LOCATING HERITAGE AND COMMUNITY SEED TREASURE TREES - COLLECTING SEED AND ESTABLISHING CLIMATE CHANGE PLANTINGS

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OUFC is a non-profit volunteer organization. Our members are unpaid VOLUNTEERS:

A mix of tree professionals and citizens involved with nurturing and protection our urban forests jradec@mountpleasantgroup.com

Locating and documenting Community Seed trees for climate change plantings is an expansion of our view of heritage trees. We need to expand our cultural and historic heritage view of trees, to include tree species as our biological heritage, as well. Individual trees, avenues and groves and stands of trees are threatened by climate change during the next 30-100 years. Heat waves and droughts will affect photosynthesis, tree performance, tree health, and seed set.

This is why we should make a start with locating, conserving and monitoring community seed treasure trees, noting such items as spring leaf flush and autumn leaf drop, collect their seeds and establish climate change plantings as the title suggests, i.e. creating native group plantings in Parks, Conservation areas and private land holdings as potential seed tree orchards for the future.

“One set of projections for Ontario indicates that by the end of the century, average summer temperature will increase from 3 to 7oC (southern and northern Ontario, respectively) and that winter temperatures will increase from up to 4oC in the south to 10oC in the north” (Colombo

et al. 2007)[1] Droughts and summer heat waves will impact on the ability of trees to photosynthesize, that is to produce the sugars which maintain the life system of trees and plants, including flowering and seed production needed to maintain local forest cover.

Climate change will affect southwestern Ontario's urban forests

(Also See CLIMATE CHANGE IN ONTARIO'S NORTHERN FORESTS on last page)

The urban forests of southwestern Ontario have vastly changed from the original "Deciduous Forest" tree cover after settlement started in 1783. Settling and urbanization of southern Ontario brought with it extreme degradation of one of the nine Canadian forest regions, the deciduous forest and its indigenous- native tree species, and the appearance of the urban forest species mix that include trees introduced from elsewhere. The remnants of this "deciduous forest" in southern Ontario, the woodlots, hedgerows and individual trees are often referred to as "Carolinian" species. An excellent book describing the Trees of Ontario's Carolinian forest was published in 2003 by Gerry Waldron, Section G3-G4 of the Toolkit.

Some Climate change scenarios (from www.planthardiness.gc.ca) describe range conditions shifts of 400-500km north by 2100. But every species is made up of a collection of local populations that are adapted to the different local climates across what can be very large ranges. It's why you should ask growers about the source of their stock and where tree seed zones can help people decide. In some cases a species projected range under future climates will overlap its current range - that's good right? Not necessarily. The population in that overlap area is not necessarily adapted to that new climate – that population's climate envelope has also moved and most trees, especially heavy seeded tree species lack the ability to move significantly northward naturally.

If increases in global temperature do not exceed two (2) degrees during the next 50 years (increase from 380 to 500 ppm of CO2 in global atmosphere), refurbishing southern Ontario's urban forest with tree species adapted to a warming and fluctuating prairie-like climate may be possible with considerable effort.

What needs to be done?

- Trees nominated as heritage trees but lacking significant historic/cultural/ rarity scores can be nominated as Community Seed Treasure trees and tagged as such.

- Community Seed Treasure trees together with heritage trees would become preferred seed tree sources for establishing climate change plantings.

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[1] **Colombo, S.J., D.W. McKenney, K.M. Lawrence and P.A. Gray. 2007. Climate change projections for Ontario: Practical information for policymakers and planners. Ont. Min. Nat. Res., Appl. Res. Dev. Br., Sault Ste. Marie, ON. Climate Change Res. Rep. CCRR-05. 37 p.**

- Locating and documenting Community Seed trees for climate change plantings is a continuation of tree hunts. Some community groups have started looking for reasons for follow-up tree hunts.

Survey items indicated on the survey form, located at the end of this write up, are needed to make decisions on how far north we can move seed to northerly locations which would have acquired new climatic envelopes 30-50 years from now.
Local communities can also start seed tree hunts, based on the OHTA Heritage Toolkit method Section D-Appendix-D.

Who? This is an informal approach, with community tree groups, municipal parks, Conservation Authorities, Private land owners, and others initiating such projects.

How? OUFC/ FGCA providing workshop input jradec@mountpleasantgroup.com
to communities as follows:

1. Initiate spring leaf flush, autumn leaf drop, seed set data - tree hunts - OUFC
Participants (individuals, community groups, and organizations) to note new specific survey items on the trees, i.e. noting date of leaf flush and autumn leaf fall, flowering time and seed set date and other items, all for a number of years.(survey form at the end of this write up)

2. Obtain Seed Collection Guidelines from FGCA

Ontario's Natural Selections

Locating heritage and community seed treasure trees, collect their seeds and setting up a network of climate change plantations (seed orchards) in addition to existing windrow, groves and avenues serves to help buffer against the loss of the genetic material at its origin due to climate change, insects, diseases or human settlement impacts and to assist species migrations to more northerly locations.

To help ensure genetic diversity within a species obtain the FGCA Seed Collection Guidelines for seed collectors trained under FGCA's Ontario's Natural Selections seed source certification program. Barb Boysen
Coordinator
www.ontariosnaturalselections.org www.fgca.net

FOREST Gene Conservation ASSOCIATION

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3. Establishment of climate change plantings by community groups

People are becoming more concerned about the implications of climate change. Scientists are telling us that historical species migration rates are much slower than what will be required as per some climate change model predictions. A changing climate will affect

- the genetic ability of existing trees to tolerate drought and heat
- the genetic ability of trees to adapt to the lengthening of the growing season affecting photoperiodic tree responses involved in tree dormancy and spring-leafing.
- the ability of trees to live through extreme/freak events (wind and ice storms; heavy snowfalls, floods,)
- trees ability to withstand both native and exotic insects and diseases.

With this in mind people are suggesting we need to assist species migrations by setting up a network of climate change plantings which may over time become seed production areas. These could be plantations of:

1. species not currently in an area but adapted to the site and soil conditions, or
2. southern provenances of existing species

Why do this?
We could assist species migrations by setting up a network of these plantings. They could serve as test plantations to see what might do well but will require very specific documentation of what plant material is used and will also require long term monitoring to be able to judge performance. They could serve as gene pool reserves to help buffer against the loss of the genetic material at its origin (due to climate change, insects, diseases or human settlement impacts). And they might serve as actual seed production areas to help regenerate future forests.

Seed from vigorous single trees, avenues and groves could be used to establish these plantings, but ideally seedlings from different single tree sources should be planted in a mix with seed from many other trees. Maintaining genetic diversity in any planting and especially one that could be a seed production area, gives us selection options especially important in a very uncertain climatic future.

Preferably the focus should be on groves and large stands of healthy mature trees with seed collection done in a good seed year so that as much of the original diversity of that stand is carried with the seed collection. For stands of trees, information on other vegetation and the site will help us to learn more about what conditions this species is suited to. It can help us make recommendations on where this species can be used so that we can restore whole plant communities not just a single species. The survey sheet at the end lists this additional stand information.

Decisions will have to be made on how far to move these trees and whether to plant them in a mix with local populations. In the short term the southern sources could suffer from the yet occurring extremes of northern areas.

The source of every seed or seedling should be well documented, labeled and well mapped on the site planting map. It could well be that the people who establish these climate change plantings will not be around to monitor them and judge their performance. Therefore it is very important to set up a system to Document, Monitor and Report – so that people in the future can truly benefit from these efforts. Ongoing observations on climate change plantings are needed on – setting of planting – full sun-shaded, leaf flush- leaf fall, and flowering- seed set. This kind of data over the years could give us a really interesting picture of changing climate and local species effects.

Establishment of climate change plantings is no different then establishing Hardwood Plantations. Von Althen described the following important requirements and steps for successfully establishing hardwood plantations on abandoned fields: A deep, moist but well-drained planting soil; ploughing of the planting area; hardy and healthy planting stock; careful planting with proper techniques; effective weed control for two years; fertilization and rodent control. However other soil types found in urban areas (deep sands, compacted clays) should be considered for climate change plantings with a suite of species adapted to those sites.

The MNR has been working with many partners to develop a 'Stewardship Tracking System' a newly developed online mapping tool to track project information. This may be a solution for the seed orchard efforts.

CLIMATE CHANGE IN ONTARIO"S NORTHERN FORESTS

A conference entitled "Managing Tree Seed in an Uncertain Climate" was held on November 14-15, 2007, in Sault Ste. Marie, Ontario. Conference Summary by:
S.J. Colombo[2], B. Boysen[3], K. Brosemer[4], A. Foley[5], and A. Obenchain[6]–
Research information Note-Climate change Number 8 2008 Applied Research and Development Branch http://ontario.ca/ofri www.fgo.ca

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[2] Ontario Forest Research Institute, Applied Research and Development Branch, Ministry of Natural Resources, Sault Ste. Marie, ON.

[3] Forest Health and Silviculture Section, Forest Management Branch, Ministry of Natural Resources Peterborough, ON

[4] Forest Genetics Ontario, Sault Ste. Marie, ON

[5] Ontario Tree Seed Plant, Forest Health and Silviculture Section, Forest Management Branch, Ministry of Natural Resources, Angus, ON

[6] as footnote 1

Canada's northern forests will experience greater increases in temperature than those growing further south. One set of projections for Ontario indicates that by the end of the century, average summer temperature will increase from 3 to 7oC (southern and northern Ontario, respectively) and that winter temperatures will increase from up to 4oC in the south to 10oC in the north (Colombo et al. 2007). Predictions of precipitation with climate change vary, but future precipitation may be insufficient to prevent large areas of Ontario forests from experiencing more frequent and intense drought (Wotton et al. 2003, Colombo et al. 2007). Such temperature and soil moisture changes would alter the ecological conditions in forests enough to affect how well trees are adapted to local climates.

LOCATING AND DOCUMENTING COMMUNITY SEED TREE(S) Form

Survey date……..By……

(Check appropriate box)

- □ **Single tree** - only one specimen tree, single or multi-stemmed;
- □ **Tree Pair** - two individual trees, considered as a unit;
- □ **Avenue of trees** - multiple trees, aligned on both sides of a roadway or driveway;
- □ **Windrow** - single or multiple rows of trees, delineating property or land use;
- □ **Grove** - small usually irregular pocket of 3 trees or more, up to 0.5 hectares;
- □ **Arboreal Remnant** - larger pocket of trees, 0.5 to 5 hectares, but not a managed woodlot.
- □ **Natural large stand- woodlot (managed or unmanaged)** -1 to 5 hectares or more.

Location: if multiple of trees also use next page and provide Map

Present Tree Ownership **(owner and contact information)**

Owner Name _____
Owner Address _____
City-municipality_____
phone ( ) - . e-mail

- **Enter Longitude and Latitude of your reporting location, if available**

…… ……

PHOTOGRAPHS Take 2 or more identified and dated photos of the tree(s), prints or slides. Include at least one close-up and one with the surrounding area in the background.

Description – single tree in top row, or if multiple trees, list in order of greatest abundance:

	Species Name(s)		Circumference[3] (cm) at dbh		Height[4] (m)		Spread[5] (m)	
	Common[1]	Scientific[2]						
1								
Or if submitting multiple tree species								
			Sm'st	Lar'st	Sho'st	Tallest	Nar'st	Wid'st
1								
2								
3								
4								
5								

[1] **Name used locally for the species.**

[2] **Latin name, genera, species, cultivar**

[3] **Smallest and largest tree measurements. Single-stem tree measured around the trunk at 1.35m (4.5ft) above ground level, or at the narrowest point between ground and main branch union(s). Multiple-stem tree, requires an asterisk and use commas between individual measurements.**

[4] **Shortest and tallest measurements, with clinometer, or use right angle triangle relationships.**

[5] **Narrowest and widest trees. Longest strait line measurement of the tree's outer branch limits.**

Approximate age –provide estimated tree(s) **origin year**-------for association with climate period **(Circle period estimate) 1990-1960; 1960-1930; 1930-1900; 1900-1870; 1870-1840; 1840-1810; before 1810.**

Leaf flush date spring…….
Leaf drop date autumn…….

Flowering date……..
Seed set Date…….

Site slope aspect 1=north 2=south 3=East 4=west 5=flat

Exposure 1=full sun 2=part sun 3=Shade dappled 4=full shade

Protection 1=near building 2=2-10m 3=>10m 4=open

Performance 1=no die back 2=minimal dieback 3=severe die-back

Soil (texture) 1=sand 2=loam 3=clay 4=unknown

Soil depth 1=shallow<30cm 2= moderate <90cm 4=deep soil>90cm

Soil drainage 1=well drained 2=wet in spring 3=wet-marsh

Additional information for avenues, groves

Land ownership	*(circle) appropriate tree site-type*
□ *Public land*	*Road / highway / park / waterway / trail / ravine.*
□ *Private land*	*residential / commercial / industrial / farm/woodlot*
□ *Institutional land*	*Place of worship / hospital / school / military base.*
□ *Other*	*specify:*

Site location and Accessibility

♦**Map - if stand of trees --Use separate sheet of paper - Draw this map in sufficient detail to allow us to find the stand.-Note nearest major street intersection-**

AND

For stands of trees, information on other vegetation and the site will help us to learn more about what conditions this species is suited to. It can help us make recommendations on where this species can be used so that we can restore whole plant communities not just a single species.
Other vegetation: overstorey woody species – list the main 2 or 3 other species in the main canopy
understorey woody species – list the main 2 or 3 species in the subcanopy
ground vegetation species– list the main 2 or 3 species of ground flora