

Trees in North Dakota

Will Horneman

USFS

Dakota Prairie Grasslands

Tree Anatomy

Shelterbelts

Common North Dakota Species

Trees

- Deciduous (Sheds leaves annually)



- Coniferous (Cone Bearing)



Deciduous Conifer

Siberian Larch

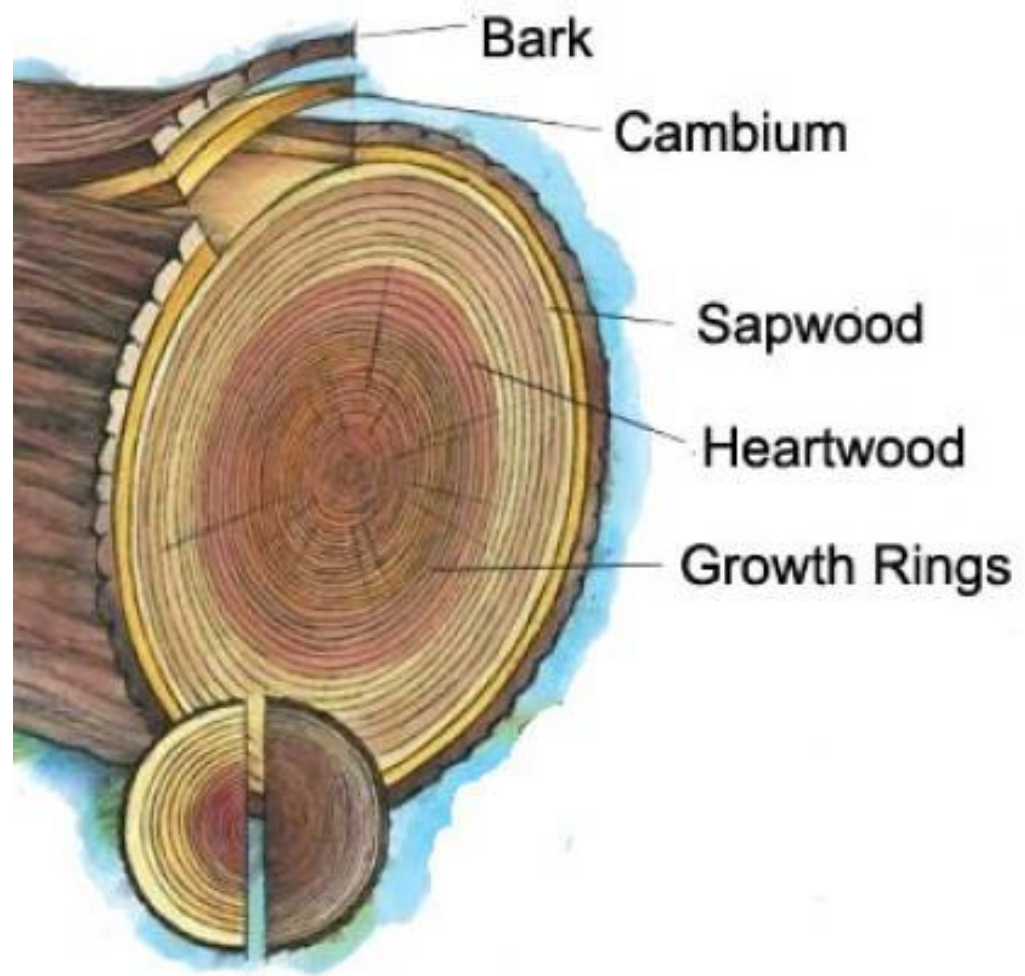
Picture Credit: yorktonnews.com



Parts of a Tree

(Forest Service)

- **A:** The **outer bark** is the tree's protection from the outside world. Continually renewed from within, it helps keep out moisture in the rain, and prevents the tree from losing moisture when the air is dry. It insulates against cold and heat and wards off insect enemies.
- **B:** The **inner bark**, or “phloem”, is pipeline through which food is passed to the rest of the tree. It lives for only a short time, then dies and turns to cork to become part of the protective outer bark.
- **C:** The **cambium cell layer** is the growing part of the trunk. It annually produces new bark and new wood in response to hormones that pass down through the phloem with food from the leaves.
- **D:** **Sapwood** (Xylem) is the tree's pipeline for water moving up to the leaves. Sapwood is new wood. As newer rings of sapwood are laid down, inner cells lose their vitality and turn to heartwood.
- **E:** **Heartwood** is the central, supporting pillar of the tree. Although dead, it will not decay or lose strength while the outer layers are intact. A composite of hollow, needlelike cellulose fibers bound together by a chemical glue called lignin.
- **Leaves** make food for the tree.



Leaves

Plants are autotrophic (Create own food)

They create their own food through Photosynthesis.

Carbon Dioxide, Water, Sunlight

Xylem (Sapwood) transports water up to leaves where they obtain carbon dioxide through leaf openings (Stomata).

Leaves synthesize sucrose and transport down by way of Phloem (inner bark)



Picture Credit: imgkid.com

Basic Biomes

Tundra

Taiga

Deciduous Forest

Grasslands

Desert

High Plateaus

Tropical Forest

Finding a tree for that location...

Not a location for that tree.

(Start with location)

1. Hardiness Zone

(What zone are you in?)

2. Soils

Alkali (high pH)

Vs. Acidic (low pH)

3. Wet Vs. Dry ground area

4. General area

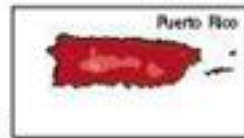
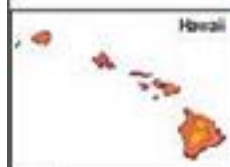
Power Lines? Mature Tree height/width

USDA Plant Hardiness Zone Map



Average Annual Extreme Minimum Temperature 1976-2005

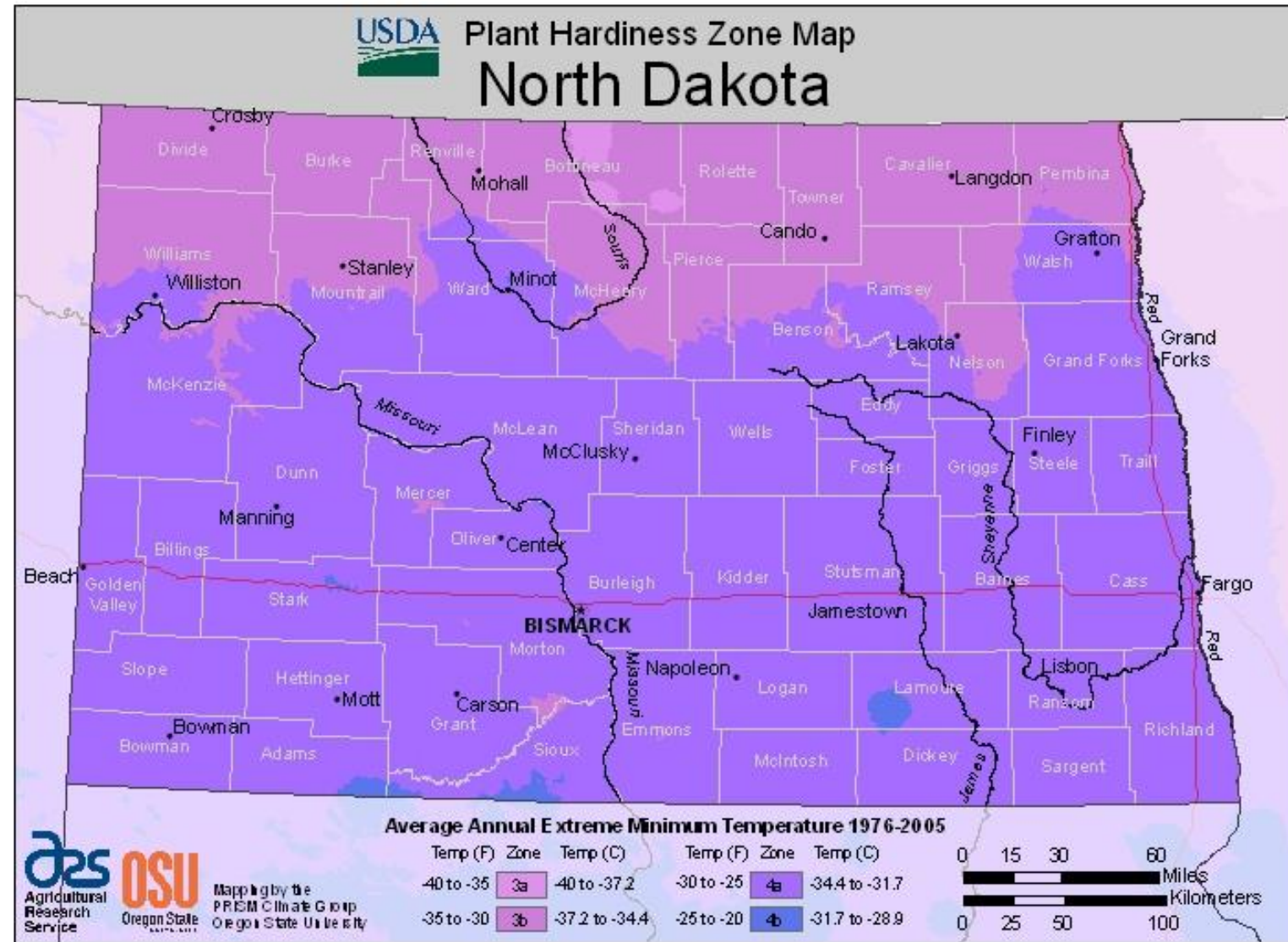
Temp (F)	Zone	Temp (C)
-60 to -55	1a	-51.1 to -48.3
-55 to -50	1b	-48.3 to -45.6
-50 to -45	2a	-45.6 to -42.8
-45 to -40	2b	-42.8 to -40
-40 to -35	3a	-40 to -37.2
-35 to -30	3b	-37.2 to -34.4
-30 to -25	4a	-34.4 to -31.7
-25 to -20	4b	-31.7 to -28.9
-20 to -15	5a	-28.9 to -26.1
-15 to -10	5b	-26.1 to -23.3
-10 to -5	6a	-23.3 to -20.6
-5 to 0	6b	-20.6 to -17.8
0 to 5	7a	-17.8 to -15
5 to 10	7b	-15 to -12.2
10 to 15	8a	-12.2 to -9.4
15 to 20	8b	-9.4 to -6.7
20 to 25	9a	-6.7 to -3.9
25 to 30	9b	-3.9 to -1.1
30 to 35	10a	-1.1 to 1.7
35 to 40	10b	1.7 to 4.4
40 to 45	11a	4.4 to 7.2
45 to 50	11b	7.2 to 10
50 to 55	12a	10 to 12.8
55 to 60	12b	12.8 to 15.6
60 to 65	13a	15.6 to 18.3
65 to 70	13b	18.3 to 21.1




OSU
 Agricultural Research Service
 Oregon State University
 Mapping by the PRISM Climate Group, Oregon State University.
<http://prism.oregonstate.edu>, 2012

Zone 3

Zone 4



Shelterbelts



Shelterbelt History

1930's – “Dust Bowl”
1930's- Great Depression

1935 U.S. Forest Service undertakes Prairie States Forestry Project initiated by President Franklin D Roosevelt.

“In 1935, the U.S. Forest Service undertook the largest tree-planting effort ever conducted, the Prairie States Forestry Project. During the next eight years, with labor provided by the Works Project Administration (WPA), more than 222 million tree seedlings were planted, creating in excess of 18,500 miles of shelterbelts.”

-James R. Brandle University of Nebraska-Lincoln

Brandle, James R., D. L. Hintz, and J. W. Sturrock. Windbreak Technology. Amsterdam: Elsevier Science Publishers B.V., 1988.
Droze, Wilmon H. Trees, Prairies, and People: A History of Tree Planting in the Plains States. Denton: Texas Woman's University Press, 1977.

Howe, J. A. G. "One Hundred Years of Prairie Forestry." *Prairie Forum* 11 (1986): 243–51.

Types of shelterbelts

Windbreaks

Wind Erosion

Pollinator Trees

Snow Control

Wildlife Enhancement

Privacy

Ornamental or Environmental

Importance of Shelterbelts

Reduce wind erosion

Reduce wind around farmsteads

Provide habitat and food for wildlife

Aid pollinating insects

Provide Privacy

Aid in snow control

Shelterbelt Resources

USDA - NRCS (Natural Resources conservation Service)

US Forest Service

NDSU

Local Soil Conservation Districts

North Dakota Forest Service

-Windbreak renovation program

NRCS Conservation Tree and Shrub Groups (CTSG)

Soil groups ranging from 1 through 10 with subgroups.

Determines soil textures, pH, salinity, and sodicity.

Shelterbelt design



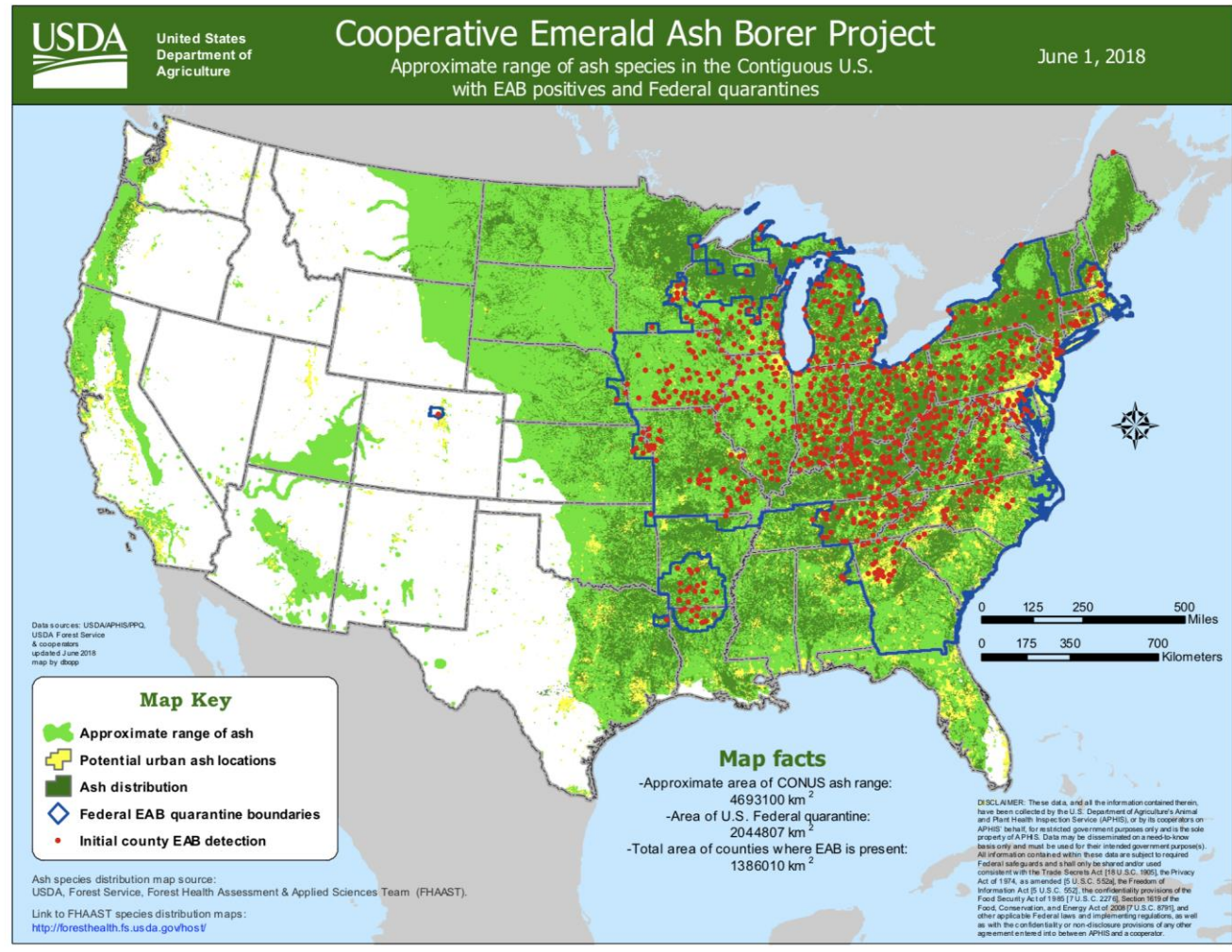
Photos: USDA NRCS

Green Ash

- Susceptible to Emerald Ash Borer -----



2 Photos: USDA



American Elm

- Susceptible to Dutch Elm Disease -----



2 Photos:

Forest
Service

---Flagging

- Chokecherry

Native Species

Edible Fruit



- Caragana

Drought-tolerant

Alkaline soil tolerant



Picture Credit: zahradnictvi_cervena.cz

- Colorado Blue Spruce

Drought tolerant

Prefer heavier soils

Average moisture



- Scotch Pine

Hardy

Prefer heavier soils

Fast growing



Photo: OhioDNR

- Ponderosa Pine

Drought resistant

Native Species

Competes well with grass



- Paper Birch

Prefers moist areas

Does not tolerate drought

Native Species



- Quaking Aspen

Prefers moist areas

Leaves shimmer due to flattened petioles.



- American Plum

Native Species

Edible fruit

Bushy tree



- Rocky Mountain Juniper

Native Species

Come in variety of forms

Good windbreak or animal cover



- Burr Oak

Long-living

Native Species

Abundant in Turtle Mountains and
Sheyenne river valley



- Russian Olive



- Russian olive is native to Europe and western Asia.
- Tree was widely used in North Dakota shelterbelts.
- Said to be likely planted in every North Dakota county.
- Very Hardy and tolerant.

- NOT NATIVE

- Hackberry

Native Species

Attracts wildlife



- Photo: Wikipedia

- Buffaloberry

Thorny

Native Species

Edible berries

Tolerates heavy clay soils



- Juneberry

Edible fruit

Native Species

Prefers moisture

Medium – Large Shrub



Photo: NDSU

- Siberian Larch

Looses needles each fall

Grows rapidly

Drought tolerant



- Common Lilac

Medium – Large shrub

Showy, fragrant flowers



Photo: Flickr

- Sandcherry

Native Shrub

Edible fruits

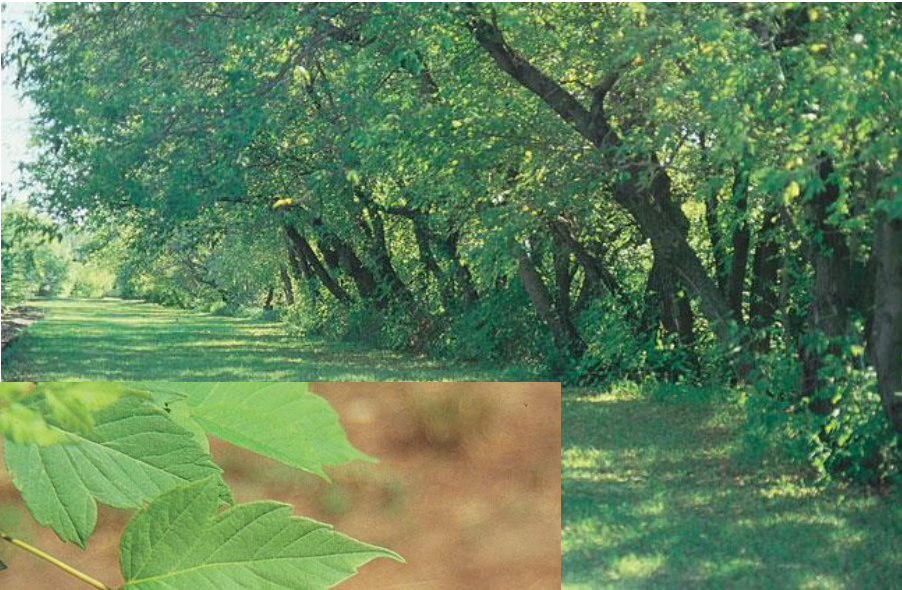


Photo: USDA

- Boxelder

Native Species

Prefers ravines, hillsides, coulees



2 Photos:
NDSU

- Crabapple

Attracts wildlife



- Willow

Native and non-native species

Low, wet areas



- Hawthorn

Dense low-branched tree

Attracts wildlife

Native and non-native species



- Ironwood (Hophornbeam)

Prefers moist areas

Native Species



- Redosier Dogwood

Native Species

Multi-stemmed shrub

Red bark provides color in winter



- Cottonwood

Native Species

Large tree

Can irritate allergies



- Smooth Sumac

Native Species

Common in Sheyenne River valley



- Photo: minnisotawildflowers.info

When Buying trees

Types of Planting Stock

Bare Root

Balled-in-Burlap (B&B)

Container

Planting Stock Sources

Local Nursery or Garden Center

-Bailey's Nursery

Mail order

-Jung's

Conservation Stock

-Towner State Nursery

Resources

North Dakota Tree Handbook NDSU

<https://www.ag.ndsu.edu/trees/handbook/ndhand-1.htm>

USDA NRCS Plants Database

<https://plants.sc.egov.usda.gov/java/>

Will Horneman – whorneman@fs.fed.us

Forest Service

USDA NRCS

NDSU