Emerald Ash Borer (EAB) Informational Guide

CITY OF EAGLE LAKE

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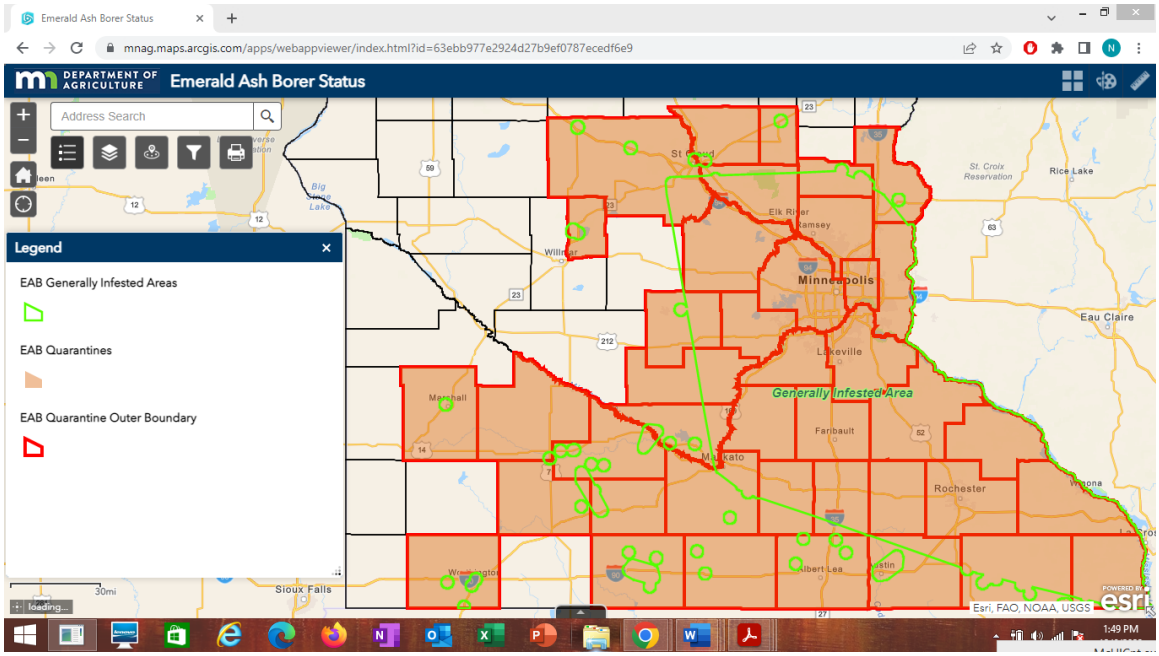
What is EAB?

Emerald Ash Borer (EAB) is an invasive species of beetle introduced from Asia. This insect was most likely introduced in the United States through wooden shipping materials. It was first located in Michigan in 2002 and has since spread throughout United States. It is now confirmed in 36 states and 5 Canadian provinces. National costs in damages are estimated to be over 10 billion dollars. Emerald Ash Borer relies on ash trees to reproduce. Adult beetles will lay their eggs in the summer. Then EAB larvae will hatch and start eating through the trees inner bark creating S-shaped tunnels (galleries). This activity disrupts the flow of nutrients throughout the trees vascular system. From here the ash tree will start to thin and then eventually die.

Where is EAB in Minnesota?

EAB is now confirmed in at least 34 counties, mostly located in the southern half of the state. The twin cities metro has the highest level of insect pressure and the most confirmed cases within the state. Mankato Minnesota is closest city with confirmed cases of EAB and Blue Earth County is listed as an EAB quarantine zone. Below is a map of EAB quarantine zones from the Minnesota Department of Agriculture's Website:



Identification

EAB only target ash trees and there are three major species of ash that are found in Minnesota. The most common is the green ash (*Fraxinus pennsylvanica*), while white ash (*Fraxinus americana)* and black ash (Fraxinus nigra) are also popular. There are some distinct characteristics that can help you identify an ash tree.

- Opposite branching
- compound leaves (multiple leaflets on one stalk which are joined to a branch)
- bark with a diamond shaped pattern (green ash typically have moss that grow on trunk)

- seeds are oar shaped samaras (winged seeds/fruit) and typically hang in large clusters
- Ash trees grow very tall and have wide reaching branches (very commonly grown in municipalities along boulevards)

Signs of EAB

There are numerous signs that indicate an EAB infestation in ash trees. By the time many of these symptoms show up it may often be too late as it can take up to 3 – 5 years for the damage to appear externally. Damage will start when the EAB larvae burrow inside the tree cutting off nutrients to the upper canopy. As the tree becomes more stressed it will start thinning. More woodpecker damage will occur as there is more larvae to eat. D-shaped exit holes will appear as adult beetles emerge from the tree. As a last resort the tree might grow epicormic shoots, which are new branches near the base/trunk of the tree. One damage starts to occur it will decline rapidly and a tree may look healthy and completely die a year or two after initial symptoms occur.

- Woodpecker damage (large holes/removal of bark from woodpecker feeding on EAB larvae)
- D shaped exit holes (left from emerging adult beetles)
- Thinning upper canopy (lots of branches dying)
- Epicormic shoots (new branches growing near base/lower trunk of the tree)
- S-shaped tunnels beneath bark (from EAB larvae)

Why manage EAB?

Trees are very beneficial to us and should be protected!

- They save you money! (Increase property value, reduced costs for cooling)
- Provide shade (the world is getting warmer, urban heat island effect will make it even hotter in urban spaces, making urban trees that much more important)
- Improve Air quality (trees absorb and store CO_2 and other air pollutants like particulate matter, helping to fight climate change and allowing us to breath cleaning air)
- Trees are pretty and they benefit YOU (an increase in urban greenery make people happier, can help reduce stress and anxiety, and make communities safer)
- Good habitat for native species
- Trees filter and clean our water (remove pollutants and sediments from rainfall)
- Help against floods (as they store water and slowly release it back into the environment)

What can you do?

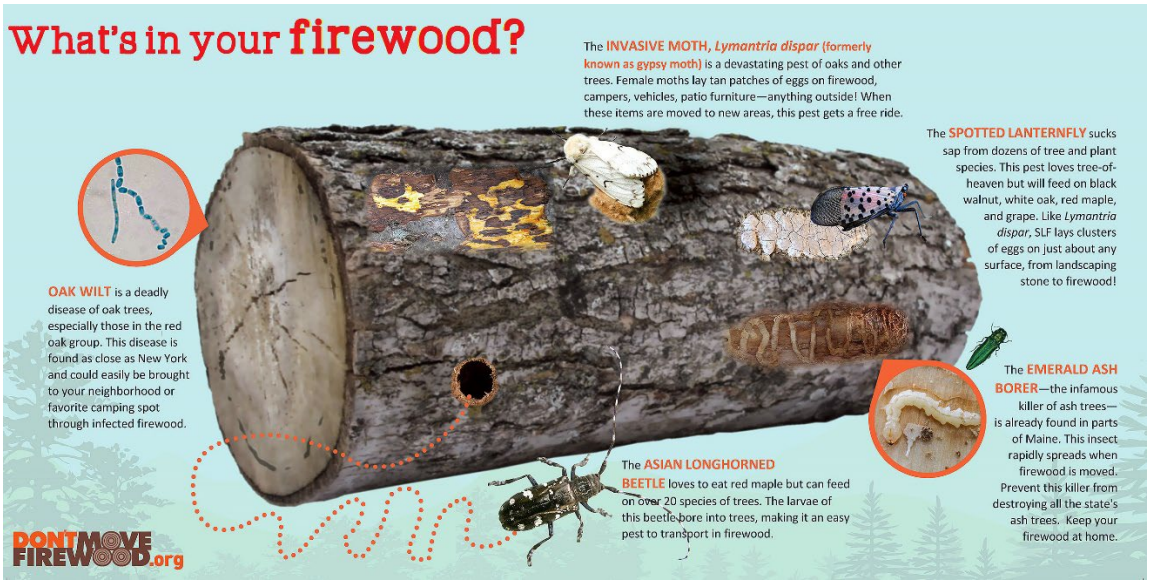
There are many things we can do to help stop the spread of EAB. Knowing how to properly identify an ash tree is a good start. Understanding the different signs of EAB and how to monitor for them is very beneficial for the community. Chemical treatments are a great preventative option for the protection of high value trees. Removing and properly disposing of dying ash wood is also critical in reducing the spread. Replacing dying ash trees with other tree species will help provide for a more biodiverse ecosystem.

Firewood

Minnesota prohibits the transporting of wood into or out of emerald ash borer infested regions. Blue earth county is one of 43 counties listed as quarantine zones

for EAB by the Minnesota Department of Agriculture (MDA). The twin cities and many urban areas in the southern half of the state are considered infested areas. Many southern Minnesota cities like Mankato, Albert Lea, New Ulm and far as Worthington are experiencing heavy infestation currently.

The MDA urges the public to purchase MDA certified firewood to protect our forests and not further spread of EAB. MDA certified firewood is heat-treated and can be moved throughout the state. The transporting of wood infested with EAB is a major factor for the widespread infestation throughout the state. By limiting the movement of any infested wood, we can help slow the spread of EAB. Following these rules will also help prevent the spread of other notable tree diseases and invasive insects. Other notable tree diseases and invasive insects include Dutch elm disease, oak wilt, bur oak blight, Asian Longhorn beetle, gypsy moth, and spotted lanternfly.



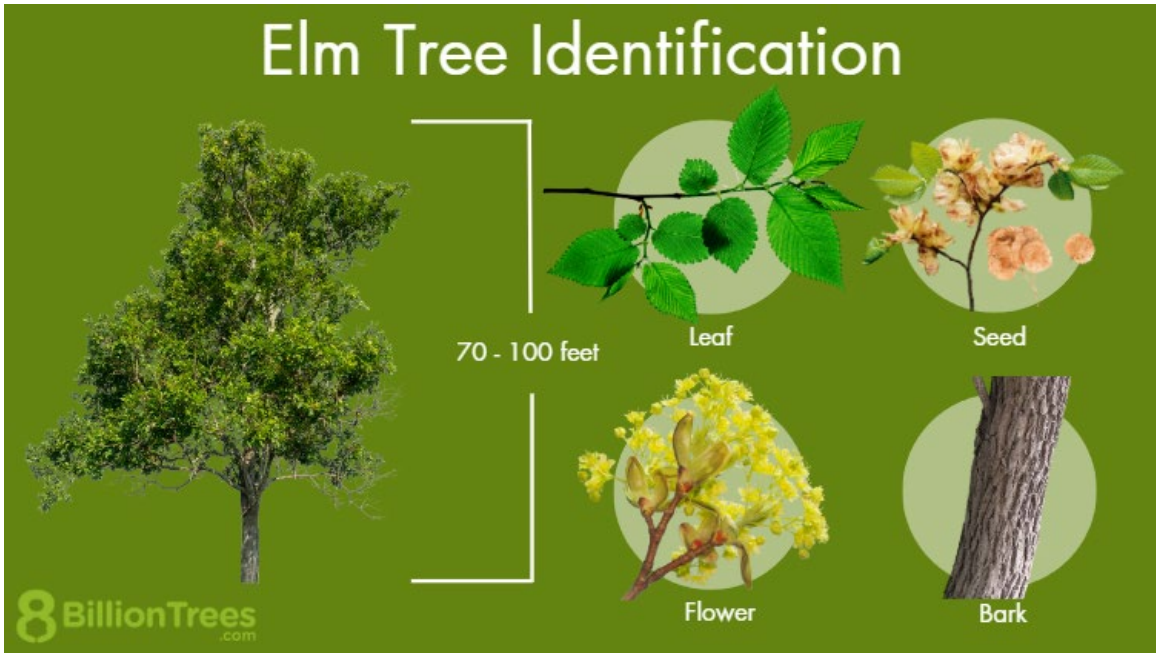
DUTCH ELM DISEASE

In the 20th century, the American elm was considered an ideal street tree because it was graceful, long-living, fast growing, and tolerant of compacted soils and air pollution. Elm populations were decimated when Dutch elm disease (DED) was introduced. DED is caused from a fungus that gets into the c=vascular system of the tree and cuts off nutrients, killing the tree (much like the result of emerald ash borer larvae tunneling through ash tree bark).

Signs of DED can be severe leaf wilting, early yellowing/browning. Dark streaks of discoloration on inner bark (when looking at cross section). The fungus can be

spread through root grafts (connected below ground roots from 2 or more trees). It can also spread when elm bark beetles move from tree to tree carrying spores of the fungus.

Management of Dutch elm disease involves disrupting the disease cycle by removing trees that are infected, insecticides to kill the insect vector (elm bark beetle), the breaking of root grafts, the use of fungicides, and the planting of elm species that have higher tolerance to the disease.



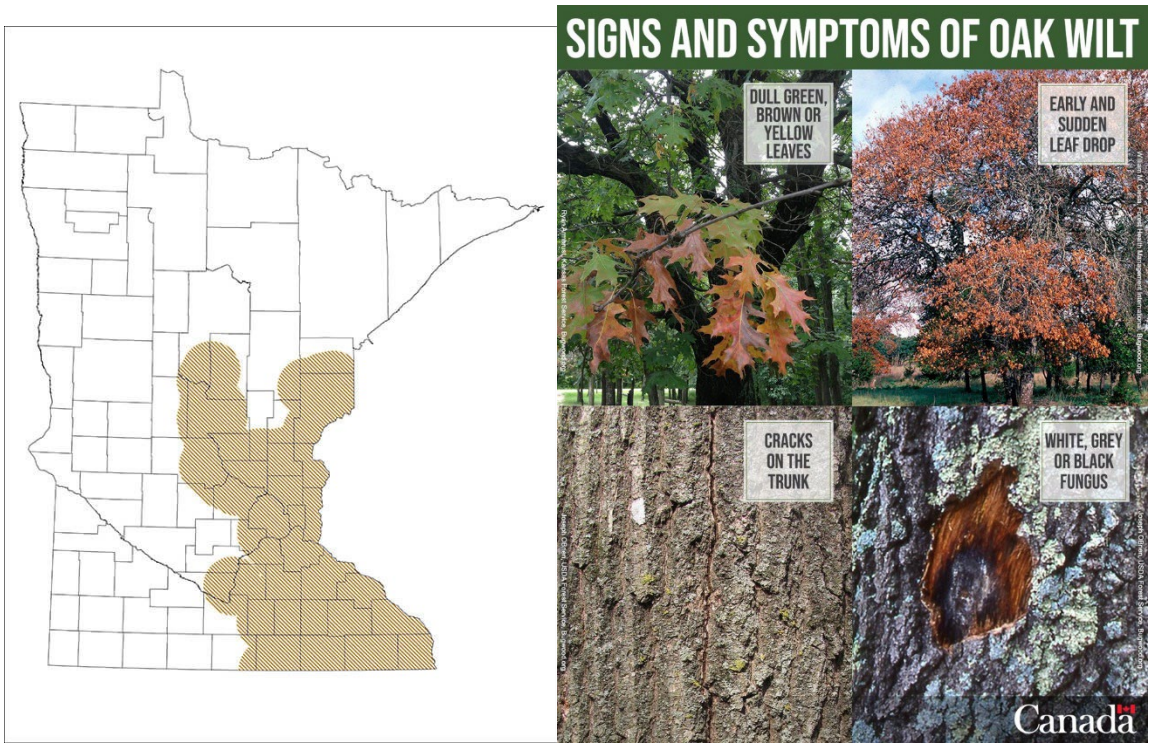
OAK WILT

Non-native fungus that kills all species of oak trees. Oak wilt is most severe in red oaks (northern red and pin oak), but species of white oaks (bur and white oak) are also susceptible. Red oaks can wilt and die in about 4 weeks while white oak might fight for several years (2-5 years) before dying.

Red Oak symptoms include rapid leaf wilting (starting at top and moving down), leaves turning bronze/reddish-brown color in summer (starting at leaf margin/tip), water-soaked appearance on green leaves, leaves prematurely falling, dark blue-grey discoloration when bark is peeled back, cracks in bark. When red oaks die from oak wilt, large fungal mats are formed.

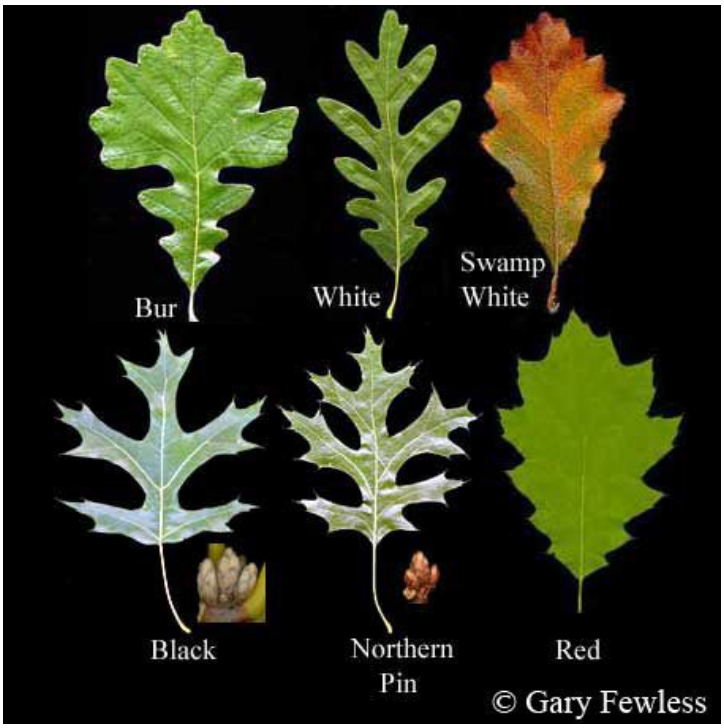
White Oak symptoms are the same but at a slower rate. The dieback will be more scattered (individual branches wilting first). Development of the disease is more of a year-to-year basis. White oaks do not create fungal mats.

Oak Wilt mostly spreads through underground root grafts so the disease can spread quickly in a forest or area with lots of oaks near each other. Oak wilt can also spread above ground via two species of sap beetles. These beetles are attracted to fresh wounds and fungal mats created from dying red oak trees. A beetle can detect and travel to a fresh wound on an oak tree within 15 minutes. It is recommended to wait until the dormant period (November-March) for all oak tree pruning. Fresh wounds made from pruning a healthy tree in the summer can attract a beetle that could spread the disease.



DON'T PRUNE OAKS IN THE SUMMER!

Oak wilt can be managed by cutting the root grafts between infected trees and non-infected ones, multiple control lines may be necessary. The most important thing you can do stop the spread to new areas is to not prune oaks during the summer. All pruning should be done over winter. Chemical treatments can be used on high value trees as a preventative from oak wilt. Chemical treatments may help white oaks if not heavily infected.

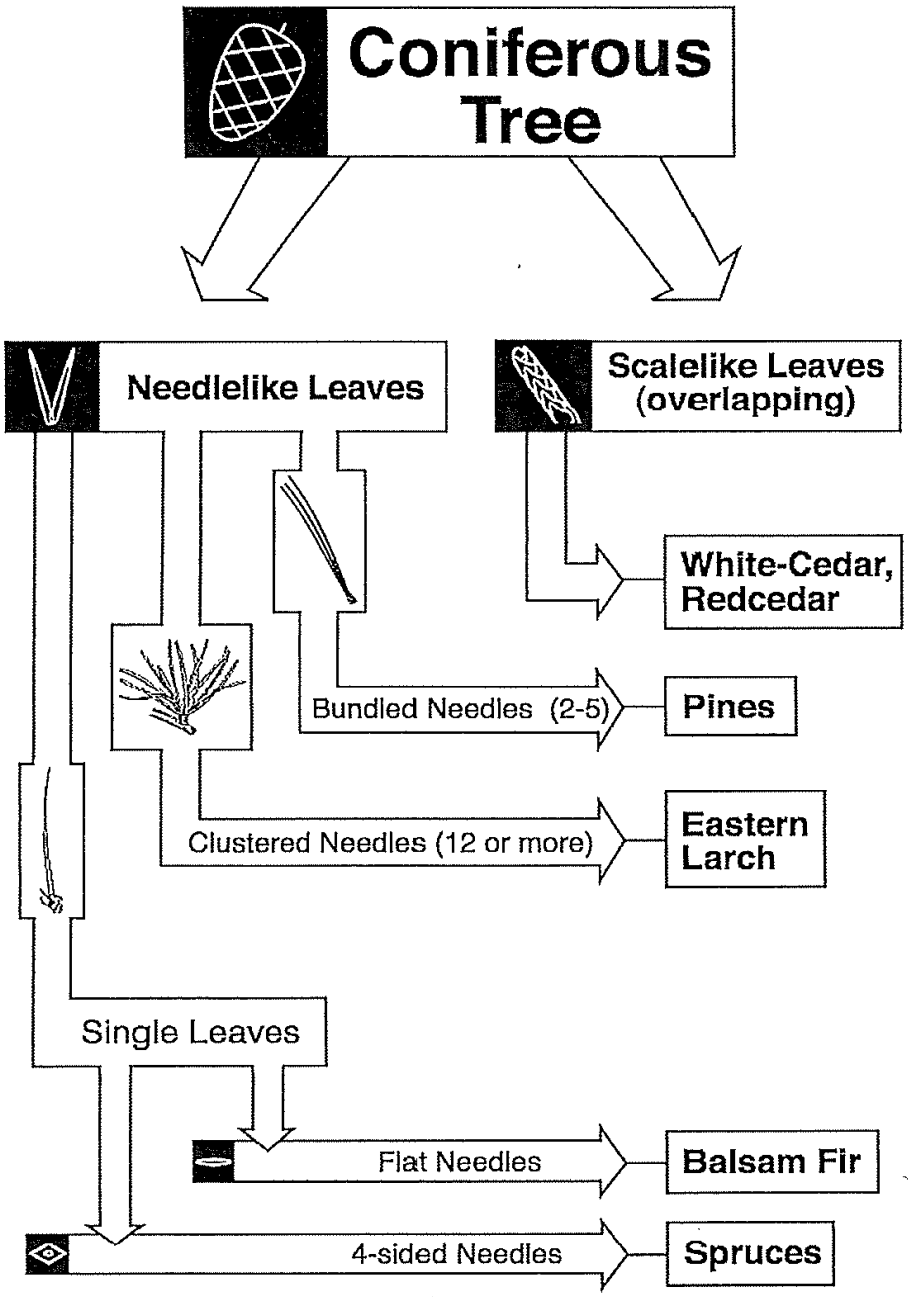


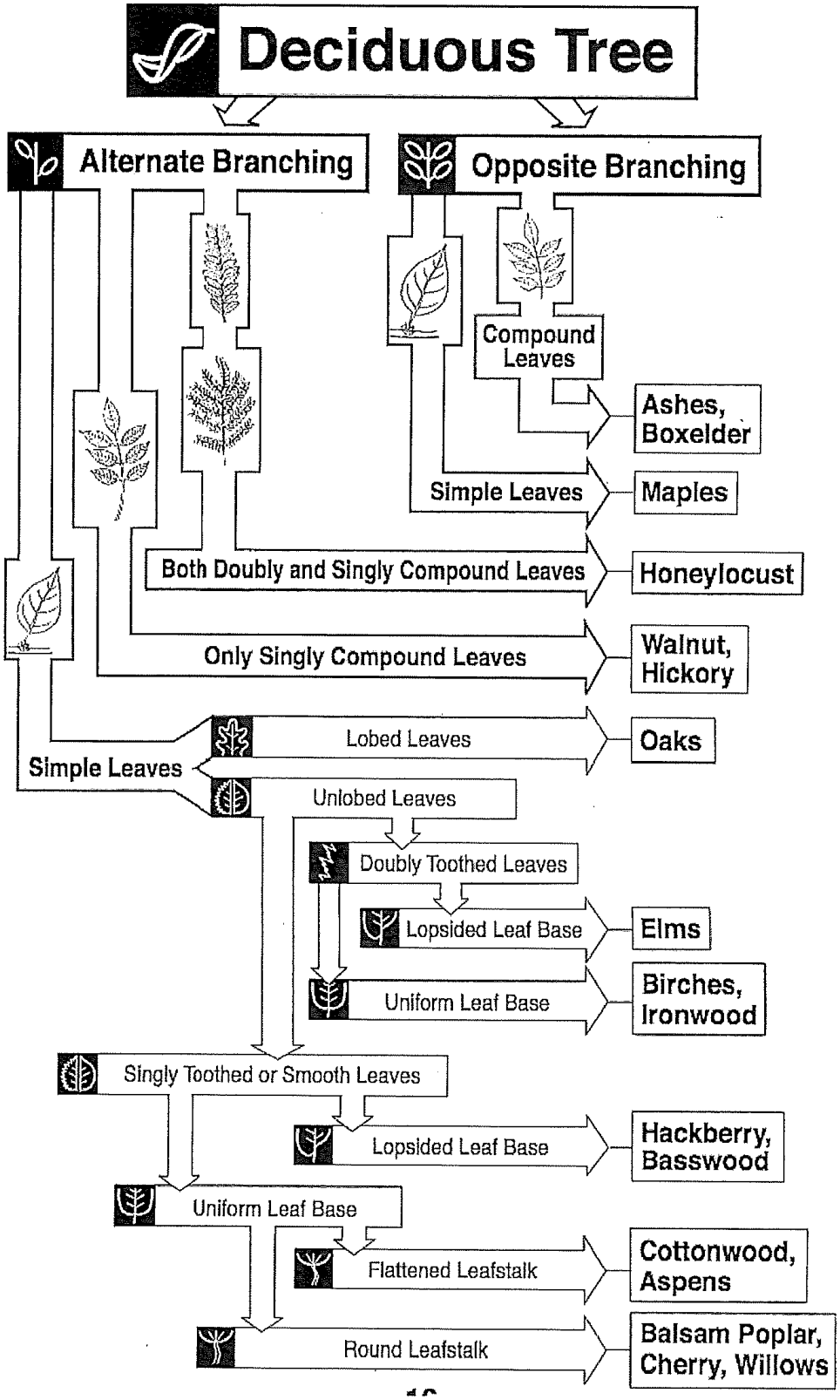
Bur Oak Blight

Fungus that only affects Bur oaks (more naturally occurring trees than one planted). Causes leaf spots in the summer. Spots appear purple/brown along major leaf veins and under leaves. Some infected leaves stay on tree over winter. Healthy bur oak trees drop their leaves for the winter (it should be noted that most other types of oaks, particularly swamp white oak, hold on to their leaves over winter).

SHORTCUT GUIDE TO MINNESOTA TREES

Read the signs and follow the arrows to find your tree




Deciduous Tree
Alternate Branching
Opposite Branching
Compound Leaves
Ashes, Boxelder
Simple Leaves
Maples
Both Doubly and Singly Compound Leaves
Honeylocust
Only Singly Compound Leaves
Walnut, Hickory
Simple Leaves
Lobed Leaves
Oaks
Unlobed Leaves
Doubly Toothed Leaves
Lopsided Leaf Base
Elms
Uniform Leaf Base
Birches, Ironwood
Singly Toothed or Smooth Leaves
Lopsided Leaf Base
Hackberry, Basswood
Uniform Leaf Base
Flattened Leafstalk
Cottonwood, Aspens
Round Leafstalk
Balsam Poplar, Cherry, Willows

RESOURCES:

EAB:
https://www.mda.state.mn.us/eab
https://mnag.maps.arcgis.com/apps/webappviewer/index.html?id=63ebb977e2924d27b9ef0787ecedf6e9
http://www.emeraldashborer.info/documents/Multistate_EAB_Insecticide_Fact_Sheet.pdf
http://www.emeraldashborer.info/documents/eab.pdf
https://emeraldashborerinsouthdakota.sd.gov/PDF/How-To-Identify-an-Ash-Tree-Infested-by-EAB_06-2001-2018.pdf

Firewood:
https://www.dontmovefirewood.org/map/minnesota/
https://www.mda.state.mn.us/reportapest

Tree ID
https://trees.umn.edu/sites/trees.umn.edu/files/files/general/beginners-guide-minnesota-trees.pdf

Benefits of trees:
https://www.nature.org/en-us/what-we-do/our-priorities/build-healthy-cities/cities-stories/benefits-of-trees-forests/?gclid=CjwKCAiA3aeqBhBzEiwAxFiOBsMBEBu2D308gj10AlJeT6vC7Peu0G5Cbwf-Ntl4KC-BRj3WPmm3KhoCoiAQAvD_BwE&gclsrc=aw.ds

Dutch Elm Disease:
https://extension.umn.edu/plant-diseases/dutch-elm-disease

Oak Wilt:
https://extension.umn.edu/plant-diseases/oak-wilt-minnesota