

Western Kentucky University

Campus Tree Care Plan

I. Purpose

- a. Identify the policies, procedures, and practices that are used in establishing, protecting, maintaining, and removing trees on the WKU campus.
- b. Ensure a safe, attractive, and sustainable urban forest on our campus through specific objectives, such as:
 - Encouraging proper species selection
 - Cultivating and sustaining species diversity and diverse age structure.
 - Defending high value trees according to their structural, historical, horticultural, or cultural significance.
 - Supporting tree health and safety by utilizing Best Management Practices (as outlined by the International Society of Arboriculture)

Note: This plan has been developed as criteria satisfaction for the National Arbor Day Foundation's Tree Campus USA designation. Although many of the practices and procedures mentioned are currently administered, this plan does not reflect official university policy. The plan is currently under review for acceptance as such.

II. Responsible Parties

- a. WKU Grounds Department, including the Gardening division, and the university's landscape architect and fellow members of the Department of Planning, Design and Construction will be responsible for oversight, regulation, and execution of this plan.
- b. These parties will be advised by the campus Tree Care Committee. This committee will be composed of the following individuals:
 - Gary Ransdell, President
 - John Osborne, Vice President for Campus Services
 - Helen Siewers, Landscape Architect
 - Greg Fear, Manager of Campus Services – Grounds
 - Martin Stone, Professor of Horticulture
 - Colton Jessie, SGA President and GreenToppers Designee
 - Jared Weaver, Arborist, City of Bowling Green

III. Goals and Targets

- a. The Department of Planning, Design, and Construction, in partnership with the Grounds Department and the Department of Geography and Geology (specifically the GIS lab), has created a digital campus tree inventory marking over 2500 trees of all species and ages on the University's main campus. This inventory will be expanded to complete main campus and map trees located at South Campus and on satellite campuses. The inventory will be used by the university's project managers and landscape architect in coordinating new construction. The inventory will also be available, via web-based, read-only access, as an educational tool for the university and campus community.
- b. The Tree Care Plan will be adopted by the campus Master Planning Committee and will be considered in all related discussion and decisions covered by this committee.
- c. Protecting and nurturing the campus urban forest and tree canopy will be considered strategic measures in our university's commitment to sustainability.

IV. Communication Strategies

The Tree Care Committee is responsible for maintaining and updating, as necessary, the Tree Care Plan and the Campus Tree Inventory. Both documents will be linked to each of the affiliated department's websites, as well as to the Office of Sustainability website.

V. Campus Arboriculture Practices

a. Pruning Schedule

- Maintenance and pruning will be dictated by tree species, age, function, placement, and in response to health and safety concerns and damage control.
- Trees should receive scheduled structural pruning as a means of preemptively mitigating the effects of adverse environmental conditions.
- Trees should be inspected annually, at least, by responsible parties to determine the actions that need to be taken during scheduled pruning.
- Trees adjacent to walkways, roadways, signs, and streetlights should be under constant surveillance for safety and clearance issues.
- Tree topping will not be tolerated.
- New trees should be evaluated for structural pruning annually as recommended by responsible parties.
- Young trees (7-20 years) should receive structural pruning, as necessary, every two to five years.
- Older trees (20+ years) should receive attention every five to seven years to remove any diseased, dying, dead, or defective branches.

b. Pruning Practices

- Crown thinning, primarily for hardwoods, is the selective removal of branches to increase light penetration and air movement throughout the crown of a tree.
- Crown raising is the practice of removing branches from the bottom of the crown of a tree to provide clearance for pedestrians, vehicles, buildings, or lines of sight.
- Crown reduction pruning is most often used when a tree has grown too large for its permitted space.
- Pruning cuts should be made so that only branch tissue is removed and stem tissue is not damaged. At the point where the branch attaches to the stem, branch and stem tissues remain separate, but are contiguous. If only branch tissues are cut when pruning, the stem tissues of the tree will probably not become decayed, and the wound will seal more effectively.

c. Cultural Practices

- New trees and those under 6" DBH will require mulching annually.
- Irrigation, in the form of tree watering bags, will be used as needed during the establishment period, or first three years, after planting.
- Trees will be monitored for pest threats and treated according to best management practices. Pesticides will be avoided if possible, and when necessary will be applied only during periods of reduced campus population. See Appendix E for details concerning the Emerald Ash Borer Management Program.
- There is no regular tree fertilization regimen beyond that which is surreptitiously applied as a result of landscape and lawn fertilization. Trees will be monitored for nutrient deficiency and fertilized accordingly as needed.

d. Other practices

- Live trees will be removed only when necessary to prevent imminent danger to the public or campus structures, when detracting from the landscape, or when necessary for construction.

- Trees larger than 12" DBH may be removed only after consultation with the Tree Care Committee and Presidential approval. The Tree Removal Form has been utilized since 2006. The tree in question is photographed and summarized. Removal must be approved by four signatures, including the President and Vice President. See Appendix A.
 - Each removal that is approved and executed will be followed by a triple planting of young, site appropriate trees in the immediate area. However, this planting will not occur until the following season appropriate for planting, regardless of the time of year that the original tree is removed.
- e. Selection and Installment
- Species selection must ultimately be dictated by site conditions and ecological considerations.
 - A species list for campus planting will serve as a guide for species selection. The list, developed by the Tree Care Committee, focuses on the use of native, underrepresented, and otherwise significant or practical choices and avoids the inclusion of known woody invasive species. See Appendix C.
 - Species, in some areas, will be chosen according to mast production or habitat value for the population of Amelanistic (White) Gray Squirrel that is present on our campus. Decisions, in some cases, will be made with protection of this unique species as priority. See Appendix D.
- f. Storm Response and Recovery
- Storm response and recovery, whether performed in-house or by independent contractors, shall begin with debris removal to make campus navigable and safe. Immediately following this phase, the recovery or removal of damaged trees will follow. Recovery will always be chosen over removal if the tree is expected to recover in an acceptable manner. Trees lost in storms will also be replaced three for one.

VI. Protection and Preservation Procedures

During the early stages of building design, trees that are to be impacted should be marked on the site map, and decisions should be made and strategies determined to protect those that will not be removed. Considerations should be given to high value trees in the choice or placement of new buildings inasmuch as the site and budget will allow.

- a. Construction damage is one of the leading causes of decline and death in trees and proper steps should be taken to ensure that desirable trees are protected to avoid losses in subsequent years. Measures must be taken to avoid:
- Physical injury to the trunk and crown
 - Cutting of roots
 - Soil compaction within the drip line
 - Smothering roots by adding soil
 - Exposure to the elements
- b. If trees are to be preserved on the construction site, their preservation must be considered long before construction begins. If success is to be achieved, it will require the commitment, from the beginning, of everyone involved.

Planning and preservation specifications:

- Evaluate each tree's suitability for saving, opting to preserve only the most vital, healthy, and structurally sound trees while maintaining, to the extent possible, a diversity of tree species and maturity.
- Prepare a plan that details the location of trees to be preserved in relation to existing features, the location of preservation zones, and details of mitigation and preservation procedures.

- Educate contractors on the purposes and procedures of mitigation and preservation techniques. Enforce adherence to these procedures throughout the project.
 - Contract documents for capital construction projects require restoration of the site to its previous condition. In the event the protection measures are not maintained, the specific contract will be consulted to assess damages.
- c. Specific guidelines for contractors in the protection of trees are provided in Appendix F.

Appendix A
Tree Removal Request Form

Tree Removal Request Form

TO: John Osborne

FR: Helen Siewers

DT:

Location:

Reason for Request:

Will road/lot closing be required?

Recommendation: Remove

Recommended by Helen Siewers: _____

Recommended by Greg Fear: _____

Recommended by John Osborne: _____

Approved by Gary Ransdell: _____

Dated Photograph #1

Dated Photograph #2

Appendix B

Campus Tree Inventory



A LEADING AMERICAN UNIVERSITY WITH INTERNATIONAL REACH
DEPARTMENT OF PLANNING, DESIGN AND CONSTRUCTION

MEMORANDUM

TO: WKU Board of Regents
FROM: Helen Siewers, Campus Landscape Architect
SUBJECT: Campus Tree Inventory
DATE: January 13, 2010

Please find attached the Main Campus Tree Inventory Status from November 2009. The inventory is a valuable planning tool for managing our urban forest, including the maintenance of existing trees, and the placement of new trees.

The tree inventory is the result of a service-learning project by Geography major David Evans. During 2009, with the assistance of staff from the Department of Facilities Management, David collected data on more than 2,000 campus trees, including tree species, current size, and Global Positioning System (GPS) coordinates. The office of Planning, Design & Construction supervised the data development and manages the project.

The attached report includes several maps related to the tree inventory:

1. Existing Trees—2,062 inventoried so far—ordered by current size (Diameter at Breast Height or DBH).
2. Maintenance Plan, noting 415 trees to be monitored, replaced, removed, or added.
3. Paved Areas Converted to Green Space: a map illustrating how we have gained green space and added 126 trees at the Centennial Mall and Residential Commons.
4. Gaps in the Tree Inventory, to be filled as work continues in 2010.
5. Composite maps and an aerial photo illustrating our goals for 2010 and beyond.

With the tree inventory as a guide, WKU is undertaking an ambitious project to plant more than 200 trees on campus in 2010.

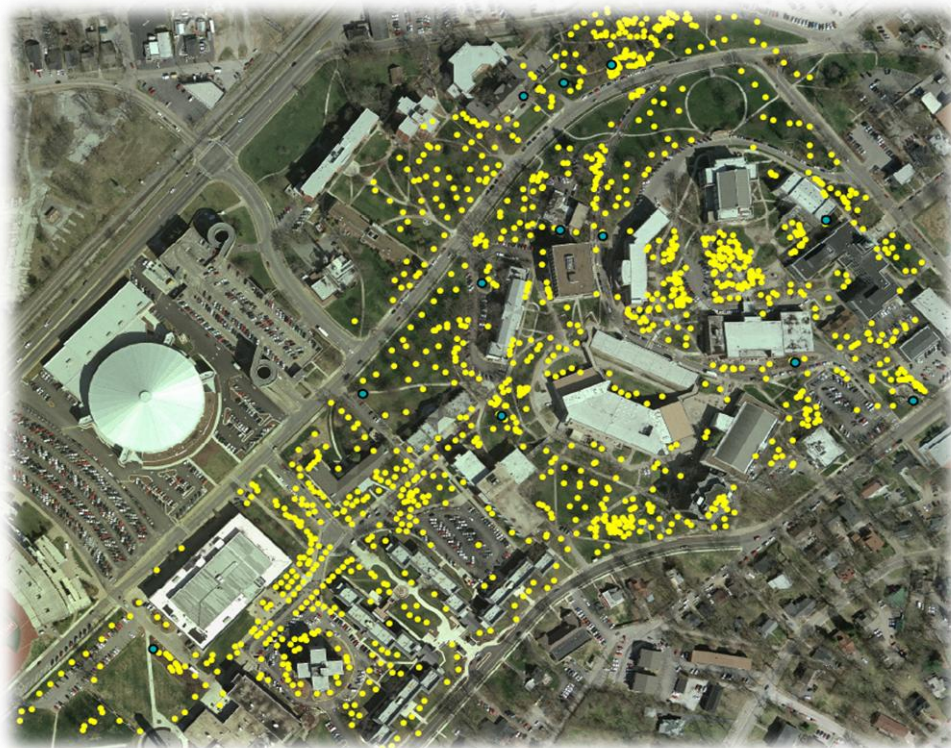
The Spirit Makes the Master

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Diameter at Breast Height (DBH)

- < 3 Inches
- ≤ 1 Ft.
- ≤ 2 Ft
- ≤ 4 Ft
- > 4 Ft



Sample Data from Campus Tree Inventory
See full listing at www.wku.edu/Dept/Support/pdc

Tree_ID	Zone	Common Name	DBH inches	MtnRec	Date	Genus
12	The Valley	Ash	5		4/28/2009	Fraxinus
13	The Valley	Ash	7		4/28/2009	Fraxinus
33	The Valley	Black Locust	5		4/28/2009	Robinia
36	The Valley	Buckeye	8		4/28/2009	Aesculus
37	The Valley	Buckeye	20		4/28/2009	Aesculus
38	The Valley	Buckeye	23		4/28/2009	Aesculus
45	The Valley	Buckeye	24		4/28/2009	Aesculus
46	The Valley	Buckeye	15		4/28/2009	Aesculus
47	The Valley	Buckeye	12		4/28/2009	Aesculus
32	The Valley	Dogwood	9		4/28/2009	Cornus
31	The Valley	Eastern Redcedar	13		4/28/2009	Juniperus
57	The Valley	Elm	15		4/28/2009	Ulmus
58	The Valley	Elm	13		4/28/2009	Ulmus
24	The Valley	Hackberry	5		4/28/2009	Celtis
25	The Valley	Hackberry	3		4/28/2009	Celtis
27	The Valley	Hackberry	5		4/28/2009	Celtis
22	The Valley	Honey Locust	1		4/28/2009	Gleditsia
51	The Valley	Honey Locust	6		4/28/2009	Gleditsia
1	The Valley	Maple	22		4/28/2009	Acer
3	The Valley	Maple	12		4/28/2009	Acer
5	The Valley	Maple	13		4/28/2009	Acer
6	The Valley	Maple	11		4/28/2009	Acer
7	The Valley	Maple	8		4/28/2009	Acer
8	The Valley	Maple	10		4/28/2009	Acer
9	The Valley	Maple	11		4/28/2009	Acer
10	The Valley	Maple	5		4/28/2009	Acer
15	The Valley	Maple	13		4/28/2009	Acer
16	The Valley	Maple	3		4/28/2009	Acer
17	The Valley	Maple	11		4/28/2009	Acer
18	The Valley	Maple	7		4/28/2009	Acer
19	The Valley	Maple	11		4/28/2009	Acer
20	The Valley	Maple	9		4/28/2009	Acer
23	The Valley	Maple	8		4/28/2009	Acer
52	The Valley	Maple	2		4/28/2009	Acer
53	The Valley	Maple	2		4/28/2009	Acer
54	The Valley	Maple	2		4/28/2009	Acer
55	The Valley	Maple	2		4/28/2009	Acer
59	The Valley	Maple	1		4/28/2009	Acer
60	The Valley	Maple	2		4/28/2009	Acer
61	The Valley	Maple	2		4/28/2009	Acer
62	The Valley	Maple	2		4/28/2009	Acer
48	The Valley	Oak	23		4/28/2009	Quercus
29	The Valley	Pine	12		4/28/2009	Pinus
30	The Valley	Pine	17		4/28/2009	Pinus
56	The Valley	Sugar Maple	21		4/28/2009	Acer
2	The Valley	Unknown	16		4/28/2009	
4	The Valley	Unknown	11		4/28/2009	

Appendix C

Species List*

<i>Acer spp.</i>	Maple spp.
<i>Aesculus spp.</i>	Buckeye
<i>Amelanchier arborea</i>	Serviceberry
<i>Betula spp.</i>	Birch
<i>Castanea dentata</i>	American Chestnut, blight resistant
<i>Carpinus caroliniana</i>	Hornbeam
<i>Carya illinoensis</i>	Pecan
<i>Carya spp.</i>	Hickory
<i>Cercis canadensis</i>	Redbud
<i>Chionanthus virginicus</i>	Fringetree
<i>Cladrastis kentukea</i>	Yellowwood
<i>Cornus florida</i> cv.	Dogwood spp., anthracnose resistant cultivars
<i>Fagus grandifolia</i> or <i>F. sylvatica</i>	Beech
<i>Fraxinus spp.</i>	Ash
<i>Ginkgo biloba</i>	Ginkgo
<i>Gleditsia triacanthos</i> var. <i>inermis</i>	Honeylocust (thornless)
<i>Gymnocladus dioica</i>	Coffeetree
<i>Halesia tetraptera</i>	Carolina Silverbell
<i>Ilex opaca</i>	American Holly
<i>Juniperus virginiana</i>	Eastern Red Cedar
<i>Liquidambar styraciflua</i>	Sweetgum
<i>Liriodendron tulipifera</i>	Tulip Poplar
<i>magnolia spp.</i>	Magnolia spp.
<i>Malus spp.</i>	Crabapple
<i>Pinus virginiana</i>	Virginia Pine
<i>Prunus spp.</i>	Flowering Cherry
<i>Quercus spp.</i>	Oak spp.
<i>Salix babylonica</i>	Weeping Willow
<i>Taxodium distichum</i> or <i>T. ascendens</i>	Bald Cypress
<i>Ulmus spp.</i>	Elm

*This list is not intended to be exhaustive, and other species may be considered for use at the recommendation of the Landscape Architect, Grounds Manager, or Gardener as deemed necessary by specific site evaluations.

Appendix D

Amelanistic Squirrel Habitat Value Statement

Gray squirrels need mast producing trees (nut and fruit producers) for food; mid-story trees, shrubs, and ground cover for cover from predators including red-tailed hawks; and nest cavities for raising their young. Ideally all of these needs should be met at the same location. Unfortunately, these conditions rarely coincide on the WKU campus.

We have some large oaks on campus, but few of these have cover and mid-story beneath them. Few of WKU's trees contain nesting cavities, which would be a hazard to humans. In the short-term we could build or purchase squirrel nest boxes to be placed near mast producers (see list below), and perhaps plant some ground cover and shrubs in the neighborhood. Alternatively, or in addition, we could find sites with cover and mid-story vegetation but poor mast production. Nest boxes and rat-proof feeders could be supplied in these locations. In any case, nesting cavities or nest boxes are essential for maintaining large squirrel populations. Several nest boxes per acre will maximize squirrel populations.

Gray squirrels need hard mast and soft mast. Hard mast producers should include large white oaks, red oaks, hickories, and chestnuts.

The less critical soft mast producers include maples, dogwoods, blackgums, plums, and hackberrys.

Gray squirrels typically produce two litters of three young each per year. Clearly we should be able to achieve a large population rapidly if we provide satisfactory habitat.

Recommendations provided by Albert Meier, PhD, WKU Department of Biology

Appendix E

Emerald Ash Borer Management Strategies

Emerald Ash Borers have not yet been sighted on the WKU main campus, although our urban forest is under surveillance. The Kentucky Department of Entomology has placed several of the “purple prism” traps in ash trees on campus. Because infestation appears to be imminent at this point, we anticipate a need for understanding and a plan for remediation.

The Kentucky department of Natural Resources, Forestry Division gives the following overview of the Emerald Ash Borer in Kentucky:

Adult emerald ash borers are active. Peak emergence should have occurred by the week of June 7 in central Kentucky and should begin to taper off significantly after that. Individual adults live for about 3 weeks but emergence occurs over several weeks so the activity period in Kentucky may extend from early May to late June or beyond.

EAB adults are $\frac{3}{8}$ to $\frac{3}{4}$ inch long and very narrow (about $\frac{1}{5}$ ” wide). The head is blunt, the body tapers noticeably at the end of the abdomen. The wing covers are emerald green; the top of the abdomen, visible when the wings are spread, is metallic purple-red.

Newly emerged adults are most active when it is warm and sunny. They feed for several days before mating, chewing irregular notches along leaf margins. Mated females will feed for another week or two before laying eggs in bark crevices or under bark flaps on the trunk. One female will lay between 60 and 90 eggs.

EAB adults are not strong fliers, typically staying within 0.5 mile of their emergence site. The natural dispersal of this insect is assumed to be 5 miles or less per year. Long distance spread is the result of inadvertent spread by humans in infested firewood and unprocessed ash logs.

State officials have issued quarantine for 20 Kentucky counties regulating the transportation outside those counties of articles that could harbor the emerald ash borer. The quarantine prohibits “regulated articles” from being moved outside a quarantined area without a certificate or limited permit except under certain conditions. A regulated article may be moved by the U.S. Department of Agriculture or the Kentucky Department of Agriculture for experimental or scientific purposes; may be moved in an enclosed vehicle or completely covered to prevent access by the emerald ash borer; may be moved directly through the quarantined area without stopping except for traffic conditions and refueling; may be moved if it is stored, packed or handled at locations that do not pose a risk of infestation; and may be moved if it has not been combined or commingled with other articles.

“Regulated articles” are defined as the emerald ash borer, hardwood firewood, ash nursery stock, green ash lumber, other ash material, and any other materials that present a threat of artificial spread of the emerald ash borer.

The counties under quarantine are Boone, Bourbon, Campbell, Carroll, Fayette, Franklin, Gallatin, Grant, Greenup, Harrison, Henry, Jefferson, Jessamine, Kenton, Oldham, Owen, Pendleton, Scott, Shelby, Trimble and Woodford. The quarantined area includes the seven counties where the emerald ash borer has been identified – Campbell, Fayette, Franklin, Jefferson, Jessamine, Kenton and Shelby – plus counties close to an infestation site and counties with a high density of ash trees.

Appendix F

Tree Care Guidelines for Contractors

Specific Preservation Techniques

1. Barrier erection. As a general guideline, the barrier should extend (at the very least) just past the drip line of the tree's crown. The intent is to protect both above and below ground portions of the tree from the side effects of construction, particularly structural damage and compaction. Fenced areas should be kept clear of equipment, debris, materials, and excess soil and should be free from digging, trenching, compaction, or other soil disturbance.
2. Limiting Access. If possible, allow only one access route onto the site, and carefully choose this route to coincide with areas that will later be used for utility and water line burial or paved areas. Areas should be chosen for their lack of proximity to the root zones of protected trees.
3. Reducing Compaction. When access routes cross the root zones of protected trees, care must be taken to reduce the inevitable compaction and irreversible damage that the tree will suffer. Spreading a thick layer of mulch (6-12 inches) over the access route will help to distribute the weight of vehicles and equipment, thereby reducing the compaction suffered by the roots. Further distribution is provided by a layer of plywood over the mulch. In many cases, the mulch can be reused during the landscaping phase of the project.
4. Mitigating grade changes.
Lowering the grade: Create terraces or tree islands to reduce compaction around root zones.
Raising the grade: Implement aeration systems or tree wells to prevent root suffocation.

