat to wetlands)**
Berberis spp.	**Barberries**
Centaurea iberica	**Iberian starthistle**
Centaurea solstitalis	**Yellow starthistle**
Crupina vulgaris	**Common crupina**
Cuscuta spp.	**Dodder**
Dioscorea polystachya	**Chinese yam**
Echium plantagineum	**Purple viper's-bugloss**
Eriochloa villosa	**Woolly cup grass**
Microstegium vimineum	**Japanese stiltgrass**
Nassella trichotoma	**Serrated tussock grass**
Orobanche spp.	**Broomrape**
Paspalum dilatatum	**Dallis grass**
Persicaria perfoliata	**Devil's-tail tearthumb**
Pueraria montana	**Kudzu**
Rhamnus spp.	**Buckthorn**
Senecio inaequidens	**South African ragwort**
Senecio madagascariensis	**Madagascar ragwort**
Solanum elaeagnifolium	**Silverleaf nightshade**
Striga spp.	**Witchweed**
Zygophyllum fabago	**Syrian bean-caper**

Rust resistant Invasive ornamental Japanese barberry cultivars were exempted

Black-legged tick

Japanese barberry exemptions are under review

Many of these plants are not present in Canada

Japanese barberry blanket forest floor near Lyme, Connecticut.

Horticultural Plants that do harm to biodiversity are not regulated

- Plants fail to meet the definition of “pest”
- They are “widespread”
- **They do harm**

Creeping Jenny

Burning bush

Ditch lily

Yellow iris

English ivy

Autumn olive

Passing responsibility

Provinces don't have the knowledge or resources

Government of Canada (CFIA)

Invasive plants not yet in Canada or present but **not widely distributed**, and being **under official control**

Prevention, Early Detection, Rapid Response, Management, Education and Awareness

Non-government Stakeholders

Activities to prevent, detect, and manage invasive plants

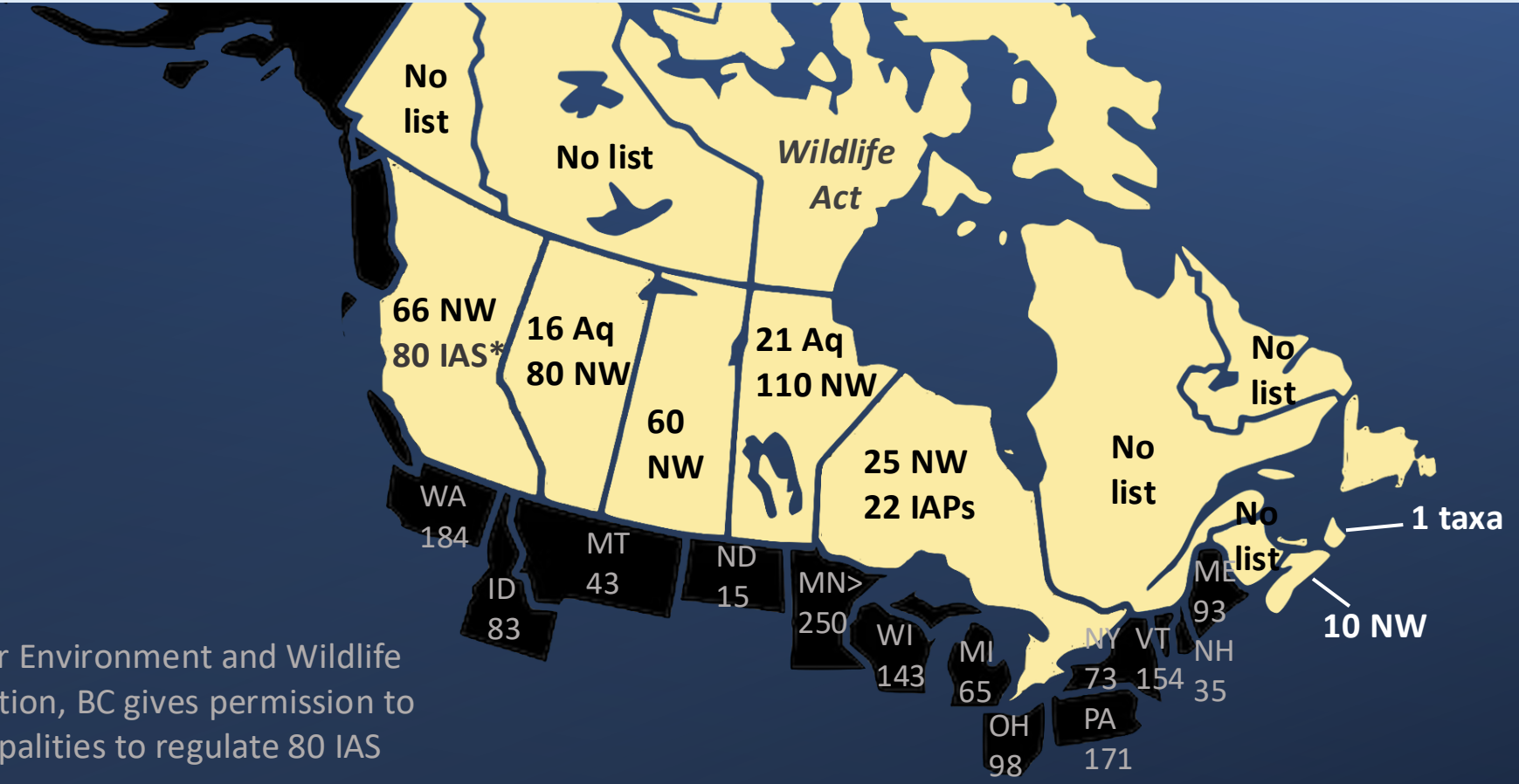
Provincial, Territorial, & Municipal Governments

Invasive plants **established** in Canada, and preventing new incursions

Where do Indigenous communities fit in?

Invasive plants don't respect borders.

Federal leadership is required for the public good, clarity, fairness and equity.



There is a mishmash of regulations and poor information sharing

*Under Environment and Wildlife Regulation, BC gives permission to municipalities to regulate 80 IAS

Protecting Horticulture but not Biodiversity

- Jumping worms are ignored
  - Harm to forests and gardens
- Boxwood moth is regulated
  - Harm to one plant in the horticultural trades

CCIPR formed in response to public demand

Amur maple

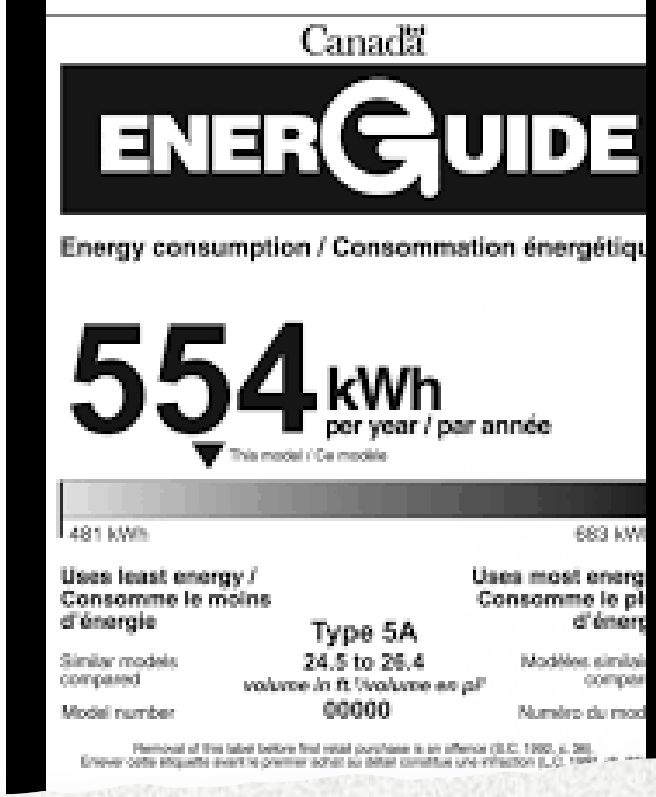
Lily of the Valley

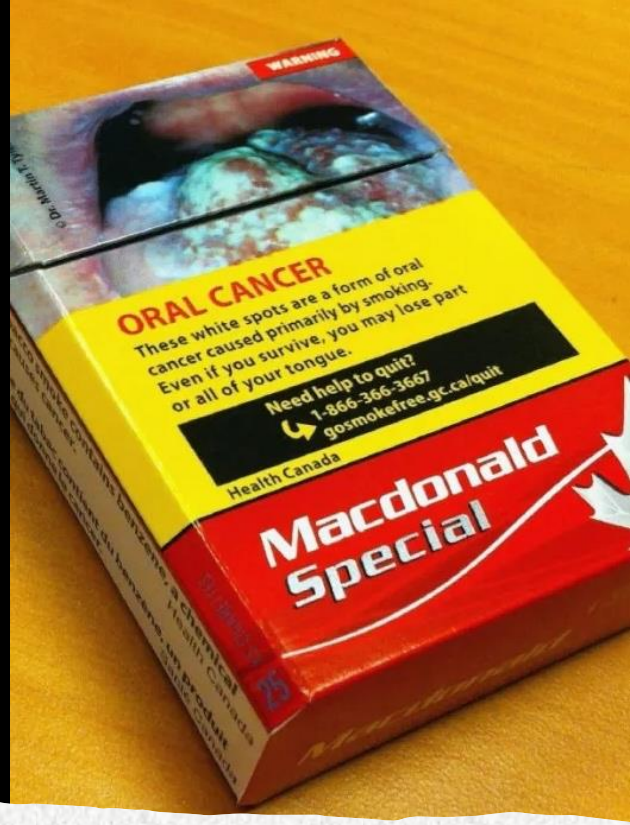
We have solutions.

To protect our economy, environment and public health from invasive plant species, we must:

1. Develop a National **Plant Risk Assessment Database**
2. Mandate **Risk Assessments**
3. **Ban the Sale** and Movement of High-Risk Invasive Plants
4. Implement Point of Sale **Labeling** for Potentially Invasive Plants

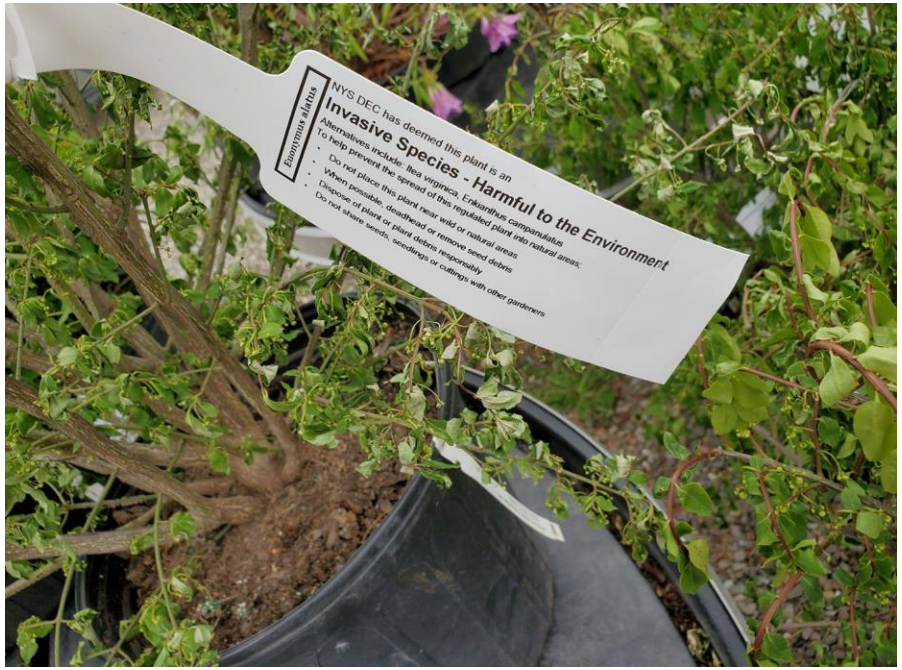
Skip to the end





Point of sale labelling

- Plants are products
- Consumers have the right to know



Burning bush *Euonymus alatus*

Label required in New York State

Labelling

For plants like burning bush, New York requires plant tags to state:

Harmful to the Environment

Recommend alternative species:

Consider Virginia sweetspire

Planting cautions:

Do not place this plant near natural areas; Deadhead; Do not share

Correct botanical name is required

Acer platenoides

NYS DEC has deemed this plant is an **Invasive Species**

Harmful to the Environment

Alternatives include; Red Maple, Sugar Maple, Eastern Redbud, European Beech

- Do not place this plant near wild or natural areas
- When possible, deadhead or remove seed debris
- Dispose of plant or plant debris responsibly
- Do not share seeds, seedlings or cuttings with others

- Regulate
- Educate
- Mitigate $$$

What can you do?

- Help call for regulations
- Explain the harm
  - “It’s not invasive in my backyard”
  - Biodiversity, human health, & the economy
  - Show invaded areas
- Have respectful conversations
  - Talk to your nurseries, public gardens, your local representatives

Become a CCIPR Supporter!

Our petitions

- Help us slow the spread of invasive plants
- Speak to your neighbours and representatives
- Bluewater *Resolution Regarding Threat of Invasive Plant Species* CARRIED April 2, 2024

Mitigation can begin at home

- Remove invasive plants from your garden
- Volunteer to remove invasive plants from natural areas
- Chat with neighbours

Invasive Plant Lists

Invasive Non-Native Plants in the Upper Thames River Watershed

The plants listed below are non-native species that have become invasive problem weeds in the Upper Thames River watershed (Middlesex, Oxford, and Perth Counties). They can spread into natural areas and forests, displacing native plants and the wildlife that depend on them. These non-native species should not be planted. Where possible, they should be removed to prevent further invasion.

Invasive Trees, Shrubs, Vines & Woody Groundcovers

Trees

Acer ginnala	Amur Maple
Acer negundo	Manitoba Maple or Boxelder
Acer platanoides	Norway Maple
Ailanthus altissima	Tree-of-heaven
Betula pendula	Weeping Birch
Crataegus monogyna	English Hawthorn
Elaeagnus angustifolia	Russian Olive
Morus alba	White Mulberry
Pinus sylvestris	Scots Pine
Populus alba	White Poplar, Silver Poplar
Prunus avium	Sweet Cherry
Robinia pseudoacacia	Black Locust
Salix alba	White Willow
Salix exalba	Crack Willow
Sorbus aucuparia	European Mountain-ash
Ulmus pumila	Siberian Elm

Shrubs

Alnus glutinosa	European Black Alder
Berberis thunbergii	Japanese Barberry
Berberis vulgaris	Common Barberry
Elaeagnus umbellata	Autumn Olive
Euonymus alatus	Winged Euonymus
Frangula alnus	Glossy Buckthorn
Ligustrum vulgare	European Privet
Lonicera japonica	Japanese Honeysuckle
Lonicera maackii	Maack's Honeysuckle
Lonicera tatarica	Tartarian Honeysuckle
Rhamnus cathartica	European Buckthorn
Ribes rubrum	European Red Currant
Rosa multiflora	Multiflora Rose
Syringa vulgaris	Common Lilac
Viburnum opulus	Cranberry Viburnum

Tartarian Honeysuckle (*Lonicera tatarica*)

Vines & Woody Groundcovers

Artemisia vulgaris	Common Wormwood
Celastrus orbiculatus	Oriental Bittersweet
Hedera helix	English Ivy
Vinca minor	Lesser Periwinkle, Myrtle
Vincetoxicum nigrum	Black Swallowwort
Vincetoxicum rossicum	European Swallowwort, Dog-strangling Vine

European Buckthorn (*Rhamnus cathartica*)

The Problem with Invasive Non-native Plants

More than 500 species of non-native plants grow "wild" in Ontario. Most of these plants were brought here from other countries or regions for food, medicine, or gardens. Not all are invasive or aggressive. The ones that have escaped cultivation and have spread widely are called invasive and are the most concerning. Many alien plants are so common, people think of them as native species.

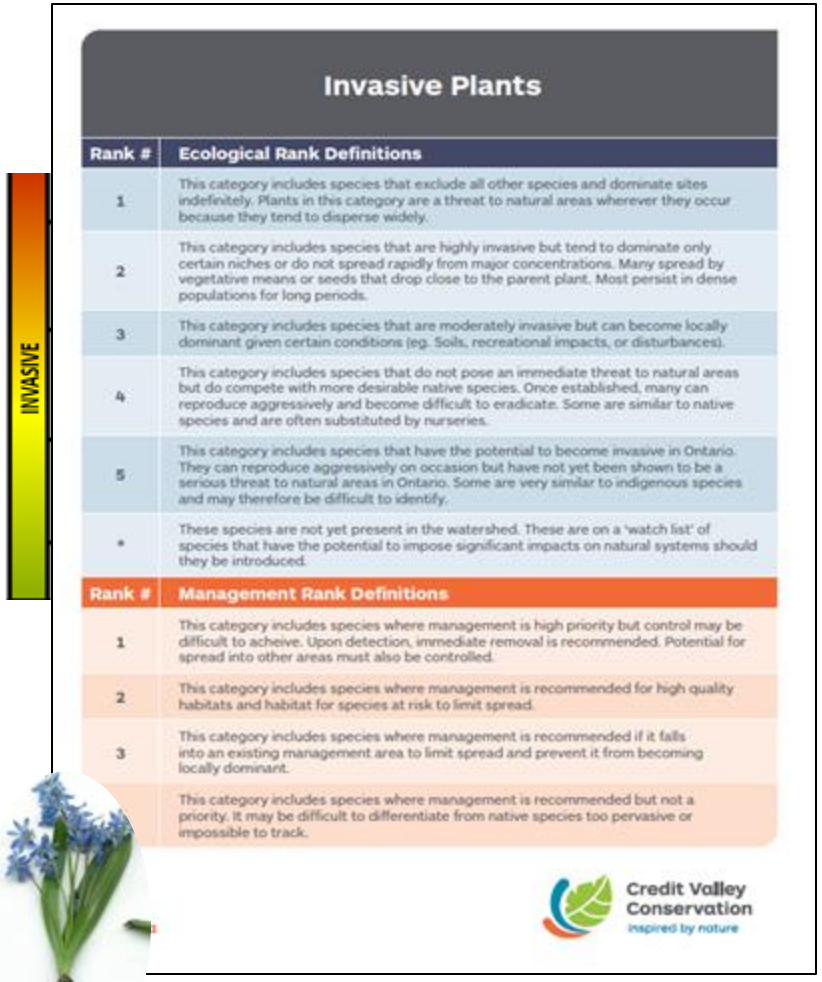
Many non-native plants have characteristics that allow them to invade natural areas and forests. These plants:

- produce a lot of seed or have aggressive rhizomes,
- can grow in a range of soil and moisture conditions,
- are not eaten by native predators,
- out-compete and replace native plants, and
- do not provide the food and habitat required by many native insects, birds or animals.

Removing Invasive Plants

By their nature, invasive plants can be tough to get rid of. Be persistent! Methods of removal include:

- Cut or girdle shrubs or trees. Repeatedly cut any suckers (off-shoots) that re-grow.
- For perennials, cut off the top of the plant before it flowers to weaken the plant and prevent seeding.
- Pull or dig up and remove individual plants or shrubs.
- Do NOT compost these plants as they may re-sprout or the seeds may remain viable. Put cuttings/plants in black plastic garbage bags and put in the garbage.
- Lay heavy black plastic over invasive groundcover for a season to smother and kill the non-native plants.
- Apply (spot treat) an appropriate herbicide for persistent trees, shrubs, and plants or for large infestations. Consult a licensed pesticide applicator for advice.
- Seek professional advice for Giant Hogweed. See UTRCA factsheet.



Invasive Plants

Rank #	Ecological Rank Definitions
1	This category includes species that exclude all other species and dominate sites indefinitely. Plants in this category are a threat to natural areas wherever they occur because they tend to disperse widely.
2	This category includes species that are highly invasive but tend to dominate only certain niches or do not spread rapidly from major concentrations. Many spread by vegetative means or seeds that drop close to the parent plant. Most persist in dense populations for long periods.
3	This category includes species that are moderately invasive but can become locally dominant given certain conditions (eg. Soils, recreational impacts, or disturbances).
4	This category includes species that do not pose an immediate threat to natural areas but do compete with more desirable native species. Once established, many can reproduce aggressively and become difficult to eradicate. Some are similar to native species and are often substituted by nurseries.
5	This category includes species that have the potential to become invasive in Ontario. They can reproduce aggressively on occasion but have not yet been shown to be a serious threat to natural areas in Ontario. Some are very similar to indigenous species and may therefore be difficult to identify.
*	These species are not yet present in the watershed. These are on a 'watch list' of species that have the potential to impose significant impacts on natural systems should they be introduced.

INVASIVE

Rank #	Management Rank Definitions
1	This category includes species where management is high priority but control may be difficult to acheive. Upon detection, immediate removal is recommended. Potential for spread into other areas must also be controlled.
2	This category includes species where management is recommended for high quality habitats and habitat for species at risk to limit spread.
3	This category includes species where management is recommended if it falls into an existing management area to limit spread and prevent it from becoming locally dominant.
	This category includes species where management is recommended but not a priority. It may be difficult to differentiate from native species too pervasive or impossible to track.

Credit Valley Conservation
inspired by nature

Office of the Auditor General of Ontario

Value-for-Money Audit:
Management of Invasive Species

"28 plants which should not be sold or shared in Ontario"

- Amur Maple
- Creeping Jenny
- English Ivy
- Goutweed
- Periwinkle
- Dame's rocket
- Japanese Barberry
- Orange Day Lily
- Miscanthus
- Lily-of-the-valley
- Pachysandra

Upper Thames Conservation (88)

Credit Valley Conservation (188)

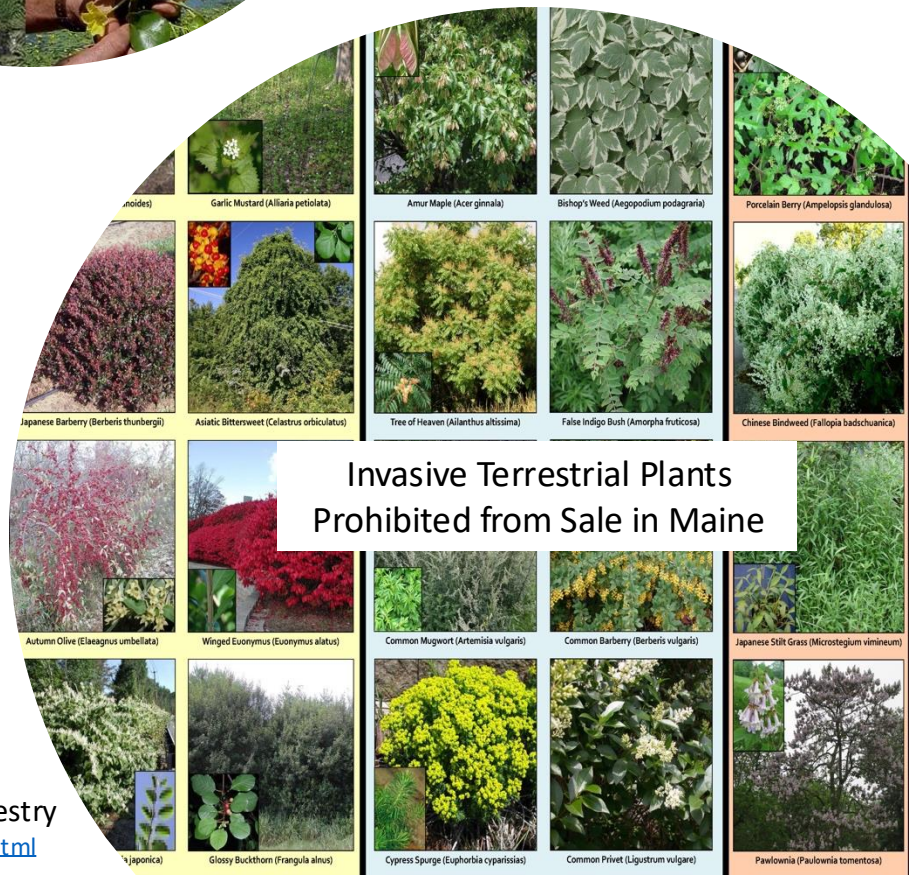
Auditor General of Ontario (28*)

*Many additional plants are discussed

Many ornamental plants are regulated south of the border

- 63 terrestrial plants on the Maine "**Do Not Plant List**"
- The number has doubled
- 11 newly added aquatic plants

Maine works with the horticultural industry



Maine Dept. of Agriculture Conservation, & Forestry
www.maine.gov/dacf/php/horticulture/invasiveplants.shtml

Canadian Council on Invasive Species

Canada's Unwanted Invasive Plant List

Norway maple
Common water hyacinth
Goutweed
English ivy
Yellow flag iris

PLANT WISE

Invasive Species Centre

Limited list (16 plants)
- Giant Hogweed
- Common Buckthorn
- Japanese Knotweed
- Garlic Mustard
- Himalayan Balsam
- Purple Loosestrife
- Dog-strangling vine
- Wild Parsnip
- Honeysuckle
- Goutweed

ONTARIO INVASIVE PLANT COUNCIL

Best Management Practices


Giant Hogweed BMP


Goutweed BMP

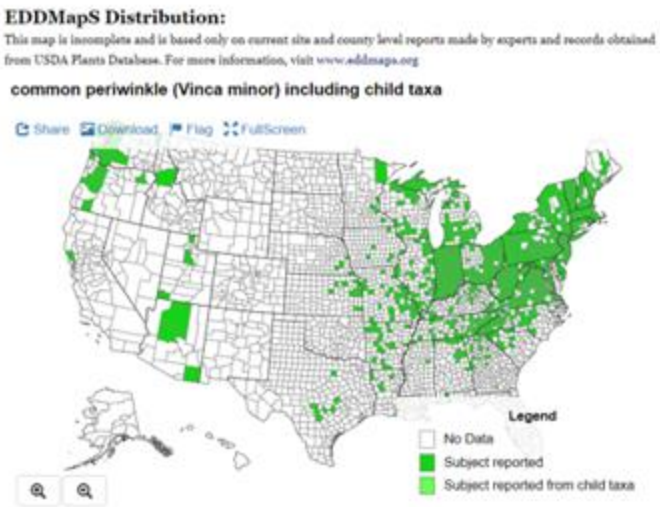
Grow me Instead


Multiflora Rose BMP


Norway Maple BMP

Search results for 'periwinkle'

Invasive Plant Atlas of the United States



www.invasiveplantatlas.org

The University of Georgia Center for Invasive Species and Ecosystem Health

Common Periwinkle (Vinca minor)

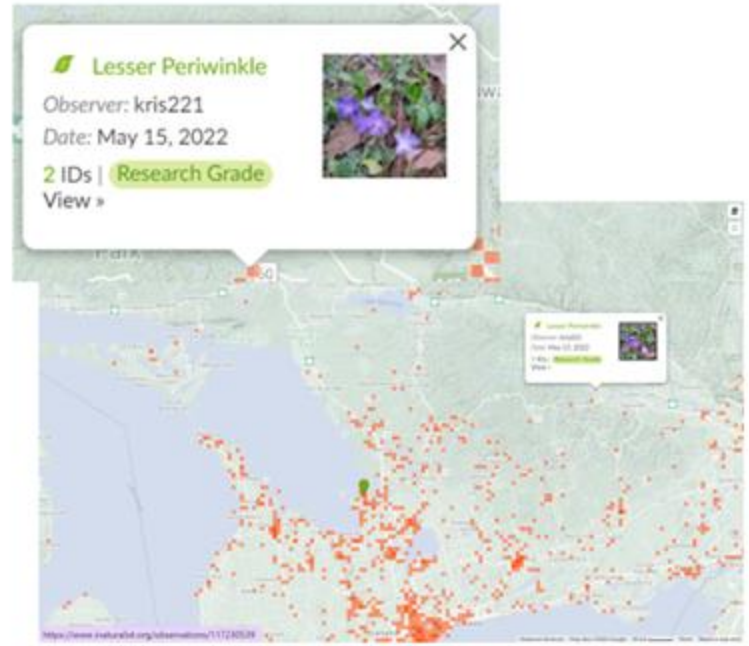
Plant: vine-like erect or trailing groundcover; mostly eve
opposite, dark green, glossy, oval to lance-shaped, thick

- Look-alikes
- Prevention and Control

Note: Herbicides are based on U.S. regulations

www.invasive.org/index.cfm

iNaturalist



Map of invaded areas
Photos of invaded areas

https://www.inaturalist.org

Invasive Plant Lists

Ontario:

- Ontario *Weed Control Act*
- Ontario *Invasive Species Act*
- Auditor General of Ontario – Value for Money Audit (2022)
- MidAtlantic Invasive Plant List (2024)
- Credit Valley Conservation Invasive Plant List (2021)
- Ontario Invasive Plant Council Grow Me Instead; Ontario Invasive Species Awareness
- Ontario Federation of Anglers and Hunters in partnership with Ontario Ministry of Natural Resources, Credit Valley Conservation – A Landowner's Guide to Managing and Controlling Invasive Plants in Ontario (2014)
- Upper Thames Conservation Invasive Non-native Plants
- Ontario South Central Conservation Authorities Invasive Plants (2023)

North America:

- Invasive Plant Atlas (US and Canada) Plant Species Reported to be Invasive in Natural Areas (1405 Records, 2018)
- Plant Invaders of Mid-Atlantic Natural Areas
- U.S. Invasive Plant Atlas
- Public Gardens as Sentinels of Invasive Plants Dashboard
- Regional Invasive Species & Climate Change (RISCC) Management Networks

CIPR
Canadian Coalition for Invasive Plant Regulation

BMPs are produced upon request with funding $$$

Ontario Invasive Plant Council can help

ONTARIO INVASIVE PLANT COUNCIL

Who We Are ▾ What We Do ▾ Invasive Plants

BEST MANAGEMENT PRACTICES

Newly Published Best Management Practices (2020-2022):

We have recently published 8 BRAND NEW BMP documents, including an updated document on Invasive Phragmites. You can find these new BMPs below.

Erect Hedge-parsley | Eurasian Water-Milfoil | European Frog-Bit | Flowering Rush | Goutweed | Invasive Phragmites | Norway Maple | White Mulberry

Newly Published Technical Bulletins (2021):

We have recently published 2 BRAND NEW Technical Bulletins, including an updated document on Invasive Phragmites. You can find these Technical Bulletins below.

Himalayan Balsam Technical Bulletin | Invasive Phragmites Technical Bulletin

Master Gardeners have factsheets

- Identification
- Impacts/dangers
- Management
- Removal
- Disposal options

DO NOT MOW!
IT CAN MAKE THINGS WORSE

Master Gardeners of Ontario Facebook Group

Invasive Knotweeds–Information and Control

- Invasive knotweeds (KW) are hardy perennials native to eastern Asia including Japan, China and Korea. They were originally introduced through the horticultural trade as ornamental plants. They are among the **world's most challenging invasive species**.
- KWs are now widespread across Canada and have significant social, economic and environmental impacts:
  - The **roots** can damage walls, pavement, human-made structures, drainage systems and flood prevention structures and cause shorelines to erode, increasing flood risk.
  - Dense **stands** can reduce visibility, trap litter and increase vermin, impact recreational activities, cause a fire hazard, and decrease property values.
  - They outcompete native plants, destroy wildlife habitat, and reduce biodiversity.
- KWs are extremely difficult to control and it is important to manage knotweeds in a way that minimizes these negative ecological and socio-economic impacts.
- The following KWs are **restricted** in Ontario which means "*it is illegal to import, deposit, release, breed/**grow, buy, sell**, lease or trade" them* (https://www.ontario.ca/page/managing-invasive-species-ontario):
  - Japanese knotweed (*Reynoutria japonica*)
  - Giant knotweed (*Reynoutria sachalinensis*)
  - Bohemian knotweed (*Reynoutria × bohemica*)
  - Himalayan knotweed (*Koenigia polystachya*)
- Gardeners may be unaware of these regulations. If you see invasive knotweeds, seeds or plant parts offered for sale, we recommend you flag or report the ads. Illegal activity can be reported to the ministry at 1-877-847-7667, toll-free anytime or Crime Stoppers anonymously at 1-800-222-TIPS(8477).

Newly updated Knotweed Factsheet!

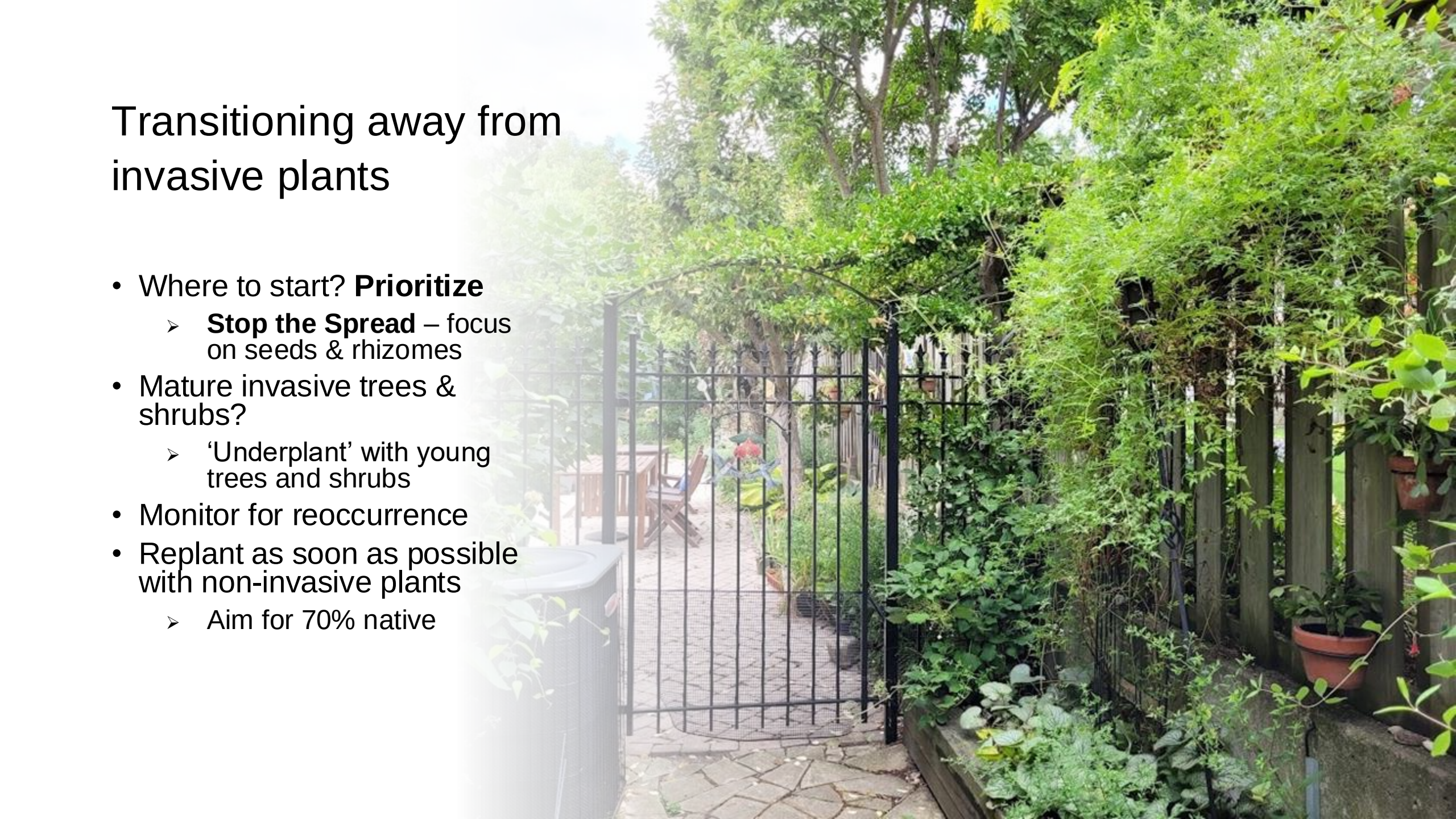
Disposing of Invasive Plants

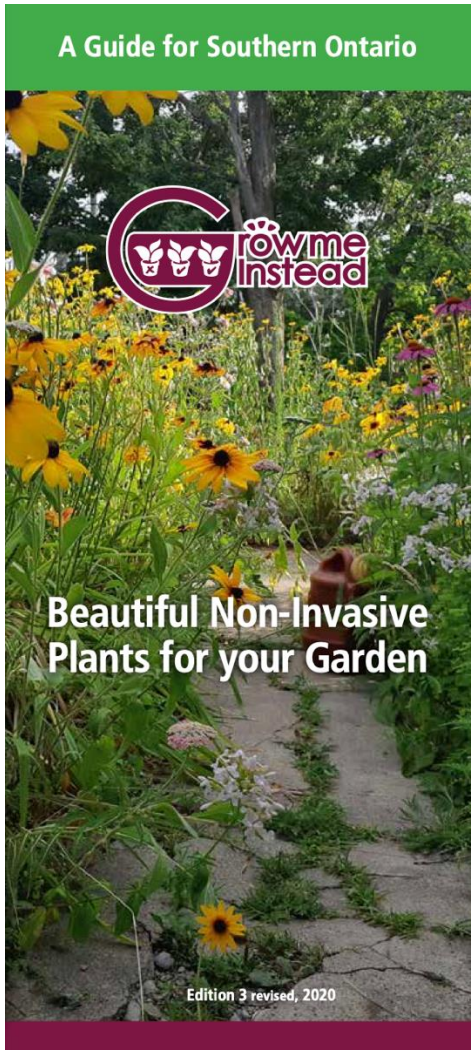
- Composting or Chipping
  - Vegetative material that doesn't propagate
  - **No** seeds, rhizomes
- Bagging (solarization)
  - Heat in direct sunlight for 1-3 weeks in black plastic
- Garbage
  - Rural vs urban
- Tarping
  - Pile invasive plants on a plastic sheet
  - Cover with a tarp and secure
- Burning
  - Be aware of risks
  - Rural vs urban considerations
  - Ditches-not property of homeowner; can lead to fires

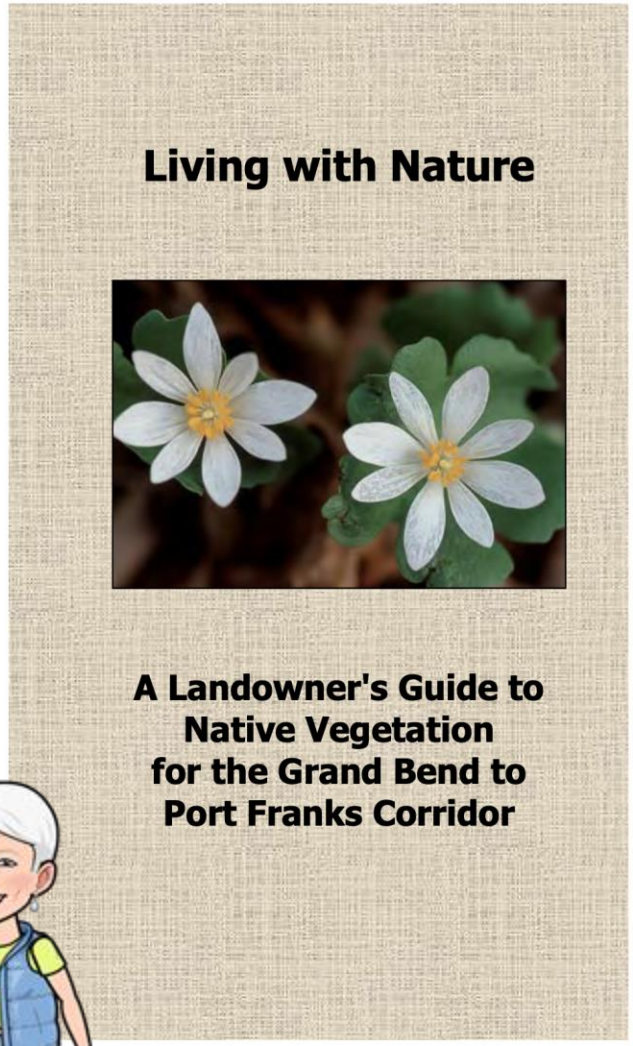
Seeds and vegetative fragments can spread along transportations corridors

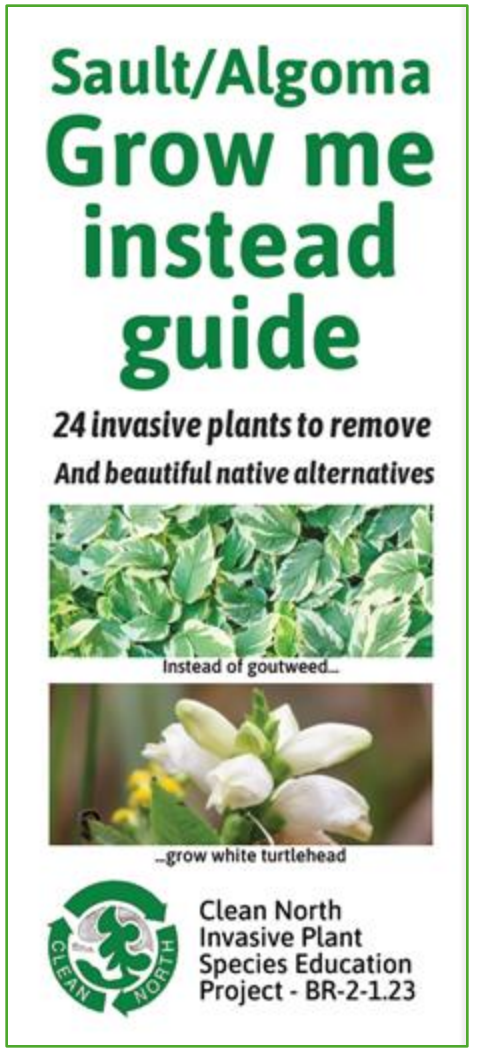
Transitioning away from invasive plants

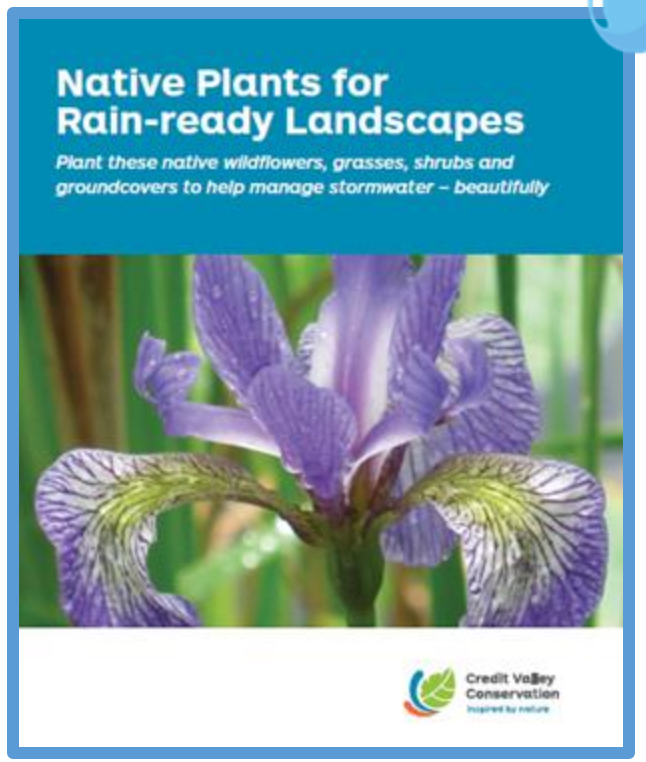
- Where to start? **Prioritize**
  - **Stop the Spread** – focus on seeds & rhizomes
- Mature invasive trees & shrubs?
  - ‘Underplant’ with young trees and shrubs
- Monitor for reoccurrence
- Replant as soon as possible with non-invasive plants
  - Aim for 70% native




A Guide for Southern Ontario
Grow me Instead
Beautiful Non-Invasive Plants for your Garden
Edition 3 revised, 2020


Living with Nature
A Landowner's Guide to Native Vegetation for the Grand Bend to Port Franks Corridor


Sault/Algoma
Grow me instead guide
24 invasive plants to remove
And beautiful native alternatives
Instead of goutweed...
...grow white turtlehead
Clean North Invasive Plant Species Education Project - BR-2-1.23



UPPER THAMES RIVER CONSERVATION AUTHORITY

Butterfly Larvae Host Food Plants
for Naturalization Projects & Gardens in the Upper Thames River Watershed

Did you know the larval (caterpillar) stage of a butterfly often requires a completely different plant or group of plants than the adult butterfly?

Your garden should include host plants for the larvae and nectar plants for the adults, to attract a wider selection of butterflies and support their entire life cycle. Ten to 14 days after the adult female butterfly lays her eggs on the underside of a host plant leaf, tiny caterpillars emerge and begin eating the plant.

The following list includes some of the butterflies commonly seen in the Upper Thames River watershed and the host plants their larvae need for food.

Information in brackets indicates butterflies that are rare or uncommon in the region, or are exotic (non-native) species.

Invasive, non-native plants are indicated with an asterisk * and should *not* be planted (food and crop plants excluded).

SPECIES	LARVAE HOST PLANTS
Skippers	
Juvenal's Duskywing	oaks
Northern Cloudywing	American Hog-peanut, other legumes
Silver-spotted Skipper	Black Locust*, other legumes
Dun Skipper	sedges
Long Dash Skipper	grasses
Hobomok Skipper	grasses
Tawny-edged Skipper	grasses
Least Skipper	wetland grasses
European Skipper (non-native)	grasses, especially Common Timothy*
Swallowtails	
Giant Swallowtail (rare)	Common Hop-tree, Common Prickly-ash
Spicebush Swallowtail (uncommon)	Northern Spicebush, Sassafras, Tulip Tree
Black Swallowtail	Parsley family such as fennel, dill
Eastern Tiger Swallowtail	Tulip Tree, cherries, ashes, willows, poplars, birch
Whites & Sulphurs	
Cabbage White (non-native)	Mustard family e.g., cabbage, turnip
Orange Sulphur	Legumes, especially clovers and alfalfa
Clouded Sulphur	Legumes, especially clovers and alfalfa
Harvesters, Coppers	
Banded Hairstreak	oaks, hickories, walnuts
Eastern Tailed Blue	herbaceous legumes, occasionally White and Red Clover
Summer Azure	dogwoods, New Jersey Tea, cherries, viburnums

Photos from top:
- Silver-spotted Skipper
- Giant Swallowtail caterpillar on Common Prickly-ash
- Black Swallowtail caterpillar on dill
- Eastern Tiger Swallowtail

XERCES SOCIETY for Invertebrate Conservation

Native Plants for Pollinators & Beneficial Insects: Great Lakes *continued*

[Native Plants For Pollinators And Beneficial Insects: Great Lakes Region]

Poster by Justin Lewis

In Our Nature

Garden Conditions and Features

- (30) Plants for **Wet Areas** and Ponds
- (27) Plants for **Boulevard Gardens**
- (21) **Groundcovers**
- (21) **Dry Shade**
- **Shade** by seasons + Ferns/sedges/grasses
- **Clay** soils
  - (12) Prairie
  - (12)Wetland
  - (9) Woodland
- (6) Milkweed (4) Sunflowers, (8) Goldenrods, (10)Asters
- (9) **Berry producing** shrubs for birds
- (21) Plants for **hummingbirds** (nectar, insect, nest)

Inournature.ca

Gardens have the potential to hinder or support biodiversity…

INVASIVE NON-NATIVE CULTIVARS NATIVE KEYSTONE

Gardens can be life preservers

This is not about returning to some mythic pristine pre-European time – that boat has sailed

Our gardens can serve as a “slow lane” to protect native species and ecosystems in a fast changing world

This can give native flora and fauna an opportunity to survive, adapt, or migrate

Morelli, et al. (2020). Climate-change refugia: biodiversity in the slow lane. Frontiers in Ecology and the Environment. 18. 228-234.

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Ontario Woody Species

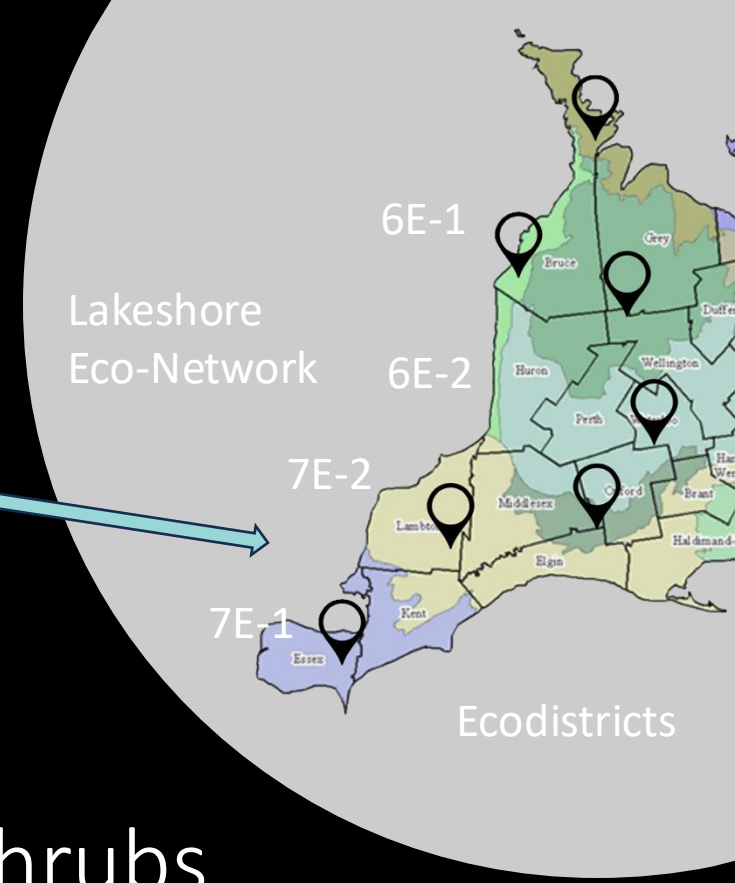
Forest Gene Conservation Association, 275 County Rd 44, Kemptville ON,

Ecodistrict 7E - 2 (St. Thomas)

Described on last page

C = very commo…
R – naturally…

Your Check List	Species	Scientific name	Eco region	Eco district	Excep… + - OCCURS … Counties …
			7E	7E - 2	
	Eastern Red Cedar	Juniperus virginiana	C	U	
	Eastern White Pine	Pinus strobus	U	U	
	Eastern White Cedar	Thuja occidentalis	U	U	
	Eastern Hemlock	Tsuga canadensis	U	U*	3, 4
	Manitoba Maple	Acer negundo	C	+	C in 3
	Red Maple	Acer rubrum	C	C	
	Silver Maple	Acer saccharinum	C	C	
	Sugar Maple	Acer saccharum	C	C	
	Ohio Buckeye	Aesculus glabra	R	+	R in 3
	White Birch	Betula papyrifera	U	U*	4
	Yellow Birch	Betula allegheniensis	C	C	
	Blue Beech	Carpinus caroliniana	C	C	
	Big Shellbark Hickory	Carya lacinosa	R	R*	5, 6, 7
	Bitternut Hickory	Carya cordiformis	C	C	
	Pignut (Red) Hickory	Carya glabra	R	R*	5,6
	Shagbark Hickory	Carya ovata	C	C	
	American Chestnut	Castanea dentata	R	R	
	Hackberry	Celtis occidentalis	U	U	
	Dotted Hawthorn	Craetagus punctata	C	C	
	American Beech	Fagus grandifolia	C	C	
	Black Ash	Fraxinus nigra	C	C	
	Blue Ash	Fraxinus quadrangulata	R	R*	6, 7
	Pumpkin Ash	Fraxinus profunda	R	R*	5, 6, 7
	Red (green) Ash	Fraxinus pennsylvanica	C	C	
	White Ash	Fraxinus americana	C	C	
	Honey Locust	Gleditsia triancanthos	R	+	R in 3
	Kentucky Coffeetree	Gymnocladus dioicus	R	+	R in 3, 6
	Black Walnut	Juglans nigra	U	U	
	Butternut	Juglans cinerea	U	U	
	Tamarack	Larix laricina	R	R	
	Tulip Tree	Liriodendron tulipifera	U	U	
	Cucumber Tree	Magnolia acuminata	R	+	R in 31
	Red Mulberry	Morus rubra	R	+	R in 5
	Black-Gum	Nyssa sylvatica	R	R*	6,7
	Ironwood	Ostrya virginiana	C	C	
	Sycamore	Platanus occidentalis	U	U	
	Balsam Poplar	Populus balsamifera	C	C	
	Eastern Cottonwood	Populus deltoides	C	C	
	Largetooth Aspen	Populus grandidentata	C	C	
	Trembling Aspen	Populus tremuloides	C	C	
	Black Cherry	Prunus serotina	C	C	
	Black Oak	Quercus velutina	U	U	
	Bur Oak	Quercus macrocarpa	C	C	
	Chinquapin Oak	Quercus muhlenbergii	U	U	
	Northern Pin Oak	Quercus ellipsoidalis	R	R*	5
	Pin Oak	Quercus palustris	R	+	R in 3
	Red Oak	Quercus rubra	C	C	
	Shumard's Oak	Quercus shumardii	R	+	R in 3, 4
	Swamp White Oak	Quercus bicolor	U	U	
	White Oak	Quercus alba	C	C	
	Sassafras	Sassafras albidum	U	U	
	Basswood	Tilia americana	C	C	
	Rock Elm	Ulmus thomasii	U	U	
	Slippery (Red) Elm	Ulmus rubra	C	C	
	White Elm	Ulmus americana	C	C	
	Common Juniper	Juniperus communis	C		
	Creeping Juniper	Juniperus horizontalis	U		
	American Yew	Taxus canadensis			



Start with trees and shrubs

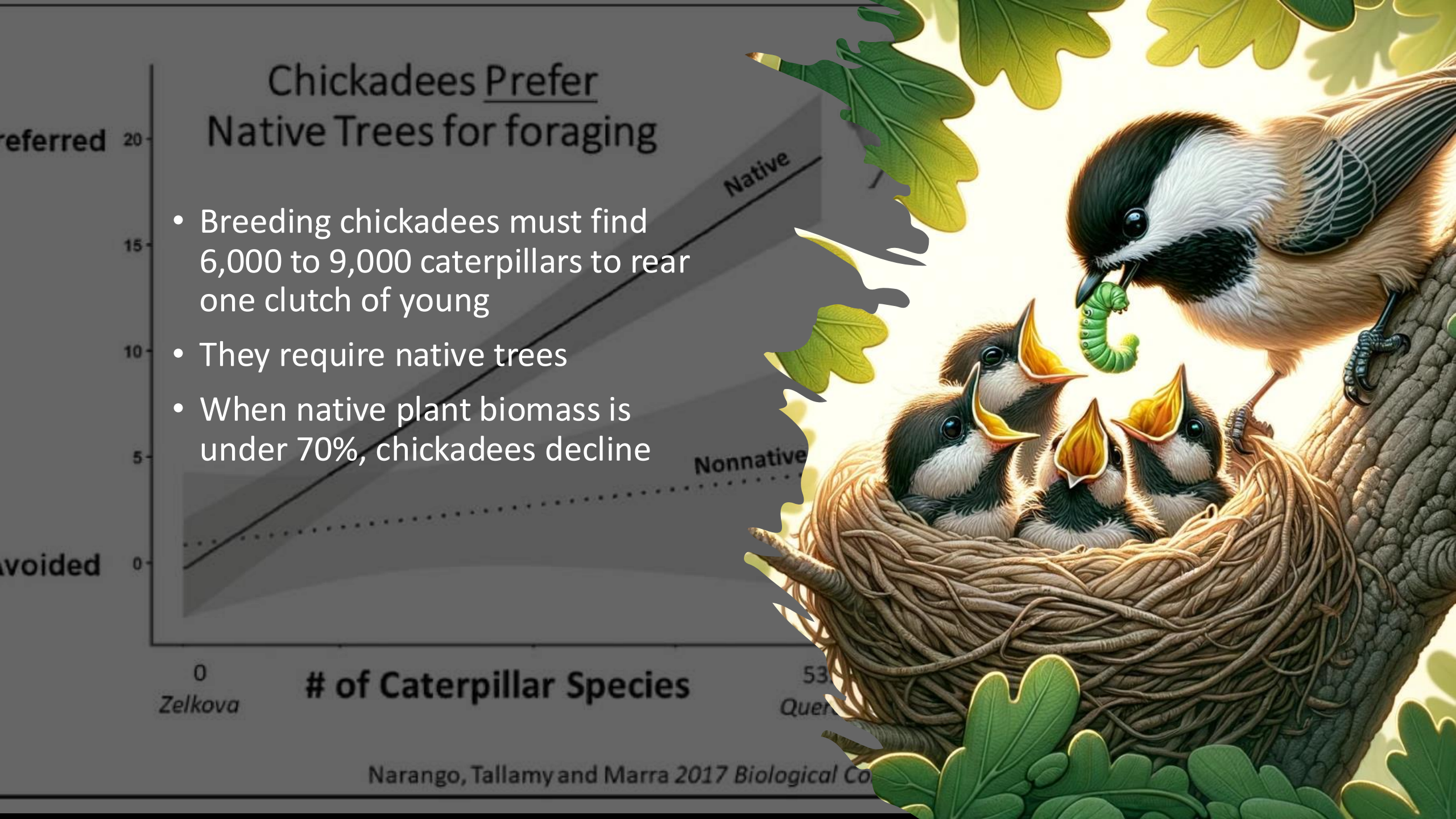
On the Forest Gene Conservation Assoc. FGCA.net website you will find:

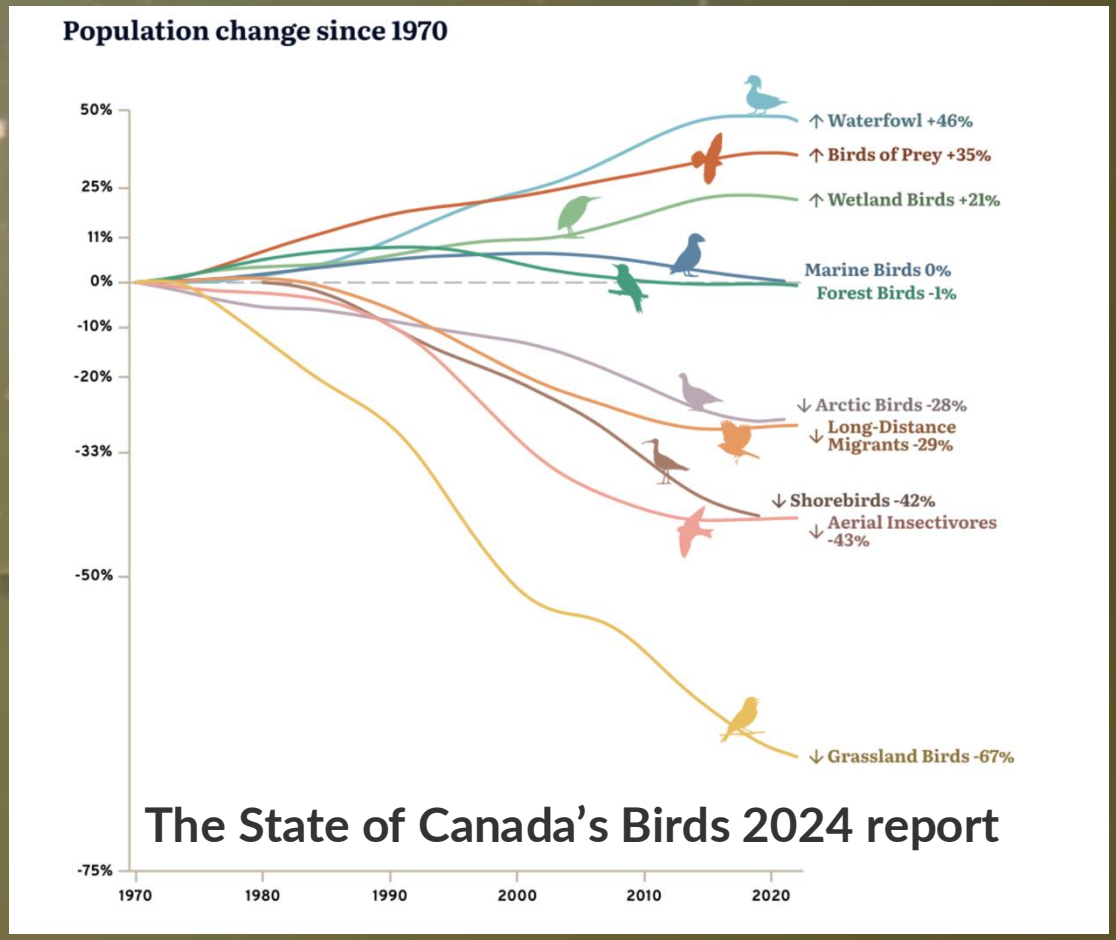
Native woody species lists and a ***Species Information Guide***

An ecodistrict is an area defined by its physical features, including bedrock, surface geology and topography as well as local climate patterns. These features play a major role in determining patterns of species presence, association and the habitats that develop.

Chickadees Prefer Native Trees for foraging

- Breeding chickadees must find 6,000 to 9,000 caterpillars to rear one clutch of young
- They require native trees
- When native plant biomass is under 70%, chickadees decline





2.9 Billion Birds Gone since 1970!
The numbers are staggering!
Our landscapes are losing their ability to support birds.

ECCC & Birds Canada. (2024). The State of Canada's Birds 2024

Rosenberg, et al (2019). Decline of the North American avifauna. Science. 366. eaaw1313. 10.1126/science.aaw1313.

van Klink, Roel & Bowler, Diana & Gongalsky, Konstantin & Swengel, Ann & Gentile, Alessandro & Chase, Jonathan. (2020). Meta-analysis reveals declines in terrestrial but increases in freshwater insect abundances. Science (New York, N.Y.). 368. 417-420.

Barn Swallow artwork courtesy of Tim Kuhn / Audubon Photography Awards.

Keystones are critical

Many non-keystone plant genera are critical hosts for specialized herbivores and planting a diversity of native species is recommended

Just 14% of the local genera support more than 90% of moth and butterfly diversity

Desiree Narango

If you build landscapes without these powerhouse plants that support caterpillars, the food web is doomed

Doug Tallamy

Narango, D.L., Tallamy, D.W. & Shropshire, K.J. (2020) Few keystone plant genera support the majority of Lepidoptera species. *Nat Commun* **11**, 5751

A keystone species maintains the structure of an ecosystem

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Choose plants that support fauna

Goldenrod (*Solidago* spp.)

Faunal Associations: A wide variety of insects visit the flowers for pollen or nectar, including long-tongued bees, short-tongued bees, wasps, flies, beetles, and a few butterflies and moths. Cross-pollination by these insects is required in order to set fertile seeds. The caterpillars of many moths feed on the foliage and other parts of this goldenrod and others (see Moth Table). A common insect that forms spherical galls on the stems is *Eurosta solidaginis* (Goldenrod Gall Fly). Other insects that feed on this goldenrod include *Epicauta pensylvanica* (Black Blister Beetle), *Lopidea media*(Goldenrod Scarlet Plant Bug), *Lygus lineolaris* (Tarnished Plant Bug), and various leaf beetles and leafhoppers. Among mammals and birds, the Prairie Chicken, Eastern Goldfinch, and Swamp Sparrow eat the seeds, while the White-Tailed Deer and Eastern Cottontail Rabbit occasionally eat the foliage (although it is not a preferred food source). In overgrazed pastures, there have been reports of a rust fungus on the leaves of goldenrod poisoning livestock during the fall. Sometimes beavers and muskrats use the stems in their dams or dens.

www.illinoiswildflowers

Goldenrod & Monarch
Photo Tina Nord Pexels.com

Compare goldenrod to periwinkle

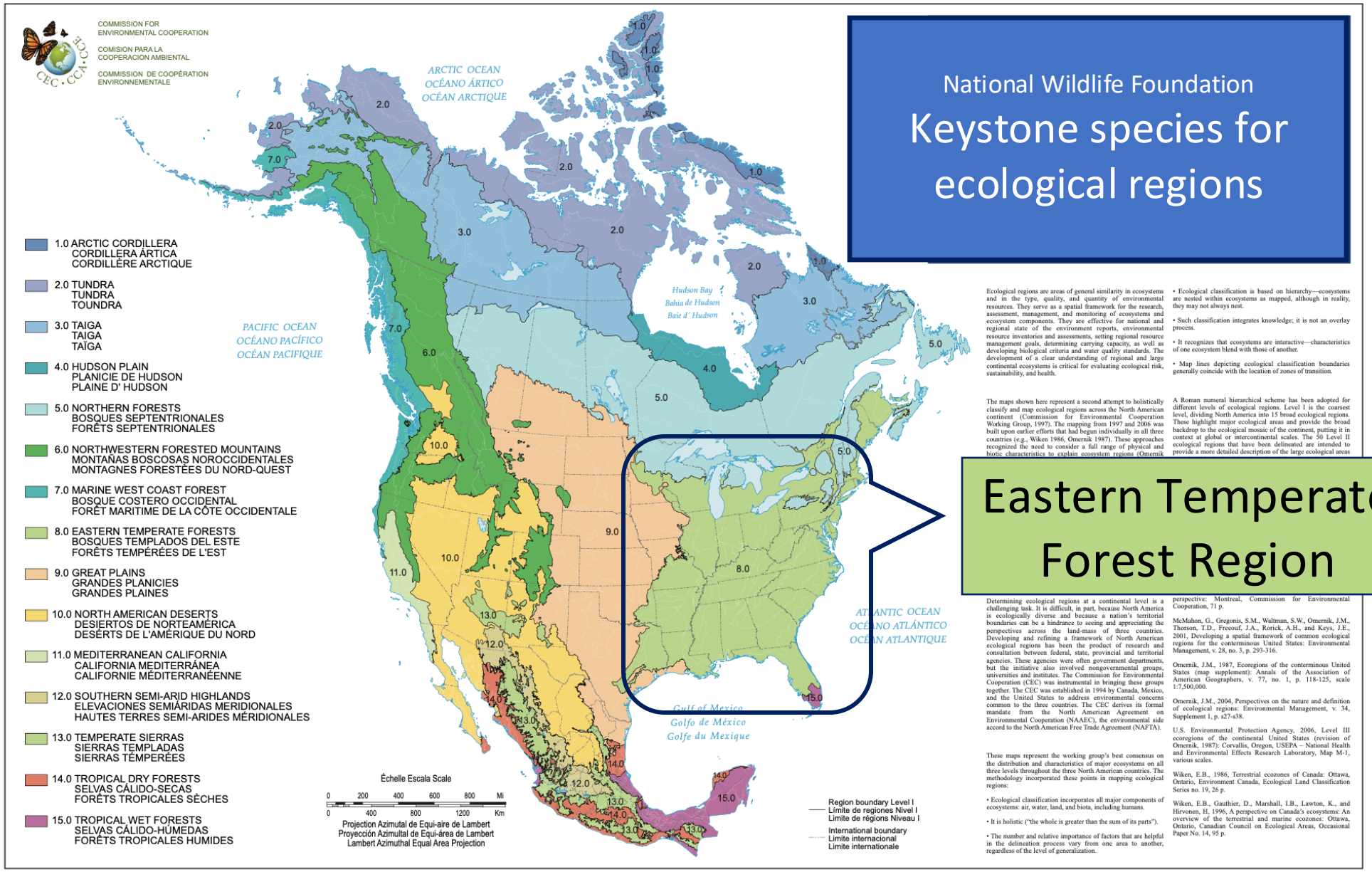
Periwinkle (*Vinca minor*)

Faunal Associations: …

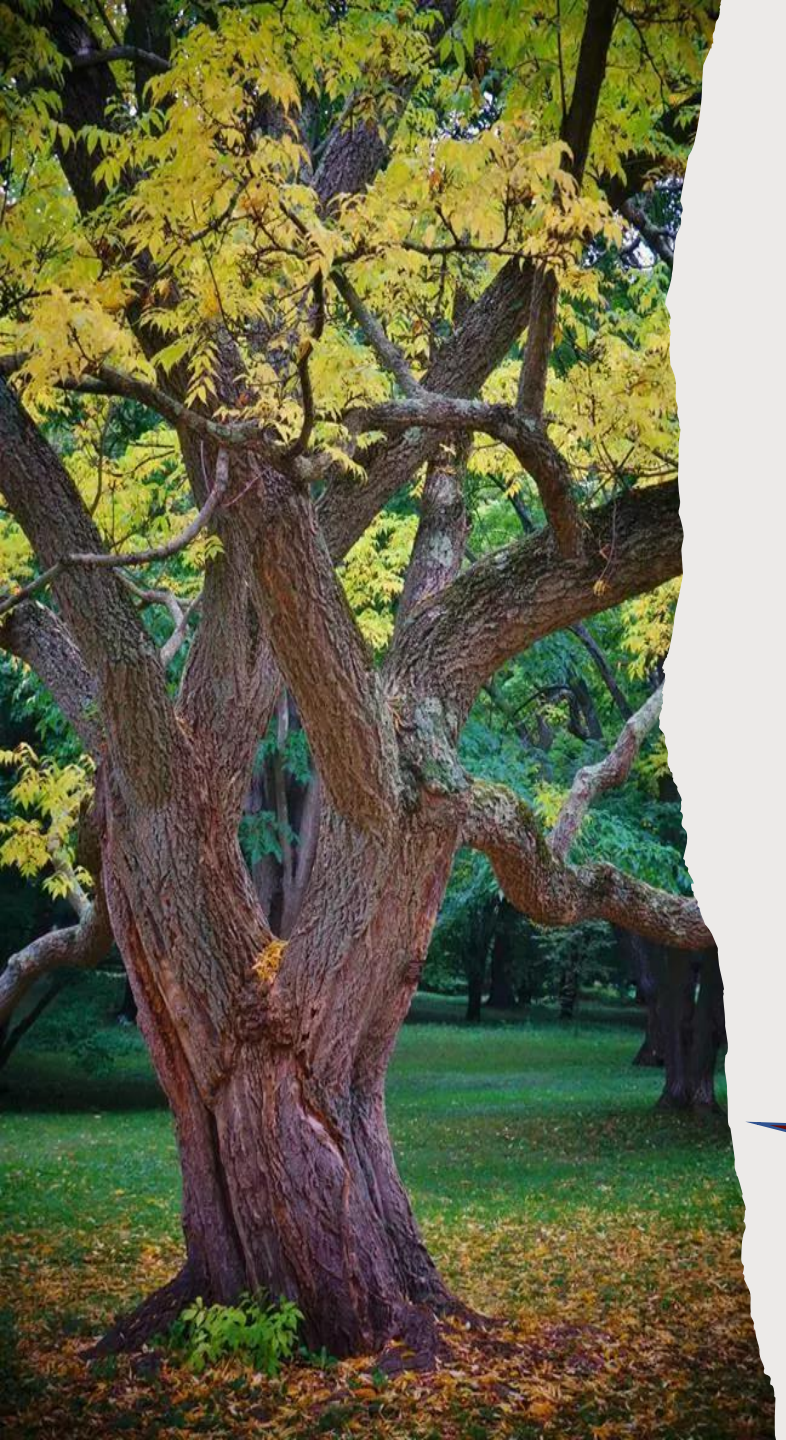
This plant appears to have little ecological value to fauna

www.illinoiswildflowers

Vinca minor
Photo: https://pixnio.com/



Keystone Plants by Ecoregion - National Wildlife Foundation https://www.nwf.org/Garden-for-Wildlife/About/Native-Plants/keystone-plants-by-ecoregion



A big difference

Amur cork

?

Perhaps swallowtails

Invasive tree

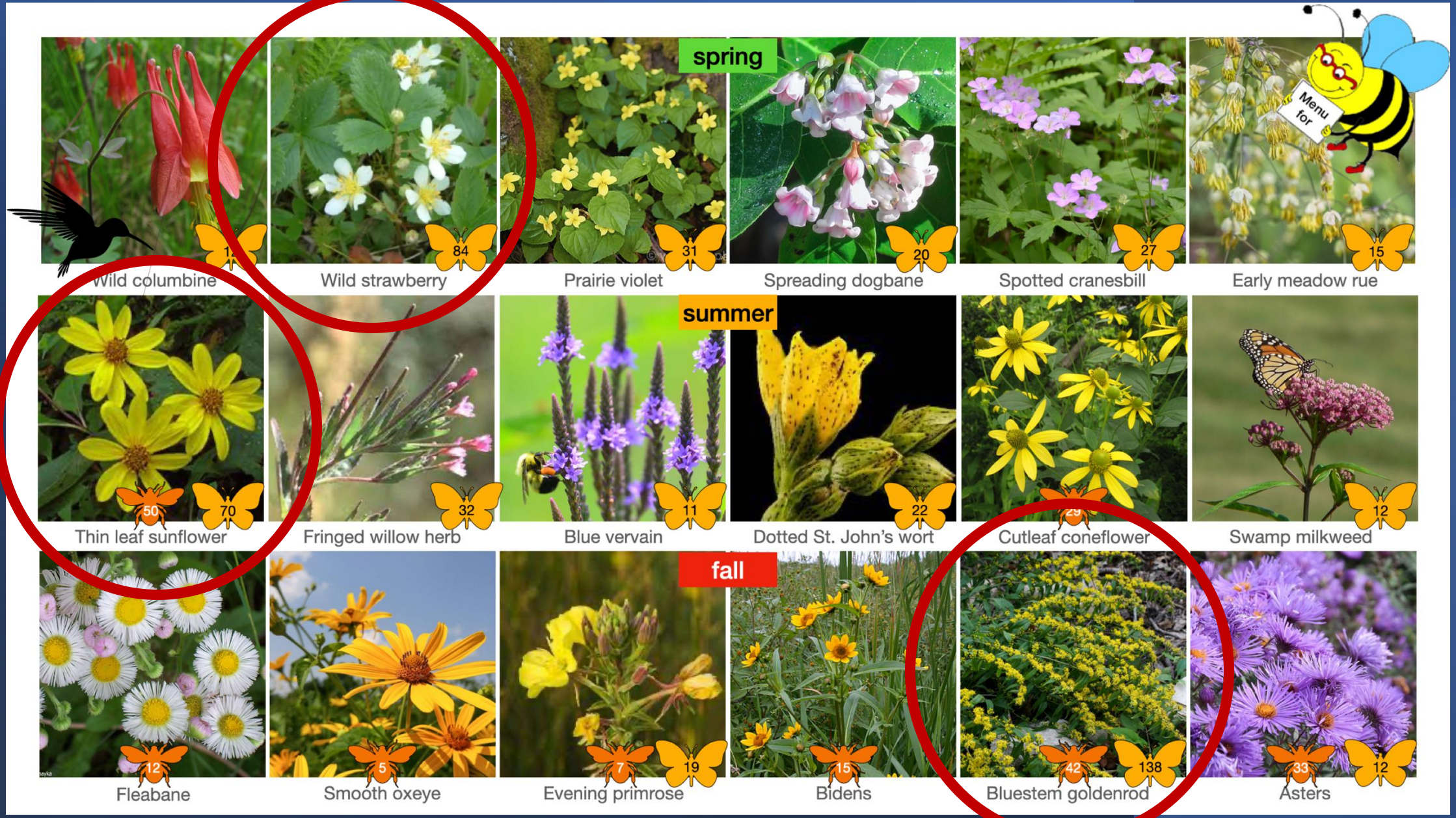
Red oak

436

Life support

Phellodendron amurense
Photo: Karl Gercens

Red Oak- *Quercus rubra*
Photo: Jackie Osmond-Patrick



National Wildlife Foundation Plant Finder https://www.nwf.org/nativeplantfinder/

Big or small your garden can provide the necessities of life

Connolly, "Urban milkweed gardens help monarch populations, study shows" 2024

Xerces Pollinator Garden Kit

Planter on a condominium roof had five large caterpillars Keller Science Action Center at the Chicago Field Museum

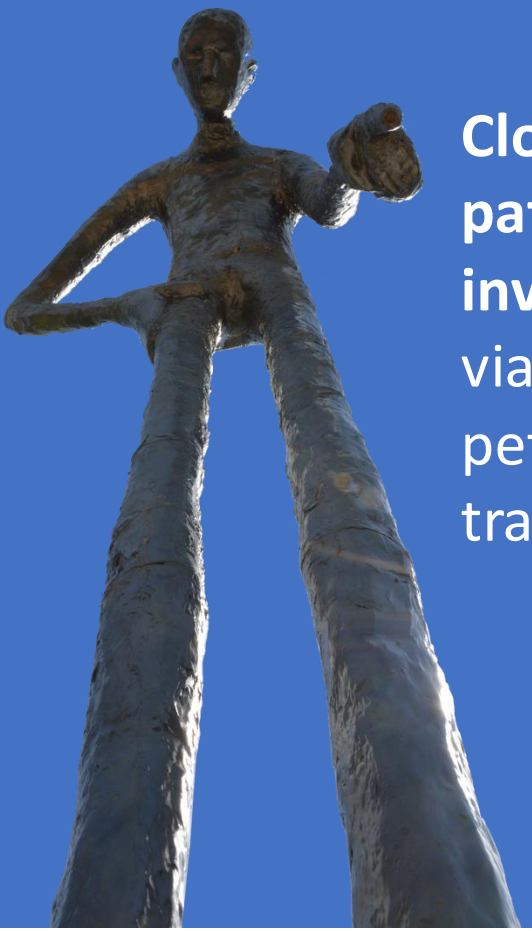
Encourage change where you live, work, and play

SAFEGUARD BIODIVERSITY

- Shrink lawns
- Increase native plants
  - Aim for 70% native species
  - **Focus on keystone plants**
  - Plant native trees
- Reject invasive plants
- Advocate for change – **Join CCIPR to stop the sales of invasive species**

Brooklyn Museum - Rebecca McMackin design

TURN OFF THE FAUCET



Close the primary pathway for invasive plants via the nursery & pet/aquarium trades

CIPR

Help us call for change!

Rather than spending countless dollars

MOPPING UP THE MESS


WHAT'S YOUR SUPERPOWER?
STOPPING THE SPREAD OF INVASIVE PLANTS!

Together we can make a difference

Lakeshore Eco-Network

Thank you!

Questions ?

CIPR