

University of Wisconsin Eau Claire

Campus Tree Care Plan



Updated 3/24/2022 DH

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UW -Eau Claire Campus Tree Plan

1) Purpose:

The purpose of the UW -Eau Claire Campus Tree Care Plan is to specify the guidelines and practices that are required in establishment, protection, maintenance, and removal of trees on the UW -Eau Claire Campus.

The goals of the tree care plan:

- Provide for the health and safety of the trees on the campus through ISA best management practices.
- Promote species diversity.
- Encourage the campus community to respect and value the campus urban forest.
- Provide adequate protection for designated campus trees during construction projects.
- Ensure that an acceptable replacement program accompanies any required tree removal on campus.

2) Responsible Department

UW- Eau Claire Grounds department under the guidance of the Facilities Director- Troy Terhark

3) Campus Tree Advisory Committee:

Includes the following members that will meet in February and October of each calendar year or as needed to provide guidance for future planning, approval of a comprehensive tree plan, education of the campus community to the benefits of the campus trees and development of connectivity to the greater Eau Claire community.

Members:

- Student Office of Sustainability Director- Maddie Loeffler
- Landscape Architect/ISA Certified Arborist- Daria Hutchinson
- Grounds Supervisor- Aaron Turek
- Biology Faculty Emeriti- Joe Rohrer
- Assistant Professor Biology- Nora Mitchell
- Public Health and Environmental Studies Associate Professor - Karen Mumford
- Arborist/Eau Claire City Forestry Supervisor- Matt Staudenmaier

4) Campus Tree Care Practices

A. Tree Selection Standards

UW- Eau Claire Grounds Department selects tree species from the list of plants indicated on the 2017 Landscape Master Plan or an approved equal. Tree species are both native and non-native.

Factors influencing tree selection will include:

- soil conditions
- exposure (sun and wind)
- human activity
- drainage
- space constraints
- hardiness zone
- potential pest problems
- maintenance requirements
- number of species already present on campus

1. Trees will be pre-selected, when possible, from a quality nursery.
2. Acceptable standard for balled and burlap trees will range between 1-1/2" to 2-1/2" caliper.
3. Evergreen trees - range of 6'-7' height.
4. If B& B is not available, container trees may be an acceptable substitute.
5. All tree selections shall follow the Guideline Specifications for Nursery Tree Quality.

i) Recommended Tree Palette:

Native Trees

<i>Acer rubrum</i> 'Franks Red'	Red Sunset Maple
<i>Acer saccharinum</i>	Silver Maple
<i>Acer saccharum</i>	Sugar Maple
<i>Acer saccharum</i> ssp. <i>Nigrum</i>	Black Maple
<i>Acer x freemanii</i> 'Autumn Blaze'	Autumn Blaze maple
<i>Acer x freemanii</i> 'AF-1'	Firefall Maple
<i>Acer x freemanii</i> 'Armstrong'	Armstrong Maple
<i>Acer x freemanii</i> 'Marmo'	Frank's Red Maple
<i>Aesculus glabra</i>	Ohio Buckeye
<i>Aesculus hippocastanum</i> 'Baumannii'	Double Flowering Horse Chestnut
<i>Alnus hirsuta</i> 'Harbin'	Prairie Horizon Alder
<i>Alnus rugosa</i>	Speckled Alder
<i>Amelanchier laevis</i> 'Spring Flurry'	Spring Flurry Serviceberry
<i>Betula alleghaniensis</i>	Yellow Birch

<i>Betula papyrifera</i>	Paper Birch
<i>Carpinus caroliniana</i>	American Hornbeam
<i>Carya cordiformis</i>	Bitternut Hickory
<i>Carya ovata</i>	Shagbark Hickory
<i>Catalpa speciosa</i>	Northern Catalpa
<i>Celtis occidentalis</i>	Hackberry
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cornus alternifolia</i>	Pagoda Dogwood
<i>Crataegus crus-galli</i> var. <i>inermis</i>	Thornless Cockspur Hawthorne
<i>Fagus grandifolia</i>	American Beech
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Imperial'	Imperial Honeylocust
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'N. Acclaim'	Northern Acclaim Honeylocust
<i>Gymnocladus dioicus</i> 'Expresso'	Kentucky Coffeetree
<i>Juglans nigra</i>	Black Walnut
<i>Juniperus virginiana</i>	Eastern Red Cedar
<i>Larix laricina</i>	Tamarack
<i>Malus ioensis</i>	Prairie Crabapple
<i>Ostrya virginiana</i>	American Hophornbeam
<i>Ptelea trifoliata</i>	Hop Tree
<i>Picea glauca densata</i>	Black Hills Spruce
<i>Pinus resinosa</i>	Red Pine
<i>Pinus strobus</i>	White Pine
<i>Populus deltoides</i>	Eastern Cottonwood
<i>Populus tremuloides</i>	Quaking Aspen
<i>Prunus serotina</i>	Black Cherry
<i>Quercus alba</i>	White Oak
<i>Betula nigra</i> 'Cully'	Heritage River Birch
<i>Quercus bicolor</i>	Swamp White Oak
<i>Quercus ellipsoidalis</i>	Northern Pin Oak
<i>Quercus macrocarpa</i>	Bur Oak
<i>Quercus muehlenbergii</i>	Chinkapin Oak
<i>Quercus rubra</i>	Red Oak
<i>Quercus x bimundorum</i> 'Midwest'	Prairie Stature Oak
<i>Quercus x schuetti</i>	Swamp /Bur Oak
<i>Sorbus decora</i>	Showy Mountain Ash
<i>Thuja occidentalis</i> 'Hetz Wintergreen'	Wintergreen Arborvitae
<i>Tilia americana</i> 'McSentry'	American Sentry Linden
<i>Tsuga canadensis</i>	Canadian Hemlock
<i>Ulmus americana</i> 'Princeton'	Princeton Elm

Introduced Trees

<i>Aesculus x arnoldiana</i> 'Autumn Splendor'	Autumn Splendor Buckeye
<i>Alnus hirsata</i> 'Harbin'	Prairie Horizon Alder
<i>Chionathus virginicus</i>	American Fringetree
<i>Cladrastis lutea</i>	American Yellowwood
<i>Cornus mas</i> 'Golden Glory'	Golden Glory Dogwood
<i>Ginkgo biloba</i> 'Princeton Sentry'	Maidenhair Tree
<i>Liquidambar styraciflua</i>	American Sweetgum
<i>Maackia amurensis</i>	Amur Maackia
<i>Magnolia acuminata</i> 'Butterflies'	Butterfly Magnolia
<i>Magnolia</i> 'Jane'	Jane Magnolia
<i>Magnolia stellata</i> 'Royal Star'	Royal Star Magnolia
<i>Malus</i> 'Adirondack'	Adirondack Crabapple
<i>Malus</i> 'Prairifire'	Prairifire Crabapple
<i>Malus</i> 'Adams'	Adams Crabapple
<i>Malus</i> 'Jewelcole'	Red Jewel Crabapple
<i>Malus</i> 'Royal Raindrops'	Royal Raindrops Crabapple
<i>Malus</i> 'Sargentii'	Sargent's Crabapple
<i>Picea pungens</i>	Colorado Spruce
<i>Robinia psuedoacacia</i> 'Purple Robe'	Purple Robe Black Locust
<i>Syringa reticulata</i> 'Ivory Silk'	Japanese Tree Lilac
<i>Taxodium distichum</i> 'Mickelson'	Bald Cypress
<i>Ulmus japonica x wilsoniana</i> 'Morton'	Accolade Elm
<i>Ulmus x</i> 'Patriot'	Patriot Elm

ii) Prohibited Species

Any plant listed on Wisconsin NR Invasive Species List

<http://dnr.wi.gov/topic/Invasives/classification.html>

<http://dnr.wi.gov/topic/Invasives/photos/>

B. Preventative Maintenance Pruning and Schedule

Because each cut has the potential to change the growth of a tree, no branch will be removed without first establishing clearly defined objectives. Removing the correct branches to accomplish specific goals is as important as making correct pruning cuts. Pruning goals must consider tree growth, development, and effects on the tree over the long term. Never remove more than ¼ of the tree leaf bearing capacity. Some points to consider:

- Establishing a strong central leader
- Reducing the potential for tree or branch failure
- Providing clearance

- Reducing wind resistance
 - Maintaining tree health
1. Majority of structural tree pruning takes place in the fall/winter/early spring as the tree form is clearly visible and the tree is dormant.
 2. Tree pruning occurs in the summer for storm damage and hazardous limbs. Gardener or the grounds supervisor must access and clear tree pruning.
 3. Only prune Oak and Elm trees while dormant unless it is a hazardous situation. Dead limbs can be marked with white paint in the active growing season for later dormant season pruning.

C. Structural Pruning

There are three basic steps to developing and maintaining a dominant leader.

1. Identify the stem that will make the best dominant trunk. It should be in the center of the crown, free of cracks, openings, mechanical damage, large pruning wounds, cankers or other defects that could compromise its strength.
2. Identify the branches that are competing with this central leader
3. Remove the competing branches back to the trunk or shorten them with a reduction cut. Be sure to remove branches that are clustered together and growing from the same point on the trunk. Ideally, only one large branch grows from one position on the trunk.

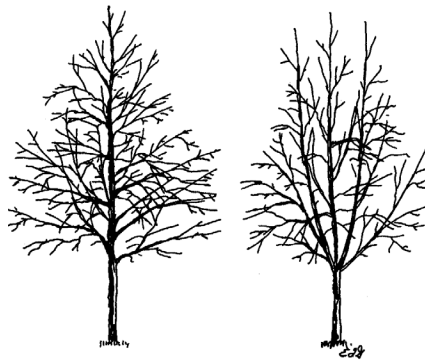


Fig. 1 Good tree structure Poor tree structure

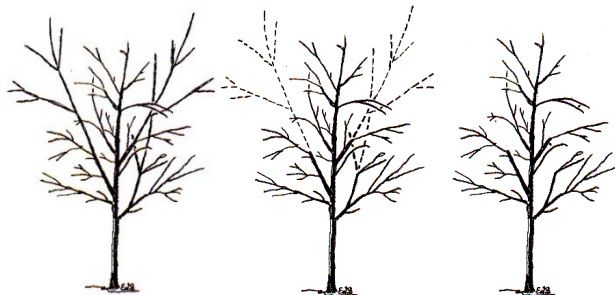


Fig. 2 Shorten competing stems to improve structure.

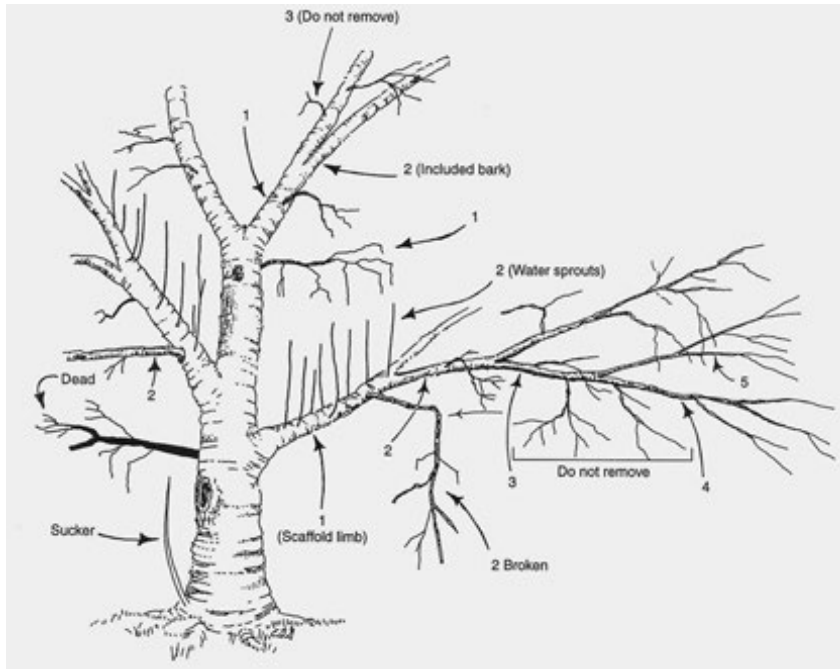
Structural Tree Pruning Timelines:

Tree	Initial Pruning	Incremental Pruning Schedule
Maple Elm	2 years after planting.	2- year increments afterword.
Birch Black Gum Catalpa Elm Aspen Maples Honeylocust Linden Cork Tree	3 years after planting.	3/4 -year increments afterword.
Beech Hackberry Hickory Coffeetree Walnut Butternut Oak Ginkgo Turkish Filbert	5 years after planting.	5 - year increments afterword.

D. Structural Pruning on Mature Trees

Structural changes in older trees occur slowly because parts are much larger, and growth has slowed. Structural pruning can still occur by focusing on making two- to four-inch-diameter cuts on codominant stems and other weak limbs. Similar to small trees, the focus is on reducing the length of stems and branches that compete with the leader, and those with defects. Removing additional branches behind the reduction cut can suppress growth rate on the pruned

stem even further. Unlike reduction cuts, removing only secondary lateral branches from stems and branches that compete with the leader on mature trees causes less dysfunctional wood behind pruning cuts. However, secondary branch removal does less to relieve mechanical stress along the pruned branch than reduction. Moreover, the branch may be forced to grow too long unless it is reduced in length with a reduction cut.



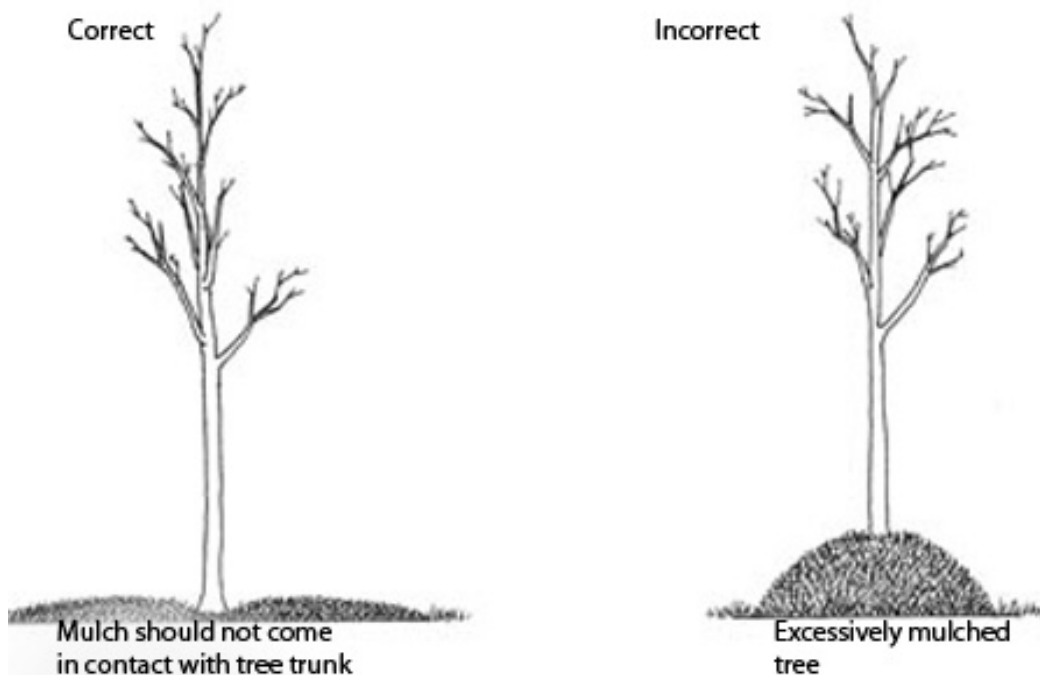
- Branches marked with a 1 or a 2 should be removed only after all other possibilities have been considered. Removing large primary branches (those marked with a 1 can result in large pruning wounds; presence of small primary branches often indicates response to injury or old age. Retaining these small branches can promote long life and faster recovery from injury.
- Focusing on branches marked with a 3, 4, or 5 (i.e. the small diameter branches toward the periphery of the crown) results in smaller pruning wounds. In many cases, pruning in this part of the crown provides enough reduction in sail area and stress on the parent branch to significantly improve structure.

Follow the rule of never removing ¼ of the tree leaf bearing capacity.

- Prune any dead and broken branches.
- Shorten longer branches of limbs growing horizontally to reduce weight.
- Remove limbs with included bark.
- Remove waters sprouts from limbs and suckers from the base of the tree.
- Do not prune small branches.

E. Mulching

- Spread mulch under trees to a recommended depth of 3-4 inches with double shredded hardwood mulch.
- Pull mulch away from the bases of tree trunks creating a donut-hole. Do not pile it up against the trunk (volcano mulching). Excessive mulch on the trunk causes moisture to build up, creating ideal conditions for insect pests, diseases, and decay. Mulch should taper in thickness to meet the grade of the surrounding turf.
- Ideally, the mulched area around a tree should extend to the drip line of the branches, or at least cover a 4-5-foot diameter area around the trunk. The larger the mulched area, the more beneficial. On larger, older trees that are in lawn areas and not in the way of sidewalks, roads etc. the first consideration should be to cut a larger mulch ring rather than pruning up.
- Check the mulch depth annually and replenish, as necessary. Sometimes this requires removal of old mulch before applying new to maintain proper depth.
- Weed spraying in tree rings is allowed a maximum of two times per season; any weed over 2" will be hand pulled.



F. Hazardous Tree Assessment, Pruning and Removal

Tree inspection of all mature trees on a yearly basis in late fall – early winter. Work on trees will be completed in house by UW Eau Claire Grounds Crew or contracted out depending on size, severity, location, and timing of the pruning/removal.

If there is disagreement on the condition of a tree, the grounds department will consult with the Eau Claire City Arborist.

What to look for:

- Location (In regard to nearby targets)
- Dead Wood
- Cracks
- Weak Branch Unions
- Decay
- Cankers
- Root Problems
- Poor Tree Architecture

Corrective Actions:

- Move the Target
- Prune the Tree
- Remove the Tree

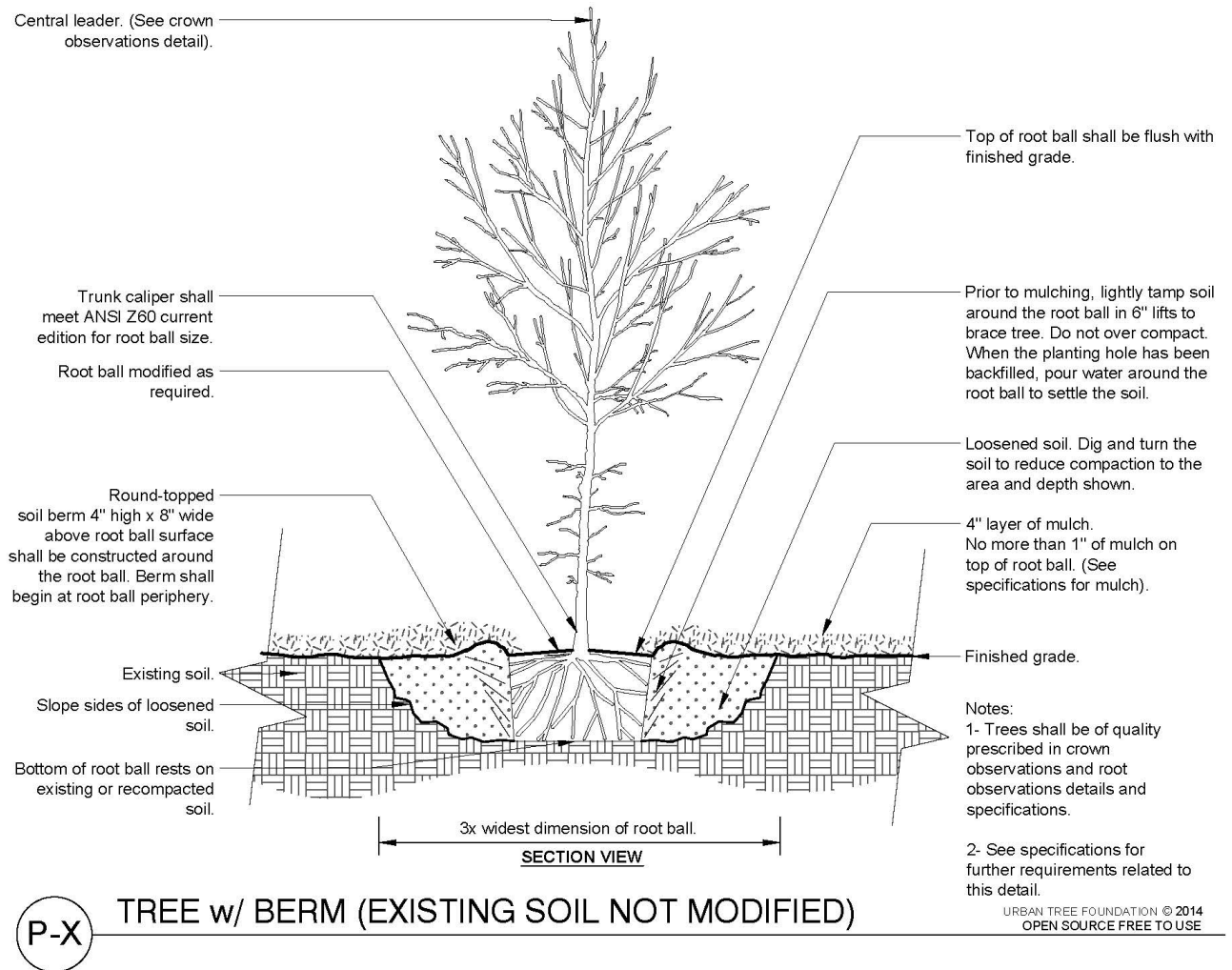
Hazard tree assessment tatum guide

HAZARD POTENTIAL

Defect	Moderate	High
Crack	Hardwood stem has single crack with cavity or decay inside	Crack goes completely through stem. May be able to detect movement of section of stem
		Stem has 2 cracks on the same segment with cavity or extensive decay inside
		Stem has crack in contact with another defect or at base of leaning tree
		Branch (4" or larger) has any crack Conifer has a single crack with inrolled bark and cavity or decay are inside
Weak unions	A weak union with inrolled bark	A weak union that is also cracked, cankered or decayed
		A weak union in the tree's hot spot
Decay	Canker-rot infection	Canker-rot infection in tree's hot spot
		Cavity or decay (fruiting body) associated with an open crack or a weak branch union Any branch with decay
Canker	Canker affects > 1/2 of tree's circumference	Canker in tree's hot spot and affects > 1/2 of tree's circumference
	Canker at base of leaning tree	Canker-rot infection in tree's hot spot
		Canker physically connected to crack, decay or weak union
Dead	Branch more than 2/3rds dead (remove branch)	Any dead tree
		Any dead branch or top
		Any lodged branch
Poor tree architecture	Branch unbalanced with respect to rest of crown mass	Tree leaning over target with > 45 degree angle to the lean
	Branches with sharp bend or twist	Tree leaning over target with another defect in the hot spot
Root problems	Root problems associated with stem decay, crack or canker	Freshly leaning tree with recent root-lifting, soil movement or mounding near base of tree
		Inadequate root support > 1/2 of roots severed inside dripline

From " How to Detect, Assess and correct Hazard Trees in Recreational Areas", 1993, Minnesota Department of Natural Resources—Forestry.

G. Planting



- Mulched area around a tree should extend to the drip line of the branches, or at least cover a 4-5-foot diameter area around the trunk. The larger the mulched area, the more beneficial. On larger, older trees that are in lawn areas and not in the way of sidewalks, roads etc. the first consideration should be to cut a larger mulch ring rather than pruning up.
- Check the mulch depth annually and replenish, as necessary.

H. Integrated Pest Management

IPM is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.

i. **UW Eau Claire- Emerald Ash Borer Management Plan** (Implemented in 2014)

The Emerald Ash Borer is an invasive insect that introduced to the United States via wooden packing material in 2002, in Detroit, Michigan. It has since spread to neighboring states and discovered in Wisconsin in 2008. As of November 2013, 21 counties are under quarantine for EAB, including the bordering county of Trempealeau. Despite the current cold winter, the Wisconsin DNR has indicated that the Emerald Ash Borer is likely to rebound this summer, as borers are adapted to cold winters in their native habitat and have the bark of the trees to provide shelter. They recommend moving forward with EAB management plans.

By implementing a management plan, UWEC seeks to lessen the impact of EAB infestation on the campus through:

1. The creation of a campus tree inventory, defining trees principally suitable for treatment.
2. Establishing an ash treatment strategy.
3. Locating holding areas for ash tree removal and developing procedures for dealing with infested material.
4. Creating re-planting recommendations.

Assessment

EAB was confirmed in Eau Claire County on November 27, 2017. The Wisconsin DNR quarantined the county. In Eau Claire, the vast majority of untreated ash trees will be killed in a 4-year window. The UW- Eau Claire Campus has an EAB plan in effect since 2014. The Grounds department has replaced 10-15 Ash trees per year; we will have a complete change out in about 6-7 years of the trees in the maintained areas of campus. However, research and experience continue to support that insecticide treatment of suitable ash trees can be more cost effective in the end – and more environmentally sound – than complete removal and replacement. Some treatment options have proven to be effective, and it would be worth keeping a remnant population of ash trees for various reasons, including retaining some larger trees on campus.

There are two reasons to treat ash trees.

1. Treating ash trees will prolong the ash tree removal process and spread out the cost in removal, replanting and reduce the immediate impact of the landscape.

2. Treating ash trees will preserve them for an indefinite amount of time. As time passes, new chemicals may be found to protect trees longer and for less money. New predators may limit or eliminate EAB. As the first initial large wave of EAB passes through, we may not have to treat trees as often and may minimize the need for removal. The UW Eau Claire campus uses the following method to treat 14 campus Green Ash trees.

Azadirachtin (TreeAzin), a relatively new trunk injection product is also approved for 2-year coverage though it is being applied on an annual basis to ensure best possible outcomes for treatment in quarantined areas, it is a class 4 pesticide (least hazardous that is commercial) and is approved for use on organic crops. Application Mid-April to early September. For maximum efficacy TreeAzin treatment should be timed with the emergence of adult Emerald Ash Borer beetles (early May to Mid-June).-UW-Eau Claire is currently using this method.

The UW Extension's research indicates that spring application have been more effective at controlling EAB and protecting canopy health.

LALGUARD AZA (Used as an updated injection replacing TreeAzin for Emerald Ash Borer injections in 2021)

LALGUARD AZA is a water-soluble, botanical insecticide applied by microinjection into the active sapwood or used as a foliar spray on affected trees. The active ingredient, azadirachtin, is derived from the neem tree (*Azadiracta indica*) and is an extract of neem seeds (not neem oil). It is not a neonicotinoid nor is it from the avermectin family of pesticides. Azadirachtin acts as an insect growth regulator, interfering with the metabolic process and molting of insects, has antifeeding properties, and reduces fecundity in female adults.

It degrades naturally and does not persist in the environment, giving LALGUARD AZA desirable ecological properties without compromising efficacy. Research confirms that LALGUARD AZA poses no measurable risk to aquatic and terrestrial invertebrates, making it ideal for use in urban and environmentally sensitive areas.

What makes it different from TreeAzin? Since LALGUARD AZA has a higher concentration of azadirachtin than TreeAzin, less product volume is required per inch of tree diameter. The benefits of a smaller dose include:

- o Significant cost-savings

- o A reduction in the volume of product needed to flow through the tree, thereby reducing otherwise longer injection times

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- o Significant cost-savings.
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The new LALGUARD AZA formulation allows the active ingredient (azadirachtin) to translocate evenly and effectively throughout the crown of the tree, while maintaining adequate concentrations to remain effective.

The new LALGUARD AZA formulation persists longer in plant tissues than TreeAzin, providing longer seasonal coverage.

LALGUARD AZA contains formulants that allow for faster translocation and persistence when injected. These ingredients directly affect the speed and dispersal of azadirachtin inside a tree.

Management

There are currently 22 ash trees on the actively maintained portions of the UWEC campus. We currently treat 12 trees, with trunk injections every 2 years including two trees on lower campus and the grove of ash around the Haas Fine Arts building.

All the ash trees indicated are 10" or larger in caliper.

The current plan for ash removal will be trees located in close proximity to campus parking lots, and near buildings. The condition of the remaining trees will be reviewed frequently, and any severely damaged or marginal trees should be removed as needed.

Disposal of infected trees must comply with the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) guidelines for trees removed by contractors or by campus staff. The latest guidelines can be found here:

<http://datcpservices.wisconsin.gov/eab/articleassets/Guide%20to%20WI%20ash%20wood%20transport%20utilization%20and%20disposal%20regs.pdf>

The campus should continue to plant a diverse variety of trees with an emphasis on select natives and "nativars". A listing of ash tree replacements can be found here:

http://datcpservices.wisconsin.gov/eab/articleassets/Alternatives_to_Ash_Pro.pdf

ii. **Oak Wilt**

Oak wilt caused by the fungus *Ceratocystis fagacearum*; this disease continues to kill oaks in Wisconsin every year. In mixed stands of white and red oaks, red oaks may die out leaving a pure stand of white oaks.

The oak wilt fungus invades the water conducting vessels of the sapwood through fresh wounds or by root grafts formed between diseased and healthy trees. In a few days, balloon-like tyloses and gums begin to plug the water conducting tissue, blocking the flow of water and nutrients from the roots to the foliage. As the supply of water becomes restricted, leaves wilt, and die. No complete control or cure for oak wilt exists. However, proper care plus mechanical and chemical control measures can keep the disease from spreading to healthy trees nearby.

Management

UW Eau Claire campus grounds uses control measures designed to keep the disease from spreading by preventing unnecessary wounds, severing root grafts either mechanically or chemically, and removing and destroying diseased trees early. Oaks are only be pruned in the dormant season. Fresh pruning cuts and bruises typically heal faster during dormant season and are less likely to attract disease-carrying insects. Pruning during the infectious spring and summer seasons carries the risk of spreading disease to other trees. In some instances, fungicides may be used where high value trees are in danger and when all other appropriate control measures have been implemented.

I. Invasive Plant Removal-

The following are not exclusive to Putnam Park but are of particular concern in managing the urban forest areas located around the UWEC campus.

Identification:

Buckthorn (Common and Glossy)

- Terminal Buds looks like a buck hoof (Common)
- Terminal buds are rust colored and hairy (Glossy)
- Holds leaves longer than other woodies
- Black Berry clusters
- Elongated lenticels on bark
- Bark becomes rough with age

Exotic Bush Honeysuckle (Amur, Morrow and Tartarian Honeysuckle)

- Entire leaf margin- smooth
- Opposite leaves
- Hollow pith in stem
- Red berries
- Persistent leaves in fall

Winged Euonymus (Burning Bush)

- Winged, corklike stems-4 ridges on each stem
- Red/orange oval berry
- Red leaves in fall
- Opposite leaves

Treatment:

Cut stems to soil surface and treat the stump to prevent re-sprouting using one-part Garlon 4 to three parts Basal Oil. Use a small hand sprayer or wand blower to coat the entire cut surface.

Garlic Mustard

- First-year plants are low rosettes of kidney shaped leaves.
- Second-year plants produce single or multiple flowering stalks 1-4 ft. high.
- Leaves: crushed leaves and stems smell like garlic
- First-year leaves are kidney-shaped with scalloped margins, leaves of mature,
- Second year plants are heart-shaped with toothed margins and pointed tips.
- Flowers, fruits, and seeds: flowers occur in small button-shaped clusters.
- Flowers have four petals in the shape of a cross.
- Fruits are slender, erect capsules (siliques).
- Seeds are 2½-3 mm long, slender and tan to dark.

Treatment:

Garlic mustard seeds can survive for five or more years in the soil. Effective management requires a long-term effort. Hand removal of plants along with the roots, is effective for light, scattered infestations. Flowering plants are low to the ground in spring to prevent seed production but cut plants can re-sprout. Careful hand removal and double bagging of plants with mature fruits are done as soon as fruits are present. Systemic herbicides containing glyphosate are effective, but repeated treatments are usually needed because of the large seed stores in the soil. Garlic mustard can also be weed whipped after flowering and before seed set which will kill the plant.

Black Locust

- Appearance: Fast growing tree up to 75' in height with deeply furrowed with flat-topped ridges. Seedlings and root sprouts have long thorns and grow rapidly.
- Leaves: Alternate, pinnately compound (leaflets on both sides of a common stalk) with 7- 21 elliptic, un-toothed leaflets, with one leaflet at the tip. A pair of short, sharp thorns sit at the base of each leaf where it is attached to the twig.
- Flowers: Fragrant, drooping white flowers arranged in elongated clusters appear in late May and June.
- Seeds: Seed pods are smooth, 2 - 4" long; they mature in September and persist through winter.
- Roots: Extensive fibrous root system. Spreads vegetatively through root suckering and runners.

Treatment:

- Organic: Studies indicate that neither cutting nor girdling alone is effective at killing a clone of black locust. Cutting and girdling stimulates suckering from the root system. Regularly repeated grazing with goats, mowing and/or burning may be effective at killing the root system, but this treatment will need to be aggressive if it is to be effective.
- Chemical: Every stem in the colony must be treated at the same time in order to prevent the root system from receiving energy from the remaining stems. This work is best done in the dormant season to prevent collateral damage to neighboring plants. Commonly, black locust is cut down or girdled, then herbicide is applied to the cut surface. Aminopyralid (Milestone®) and clopyralid (Transline®) are both effective at killing black locust, applied to the stump at a 5% concentration. Both water and mineral oil can be used as carries for these chemicals, but regular agitation is needed when mixed in oil.

Basal bark treatment with Milestone or Transline at 5% mixed in mineral oil. Apply with a backpack sprayer from the base of the tree up the trunk 1-1.5'. This method is most effective on smaller, thinner barked stems and must be done very thoroughly to completely saturate the bark of the tree.

Re-sprouts can be treated with a foliar application of the same herbicides, at roughly 0.25 oz/gal. Always read herbicide labels carefully before use and always apply according to the instruction on the product label.

J. Snow Removal-

Grounds snow removal planning occurs every fall to evaluate campus changes and create a location plan for temporary and permanent snow piles placement. The grounds crew reviews practices and procedures on an annual basis to assure snow and salt placement is in the proper locations

away from trees, planted beds and irrigated lawn areas. (For more information, see the UWEC Grounds Snow Removal Policy)

K. Winter Tree Guard Protection-

All trees under 6" caliper with smooth bark are wrapped with corrugated plastic tree guards in late fall to protect the bark from sunscald, frost cracks, and pest damage.

5. Tree Protection and Preservation Policy

All future development activities on the campus will include plans to the extent possible to preserve and protect trees. During initial construction project planning, all trees within the project limits will be assessed for their value and condition and will be protected or removed within the scope of the project. The overall goal is to plant and preserve trees in the proper locations for optimal growth.

a) High Priority- Any desirable tree species with good structure, health and room to grow to maturity. Desirable tree species less than 6-inch DBH may warrant consideration for relocation.

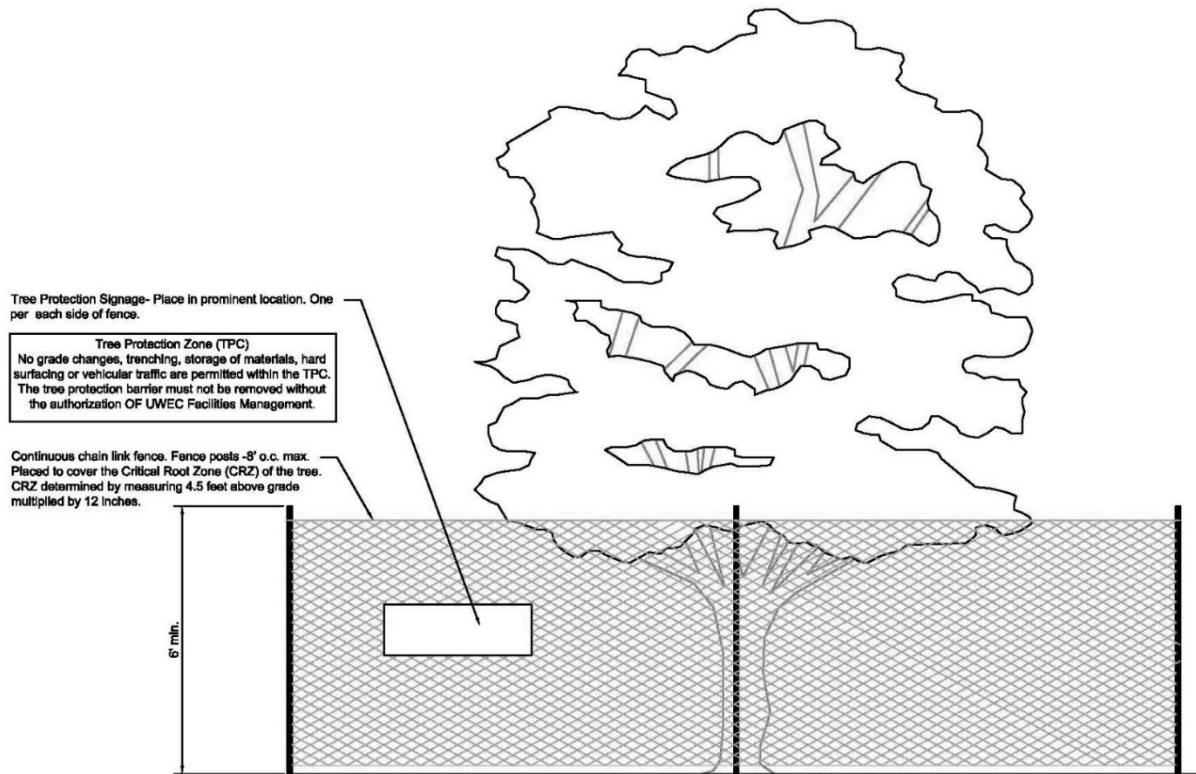
b) Low Priority - Larger trees outside the building footprint with poor form, poor health or inadequate space to grow to maturity.

c) Trees to Move or Remove- Trees planted too closely to building or access footprint. Careful planning/and tree selection will circumvent future removals.

Trenching - All site factors should be taken into consideration to assess the potential for root system damage and the chances for survival. Anytime digging infringes on the critical roots, there is a potential to affect the future health and structural integrity of the root system. Pathogens have the opportunity to enter the tree through the open wounds because the tree's natural defenses are affected. The closer and deeper you dig near the trunk, the greater the potential impact in the future. Digging a trench near the trunk of a tree from one side of the canopy to the other could remove up to 45 percent of the roots, depending on the depth. The result is the potential loss of the tree or foliage dieback on at least one side of the crown.

Any necessary trenching inside the critical root area, or zone, for installing irrigation pipes, gas lines, or electrical conduit requires careful planning to avoid damaging trees. The absorbing roots as well as larger roots near the

base are shallow and easily damaged. Air trenching the soil using compressed air as a “shovel” preserves lateral roots and allows for irrigation lines and other utilities to be installed under spreading root systems. A certified arborist will evaluate any trenching within a Critical Root Zone of a tree prior to commencing for potential impacts and best management practices for the health of the tree.



TREE PROTECTION FENCING DETAIL

Tree protection zone fencing shall be erected before any construction activities commence and remain until construction is concluded and will be installed and removed without harm to trees. Install protection fencing along the edges of the Critical Root Zone (CRZ) zone in a manner that will prevent people from easily entering the protection area. Fence will consist of 6' minimum continuous chain link with 8' maximum on center posts. Mulch the inside of the fence area with a minimum 2" thick layer of organic mulch. Do not place mulch within 6" of tree trunks. Tree protection signage will be places in a prominent location. One sign for each side of the fencing.

Maintain tree protection zone fencing and signage in good condition as acceptable to UWEC Facilities Grounds per a Certified Arborist and remove when construction operations are complete, and equipment has been removed from the site.

6. Goals and Targets –

- Campus Tree Inventory- Started in fall of 2016. All zones 19 completed in the Fall of 2020. Fall 2021 we started to revisit each area to take new measurements to update tree growth rates. Grounds works each semester with students from the departments of Biology, Public Health and Environmental Studies and Geography to complete and update the tree inventory.
- Development of the UW- Claire Arboretum programming including Poplar pop up garden and Nature Rx.

Arboretum Online Map-

<https://uwec.maps.arcgis.com/apps/View/index.html?appid=ac99dbc93f7348aa8e7f4aba41b30498>

7. / 8. Tree Damage Assessment/Prohibited practices-

Bicycle policy

Rules and Regulations- (Effective Summer 2018)

- Bicycles may only park in designated bike racks located around campus. To prevent theft, please lock your bicycles.
- Permits are not required.
- Illegally parked bikes obstruct walkways and present serious hazards for people who use wheelchairs, canes, walkers, or who have other mobility or visual difficulties. Please do not park your bike in the line of travel to stairs, ramps doorways or ADA curb ramps.
- Bikes locked to trees can cause serious damage to or even kill a tree. Please protect our trees and help keep the campus beautiful by not locking your bike to trees or shrubs.
- Bike racks and covered bike parking (except those surrounding residence halls) are not intended as long-term storage areas. Short-term bike parking spaces are marked and have a 24-hour parking limit.
- Illegally parked bikes are subject to impoundment. Parking in non-designated areas (railings, signposts, trees, light poles, building signs, blocking ADA ramps or curb cuts) may result in bike locks cut and bikes removed to Facilities by the Grounds department under the advisement of the Associate Director of Facilities.
- Impounded bicycles will be securely stored at Facilities for a period of 30 days. Bikes can be retrieved from Facilities Grounds between the hours of 6:00 am and 2:00 pm, Monday – Friday. If a bike is not reclaimed within 30 days, the bike will be sold through UW Eau Claire Surplus. UW Eau Claire Facilities will not be responsible for the costs of cut locks.

Bike Rack Locations:

- Bike racks are located near almost every building.

Sheltered parking locations:

Lower Campus:

- South of McIntyre Library- Long term
- South of Kjer Theatre- Short Term
- Putnam Drive near the wooden steps- Short Term
- North of Schofield/ VVL connector- Short term

Upper Campus:

- South of Sutherland Resident Hall- Long Term
- Hilltop Entrance – Long Term
- South of The Suites- Long Term

Sheltered, secure bike lockers are available to rent on a semester or annual basis. Bicycle lockers are available for rental in the following locations:

- McIntyre Library Underpass
 - Phillips Courtyard
 - Sutherland Hall- South
- Please contact the University Recreation and Sports Facilities for more information on rental: 715-836-3377.

Hammocks/Slacklining

UW -Eau Claire Facilities prohibits temporary or permanent attachments of any kind to campus trees.

One of the biggest impacts of hammocks and slack lines lies in the damage they can do to trees. As the anchor material tethered to the tree fluctuates (due to either bouncing on the slack line or rocking in a hammock), it can cause significant wear on the outer layer of the trees' bark. The consequence: patches where the bark loosened or worn off become prone to fungi, decay, and visible damage. Since the outer layer of bark is a tree's first line of defense, damage to the bark needs to be avoided to help prevent susceptibility to insects and disease, which can compromise a tree's life expectancy.

Trees that are especially susceptible are the thinner barked and softer wood trees including Maple, Birch, Beech, Linden, Spruce, Pine and Crab- Apple but any tree with a trunk under 12" DBH including Oaks and Ash are at risk.

Slack line/hammock tension results in pressure applied where the sling touches the trunk. Water and nutrient pathways in the phloem layer just underneath the bark are squeezed and can be irreversibly damaged. Tree damage may not be obvious from the outside. The straps which are used to attach a slack line/hammock to a tree could also cause damage to the living tissue beneath the phloem (the cambium layer), which is only two cells thick.

Multiple attachments to the same area of the tree will cause wearing off the protective bark layer, damaging the cambium and may eventually cause mortality of a branch or the tree. A protective layer between the strap and the bark may help protect rubbing on the bark, but it does nothing to decrease pressure placed on the living tissue underneath the bark.

We have thousands of students on campus and every spring and fall, while the weather is agreeable, we have to address slack lines and hammocks attached to trees. Both are increasing in popularity each year, but in-depth studies have not been undertaken as to the extent of long-term damage they can cause. When students are attaching slack lines/ hammocks to trees, they may not see visible damage and are not necessarily thinking about all the other people that may also be attaching to the same spot at different times over the course of a day.

9. Tree Care Terminology

Annual rings: A layer of wood – including springwood and summerwood – grown in a single season; seen in the cross-section of the trunk.

Arboriculture: Science of tree development and care.

Bark: Outer layer of branches, twig, and trunks; the protective outer layer.

Branch: A stem attached to another larger stem, leader, or trunk.

Broadleaf: trees having broad, flat-bladed leaves rather than needles; also, a common name for hardwoods.

Bud: A small protuberance on a stem or branch, sometimes enclosed in protective scales and containing an undeveloped shoot, leaf, or flower.

Buttress root: Large root that flares from the trunk near ground level.

Cambium: layer of tissue one to several cells thick found between the bark and the wood; divides to form new wood and bark.

Canopy: The branches and leaves altogether – the top of the tree. (Crown)

Cavity: Opening or hollow in trunks or limbs of a tree – might be from decay or damage.

Co-dominant stems or trunks: Two equally competing terminal branches or leaders.

Conifer: trees and shrubs that usually bear their seeds in cones and are mostly evergreen; includes pines, firs spruces, yews, and Douglas fir.

Crotch: Top of the union or merging of two branches, or branch and trunk, or two leaders.

Crown: Portion of the tree above ground comprised of all the branches and foliage.

Crown cleaning: Removal of water sprouts, dead growth, dying growth, diseased tissue, broken limbs and structurally bad growth.

Cultivar: Cultivated variety. Maybe a field selection man-made cross or hybrid.

Decay: Deterioration of wood tissue by fungus and bacteria.

Deciduous: Plants or trees that drop leaves, needles, or foliage in winter.

Dieback: When ends of twig or branches defoliate, decline, and die back to remaining live plant parts. A dead tree has no dieback.

Drip line: The perimeter or boundary of the canopy at ground level. However far the branches extend to each side of the trunk.

Drop zone: The general area where branches are dropped or lowered with rope, during tree pruning or removal.

Evergreen: trees and shrubs that retain their live, green leaves or needles during the winter and for two or more growing seasons.

Fronde: Term used for the leaves of palms and ferns.

Girdling root: A root growing around part of the trunk or all of it that is restricting its expansion or outward growth.

Guying: Securing, repositioning, or stabilizing of a tree with ropes, wires or cables attached to anchoring devices.

Hardiness: The potential and inherent ability to withstand temperature extremes, temperature levels – climate and weather condition related.

Hardiness zones: Sections of a country, states or regions designated or assigned a number and/or letter, indicating the high and low temperatures.

Hardscape: The sidewalk, curb, gutter, and street covering the soil surface.

Heartwood: nonliving wood (often dark) found in the middle of a tree's stem/trunk.

Lateral: A side branch or twig extending from another one.

Lateral root: Roots extending outward off main or buttress roots.

Mature height: A tree's tallest anticipated height at mature growth.

Multiple leaders: Co-dominant stems competing for the dominant growth extension of tree.

Native: A species that historically occurred or naturalized in a geographic region as opposed to introduction to the area.

Node: The point on stem where one or more leaves and/or buds are attached.

Permanent branch: A branch intended to be left in place for the permanent branch structure of a tree.

Phloem: The food transport tissue of the tree, just outside the cambium and below the bark. The tree's "downward freeway" for nutrient transport.

Photosynthesis: The food producing process usually occurring in leaves resulting in the use of carbon dioxide and the release of oxygen.

Pruning: Removal of living limbs to direct the growth of a tree, or removal of weaknesses or dead growth.

Raising: Removal of lower, lowest, branches for headroom, clearance, or improved air circulation in the environment of the tree.

Reduction: A branch removal pruning, with technique, to reduce the overall dimensions of a tree canopy.

Restoration: Pruning to bring a tree's form, branch structure or health to an improved state.

Root ball: The remaining roots and soil around the base of a tree trunk after it is dug for transplanting, or after harvest in a tree farm.

Root flare: The base of the tree that "flares" outward at the trunk collar between the main trunk and buttress roots.

Root pruning: Cutting roots, for whatever planned profitable reason, to prepare for transplant, to protect concrete like sidewalks, etc.

Sapwood: living wood, often light colored, found between the bark or cambium and the heartwood.

Shade intolerant: trees that need a lot of sunlight for growth and survival.

Shade tolerant: trees that can tolerate less sunlight for growth and survival.

Softwoods: usually refers to trees that are conifers or cone bearing. Conifers generally have softer wood than angiosperms or hardwoods, but there are many exceptions.

Soil analysis: The results of a chemical test that determines soil pH, and nutrient content including nitrogen, phosphorus, and potassium, as well as other minerals.

Stress: A condition of a tree that means it is not in a state of premium or reasonable growth.

Subordinate: Pruning a branch or leader to reduce domination in relation to nearby branches and leaders.

Sucker: A shoot originating from a root or lower trunk – sprouts and water sprouts are shoots from up above.

Taper: A decrease in the diameter of trunk and branches from the base toward the tip.

Terminal bud: The bud at the apex of a stem – main central leader tip, the bud there.

Thinning: Selective pruning or thinning of stems and branches to increase air, moisture, or light penetration to canopy or ground. This can also reduce the load bearing weight of snow and ice in winter.

Transplant: Moving a tree or shrub from one location to another – not usually thought of as from nursery or tree farm to a landscape.

Transplant shock: A tree showing stress after transplanting.

Tree wrap: Material wrapped around tree trunks or limbs to protect from sunburn or for protection during transportation.

Trunk: The lowest base stem that supports the tree – the link between the roots below, and the canopy above.

Undercut: An undercut is the first of three cuts in the multiple three-cut system to remove a branch without tearing bark. The undercut, and top cut are made a approximately six inches from the branch collar and trunk.

Water sprout: A vertical shoot from a branch, or upper trunk, that is faster growing compared to most other branches.

Weak crotch: When two or more branches or leaders meet at a union, which is weak. In most cases, a weak “V” shaped crotch or union.

10. Communication Strategy-

The Landscape Master Plan including the Campus Tree Plan is vetted and communicated to the campus community through presentations, advisory committee meetings and endorsement by the Student Office of Sustainability and University Student Senate. Upon initial acceptance, the Landscape Master Plan including the Tree Campus USA - Tree Care Plan will be placed on the UW- Eau Claire Facilities website.

References:

Invasive species rule – NR 40, Wisconsin Department of Natural Resources:

<https://dnr.wi.gov/topic/Invasives/classification.html>

Urban Tree Foundation: <http://www.urbantree.org/Ostructure1.shtml>

How to Detect, Assess and Correct Hazard Trees in Recreational Areas. 1193, Minnesota Department of Natural Resources- Forestry

<https://www.leg.state.mn.us/docs/pre2003/other/930366.pdf>

DNR EAB notices: <http://datcpservices.wisconsin.gov/eab/>

Insecticides: <http://hort.uwex.edu/articles/professional-guide-emerald-ash-borer-insecticide-treatments>

http://www.emeraldashborer.info/files/multistate_eab_insecticide_fact_sheet.pdf

TREE-age: <http://shop.arborjet.com/ProductDetails.asp?ProductCode=0006>

TreeAzin: [\\Staff.uwec.edu\facmgtsh\\$\GROUNDS\TREE CAMPUS USA\Application Materials\Tree Care Plan\TreeAzin_Specimen_Label.pdf](\\Staff.uwec.edu\facmgtsh$\GROUNDS\TREE CAMPUS USA\Application Materials\Tree Care Plan\TreeAzin_Specimen_Label.pdf)

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