

USDA Forest Service

URBAN FOREST CONNECTIONS

webinar series

Second Wednesdays | 1:00 – 2:15 pm ET

www.fs.fed.us/research/urban-webinars



CLIMATE CHANGE & URBAN ENVIRONMENTS: ADAPTATION THROUGH DIVERSITY

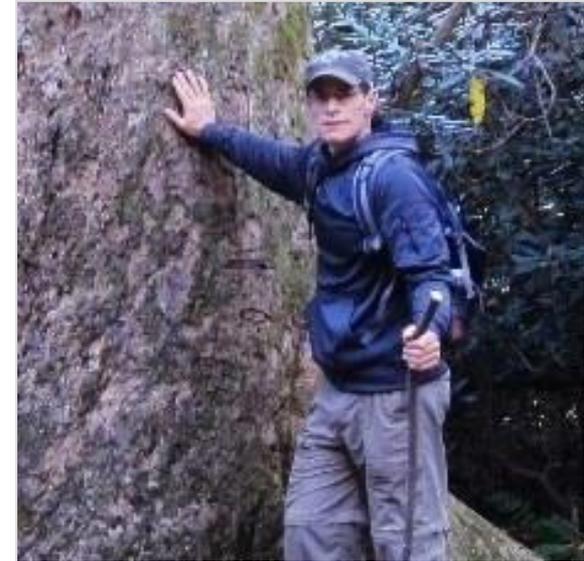


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Environmentally Adapted Trees (EAT) for Nebraska and Kansas

Justin Evertson, Nebraska Statewide Arboretum
Special Thanks to Heather Byers, Great Plains Nursery



Environmentally Adapted Trees Initiative

EAT will identify and propagate superior and environmentally-adapted trees from across the central Great Plains region and actively promote and plant progeny of those trees in Kansas and Nebraska to help expand the diversity and resiliency of planted landscapes.



Environmentally Adapted Trees Initiative

- Identify at least 30 proven but underutilized species that deserve to be planted more.
- Identify at least 20 very rare and/or potential species and plant them for evaluation at trial sites across the state.



Environmentally Adapted Trees Initiative

- Obtain seeds, seedlings and cuttings of hard-to-find species and work with nurseries to grow and/or obtain targeted trees for greater commercial availability.



Why are we doing this?

Because trees are hugely important to our daily lives and yet the future of our planted trees is far from certain.

1. Changing climate.
2. Insect and disease threats.
3. Aging and shrinking community forest canopy.
4. Lack of species and genetic diversity.
5. Invasive species.
6. Water issues.
7. Human neglect and apathy.

Benefits of Trees

Beauty, comfort, shade, energy conservation, stormwater absorption, wildlife, human health, food, lumber, etc.



Can you
imagine?

Near Callaway ca. 1880



Stratton ca. 1900



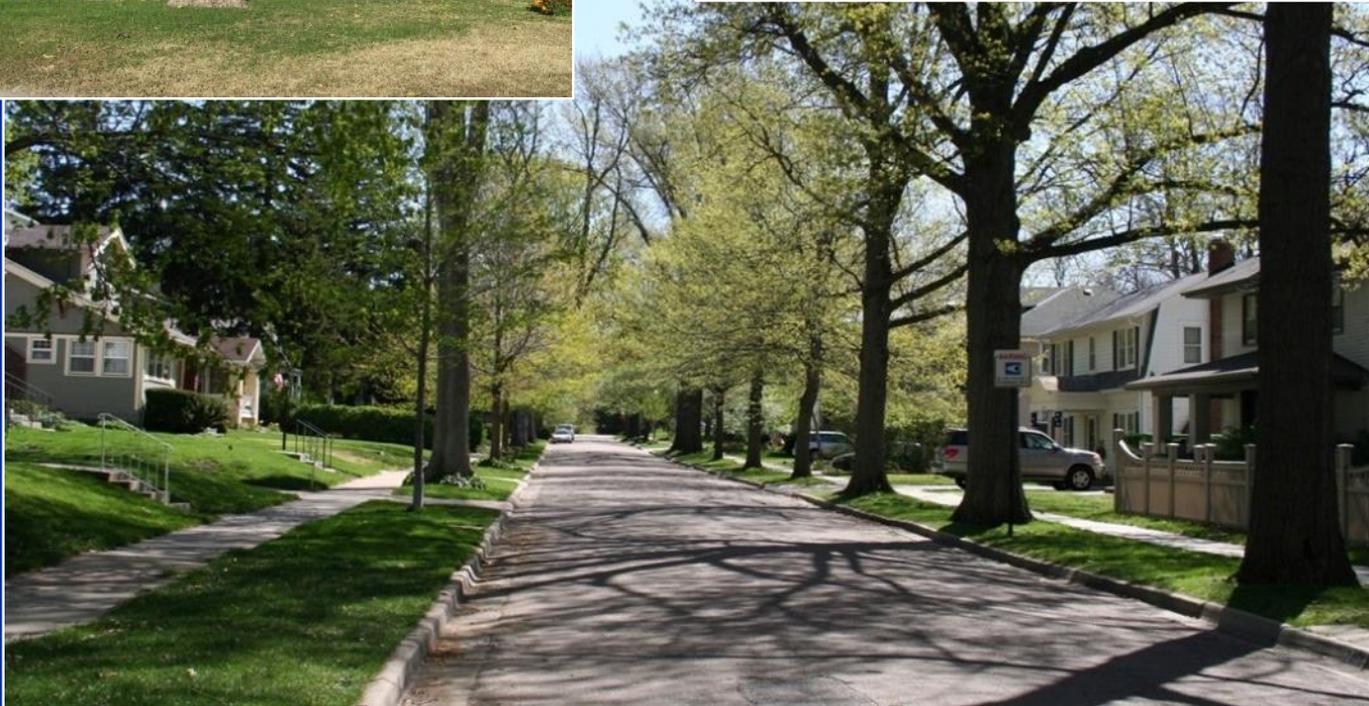
Lincoln ca. 1870



2010



We especially need big trees!



We're losing our big trees.

- 30% to 50% canopy loss in established neighborhoods since 1960s.



Many threats are outside of our control.

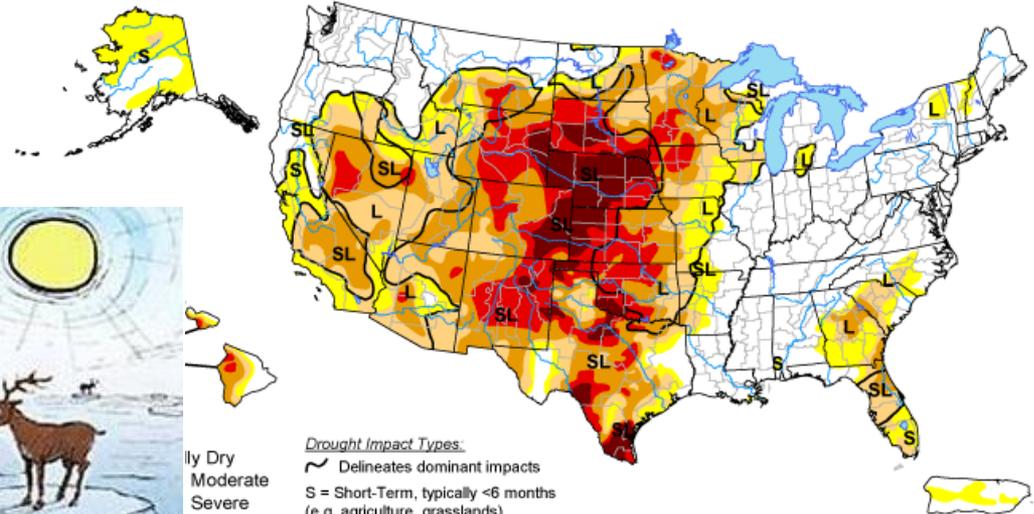


The Impact of a Changing Climate?

- For us: likely hotter and drier with more pronounced fluctuations and abrupt changes. Hot to cold – wet to dry.

U.S. Drought Monitor

March 12, 2013
Valid 7 a.m. EDT



Drought Impact Types:
~ Delineates dominant impacts
S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

Monitor focuses on broad-scale conditions.
Impacts may vary. See accompanying text summary
statements.

droughtmonitor.unl.edu/



Released Thursday, March 14, 2013

Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC



2012 Drought:

- Lincoln 19" – 9" below avg.
- Virtually no rain July-Sept.
- Over 18 days above 100F.



2015:

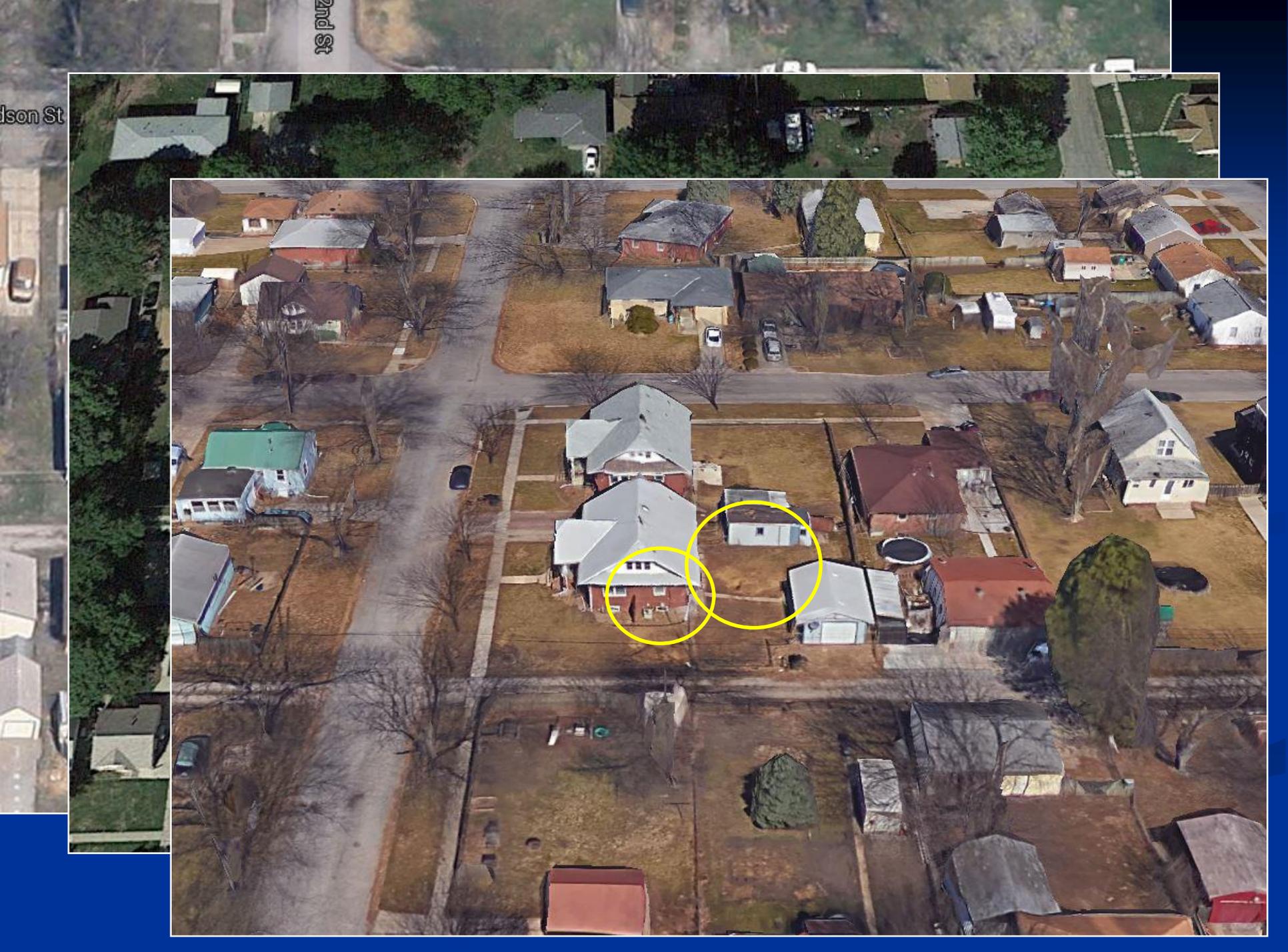
- Record Rainfall



Apathy







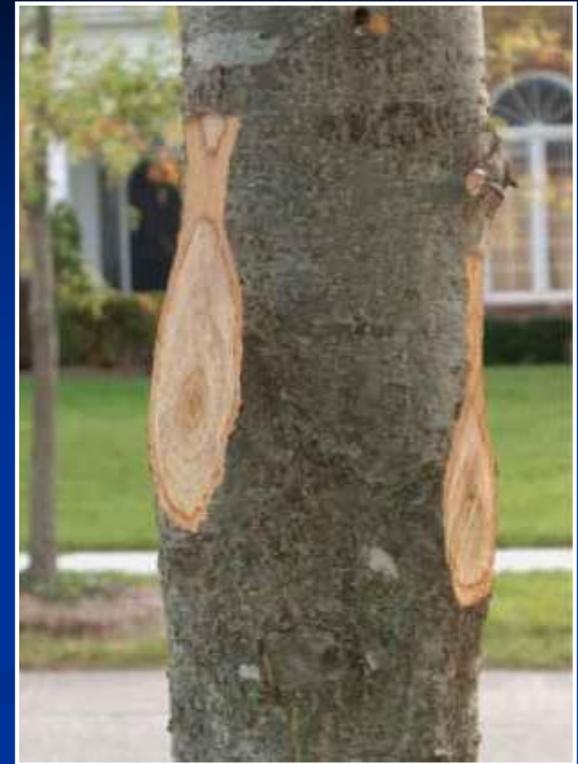
Johnson St

2nd St

Things we can control!

1. Poor species selection
2. Poor siting and/or design (wrong tree/wrong place)
3. Poor nursery stock
4. Poor planting
5. Poor pruning & care
6. Lawn related: mower & herbicide damage, over watering, etc.
7. Altered and compacted soils
8. Vandalism/mistreatment

Let's start by reducing human-caused harm.



Trees as commodity. “We’re not selling toasters!”

How many ‘Autumn Blaze’ maples and callery pears do we need?



Better trees begin with:

1. Good species selection – broad diversity in species & age.
2. Emphasis on seed grown trees and fewer clones.
3. Good design and siting. Plant in communities and groups.
4. High quality nursery stock.
5. Proper planting.



Environmentally Adapted Trees: Increasing Diversity and Resiliency

We don't suffer from a lack of suitable species adaptable to our tough conditions. There are at least 150 suitable species/types we can use.

But we're looking for more! ;-)





Survival in nature requires genetic diversity & adaptability to environmental changes.

Many of the best adapted trees are native.



Scouring the region for native species and planted survivors.



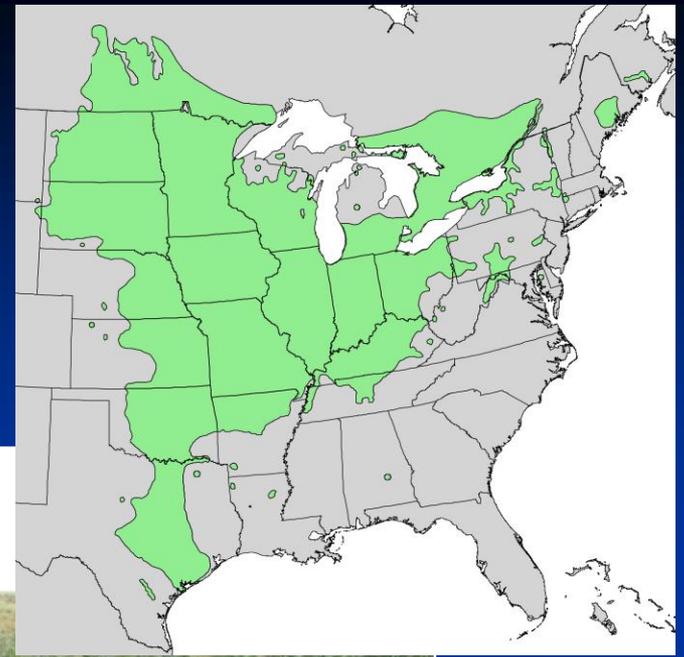
Bartlett Arboretum
Belle Plaine KS

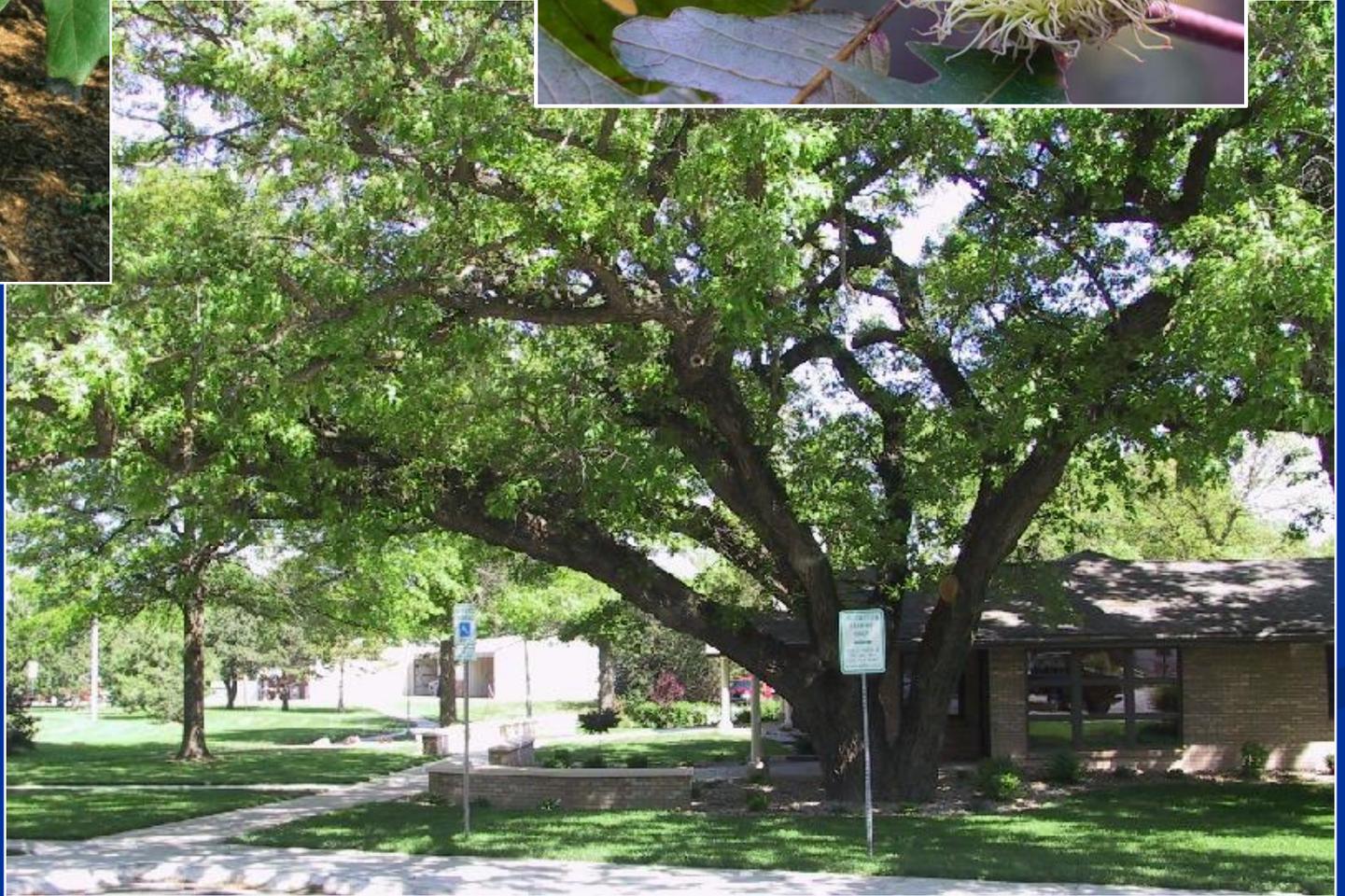


Southeast Kansas

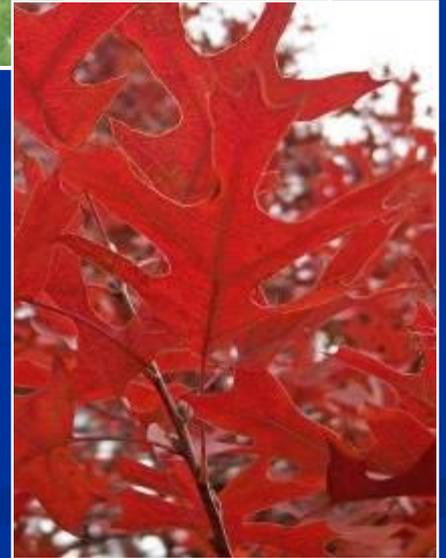


Burr Oak Canyon – SW Nebraska





Quercus macrocarpa



Quercus buckleyi

So Many Oaks!

Bur Oak

White Oak

Chinkapin Oak

Swamp White Oak

Chestnut Oak

Post Oak

Overcup Oak

Red Oak

Black Oak

Blackjack Oak

Shingle Oak

Cherrybark Oak

Hills Oak

Shumard Oak



Quercus velutina



Quercus imbricaria



Quercus alba

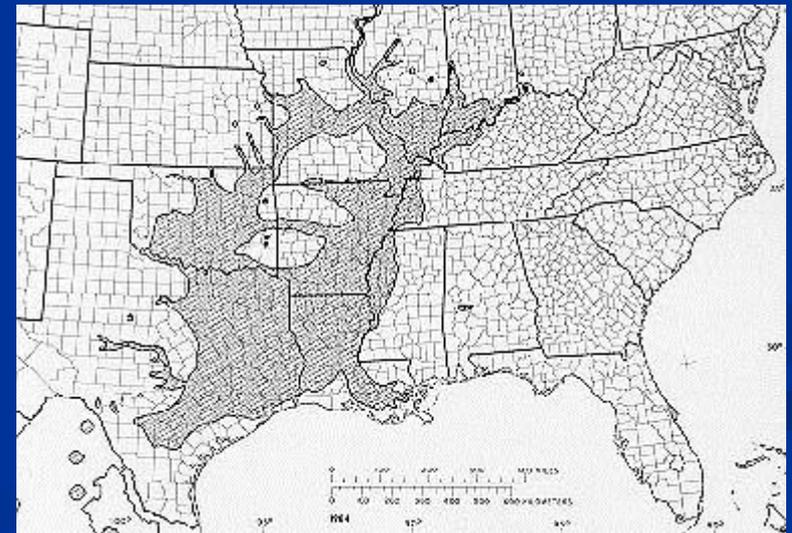


Quercus rubra

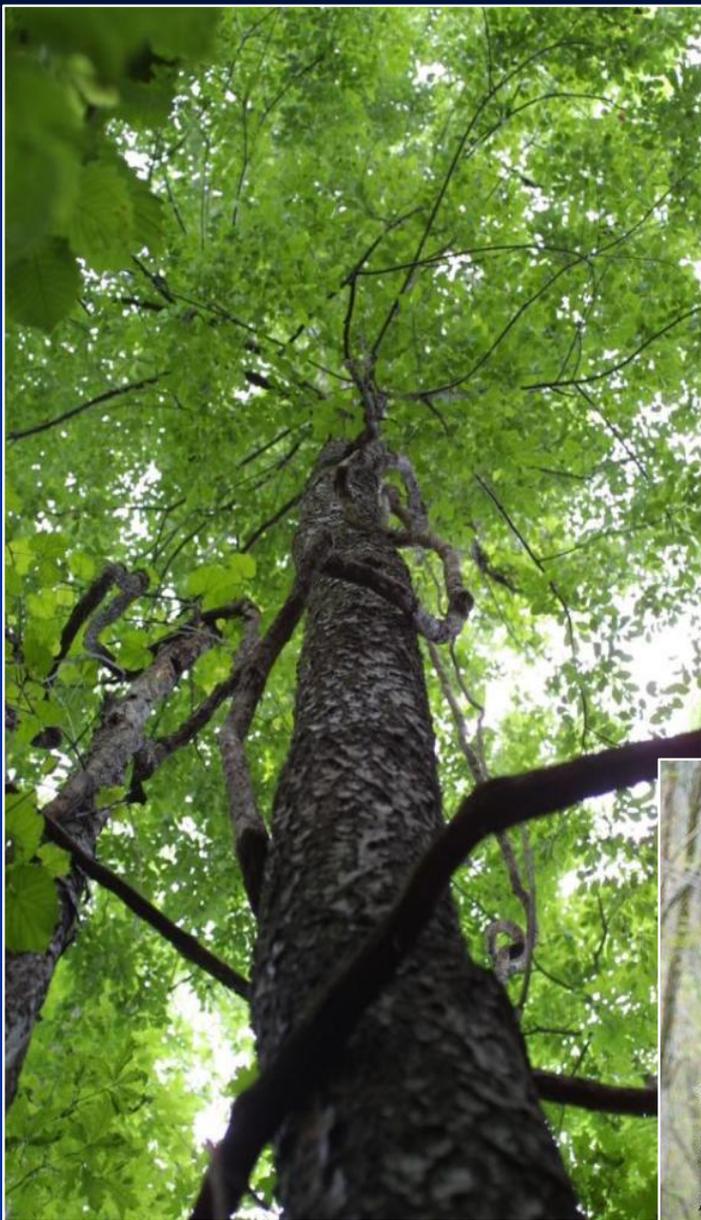


Quercus muehlenbergii

Carya illinoensis



Black Cherry - *Prunus serotina*



Liriodendron tulipifera



Caddo variety



Acer saccharum



Bigtooth Maple

Diospyros virginiana



Return of the American Elm

Ulmus americana – 'Princeton', 'Jefferson' and local seed sources.



UGA5038066

Other Elms

Ulmus thomasi



'Triumph' Elm

Non-natives help expand the palette of available trees for landscape use.*

*We only have 30 native species suitable for landscape planting in Nebraska.

Horsechestnut

Miyabe Maple

European Beech

Silver Linden

English Oak

Mongolian Oak

Sawtooth Oak

London Planetree

Japanese Tree Lilac

Katsuratree

Ginkgo

Pagodatree

Turkish Filbert

Paperbark Maple

Shantung Maple

Manchurian Ash

Amur Maackia

Japanese Zelkova

David Elm

Evodia

Saucer Magnolia

Bosnian Pine

Korean Pine

Swiss Stone Pine

Meyer Spruce



A Few Evergreens

Pinus cembra





Picea meyeri





Pinus heldreichii
var leucodermis

Juniperus virginiana



Non-natives will be evaluated
for potential invasiveness



Pyrus calleryana



Nursery Partners

Great Plains Nursery - Weston

Faller Nursery – York

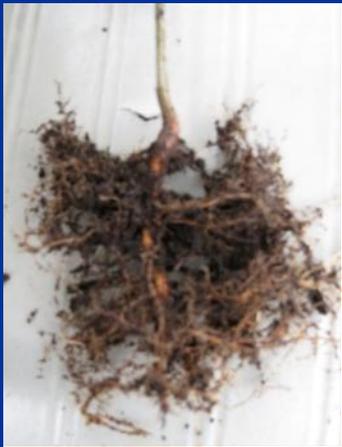
Papio Valley Nursery - Omaha



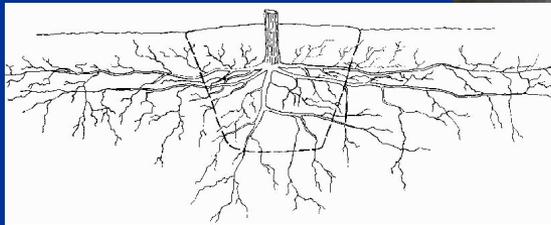
Healthy Trees = Healthy Root System

The Best Trees have LOTS OF
ROOT TIPS

- Rootmaker® System
 - Encourages root branching by use of air pruning, entrapment & constriction



Traditional Growing Methods



Benefits of the Grow-bag System

- Encourage a fibrous, non-circling root system
- Because of increases branching, the root system has a greater surface area
- Accelerates plant growth, increases vigor
- Rapid transplant success
- Long-term health



Relict™ Bur Oak

Burr Oak Canyon – near McCook, NE



Characteristics of both Post Oak and Gamble Oak

The name refers to the ecology form meaning a plant that exists as a remnant of a formerly widely distributed group in an environment.

OAK SEEDLINGS



NEWLY TRANSPLANTED
5/20/14
2 MONTHS OLD



8/5/14
5 MONTHS OLD



7/1/14
4 MONTHS OLD

GREAT PLAINS NURSERY

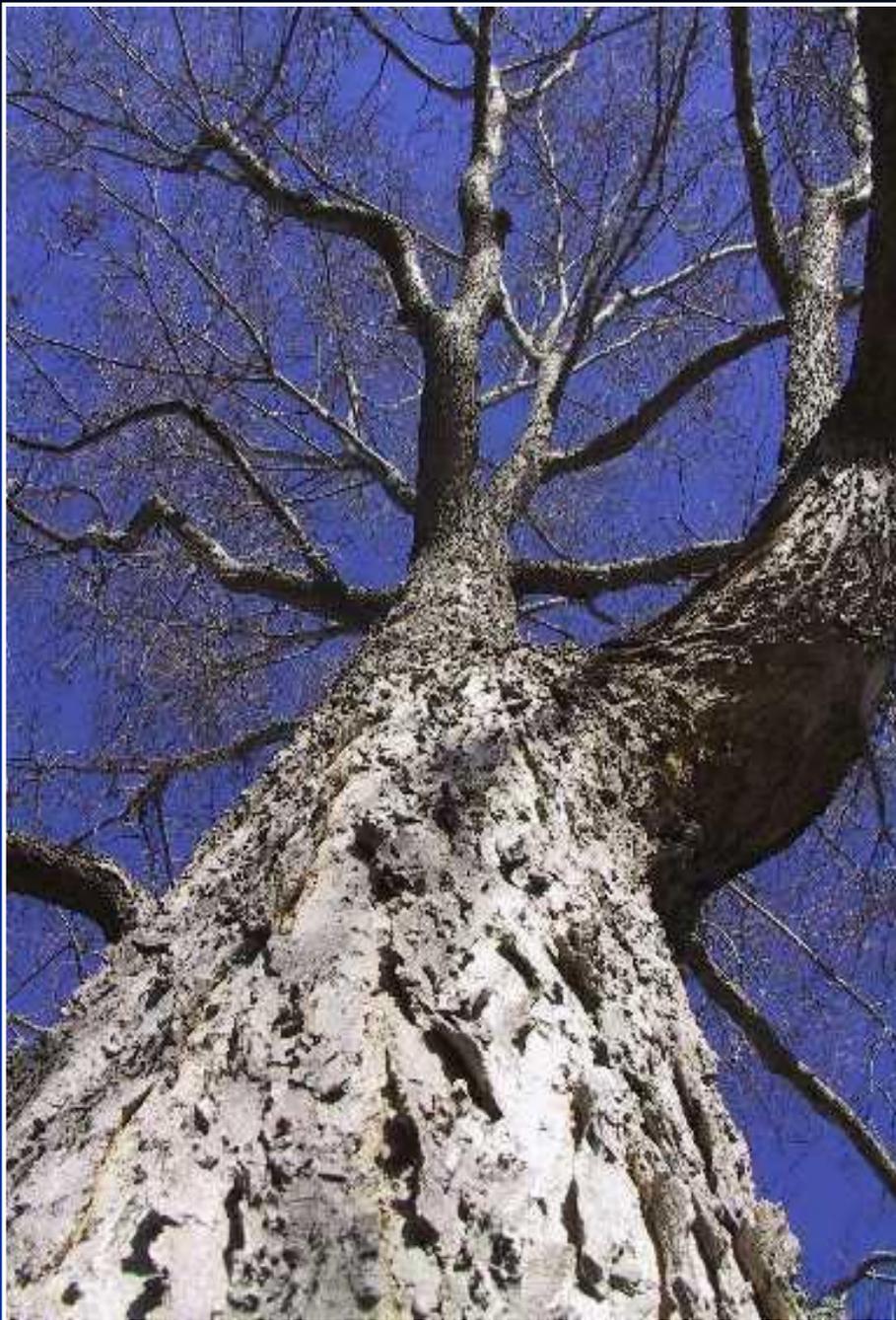
Better Tree Structure





Who said Bur oaks are slow growing?

#7 RT Bur Oak – **4 years** after planting in Omaha



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