

RESOURCES FOR GARDENING FOR THE FUTURE

Prepared by Cathy Kavassalis – April 2024

Key lesions

- Shrink your lawn.
- Reduce the use of pesticides and fertilizers.
- Limit your use of exterior lighting (turn them off when you are not there to enjoy them).
- Add native plants to your garden.
 - Aim for 70% native plants.
 - Focus on **keystone plants**.
 - Plant native trees – these make the most difference because of their size. (biomass)
- Reject invasive plants. Join the Canadian Coalition for Invasive Plant Regulation (CCIPR.ca) and help us to stop the sale of invasive plants.

Keystone species:

For Moths and Butterflies

Examples of some trees and shrubs that support the greatest number of moth and butterfly species (Lepidoptera) across the Eastern Temperate region (first number) and Northern Forest region (second number) include:

- oak (*Quercus* 436-445)
- cherry (*Prunus* 340-409)
- willow (*Salix* 289-397)
- birch (*Betula* 284-337)
- aspen (*Populus* 249-285)
- maple (*Acer* 238-276)
- raspberries (*Rubus* 127-153),

A few perennials

- Goldenrods (*Solidago* 104-120)
- Rose (*Rosa* 102-119)
- Aster (*Symphyotrichum* 100-108)
- Strawberries (*Fragaria* 81-133)
- Visit National Wildlife Federation Keystone Plants by Ecoregion for full lists:
<https://www.nwf.org/Garden-for-Wildlife/About/Native-Plants/keystone-plants-by-ecoregion>

For Bees

Many native bees require particular species of plants or related groups of plants to reproduce. Some genera of plants support more specialist bees than others. These include:

- sunflower (*Helianthus* 50)
- goldenrod (*Solidago* 42-22)
- aster (*Symphyotrichum* 33-16)
- black eyed susan (*Rudbeckia* 29-17)
- beggartick (*Bidens* 15-7)
- willow (*Salix* 14-12)

- blueberry (*Vaccinium* 14-6)
- fleabane (*Erigeron* 12-5)

Local Species

Try to select species that actually occur in your region. For instance, for native keystone species in the Eastern Temperature Forest region of Ontario, you might select:

- **Raspberries** (*Rubus*): *Rubus allegheniensis*, *R. idaeus* ssp. *strigosus*, *R. occidentalis*, *R. odoratus*, *R. pubescens*, etc.
- **Goldenrods** (*Solidago*): *Solidago altissima*, *S. caesia*, *S. canadensis*, *S. flexicaulis*, *S. juncea*, *S. nemoralis*, *S. rugosa*, etc.
- **Rose** (*Rosa*): *Rosa blanda*, *R. carolina*, *R. palustris*, etc.
- **Aster** (*Symphyotrichum*): *S. cordifolium*, *S. ericoides*, *S. lanceolatum*, *S. lateriflorum*, *S. novae-angliae*, *S. pilosum*, *S. puniceum*, etc.
- **Strawberries** (*Fragaria*): *Fragaria vesca*, *F. virginiana*
- **Grape** (*Vitis*): *Vitis aestivalis*, *V. riparia*, etc.
- **Sunflowers** (*Helianthus*): *Helianthus divaricatus*

For Ontario trees and shrubs by Ecodistrict, visit the Forest Gene Conservation Network <https://fgca.net>

National Wildlife Federation Native Plant Finder provides lists of native keystone species by zipcode: <https://www.nwf.org/nativeplantfinder> (For instance, use a postal code for a city in Northern New York or Michigan to get options that may be similar to plants in Southern Ontario.).

Native plant resources for Ontario:

- **Forest Gene Conservation Association** <https://fgca.net>
- **Woody Plant Species for London, Ontario** Ecodistrict 7E-6 https://fgca.net/map_pdf/7E-6.pdf
- **Regional Conservation Authorities** have created lists of appropriate regional species. For example:
 - **Upper Thames River Conservation Authority Gardening with Native Plants** <https://thamesriver.on.ca/watershed-health/native-species/native-gardens/>
 - **Native Plants for the Grand River:** https://www.grandriver.ca/en/our-watershed/resources/Documents/RWQP_Factsheets_NativePlants.pdf
 - **Ausable Bay Native Plant Guide** https://www.abca.ca/assets/files/Native_Plant_Guide_2021_LR.pdf
- Oldham (2017). **List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E)**. https://www.researchgate.net/publication/317731067_List_of_the_Vascular_Plants_of_Ontario%27s_Carolinian_Zone_Ecoregion_7E
- Oldham & Brinker. (2009). **Rare Vascular Plants of Ontario**, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources https://www.researchgate.net/publication/265000596_Natural_Heritage_Resources_of_Ontario_Rare_Vascular_Plants

- **Regional Invasive Species and Climate Change (RISCC) Resources**
 - DO NOT SELL! **ORNAMENTAL PLANTS TO AVOID WITH CLIMATE CHANGE**
<https://doi.org/10.7275/avq3-ma30>
 - **ARE YOU SLEEPING? ARE YOU SLEEPING?**
https://scholarworks.umass.edu/eco_ed_materials/13/
 - **CLIMATE SMART GARDENING**
https://scholarworks.umass.edu/eco_ed_materials/8/
 - more <https://www.riscnetwork.org/management-challenges>

Native plant nurseries:

- Halton Master Gardeners **Native Plants Nurseries** in Southern Ontario – Updated April 2024 <https://haltonmastergardeners.com/2022/03/28/native-plants-nurseries-in-ontario/>
- Online plant retailers often have filters or pages that allow you to select appropriate plants for specific site conditions, like dry shade or wet clay.
 - While not a native nursery, NVK nurseries has a useful advanced search feature that can provide you lists of plants (including native species) for site specifications: <https://www.nvknurseries.com/Plant-Search>
 - **Ontario Native Plants** provides lists for site conditions:
https://onplants.ca/shop/?gad_source=1&gclid=Cj0KCQjw_qexBhCoARIsAFgBlesXZ-ApJnMxF5SGVXOKsqFknB1fiFrrf-I9fodpAsGMOT1zPerxJrQaAvgDEALw_wcB
 - **In Our Nature** plants for sandy soil and dry shade
<https://www.inournature.ca/ontario-native-plants-for-dry-shade>
 - **Not So Hollow Farm** Five Native Perennials For Dry Soil
<https://notsohollowfarm.ca/five-native-perennials-for-dry-soil/>
 - **There are many additions nurseries that offer similar solutions for difficult conditions.**

New Horticulture / Landscaping Design Ideas

- **Native Garden Designs - Wild Ones** <https://nativegardendesigns.wildones.org>
- **Gardenista: Ozawa, “Ask the Experts: 11 Favorite Native Plant Combinations” (April 4, 2024)** <https://www.gardenista.com/posts/ask-experts-best-native-plant-pairings/>
- **Rebecca McMackin Lectures** <https://www.rebeccamcmackin.com/online-lectures>
- **Rebecca McMackin Newsletter** <https://www.rebeccamcmackin.com>
- **New Ecological Horticulture** - Professor Brad Collett & Michael Ross U of Tennessee
<https://plantsciences.tennessee.edu/academics/sustainable-landscape-design/>
- **Thomas Rainer Grounded Design** <https://www.thomasrainer.com>
- **The New Perennialist – Tony Spencer** <https://www.thenewperennialist.com/new-perennialist-talks/>
- **OSU Department of Entomology Garden Series** <https://u.osu.edu/6plus/>

Resources for supporting insects, pollinators, beneficial bugs, and allies:

- Insects are the most important group of animals that transfer energy captured by plants to other animals. 96% of all terrestrial birds rear their young on insects. 90% of all insects that eat plants require native plants to complete their development (Tallamy, D. W. (2017). Creating Living Landscapes: **Why We Need to Increase Plant/Insect Linkages in Designed Landscapes**, Hort Technology, 27(4), 446-452. Retrieved Apr 20, 2023, from <https://doi.org/10.21273/HORTTECH03699-17>)
- Y. Kawahara, L. E. Reeves, J. R. Barber, S. H. Black. 2021. **Eight simple actions that individuals can take to save insects from global declines**. Proc. Natl. Acad. Sci. U.S.A., doi:10.1073/pnas.2002547117. <https://www.pnas.org/doi/10.1073/pnas.2002547117>
- **Healthier Holmes** "[How to create habitat for stem-nesting bees](#)"
- Project Earth - **Habitat Piles: Turning Garden Debris Into Shelter and Sculpture** <https://perfectearthproject.org/habitat-piles-turning-garden-debris-into-shelter-and-sculpture/>
- **Native Plants for Pollinators** <https://files.cvc.ca/cvc/uploads/2017/04/17-uo-nativeplantsforpollinators-booklet-v8-web.pdf>
- **Pollinator Plants** for the Great Lakes Region, The Xerces Society <https://xerces.org/publications/plant-lists/pollinator-plants-great-lakes-region>
- Plants for the **Rusty Patch Bumblebee**: <https://wildlifepreservation.ca/a-flower-patch-for-the-rusty-patched/>
- Bee and pollinator books and resources BY **HEATHER HOLM** <https://www.pollinatorsnativeplants.com/plant-lists--posters.html>
- Fiedler, A. Tuell, J. Isaacs, R. Landis, D. 2007. **Attracting Beneficial Insects** with Native Flowering Plants. Extension Bulletin E-2973. Department of Entomology, Michigan State University <https://ncipmhort.cfans.umn.edu/sites/ncipmhort.cfans.umn.edu/files/2020-05/Attracting%20beneficial%20insects%20with%20flowers.pdf>
- Xerces Society: Hopwood, J., Lee-Mader, E., Morandin, L. Vaughan, M. Kremen, C., Cruz, J. Eckberg, J. Jordan, S. Gill, K. Heidel-Baker, T. Morris, S. 2016. **Habitat Planning** for Beneficial Insects. Xerces Society for Invertebrate Conservation. http://www.xerces.org/sites/default/files/2018-05/16-020_01_XercesSoc_Habitat-Planning-for-Beneficial-Insects_web.pdf
- **Jessica Walliser** - **Attracting Beneficial Bugs to Your Garden: A Natural Approach to Pest Control** Paperback – <https://www.jessicawalliser.com/books/attracting-beneficial-bugs-garden-natural-approach-pest-control/>

Rain Gardens & Container Gardens

- Toronto Conservation Authority: A complete guide to building and maintaining a rain garden <https://trca.ca/news/complete-guide-building-maintaining-rain-garden/>
- New York Botanical Gardens "How can I plant a small container with plants for pollinators?" <https://libanswers.nybg.org/faq/277949>
- Illinois Extension "https://extension.illinois.edu/news-releases/large-yard-not-required-support-pollinators" <https://extension.illinois.edu/news-releases/large-yard-not-required-support-pollinators>

- Marin MGs - Edibles in containers
<https://marinmg.ucanr.edu/EDIBLES/ContainerEdibles/>
- NC State Growing edibles in Containers https://bpb-us-e1.wpmucdn.com/sites.psu.edu/dist/0/119681/files/2021/09/NLI-Growing-Edibles-in-Containers_8-24-20-.pdf

Resources for supporting birds:

- Gardening for Birds <https://birdgardens.ca>
- General advice for and **native plants to support birds:**
https://files.cvc.ca/cvc/uploads/2021/07/BirdGardens_2009.pdf
- Plant List: **Native Plants for Breeding Birds** (they have one for migratory birds as well)
<https://files.cvc.ca/cvc/uploads/2015/05/21310-breeding-birds.pdf>

Invasive species information:

- **IPBES (2023). Report on Invasive Alien Species** <https://www.ipbes.net/ias>
- **The Canadian Coalition for Invasive Plant Regulation (CCIPR)** <https://ccipr.ca>
- Ontario Office of the Auditor General, "Value-for-Money Audit: **Management of Invasive Species**," 2022:
https://www.auditor.on.ca/en/content/annualreports/arreports/en22/ENV_ProvMgmtInvasiveSpecies_en22.pdf

Ontario Auditor General: DO NOT PLANT OR SELL LIST			
Amur maple	English ivy	Lily of the valley	Periwinkle
Autumn & Russian olive	Garlic mustard	Miscanthus	Sea buckthorn
Burning bush	Glossy buckthorn	Multiflora rose	Spearmint
Common buckthorn	Goutweed	Norway maple	Tree-of-heave
Creeping jenny	Italian honeysuckle	Oriental bittersweet	White mulberry
Dame's rocket	Japanese barberry	Ornamental honeysuckle	Wintercreeper
Daylily	Japanese honeysuckle	Pachysandra	Yellow archangel

Some highly invasive plants regulated in provinces, border states, (and other states)

Common name	Scientific name	Jurisdictions regulated
Tree of heaven	<i>Ailanthus altissima</i>	AB ME MI NH, OH, PA VT WA WI – Recently Prohibited in Ontario
Japanese barberry	<i>Berberis thunbergii</i>	CAN (PPA)* ME NH NY VT NY PA WI (DE IN MN)
Asiatic bittersweet	<i>Celastrus orbiculatus</i>	ME MN NH NY OH PA VT WI (DE CT IL MA)

Scotch broom	<i>Cytisus scoparius</i>	BC ID OH MT PA WA WI (MD)
Russian olive	<i>Elaeagnus angustifolia</i>	OH MT WA WI (IL)
Autumn olive	<i>Elaeagnus umbellata</i>	AB ME MI NH NY OH WI (CT DE MA)
Winged euonymus	<i>Euonymus alatus</i>	ME NH NY VT WI (DE MD MA)
Japanese honeysuckle	<i>Lonicera japonica</i>	ME MN NH NY OH VT WI (DE CT IL)
Amur or bush	<i>L. maackii</i>	
Morrow's	<i>L. morrowii</i>	
Tatarian	<i>L. tatarica</i>	
Multiflora rose	<i>Rosa multiflora</i>	ME NH, NY OH PA WI (IL MA)

More lists and info on **invasive plants**

- Canadian Council on Invasive Species [CANADA'S UNWANTED INVASIVE PLANTS](#)
- Ontario Invasive Plant Council [Grow Me Instead](#); [Ontario Invasive Species Awareness](#)
- Credit Valley Conservation [Invasive Plant List 2021](#)
- Upper Thames Conservation [Non-native plants](#)
- Ontario South Central Conservation Authorities [Invasive plants](#) (XLSX spreadsheet - collated from various websites)
- 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](#) (Swearingen, J., B. Slattery, K. Reshetiloff, and S. Zwicker. 2010. Plant Invaders of Mid-Atlantic Natural Areas, 4th ed. National Park Service and U.S. Fish and Wildlife Service. Washington, DC. 168pp.)
- Public Gardens as Sentinels of [Invasive Plants Dashboard](#)
- Culley, et al., "The potential role of public gardens as sentinels of plant invasion." ([2022](#)). [XLXS spreadsheet](#) of plants of concern (will download if clicked):
- Regional Invasive Species & Climate Change ([RISCC](#)) Management Networks
- For removing invasive plants read the Ontario Invasive Plant Council **Best Management Practices guides** <https://www.ontarioinvasiveplants.ca/resources/best-management-practices/>

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State of the environment reports and lectures:

- IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, Jet al., (eds.). IPBES secretariat, Bonn, Germany. <https://www.ipbes.net/global-assessment>

- Canadian Endangered Species Conservation Council. (2022). “Wild Species 2020: The General Status of Species in Canada.” https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/reports/Wild%20Species%202020.pdf
- Species at Risk in Ontario <https://www.ontario.ca/page/species-risk-ontario>
- UN Report May 2019: “Nature’s Dangerous Decline ‘Unprecedented’; Species Extinction Rates ‘Accelerating’”
<https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/>
- The World Wildlife Fund’s [Living Planet Report 2020](https://www.wwf.ca/living-planet-report-2020/), published Friday, Sept 9, 2020

Learn more about climate change:

- NASA'S Earth Minute: “**Earth Has a Fever**” - video
<https://www.jpl.nasa.gov/edu/learn/video/nasas-earth-minute-earth-has-a-fever/>
- Dr. Katharine Hayhoe: “Pandora’s Box: **Climate Change as a Threat Multiplier.**” - video
<https://www.climateone.org/video/katharine-hayhoe-climate-change-threat-multiplier>
- Song, Haijun et al. (2021). **Thresholds of temperature change for mass extinctions.** *Nature Communications*. 12. <https://www.nature.com/articles/s41467-021-25019-2>

Reference Communities as the Basis for Garden Design:

To survive, plants must acquire the necessities of life: mineral nutrients, water, carbon dioxide, and light. Their ability to do this is influenced by environmental conditions like temperature, moisture, soil pH, structure, and chemistry. At the same time, they must interact with other plants, and deal with predation by herbivores, as well as threats from pathogens and parasites. Moreover, abiotic stressors such as drought, fire, flooding, soil compaction, and salinity further complicate a plant's ability to thrive in a given location. This intricate web of influences makes it a challenge to explain observed plant association patterns and to recommend particular groupings of plants that make the best companions. (A good read R., Bretman, A. & Bennett, T. (2021) pdf) Friends, neighbours and enemies: an overview of the communal and social biology of plants. *Plant, Cell and Environment*, 44 (4). pp. 997-1013).

German horticulturists Hansen & Stahl (1993) grouped plants into categories based on their perceived sociability characteristics and these principles used by landscape designers like Rainer & West “Planting in a Post-Wild World: Designing Plant Communities for Resilient Landscapes” (2015). A good basic description of this was published in the NYT “Understanding What Makes Plants Happy ,” (Roach, 2017). Contact me if you want more reading.

I recommend looking at natural landscapes to see how plants associate in your region. According to the Canadian National Vegetation Classification (CNVC) system, there are regionally distinct subsets of plant species (termed “macrogroups”) within biogeographical ecoregions. For instance, the following trees, shrubs, and herbs are characteristic of the

Temperate Forests macrogroup CM742 associated with ecoregions 6E & 7E). This would be an example of typically co-occurring plant species.

Trees	Shrubs	Herb/ Dwarf Shrub
eastern flowering dogwood	hawthorns	may-apple
white oak	riverbank grape	blue-stemmed goldenrod
blue-beech	American witch-hazel	carrionflowers
hickories	poison iv	calico aster
black cherry	Virginia creeper	white trillium
northern red oak	running strawberry bush	spotted geranium
white ash	eastern prickly gooseberry	Canada avens
red maple	alternate-leaved dogwood	broad-leaved enchanter's nightshade
sugar maple	striped maple	Jack-in-the-pulpit
American beech	Canada fly-honeysuckle	large false Solomon's seal
basswood	beaked hazelnut	wild lily-of-the-valley
eastern hop-hornbeam		hairy Solomon's seal
balsam fir		wild sarsaparilla
yellow birch		red trillium
eastern hemlock		yellow clintonia
		heart-leaved foamflower
		dwarf raspberry
		whorled wood aster
<p>From Canadian Forest Service. (2019). Canadian National Vegetation Classification (CNVC): Eastern Canadian Temperate Deciduous Forest Macrogroup CM742; Baldwin et al., (2019) The Canadian National Vegetation Classification: Principles, Methods and Status. Canadian Forest Service Information Report</p>		

More questions?

- **Ask a Master Gardener** – MGOI.ca
- <https://www.facebook.com/groups/MasterGardenersofOntario/>