

DROUGHT TOLERANT LANDSCAPING

A Resource for Development

January 2012





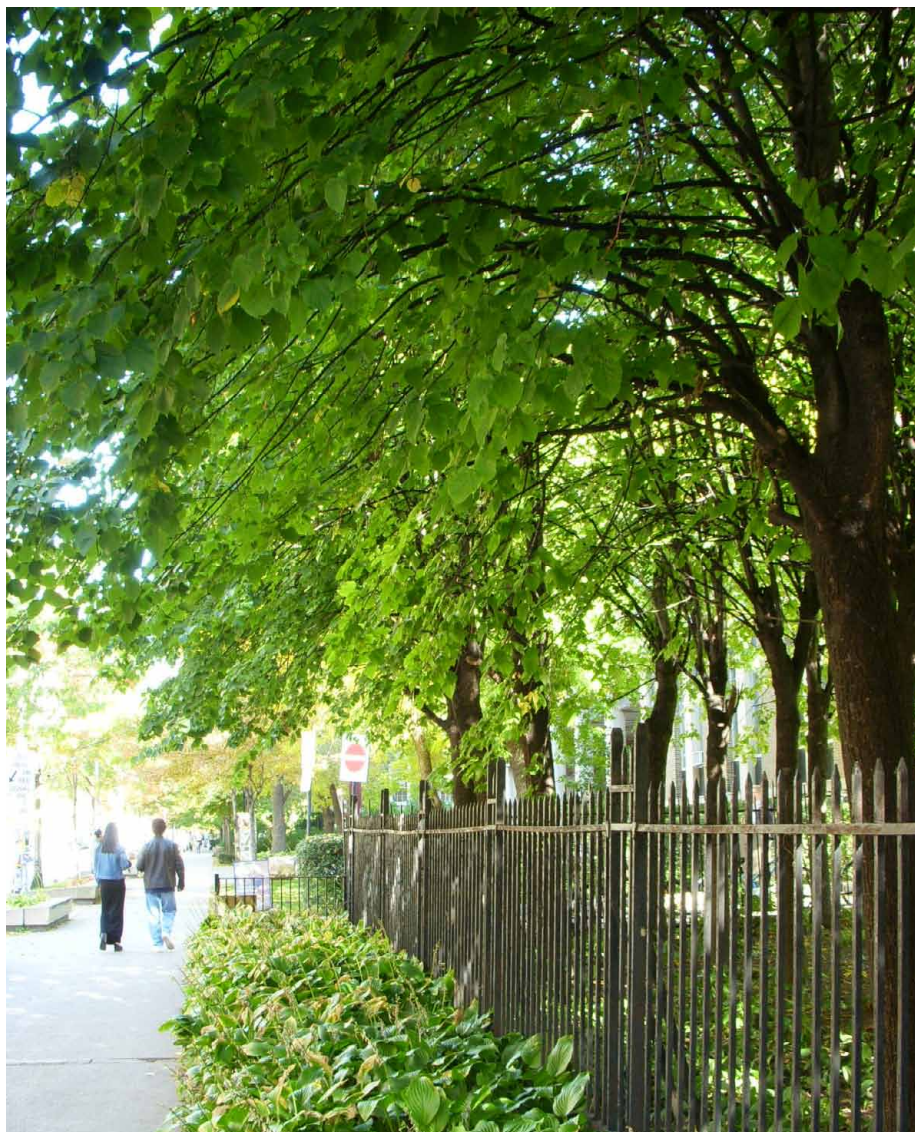
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1 Introduction Drought Tolerant Landscaping



The new Toronto Green Standard Tier 1 requires a minimum of 50 percent water efficient landscape species and 50 percent native species to be used in landscaping for all development within the City of Toronto. The selection of drought tolerant and native plant material in development is important as drought tolerant plants reduce the demand for potable water in landscaping, requiring less maintenance and bringing ecological diversity and seasonal interest to the landscape. This resource has been created by city staff to assist city staff and professionals working in the development industry in finding drought tolerant planting material to meet the T.G.S. requirements.

Southern Ontario encompasses a great richness of ecological diversity which includes a large variety of native drought tolerant species and landscape types. Encouraging development projects to include native drought tolerant species within the landscape design increases species biodiversity, helping enhance the unique, yet fragmented natural heritage systems (such as the Oak Savanna, Carolinian Forest, Tall Grass Meadow) within the City of Toronto. Species native to Southern Ontario have adapted to the local environmental conditions over thousands of years and thus are best suited to the local soil and climate conditions. Because of this adaptation, local native species are more adaptive to local drought and disease, requiring less watering, maintenance and replacement in the long term. Planting native species also brings seasonal diversity in color and interest to a landscape and provides the appropriate species for food and shelter to many local insects, birds and animals, creating animation in the landscape and supporting local wildlife populations.

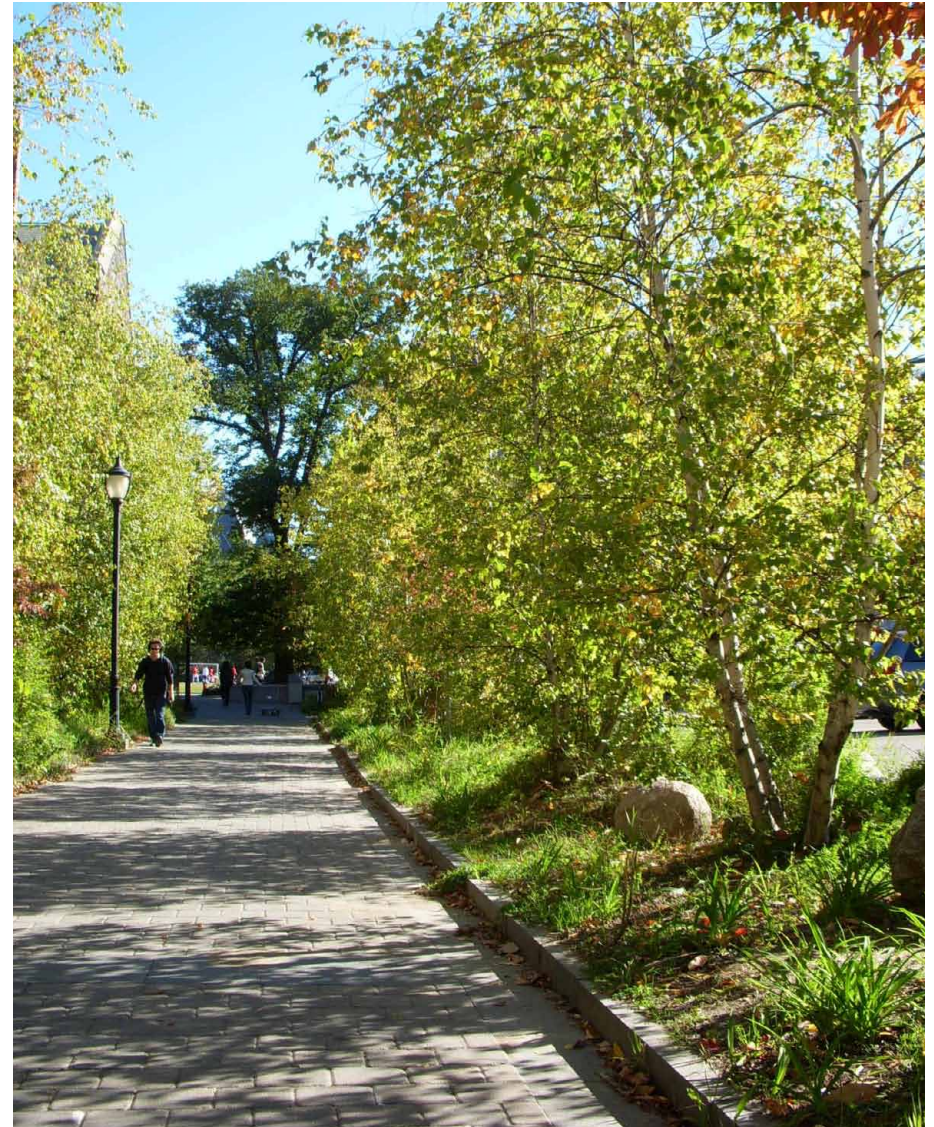
The key to reaping the benefits of drought tolerant native species is two fold: assessing the appropriate landscape planting material for the conditions of the site and the initial establishment of the plants within the site during the first year. Drought tolerant plant material must have soil, sun and moisture requirements that closely match the conditions of the site. Once planted, the landscape plantings require deep and thorough watering on a consistent basis within the first year to establish the plant's root systems. Drought tolerant and native plantings can only be drought tolerant after the planting's root systems have established.

2 **Introduction** Drought Tolerant Landscaping

One of the challenges of planting, especially native species, on development sites is the condition of the soil on site. At many development sites the original soils have been disturbed or in many cases stripped of their organic layers, filled with construction debris (altering the pH of the soil) and compacted by heavy machinery. These conditions make it very difficult for plant roots to grow and establish without access to air and water pockets that would be normally present in a healthy soil environment. In addition, many landscape development sites are situated above underground concrete parking slabs where disturbed, off site soil is introduced in minimal amounts and requires constant irrigation and maintenance to maintain a supportive environment for plant growth.

Many species native to Southern Ontario have adapted to specific soil pH and composition conditions which may not be available on development sites and as such, should not be selected for planting on development sites with highly disturbed soil conditions. Selection of native or non native plant material needs to be balanced between picking appropriate plants which will grow in the existing soil conditions and providing native plant diversity to the site. When designing planting beds with drought tolerant and native plant material, both formal and informal planting layouts should be considered. In the context of an urban environment a formal, geometric planting is as appropriate and can provide as diverse a species selection as an informal 'naturalized' planting.

The following two pages list commonly planted native and non-native landscape species which are tolerant to drought and nutrient poor soils on moderately disturbed sites. The species planting lists are followed by a planting list of local native and cultural drought tolerant landscape types. These planting lists should be used as a non exhaustive list, as a catalogue rather than a cookbook for selecting drought tolerant planting.



3 Commonly Planted Drought Tolerant Landscaping Species

NOTATIONS

(i) **invasive species**, not to be planted near natural ravine areas.
 (cs) **commonly substituted species**, carefully select appropriate species
 (h) **hybrid species**, genetic hybrid of native and non native species
 (nc) **native canadian species**, native to Canada, not to Southwestern Ontario
 (*) Black Walnut juglone toxicity, plant walnut associated species in understorey

TREES

Deciduous Trees

Native Trees

Honey Locust
Gleditsia triacanthos
 Black Locust (i)
Robinia pseudoacacia
 Red Oak
Quercus rubra
 Pin Oak
Quercus palustris
 Bur Oak
Quercus macrocarpa
 Swamp White Oak
Quercus bicolor
 Chinkapin Oak
Quercus muehlenbergii
 Kentucky Coffee Tree
Gymnocladus dioica
 Black Walnut (*)
Juglans nigra
 Ohio Buckeye (cs)
Aesculus glabra
 Tulip Tree
Liriodendron tulipifera
 Ironwood
Ostrya virginiana
 Hackberry
Celtis occidentalis
 Accolade Elm (h)
Ulmus 'Accolade'
 Redmond Linden (h)
Tilia americana 'Redmond'

Red Maple
Acer rubrum
 Freeman Maple (h)
Acer freemanii
 Silver Maple
Acer saccharinum
 Black Maple
Acer nigrum
 Northern Catalpa
Catalpa speciosa
 Mountain Ash (cs)
Sorbus americana
 Red Bud
Cercis canadensis

Non Native Trees

Ginkgo
Ginkgo biloba
 English Oak
Quercus robur
 London Plane Tree (h)
Platanus x acerifolia
 European Mountain Ash (i)
Sorbus aucuparia
 Common Horsechestnut (i)
Aesculus hippocastanum
 Little Leaf / Greenspire Linden
Tilia cordata
 European Hornbeam
Carpinus betulus
 Callery Pear Chanticleer
Pyrus calleryana 'Chanticleer'
 Amur Cork Tree
Phellodendron amurense

Turkish Hazel
Corylus colurna
 Norway Maple (i)
Acer platanoides
 Zelkova
Zelkova serrata
 Amur Maple (i)
Acer ginnala
 Japanese Lilac (i)
Syringa reticulata

Evergreen Trees

Native Trees

White Pine
Pinus strobus
 White Spruce
Picea glauca
 Colorado Blue Spruce (nc)
Picea pungens
 Eastern White Cedar
Thuja occidentalis

Non Native Trees

Austrian Pine
Pinus nigra
 Scots Pine (i)
Pinus sylvestris
 Norway Spruce
Picea abies
 Serbian Spruce
Picea omorika
 Siberian Larch
Larix sibirica

SHRUBS

Shrubs

Native Shrubs

Staghorn Sumac
Rhus typhina
 Fragrant Sumac
Rhus aromatica
 Bush Honeysuckle (cs)
Diervilla lonicera
 Smooth Wild Rose (cs)
Rosa blanda
 Pasture Rose (cs)
Rosa carolina
 (cs for *Rosa virginiana*)
 Saskatoonberry
Amelanchier alnifolia
 Serviceberry
Amelanchier laevis
 Nannyberry
Viburnum lentago
 Ninebark (s)
Physocarpus opulifolius
 New Jersey Tea
Ceanothus americanus
 Grey Dogwood
Cornus racemosa
 Red Osier Dogwood
Cornus stolonifera
 Chokecherry
Prunus virginiana
 Witchhazel
Hamamelis virginiana
 Shubby Cinqufoil
Potentilla fruticosa

Meadowsweet Spirea (cs)
Spiraea latifolia
 Snowberry (cs)
Symphoricarpos albus
 var *albus*
 Silver Buffaloberry (nc)
Shepherdia argentea
 Soapberry
Shepherdia canadensis
 Oregon Grape (nc)
Mahonia Aquifolium
 Cockspur Hawthorn
Crataegus crus-galli
 Downy Hawthorn
Crataegus mollis
 Purple Flowering Raspberry
Rubus odoratus

Non Native Shrubs

Spirea Varieties
Spiraea japonica
 (anthony waterer)
Spiraea bumalda
 (goldflame)
 Euonymous Varieties (i)
Euonymus fortunei
 (sarcoxie)
Euonymus elatus
 (burning bush)
 Common Boxwood
Buxus sempervirens
 Barberry Varieties (i)
Berberis thunbergii
 (japanese barberry)

Berberis Vulgaris
 (common barberry)
 Forsythia (i)
Forsythia intermedia
 Alpine Current
Ribes alpinum
 Purple Leaf Sand Cherry
Prunus cistena
 Salt Spray/Japanese Rose (i)
Rosa rugosa
 Common Lilac (i)
Syringa vulgaris
 Mock Orange (i)
Philadelphus lewisii
 American Beautyberry
Callicarpa americana
 Honeysuckle Varieties (i)
Lonicera japonica (japanese)
Lonicera tatarica (tartarian)

Evergreen Shrubs

Native Shrubs

Common Juniper
Juniperus communis
 Creeping Juniper (c)
Juniperus horizontalis

Non Native Shrubs

Mugo Pine
Pinus mugo
 Savin Juniper
Juniperus sabina

4 Commonly Planted Drought Tolerant Landscaping Species

NOTATIONS

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PERENNIAL FLOWERS	GRASS	GROUND COVERS	VINES
<p>Perennial Flowers</p> <p>Native Flowers Wild Bergamot/ Bee Balm <i>Monarda fistulosa</i> Grey Headed Coneflower <i>Ratibida pinnata</i> Narrow Leaf Coneflower <i>Echinacea angustifolia</i> Pale-Leaved Sunflower <i>Helianthus stumosus</i> Ox Eye Sunflower <i>Heliopsis helianthoides</i> Showy Sunflower (h) <i>Helianthus laetiflorus</i> Woodland Sunflower <i>Helianthus divaricatus</i> Sky Blue Aster <i>Aster oolentangiensis</i> New England Aster <i>Aster novae-angliae</i> Smooth Aster <i>Aster laevis</i> Bogleaf Aster <i>Aster macrophyllus</i> Black Eyed Susans <i>Rudbeckia hirta</i> Coreopsis/Tickseed <i>Coreopsis lanceolata</i> Cylindrical Blazing Star <i>Liatris cylindracea</i> Dense Blazing Star <i>Liatris spicata</i></p> <p>Hoary Vervain <i>Verbena stricta</i> Showy Tick -Trefoil <i>Desmodium canadense</i> Spotted Joe-Pye Weed <i>Eupatorium maculatum</i> Boneset <i>Eupatorium perfoliatum</i> Ironweed <i>Vernonia gigantea</i> Cup Plant <i>Silphium perfoliatum</i> Butterfly Milkweed <i>Asclepias tuberosa</i> Common Milkweed <i>Asclepias syriaca</i> Wild Columbine <i>Aquilegia canadensis</i> Blanket Flower <i>Gaillardia aristata</i> Foxglove var Huskar's Red <i>Penstemon digitalis</i> Lavander Hyssop <i>Agastache foeniculum</i> Harebell <i>Campanula rotundifolia</i> Western Pearly Everlasting <i>Anaphalis margaritacea</i> Stiff Leaved Goldenrod <i>Solidago rigida</i> False Indigo <i>Baptisia australis</i></p> <p>Non Native Flowers Purple Coneflower/Echinacea <i>Echinacea purpurea</i> Butterflybush <i>Buddleia davidii</i> Autumn Joy Sedum <i>Sedum spectabile</i> Daylillies (i) <i>Hemerocallis species</i> Common Daisy <i>Chrysanthemum leucanthemum</i> Shasta Daisy <i>Leucanthemum superbum</i> Marguerite Daisy <i>Argyranthemum frutescens</i> Red Valerian <i>Centranthus ruber</i> Common Yarrow <i>Achillea millefolium</i> Common Sage <i>Salvia officinalis</i> Russian Sage <i>Perovskia atriplicifolia</i> Sea Holly <i>Eryngium maritimum</i> Speedwell <i>Veronica longifolia</i> Perennial Cornflower <i>Centaurea montana</i> Dianthus <i>Dianthus barbatus</i> Lavender <i>Lavandula officinalis</i></p>	<p>Perennial Grass</p> <p>Native Grasses Indian Grass <i>Sorghastrum nutan</i> Switch Grass <i>Panicum virgatum</i> Big Bluestem <i>Andropogon gerardii</i> Little Bluestem <i>Schizachyrium scoparium</i> Hairy Panic Grass <i>Panicum acuminatum</i> Northern Dropseed <i>Sporobolus heterolepis</i> Tufted Hairgrass <i>Deschampsia caespitosa</i> Common Wood Sedge <i>Carex blanda</i></p> <p>Non Native Grasses Feather Reed Grass <i>Calamagrostis acutiflora</i> Fountain Grass <i>Pennisetum setaceum</i> Porcupine/Zebra Grass (i) <i>Miscanthus sinensis</i> Ribbon Grass (i) <i>Phalaris arundinacea</i> Blue Fescue <i>Festuca glauca</i></p>	<p>Ground Covers</p> <p>Native Groundcovers Creeping Juniper <i>Juniperus horizontalis</i> Bearberry (cs) <i>Arctostaphylos uva-ursi</i></p> <p>Non Native Groundcovers Periwinkle (i) <i>Vinca minor</i> Euonymous (i) <i>Euonymous fortunei</i> Cottageaster (i) <i>Cotoneaster damerrii</i> Japanese Spurge (i) <i>Pachysandra terminalis</i> Lamb Ears <i>Stachys byzantina</i> Perrenial Alyssum <i>Aurinia saxatilis</i> Creeping Thyme <i>Thymus serpyllum</i> Ice Plant <i>Delosperma species</i> Stonecrop <i>Sedum species:</i> <i>Sedum album</i> <i>Sedum rupestre</i> Hens and Chicks <i>Sempervivum tectorum</i></p>	<p>Vines</p> <p>Native Vines Virginia Creeper <i>Parthenocissus vitacea</i> Wild Grape <i>Vitis riparia</i></p> <p>Non Native Vines Boston Ivy <i>Parthenocissus tricuspidata</i> Trumpet Vine <i>Campsis radicans</i></p> <hr/> <p>TURF GRASS</p> <p>Drought tolerant lawn mixtures: Creeping Red Fescue <i>Festuca rubra</i> Hard Fescue <i>Festuca duriuscula</i> Chewings Fescue <i>Festuca rubra commutata</i> Perennials Rye <i>Lolium perenne</i> Pennsylvanian Sedge <i>Carix pensylvanica (r)</i></p>

5 Native Southern Ontario Drought Tolerant Landscapes

Carolinian Forest Landscape

The Carolinian Forest is a life zone that extends along the eastern board of North America between the Carolinas and Southwestern Ontario, the northerly limit extending to the Toronto area. It is characterized by a predominance of deciduous, broad leaf trees and is rich in biodiversity; 40 percent of Ontario's rare plants are found exclusively in the Carolinian forest. Many Carolinian species prefer well-drained, sandy, often acidic soils which in turn makes many Carolinian species suitable to drought tolerant landscapes given appropriate soil conditions. Drought tolerant Carolinian species include:



Deciduous Trees

Red Oak	Shagbark Hickory (r)
<i>Quercus rubra</i>	<i>Carya ovata</i>
Black Oak (r)	Kentucky Coffee Tree
<i>Quercus velutina</i>	<i>Gymnocladus dioicus</i>
Pin Oak	American Chestnut (r)
<i>Quercus palustris</i>	<i>Castanea dentata</i>
Bur Oak	Northern Catalpa
<i>Quercus macrocarpa</i>	<i>Catalpa speciosa</i>
Chinkapin Oak	Sycamore (r)
<i>Quercus muehlenbergii</i>	<i>Platanus occidentalis</i>
Black Walnut (*)	Tulip Tree
<i>Juglans nigra</i>	<i>Liriodendron tulipifera</i>

Red Bud
<i>Cersis canadensis</i>
Sassafras (r)
<i>Sassafras albidum</i>
Black Gum (r)
<i>Nyssa sylvatica</i>
Cucumber Tree (r)
<i>Magnolia acuminata</i>
Red Mulberry (r,cs)
<i>Morus rubra</i>
(cs for <i>Morus alba</i>)
Flowering Dogwood
<i>Cornus florida</i>

Shrubs

Witch Hazel
<i>Hamamelis virginiana</i>
Nannyberry
<i>Viburnum lentago</i>
Choke Cherry
<i>Prunus virginiana</i>
Canada Plum (r)
<i>Prunus nigra</i>
Staghorn Sumac
<i>Rhus typhina</i>
Grey Dogwood
<i>Cornus racemosa</i>
Pasture Rose
<i>Rosa carolina</i>

Perennial Flowers

Showy Tick-Trefoil
<i>Desmodium canadense</i>
Butterfly Milkweed
<i>Asclepias tuberosa</i>
Wild Bergamot
<i>Monarda fistulosa</i>
Ironweed
<i>Vernonia gigantea</i>
Cup Plant
<i>Silphium perfoliatum</i>
Lance Leaf Coreopsis
<i>Coreopsis lanceolata</i>

(r) rare species, difficult to obtain from nurseries, sensitive to environmental conditions

6 Native Southern Ontario Drought Tolerant Landscapes

Oak Savanna Landscape

A Savanna is a term applied to natural grassland areas with scattered open-grown trees. Ontario contains native Oak Savannas within the Carolinian Forest of Southwestern Ontario, primarily along the sandy bluffs of the Old Lake Iroquois shoreline such as High Park in Toronto. Savannas and prairies develop on sites which are subject to environmental stresses, typically fire, drought, spring flooding, and warmer than usual local climates. Savanna sites in the Carolinian region are found mostly on very sandy soils which makes many savanna species suitable for drought tolerant landscaping. Oak Savanna species planted in development landscapes will require appropriate soil conditions, those conditions found naturally within Toronto occur along the Old Lake Iroquois shoreline, south of St. Clair Ave. Drought tolerant Savanna species include:



Deciduous Trees

Red Oak <i>Quercus rubra</i>	Shagbark Hickory (r) <i>Carya ovata</i>
Black Oak (r) <i>Quercus velutina</i>	Bitternut Hickory (r) <i>Carya cordiformis</i>
Pin Oak <i>Quercus palustris</i>	Pignut Hickory (r) <i>Carya glabra</i>
Bur Oak <i>Quercus macrocarpa</i>	White Pine <i>Pinus strobus</i>
Black Cherry <i>Prunus serotina</i>	Red Pine (r) <i>Pinus resinosa</i>
Pin Cherry <i>Prunus pensylvanica</i>	Eastern Red Cedar <i>Juniperus virginiana</i>

Shrubs

Smooth Wild Rose <i>Rosa blanda</i>	Bush Honeysuckle <i>Diervilla lonicera</i>
Serviceberry <i>Amelanchier laevis</i>	Snowberry (cs) <i>Symphoricarpos albus</i>
Grey Dogwood <i>Cornus racemosa</i>	Ninebark <i>Physocarpus opulifolius</i>
Chokecherry <i>Prunus virginiana</i>	Nannyberry <i>Viburnum lentago</i>
New Jersey Tea (r) <i>Ceanothus americanus</i>	
Staghorn Sumac <i>Rhus typhina</i>	

Perennial Flowers

Wild Bergamot <i>Monarda fistulosa</i>
Black Eyed Susans <i>Rudbeckia hirta</i>
Butterfly Milkweed <i>Asclepias tuberosa</i>
Showy Tick-Trefoil <i>Desmodium canadense</i>
Woodland Sunflower <i>Helianthus divaricatus</i>
Wild Lupine (s) <i>Monarda fistulosa</i>

Grasses

Little Bluestem <i>Schizachyrium scoparium</i>
Big Bluestem <i>Andropogon gerardii</i>
Indian Grass <i>Sorghastrum nutans</i>
Switch Grass <i>Panicum virgatum</i>

(r) rare species, difficult to obtain from nurseries, sensitive to environmental condi-

7 Native Southern Ontario Drought Tolerant Landscapes

Tall Grass Prairie and Meadow Landscape

Tall Grass Prairie is a natural community within the Carolinian life zone of Southern Ontario which is dominated by grasses and wildflowers. It is typically found on drier, nutrient-poor soil and depends on fire to flourish. Meadow landscapes in contrast, depend on cycles of flooding and drought to maintain an open, treeless habitat. Due to their natural habitat both Tall Grass Prairie and Meadow species are excellent drought tolerant landscaping candidates requiring medium to full sun exposure. Drought tolerant prairie and meadow species include:



Shrubs	Perennial Flowers	Grasses
Grey Dogwood <i>Cornus racemosa</i>	Wild Bergamot <i>Monarda fistulosa</i>	Little Bluestem <i>Schizachyrium scoparium</i>
Smooth Wild Rose <i>Rosa blanda</i>	Dense Blazing Star <i>Liatris spicata</i>	Big Bluestem <i>Andropogon gerardii</i>
New Jersey Tea (r) <i>Ceanothus americanus</i>	Grey Headed Coneflower <i>Ratibida pinnata</i>	Indian Grass <i>Sorghastrum nutans</i>
Soapberry <i>Shepherdia canadensis</i>	Butterfly Milkweed <i>Asclepias tuberosa</i>	Switch Grass <i>Panicum virgatum</i>
	Common Milkweed <i>Asclepias syriaca</i>	Hairy Panic Grass <i>Panicum acuminatum</i>
	Tall Sunflower <i>Helianthus giganteus</i>	Northern dropseed <i>Sporobolus heterolepis</i>
	Prairie Dock <i>Sisyrinchium albidum</i>	

8 Cultural Drought Tolerant Landscapes

Butterfly Landscape

A butterfly landscape incorporates many Tall Grass Prairie and Meadow landscape species, except species are selected based on their preference by butterflies for food or shelter. Many butterflies such as the Monarch and Viceroy prefer colorful and scented flowering plants in warm, sunny locations. Butterfly gardens are ideal landscapes for developments looking for low maintenance, colorful, scented, and ecologically friendly gardens. Butterfly preferred drought tolerant species include:

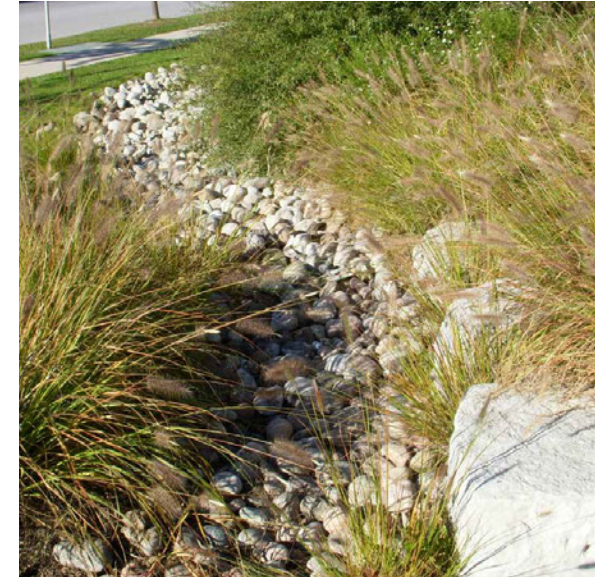
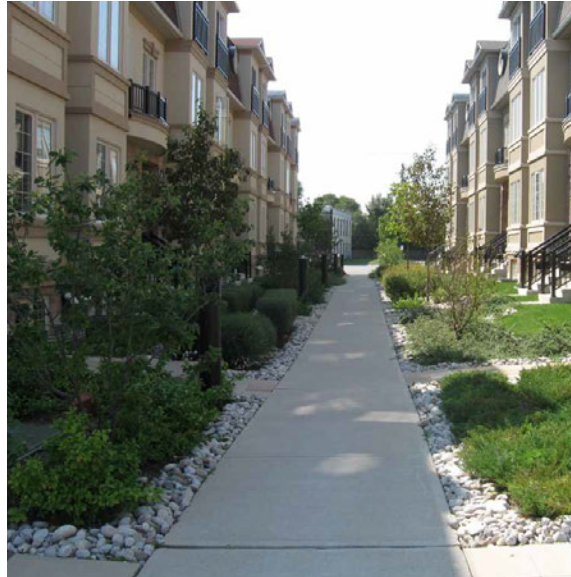


Shrubs	Perennial Flowers			Grasses
Red Osier Dogwood <i>Cornus stolonifera</i>	Butterfly Milkweed <i>Asclepias tuberosa</i>	Sky Blue Aster <i>Aster oolentangiensis</i>	Ironweed <i>Vernonia gigantea</i>	Little Bluestem <i>Schizachyrium scoparium</i>
Grey Dogwood <i>Cornus racemosa</i>	Common Milkweed <i>Asclepias syriaca</i>	New England Aster <i>Aster novae-angliae</i>	Boneset <i>Eupatorium perfoliatum</i>	Big Bluestem <i>Andropogon gerardii</i>
Smooth Wild Rose <i>Rosa blanda</i>	Butterfly Bush <i>Buddleia davidii</i>	Smooth Aster <i>Aster laevis</i>	Blanket Flower <i>Gaillardia aristata</i>	Hairy Panic Grass <i>Panicum acuminatum</i>
Nannyberry <i>Viburnum lentago</i>	Grey Headed Coneflower <i>Ratibida pinnata</i>	Black Eyed Susan <i>Rudbeckia hirta</i>	Showy Tick-Trefoil <i>Desmodium canadense</i>	Tufted Hairgrass <i>Deschampia caespitosa</i>
Cockspur Hawthorn <i>Crataegus crus-galli</i>	Narrow Leaf Coneflower <i>Echinacea angustifolia</i>	Wild Bergamot <i>Monarda fistulosa</i>	Field Thistle <i>Cirsium discolor</i>	Northern dropseed <i>Sporobolus heterolepis</i>
Downy Hawthorn <i>Crataegus mollis</i>	Purple Coneflower/Echinacea <i>Echinacea purpurea</i>	Stiff Leaved Goldenrod <i>Solidago rigida</i>		
	Ox Eye Sunflower <i>Heliopsis helianthoides</i>	Dense Blazing Star <i>Liatris spicata</i>		

9 Cultural Drought Tolerant Landscapes

Rock Garden Landscape

A rock garden, also known as a moraine or alpine garden, is a type of landscape that predominantly features rocks or stones with low growing plants native to rocky or alpine environments. Originally inspired by the collection of plants from alpine mountain regions, rock gardens are good candidates for drought tolerant landscapes due to alpine species abilities to withstand harsh alpine environments of extreme temperature changes with minimal amounts of soil. Rock gardens thrive in both sunny and shady locations and require good drainage and proper soil conditions, ideally situated on sloped areas with a growing medium of sand, gravel and organic material. Drought tolerant rock garden species include:



Shrubs

Creeping Juniper

Juniperus horizontalis

Shrubby Cinquefoil

Potentilla fruticosa

Cotoneaster

Cotoneaster horizontalis

Spirea Varieties

Spirea var bumalda, japonica

Perennial Flowers

Ground Phlox

Phlox stolonifera

Rock Cress

Arabis, Aubrieta var

Creeping Thyme

Thymus serpyllum

Perennial Allysium

Aurinia saxatilis

Perennial Groundcovers

Sedum Varieties: Flowering Mound Sedums:

S. Herbstfreude, S. Spectabile

Mat Forming Sedums:

S. Rupestre 'Angelina' S. Album, S. Pachyclados

Hens and Chicks

Sempervivum tectorum

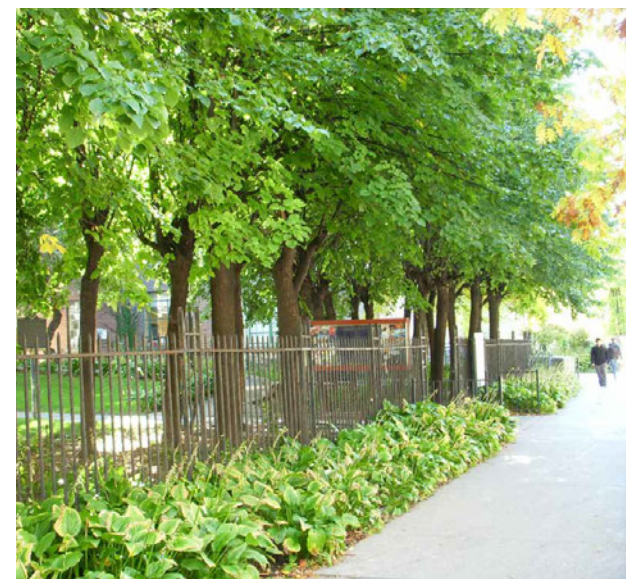
Bearberry

Arctostaphylos uva-ursi

10 Cultural Drought Tolerant Landscapes

Pre-Confederation Pioneer Landscape

Pioneer gardens were planted as a means of survival for North American pioneers, consisting of many food based and medicinal plants. The gardens typically included a mixture of beneficial European species and native Canadian plant species, introduced by the local North American natives. Many pioneer landscape species are hardy and drought tolerant due to the pioneer's selection of low maintenance plant species. Drought tolerant pioneer garden species include:



Trees	Shrubs	Perennial Flowers	Medicinal Perennial Flowers	Food Producing Plants
Black Walnut (*) <i>Juglans nigra</i>	Serviceberry <i>Amelanchier laevis</i>	Day Lilies (i) <i>Hemerocallis</i> var.	Flowering Tobacco <i>Nicotiana glauca</i>	Bur Oak, White Oak Acorns <i>Q. alba</i> , <i>Q. macrocarpa</i>
Bur Oak <i>Quercus macrocarpa</i>	Smooth Wild Rose <i>Rosa blanda</i>	Common Daisy <i>Cyanthus leucanthemum</i>	Echinacea <i>Echinacea purpurea</i>	Black Walnut, Butternut Nuts <i>J. nigra</i> , <i>J. cinerea</i>
	Downy Hawthorn <i>Crataegus mollis</i>	Cosmos <i>Cosmos bipinnatus</i>	St John's Wort <i>Hypericum perforatum</i>	Jerusalem Artichoke (i) <i>Helianthus tuberosus</i>
	Common Lilac (i) <i>Syringa vulgaris</i>	Hollyhocks <i>Alcea rosea</i>	Lavender <i>Lavandula officinalis</i>	Scarlet Runner Bean <i>Phaseolus coccineus</i>
	Blackberry <i>Rubus allegheniensis</i>	Phlox <i>Phlox paniculata</i>	Common Sage <i>Salvia officinalis</i>	Serviceberry <i>Amelanchier laevis</i>
	Red Currant <i>Ribes rubrum</i>	Black Eyed Susans <i>Rudbeckia hirta</i>	Camomile <i>Chamaemelum nobile</i>	Blackberry <i>Rubus allegheniensis</i>
	Chokecherry <i>Prunus virginiana</i>			Smooth Wild Rose <i>Rosa blanda</i>

10 Cultural Drought Tolerant Landscapes

Hedgerow Landscape

A hedgerow is a line of closely planted shrubs and trees designed to mark a boundary, form of barrier for privacy, serve as a windbreak and muffle sound. Natural hedgerows result from wind dispersed seeds and the droppings from berry and seed eating birds and animals. Resultant hedgerows grow thick with vines and wildflowers providing all the ingredients animals require for survival; food, shelter and nesting sites. Being opportunistic and hardy by nature, many hedgerow species are good candidates for a drought tolerant landscape. In addition hedgerow species function well in a landscape as a windbreak, privacy screen, and provide seasonal interest with a variety of flowering and fruit bearing species. Drought tolerant hedgerow species include:

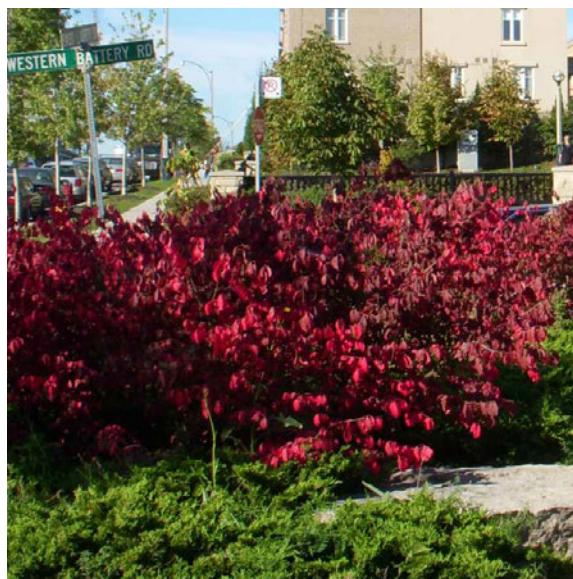


Trees	Shrubs		Perennial Flowers	Vines
Cockspur Hawthorn <i>Crataegus crus-galli</i>	Serviceberry <i>Amelanchier laevis</i>	Nannyberry (cs) <i>Viburnum lentago</i>	Black Eyed Susan <i>Rudbeckia hirta</i>	Virginia Creeper <i>Parthenocissus vitacea</i>
Downy Hawthorn <i>Crataegus mollis</i>	Chokecherry <i>Prunus virginiana</i>	Canada Plum <i>Prunus nigra</i>	Bigleaf Aster <i>Eurybia macrophylla</i>	Wild Grape <i>Vitis riparia</i>
Pin Cherry <i>Prunus pensylvanica</i>	Red Osier Dogwood <i>Cornus stolonifera</i>	Witch Hazel <i>Hamamelis virginiana</i>		
Eastern White Cedar <i>Thuja occidentalis</i>	Smooth Wild Rose <i>Rosa blanda</i>	Purple Flowering Raspberry <i>Rubus odoratus</i>		
	Staghorn Sumac <i>Rhus typhina</i>			
	Common Hobblebush (cs) <i>Viburnum lantanoides</i>			

11 Invasive Species

Invasive Species

Many non native drought tolerant species are both extremely adaptive and prolific that they become invasive and **should never be planted near ravine or naturalized areas**. Once established in naturalized areas, these species out-compete native plant species, resulting in a monoculture of invasive species with low ecological value. Common drought tolerant invasive species to avoid planting near ravines and naturalized areas include:



Trees	Shrubs	Perennial Flowers	Groundcovers	Grasses
Norway Maple <i>Acer platanoides</i>	Euonymous Varieties <i>Euonymus fortunei</i> (sarcxie)	Forsythia <i>Forsythia intermedia</i>	Periwinkle <i>Vinca minor</i>	Ribbon Grass <i>Phalaris arundinacea</i>
Black Locust <i>Robinia pseudoacacia</i>	<i>Euonymus elatus</i> (burning bush)	Common Privet <i>Ligustrum vulgare</i>	Oriental Bittersweet <i>Celastrus orbiculatus</i>	Porupine/Silver Grass <i>Miscanthus sinensis</i>
Common Horsechestnut <i>Aesculus hippocastanum</i>	Common Lilac <i>Syringa vulgaris</i>	Cottoneaster <i>Cotoneaster damerrii</i>	Japanese Honeysuckle <i>Lonicera japonica</i>	Rough Manna Grass <i>Glyceria maxima</i>
European Mountain Ash <i>Serbus aucaparia</i>	Japanese/Multiflora Rose <i>Rosa rugosa</i>	Mock Orange <i>Philadelphus lewisii</i>	Japanese Spurge <i>Pachysandra terminalis</i>	
Amur Maple <i>Acer ginnala</i>	Siberian Peashrub <i>Caragana arborescens</i>	False Spirea <i>Sorbaria sorbifolia</i>		
Scot's Pine <i>Pinus sylvestris</i>	Common/Japanese Barberry <i>B.vulgaris, B. thunbergii</i>	Western Snowberry <i>Symphoricarpus albus var.</i>		
Russian Olive <i>Elaeagnus angustifolia</i>		St John's Wort <i>Hypericum perforatum</i>		
		Day Lillies <i>Heemerocallis var.</i>		
		Borage <i>Borago officinalis</i>		
		Tansy <i>Tanacetum vulgare</i>		

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