



NORTHEASTERN UNIVERSITY
ARBORETUM PLAN
2019








Northeastern



Northeastern

Northeastern University Arboretum
360 Huntington Ave, Boston, MA 02115
42.338889°N, 71.090278°W
72 Acres, Boston Campus, 9.1 acres / 13% Under Cultivation
<https://www.northeastern.edu/>

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1. Mission

The mission of the Northeastern University Arboretum is to develop and maintain a living plant collection that will provide students, faculty, staff and visitors with an attractive living environment for learning and enjoyment. The Arboretum also endeavors to be a tangible, sensory expression of the University's national and international reputation for excellence and to perform ecosystem functions that enhance the campus environment.

1.1. Environment of Learning

Through their diversity and organization, the arboretum collections promote educational opportunities.

1.2. Environment for Living

The arboretum is fundamental to the experience of the campus grounds. Trees, shrubs and herbaceous plants in the Northeastern Arboretum are arranged to grace the campus with their form, flower and foliage. The sensory effects of leaves moving in the breeze, the autumn color of campus trees, and the endless variations of light and shadow on campus buildings and paths are intended to create a life filled experience that rewards the campus population in all seasons of the year. Campus plantings seek to instill feelings of kinship with nature, connect the campus community to timeless natural processes, and foster feelings of repose amidst the constant activity of urban campus life.

1.3. Symbolic Function

The campus landscape is an expression of the institution. Recruitment, retention and lifelong ties of Northeastern to its alumni are powerfully shaped by the campus landscape.

1.4. Ecosystem Functions

The campus landscape functions to regulate local climate conditions, improve air quality and mitigate urban heat island effect. Campus trees provide erosion and sediment control, and assist in the volume and quality management of stormwater runoff. Trees and shrubs provide habitat for songbirds and pollinators. The Arboretum landscape supports human health and well-being, providing for social connection, mental restoration and encouragement of pedestrian and bicycle use over automobile use.

2. Purpose

The Northeastern University Arboretum Plan sets standards for the management, design, and curation of tree, shrub, and herbaceous plant materials in the campus collection.

2.1. Specific Objectives of the Arboretum Plan are as follows:

- Promote public safety through the use of best practices in the care of campus trees
- Maintain and increase the educational value of the campus urban forest.
- Enhance the visual quality and sensory appeal of the campus
- Capitalize on ecosystem functions performed by campus trees and shrubs
- Protect campus trees during construction and renovation projects
- Acquire high quality plants using industry standards
- Ensure proper species selection and diversification of the campus tree population
- To ensure proper and state of the art practices are employed for tree planting and the ongoing care of campus trees
- To promote proper age distribution in the tree population, and reasonable replacement of trees in response to losses from weather, pests, injury or construction displacement

3. Defining Features of the Arboretum

3.1. Integral with the functional living spaces of the campus

Rather than being a separated dedicated plot of land, the Northeastern Arboretum is integral with the entire university campus landscape. It occupies the functional spaces of the campus including its streets, plazas, quadrangles and pedestrian corridors. Thus, the Northeastern Arboretum is a unique urban arboretum that is integral with the fabric of a densely built academic community in the City of Boston.

3.2. Urban Landscape

The Northeastern University Arboretum is an urban landscape occupying the interstitial spaces between buildings. Often the planting areas are confined in the spaces between buildings and streets or pedestrian paths. Collectively the planting areas of the Arboretum constitute only about 16% of the campuses' 72 acres. Yet the contribution that the Arboretum makes to the campus character and identity far exceeds this area calculation.

3.3. Functional Landscape

The arboretum seeks to provide a number of ecosystem functions including local microclimate regulation, heat island mitigation, air cleansing, soil stabilization, storm water cleansing and management, and improved human health and well-being. By virtue of the arboretum's close proximity to Boston's Emerald Necklace open space corridor, it extends the habitat value of the Emerald Necklace for songbirds and pollinators.

3.4. Living Collections

The collections of the arboretum are focused on trees and shrubs with attributes that allow them to adapt to urban conditions in the temperate Northeast of the United States. The collection includes 1471 individual trees and 5404 woody shrubs. About 20% of the 141 tree species represented are native to New England.

MANAGEMENT PLAN

MANAGEMENT PLAN

Northeastern University Arboretum

1. Purpose

The Northeastern University Arboretum Management Plan identifies policies, procedures and practices used to manage the University's tree resources. The goal of the plan is to provide a safe, attractive, educational and sustainable campus urban forest.

2. Goals and Targets

The Northeastern University Arboretum goals for improvement are as follows. As goals and targets are met over time, the list of goals and targets shall be updated by the Arboretum Advisory Committee.

2.1. Collection Goals

2.1.1. The arboretum will increase its tree and shrub labeling by at least 250 labels each year until the entire collection is labeled.

2.1.2. The arboretum will target collection of *Nyssa sylvatica* cultivars in addition to its general focus on ericaceous woody plants and plants suitable for urban conditions. Other tree genera under consideration for expansion are *Acer*, *Quercus* and *Cornus*.

2.2. Sustainability Goals

2.2.1. Increase pollinator and songbird food sources

2.2.2. No net landscape loss target

2.3. Horticulture Goals

2.3.1. Complete the tree maintenance tracking system record keeping and have the system up to date in two years by 2021.

2.3.2. Identify and organize appropriate training courses for grounds staff. Possible topics include tree identification, GIS mapping training, database upkeep training and labeling system training.



2.4. Plant Display Goals

2.4.1. Continue to coordinate plant displays of foliage, flower, fruit and form with the University calendar.

2.5. Communication Goals

2.5.1. Launch the Arboretum web page in the next 12 months, by mid 2020.

3. Tree Care Guidelines

The goal of the arboretum tree care guidelines is to provide a safe, attractive, educational and sustainable campus urban forest that faculty, staff, students, and visitors can use as a resource for teaching, learning, respite and enjoyment.

3.1. Plant Selection and Purchasing Guidelines

3.1.1. Long term tree success begins with proper tree selection. Trees shall be inspected prior to being selected for use on the campus. The following minimum criteria shall apply.

3.1.2. General: Plant material shall conform to the latest edition of the American Standards for Nursery Stock, ANSI Z60.1, by the American Nursery and Landscape Association.

- 3.1.3. Hardiness: Preference shall be given to plant species that are proven hardy in average annual extreme minimum temperatures of -10 to -5 degrees Fahrenheit (USDA Zone 6a). Occasionally, if microclimate conditions allow, plants with less tolerance to minimum low temperatures may be tested, but not used extensively on campus.
- 3.1.4. Site Considerations: Plants shall be selected and located with due consideration to shade tolerance, salt tolerance, wind exposure, soil drainage conditions, soil compaction and moisture availability. Consideration shall also be given to the canopy space available. Plants selected for campus use shall be of a size the will fit the space available without the need to excessively prune the plant at the time of planting or cause unreasonable pruning demands in the future.
- 3.1.5. Good Structure of Branching and Root Systems: Trees shall have good root and branching structures. Roots systems shall be free of kinks, circling roots, girdling roots, and shall not be root bound if in containers. Trunks shall be firmly anchored in the root ball and root flares shall not be buried. Trees shall have a single leader with a balanced branch system where branches are no larger than 2/3 the diameter of the trunk. Multi- leader trees are only acceptable in species for which this is characteristic.
- 3.1.6. Disease and pest free: All plants selected for use on the campus shall be free of disease and pests. Tree wrapping shall be removed to inspect for pests, disease and damage to the trunk, then replaced. Root balls and containers shall be free of weeds and undesirable or invasive plants.
- 3.1.7. Prohibited Species: Plants on the Massachusetts Invasive Plant Advisory Group (MIPAG) lists of “invasive” and “likely invasive” plants shall not be used on the campus.
- 3.1.8. Preferred Species: Preference shall be given to plants that are native to the Northern Hardwood Forest, Appalachian Oak Forest, and the Northeastern Oak-Pine Forest plant communities as identified by A. W. Kuchler.

3.2. Planting Guidelines

- 3.2.1. Planting practices shall conform the current edition of ANSI A300-06 Planting and Transplanting Standards. The project specifications for each campus project that includes new planting shall apply the standards of ANSI A300-06 to the specific circumstances of the project. The project team responsible for construction documents shall identify and explain all departures from ANSI A300-06. It is recommended that model planting details, available through the International Society for Arboriculture (ISA), be consulted at: <https://www.isa-arbor.com/education/onlineresources/cadplanningspecifications>

Given the limited amount of tree canopy space available adjacent to campus buildings and streets, plants selected for campus use shall be of a size that will fit the space available without the need to excessively prune the plant at the time of planting or cause unreasonable pruning demands in the future.

Given the unpredictable urban soils typical throughout the Northeastern University campus, all planting shall be preceded by investigation of the specific existing soils or imported soils to be used at the proposed planting locations. The investigation shall include an analysis of plant pit percolation rates and soil tests for all existing, imported and structural soils. The analysis shall be conducted by an approved testing laboratory and result in a planting soils report. The report shall include the following information including recommendations for soil amendments and modifications required to establish favorable soil conditions to support the proposed plants:

3.2.2. Soil bulk density analysis, including soil texture sieve analysis with particle size distribution to identify percent of gravel, sand, silt and clay. Sieve analysis shall be performed and compared to USDA Soil Classification System and in compliance with ASTM D422.

3.2.3. Soil chemical analysis in accordance with AOAC standards, including:

3.2.3.1. pH and buffer pH

3.2.3.2. Percent organic matter

3.2.3.3. Nutrient analysis by parts per million, including nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, magnesium, manganese, iron, zinc, calcium and extractable aluminum. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil as calculated by the amount of materials to be added per volume of soil for the type of plants to be grown in the soil.

3.2.3.4. Toxic elements analysis, including arsenic, boron, cadmium, chromium, copper, lead mercury, molybdenum, nickel, zinc and PCB. Test results shall be cited in milligrams per kilogram.

3.2.3.5. Soluble salt by electrical conductivity of a 1:2 soil/water sample measured in Milliohm per cm.

3.2.3.6. Cation Exchange Capacity

3.2.3.7. Carbon/Nitrogen Ratio.

3.2.4. Compost and amendment recommendations, testing, fertilization, drainage, and soil management to comply with ANSI A300 - 02 Soil Management standards.



3.3. Tree Maintenance Guidelines

3.3.1. Care of the campus arboretum trees and shrubs shall be done in accordance with recognized professional standards for woody plant maintenance and management.

3.3.2. Pruning: Campus tree pruning includes the following activities. These activities shall be performed by trained Facilities Services personnel or by outside arborists hired by the University. Arborists shall be certified by the International Society for Arborists (ISA).

- Hazard reduction
- Elevate for ground clearance
- Prune for building clearance
- Crown reduction, and crown cleaning
- Corrective structural pruning – reduce secondary leaders, reduce large diameter limbs, reduce upright branches
- Dead wood removal

All pruning practices conform to the current edition of ANSI A300 - 01 Tree Care Standards for Pruning.



3.3.3. Watering, mulching and fertilization: Tree evaluations conducted by trained Facilities Services personnel or by ISA certified consultant arborists shall be made on a regular basis. The evaluations shall include recommendations for root zone treatments as may be required to promote tree health. Recommendations may include:

- Application of bio-stimulants and compost
- Irrigation
- Root collar excavation
- Aeration
- Surface fertilization
- Application of mulch to retain soil moisture, repress weeds and encourage a healthy root zone.

Soil and root zone practices shall conform to the current edition of ANSI A300 - 02 Tree Care Standards for Soils Management and A300 – 8 Root Zone Management.

3.3.4. Disease and Pest Control: Tree inspections for disease and pests shall be made on

a regular basis by Facilities Services personnel or ISA certified consultant arborists. All new plants added to the campus Arboretum shall be free of pests and disease, including weeds and invasive plants growing in the containers or root balls of new plants.

The control of tree disease and pests shall conform to ANSI A300 – 10 Tree Care Standards for Integrated Pest Management. The Arboretum goal is to use only organic disease and pest control materials.

3.4. Tree Risk Evaluation and Removal Policy

- 3.4.1. Facilities Services grounds supervisors and groundskeepers shall conduct observations through active scouting of campus trees on an on-going basis, to identify problems and tree hazards. Observations shall be increased following storm events. Responses to tree hazards vary from immediate action to scheduled maintenance, depending on the degree of hazard observed.
- 3.4.2. In addition to active scouting, periodic systematic evaluations of all trees shall be made by an ISA certified arborist. The latest evaluation and tree condition assessment was done in 2018. In the 2018 evaluation, all trees were given a 360-degree visual inspection. Based on the inspection, management recommendations were made and management response priorities were assigned as follows: 1.) High, 2.) Intermediate, 3.) Medium, 4.) low, and 5.) No action at this time.
- 3.4.3. The 2018 evaluation revealed that campus trees are mostly in good to fair condition. Only 3% of the arboretum's 1421 trees had conditions that required a "High" priority response. Some of these involved trees that require removal of post-installation guy wire removal, while others involved dead wood overhanging pedestrian paths.
- 3.4.4. Trees shall be considered for removal if they are: standing dead, a safety hazard, damaged beyond recovery, heavily diseased without the promise of recovery, or in the path of a necessary campus construction project that is deemed to be more important to the University than protection of the tree in question.
- 3.4.5. Trees considered for removal shall be evaluated by an ISA certified arborist, who shall make a recommendation to the Program Director for Landscape. Prior to all tree removals, consideration should be given to moving the tree, or if it must be cut down, to repurposing its wood. All tree removals require the approval of the Program Director for Landscape.
- 3.4.6. Prior to tree removals that could have public repercussions, the Program Director for Landscape shall notify the University senior leadership team and University Communications of pending tree removals. University Communications will make

tree removal announcements to the University community.

3.4.7. Following tree removals, the Program Director for Landscape shall be responsible for updating the campus tree inventory and mapping.

4. Tree Protection and Preservation Guidelines

4.1. Campus Planning and Development Considerations

4.1.1. General Requirements: Tree related practices during campus construction projects shall conform to ANSI A300-05, Management of Trees and Shrubs During Site Planning, Site Development and Construction.

Prior to or at the beginning of all construction projects, the design team with the assistance of the Program Director for Landscape shall identify all campus trees that may be impacted by the project. If a campus building, landscape or utility project involves risk to the Arboretum collections, the Program Director will require the preparation of a Tree Protection Plan that shall be included in the project Construction Drawings and Specifications. Projects requiring a Tree Protection Plan shall retain an ISA certified arborist to guide the development and implementation of the plan.

The tree protection plan will include: accurate survey of the trees impacted by the project; identification of trees that will be retained and protected; description of pre-construction activities such as watering, root pruning, and crown pruning for protected trees; and designation of a Critical Root Zone (CRZ) and a Tree Protection Zone (TPZ) for protected trees. An ISA certified arborist should be consulted in developing both the critical root zone and the tree protection zone. The Critical Root Zone (CRZ) (sometimes called the Root Protection Zone (RPZ)) is the area that is likely to contain the majority of roots needed to be protected for the tree to thrive.

For the purposes of this plan, the CRZ shall be defined as a radial offset from trunk of the tree of one foot for every inch DBH (Diameter at Breast Height), or the dripline of the canopy (whichever is larger). The evaluating arborist can make modifications to the CRZ to account for impediments to root growth, such as retaining walls, buildings, utility trenches, etc. Once the CRZ is defined, the Tree Protection Zone shall be defined. For the purposes of this plan, the TPZ shall be defined as the zone where tree protection methods and guidelines must be followed to preserve the health of existing trees. The TPZ must include the full zone of buttressing and rapid tapering of roots (varies based on species and age, and shall be determined by an ISA certified arborist), and preserve at least 70% of the CRZ. The CRZ and the TPZ both must be shown on all demolition and tree protection plans included in



construction documents for projects that are within 5' of a potential CRZ.

The following tree protection topic areas shall be addressed in the Tree Protection Plan in the project construction documents:

- 4.2. Barriers: TPZs shall be protected with fencing prior to the commencement of construction, and maintained for the duration of the project. Fencing shall be suitably strong to and rigidly fixed to last during the entire construction period. Provisions for replacement and repair of damaged barriers shall be included. Six (6) foot tall temporary chain-link fencing, wood fencing, or expanded metal fencing are all suitable for tree protection fencing. Plastic construction netting on stakes is not acceptable.
- 4.3. If construction activities need to occur with the TPZ, all exposed soil shall be covered with 2" of twice ground mulch prior to work being performed. Mulch to be kept min. 6" off the root flare of the tree. Mulch may be removed at the end of work performed when the barriers are removed.
- 4.4. Storage of construction materials, waste, equipment and vehicles in Tree Protection Zones shall be prohibited. Contractor parking will be prohibited in all tree protection zones.
- 4.5. Restrictions on waste disposal, equipment cleaning, and toxic materials shall prohibit these activities in the Tree Protection Zones.
- 4.6. Limitations on excavation, trenching and filling in the tree protection area. Shall include



restrictions on methods and types of equipment permitted where grading is necessary. Include proper root pruning guidelines in situations where trenching and excavation will encounter tree roots.

- 4.7. Equipment selection and operation guidelines, including equipment with the potential to extend over the protection fence and cause crown damage
- 4.8. Root protection and damage mitigation during excavation, including provisions for pneumatic excavation tools, such as an air or water spades, in advance of trenching and root pruning.
- 4.9. Construction signage indicating the Tree Protection Zones and prohibitions to entry.
- 4.10. Upon the review and approval of the Program Director, tree protection fencing barriers, signage, temporary mulch, and temporary irrigation, shall be removed after construction activities that may impact the tree are complete.

5. Tree Damage Assessment Guidelines

Trees damaged during construction projects or by other causes will be evaluated by an ISA certified arborist. The evaluation shall determine whether the tree should be removed, if the tree is to receive treatment for its recovery, and the value of the tree if were to be lost.

In situations where damage is attributable to a responsible party, damages will be assessed

as follows. Tree damage provisions shall be part of all University construction contracts involving potential damage to trees.

- 5.1. The dollar value of damage to trees and shrubs will be assessed by an ISA certified arborist with a Tree and Plant Appraisal Qualification (TPAQ) and in accordance with The Guide for Plant Appraisal, most recent Edition, authored by the Council of Tree and Landscape Appraisers (CTLA) and published by the ISA.
- 5.2. Branch, trunk and root damage which does not have an immediate effect on the tree will cause the University to withhold, from contractors responsible for the damage, an assessed amount equal to the value of the tree for a period of two years. After that period the impact of the damage to the tree will be assessed by an ISA certified arborist and the value of damage assigned.
- 5.3. A fine of \$1,000 will be levied against each incident involving unauthorized activity within a Tree Protection Zone in a campus construction area. Unauthorized activities include trespass by personnel, use of equipment, vehicle traffic, parking, materials storage, waste disposal, equipment cleaning, and all other activities that may damage the trees in the Tree Protection Zone. If the incident results in tree damage, an additional damage assessment will be levied equal to the damage incurred.
- 5.4. For all construction projects it shall be the responsibility of the general contractor to inform all workers and sub-contractors of the project tree protection requirements.

6. Prohibited Practices

Under no circumstances will trees or shrubs be removed or planted on the campus without the advance approval of the Program Director for Landscape in consultation with the Arboretum Advisory Committee.

7. Commemorative Tree Guidelines:

- 7.1. From time to time the University receives gifts and requests for memorial trees to be installed on the campus to commemorate events or individuals. The following guidelines shall regulate commemorative planting.
- 7.2. Applications for commemorative trees shall be made to the Arboretum Advisory Committee. The committee will make a recommendation to the University senior leadership team. The senior leadership team shall rule on the application. All

commemorative trees shall be approved by the senior leadership team prior to installation.

- 7.3. Reasons for planting commemorative trees shall include but are not limited to: commemoration of visits to the campus by celebrated people; to commemorate events of significance to the University; or to commemorate individuals of significance to the University.
- 7.4. The tree location, size and species selection will be the responsibility of the Program Director with advice from the Arboretum Advisory Committee. Commemorative trees shall be selected to be consistent with the overall Collections Policy of the Arboretum. Commemorative trees will be located in areas where it is reasonable to assume that the tree will not be displaced by campus development or infrastructure projects for the foreseeable future as defined in current campus master plans.
- 7.5. All commemorative trees will be maintained as part of the Campus Arboretum until such time that the tree dies; becomes a safety hazard and must be removed; becomes diseased or damaged and must be removed; or is displaced by planned campus development. After the loss of a commemorative tree, the University is not under obligation to replace the tree; however, if the proponents of the commemorative tree would like to renew the commemoration with a replacement tree at the same or other location, the University will accept such application.
- 7.6. The commemorative tree guidelines will be shared with all proponents of commemorative trees.
- 7.7. All commemorative trees and the names and contact information for the original applicants will be documented and maintained by the Program Director.

8. Communications Strategy

- 8.1. The Campus Tree Care Plan shall be made available to the campus community on the Northeastern University Facilities Division web page and through links from the University Campus Planning and Development web page.
- 8.2. From time to time campus arboretum tours are conducted by the Program Director for Landscape
- 8.3. A plant labeling system is being planned to better facilitate plant identification and provide links to an Arboretum data base.

DESIGN GUIDELINES



DESIGN GUIDELINES

Northeastern University Arboretum

1. General

While much of the perceived quality of the campus arboretum landscape depends upon the level and consistency of maintenance applied, the original design also plays an important role; therefore, the following design guidelines shall be followed in the development of all campus arboretum and landscape projects.

The guidelines are intended to promote consistency and unity throughout the campus landscape. This is challenging because the landscape is designed project by project, over time, and often by different teams of people.

A coherent, unified landscape experience that results in a calming of the mind is desired; the kind of calm one feels when immersed in natural environments. The unifying design goal of the Northeastern arboretum landscape is to achieve an urban forest rich in sensory appeal, consistent in its overall effect and compositionally whole. The guidelines seek to prevent fragmentation of the landscape into a collection of individual identifiable projects with their own distinct materials and forms, each fashionably demanding attention.

The overall effect of the campus arboretum design should be to create a sense of order, scale, refinement and durability that reflects the importance of a community of higher education and high social purpose.

2. Operational Function

Each landscape design project shall seek to enhance the operational and ecological function of the campus landscape.

2.1. Circulation

Designs shall respond to the specific requirements for campus pedestrian, bicycle, and vehicular circulation, including emergency and service access. Paths should closely follow desired patterns of pedestrian movement. Curbs have been used to good effect throughout the campus to protect planting areas from service vehicles, snow removal vehicles and pedestrians. This practice should continue in areas where there is danger of vehicular encroachment into planting areas. Plantings should be designed to allow for proper clearances in all circulation corridors.



2.2. Landscape Use

Designers and the Program Director shall establish programmatic requirements for landscape projects at the outset of the design process. Non-circulation uses such as gathering areas, social spaces, outdoor study spaces, active recreation spaces and outdoor classrooms shall be identified and accommodated.

2.3. Planting Goals

Particular planting goals for unique campus microclimate zones (deep shade, exposed, sheltered, etc.); for specific educational or collection goals; or specific maintenance requirements shall be identified and specified with the Program Director prior to starting design.

2.4. Utilities

Utility requirements shall be incorporated into design decisions from the outset of the design process, including consideration of future maintenance access.

3. Ecological Function

3.1. Stormwater

All landscape projects shall identify best management practices applicable to improving stormwater management for volume and quality. Practices such as proper planting soil design and depths, rain gardens, bio-swales, and other applicable techniques including permeable pavements shall be explored and applied as dictated by the project conditions.

3.2. Local Climate Regulation

There is approximately 9.1 acres of tree canopy on the main campus. This canopy is an important mitigating factor in reducing urban heat island effect during the summer months. New landscape projects shall seek to avoid any loss of tree canopy and endeavor to increase the canopy, particularly in areas adjacent to extensive pavement. The canopy works to moderate heat through shade and increased evapotranspiration. Opportunities to employ trees to reduce cooling loads of buildings shall be sought.

3.3. Habitat Enhancement

Plant assemblages shall be selected to enhance habitats for desirable songbirds, migratory birds and pollinators. Plants that offer food, shelter, resting area and nesting space for desirable wildlife is encouraged. The Northeastern campuses' proximity to the Emerald Necklace open space makes it a well situated refuge for desirable plant and animal diversity. Enhancing habitat value for desirable species can contribute to conservation of biological and genetic diversity. Habitat spaces may not be suitable for all areas of the campus because of conflicting functional use. Where possible, human access and interpretive information about habitat enhancements and the promotion of biological diversity shall be provided.

3.4. Biological Diversity

To contribute to the conservation of regional biodiversity, preference should be given to plants that are native to the Northern Hardwood Forest, Appalachian Oak Forest, and the Northeastern Oak-Pine Forest plant communities as identified by A. W. Kuchler.

4. Horticultural Considerations

4.1. Appropriateness for Maintenance

Because of the urban conditions (limited soil volume, poor soil quality, irregular hydrology and limited sunlight) that typify the campus, all plants in the campus arboretum require continuous care in order to prosper. However, an effort shall be made to avoid conditions that will create extra maintenance. For example trees with weak wood likely to break up in storms should be avoided. Likewise, plants with excessive fruit production should not be used in paved areas where they may create a safety hazard and clean-up problem.

Plantings shall be located with anticipation of the impacts of routine campus operations such as snow removal, utility maintenance, building maintenance and building move-in move-out.

4.2. Horticultural suitability

Plants should be selected to match the climatic, wind exposure, deicing salt exposure, sunlight, drainage and soil conditions of the proposed planting location. Plants should be able to adapt to the conditions in which they are planted. Preference should be given to plants that are proven performers in growth and vitality; are adaptable to a range of conditions; have limited pest and disease problems; and are not invasive as identified in the Massachusetts Invasive Plants Advisory Group (MIPAG) list of invasive and likely invasive plants.

Plants with desirable characteristics and arboretum collection priority, but with suspected adaptability to the campus growing conditions shall be used in limited quantities and only as approved by the Program Director for Landscape.

4.3. Planting size

Many of the available planting locations on the Northeastern campus are constrained by buildings and streets. To ensure that plant materials are sized to fit the spaces they are assigned, care shall be taken to accurately measure canopy space prior to plant selection. Plants shall be selected to fit the space available without having to resort to hard pruning.

In general, smaller tree sizes are preferred to large specimens, as long as the trees can be adequately protected from pedestrians, bicycles and vehicles until the plant reaches a sufficient size to reduce accidental damage. The advantages of planting smaller trees include lower initial material and labor costs, as well as better acclimation of the plant to its new site.

Consideration shall also be given to the growth rate and ultimate size of plants to avoid plants outgrowing their sites and causing long term maintenance problems. When selecting plants for constrained sites, designers shall consider cultivars that have dwarf or fastigiate forms.



4.4. Layering

In an effort to optimize the effectiveness of the planting space available on the campus, designers shall strongly consider the potential for layered planting where conditions allow. Layered planting means that a single planting area can possess a combination of canopy trees, understory trees, shrubs, and herbaceous or woody ground cover plantings. This approach may result in plant assemblages that mimic natural woodland communities and can result in lower long term maintenance.

4.5. Species Representation

The 10-20-30 urban forestry guideline shall be applied to tree selection. The guideline is intended to reduce the risk of catastrophic tree loss due to pests or disease. The campus tree population should include no more than 10% of one species, 20% of any one genus, or 30% of any botanical family.

5. Visual - Sensory Effect

5.1. Purposeful Space Definition

The use of three dimensional buildings, walls, or plant materials to frame and enclose space is referred to as “space definition”. Streets, paths, low hedges, curbs and other boundaries also influence space definition, but less profoundly than three dimensional buildings, walls and plantings.



The organization of the primary landscape corridors, plazas and lawns is a foundational aspect of the campus landscape design. It should be one of the first considerations for all landscape and planting projects, and should precede the selection of all plant species. Determining the space-defining role (edge definition, overhead canopy definition, background visual barrier, focal point of visual attention, etc.) of a given planting will play a significant role in plant selection. All planting proposals for the campus should commence with the definition of space-defining goals.

5.2. Scale

The strongest elements of space definition on the campus are its buildings. Their mass, size and close packed arrangement define the spatial framework of the campus experience. For planting designs to be successful in the context of campus buildings, they must be of the appropriate institutional scale. That is, plantings shall adopt proportions compatible with the size and composition of adjacent buildings. Small planting gestures in close association with large institutional buildings can look trivial, and will fail to contribute meaningfully to the order of the campus. Major streets, pedestrian corridors, plazas and open spaces should be designed with simple bold plantings that reflect the scale of their surrounding buildings. The most useful plantings to positively achieve human scale in the landscape are shade trees. Tree canopies over pedestrian spaces lower the “ceiling” of the landscape and pleasantly reduce the apparent size and mass of adjacent buildings. The same trees provide attractive naturalistic scenery for occupants inside the building.

Intricate garden scale plantings that add to the intimacy of the landscape experience should be reserved for smaller courtyards and corridors.

5.3. Unity and Variety

In general the diversity of campus plantings is encouraged for ecological reasons; however, diversity should not result in the loss of visual unity and coherence in the major pedestrian linkage spaces of the campus.

Whereas architectural distinctiveness and variety are attributes often considered desirable and recognized as inherent among the various building program requirements and building types that make up a campus, the design attributes most sought in the campus landscape are unity and continuity of effect.

Design variety in the campus arboretum landscape for its own sake or as a matter of personal style or preference is discouraged in favor of an approach that connects the various parts of the landscape into a unified whole. The campus landscape design should evoke a psychological calm that derives from its consistent treatment. The design goal is a landscape defined by rhythmic, continuous spatial sequences and the harmonious use of materials instead of individual expressions that sacrifice connection to the whole. It is far more important to have the adjacent parts of the landscape form a connected, well planned experience than it is to have a landscape designed to suit the unique materials and forms of a particular building or designer at the expense of the larger landscape experience.

Designers should look at the best parts of the existing campus landscape and its plantings as a source of inspiration with the intent of perpetuating the better qualities of the historic landscape, and adding new plantings in a seamless way. In the long term, campus community members should be struck by the continuity of the overall campus landscape composition rather than by the differences bestowed by different generations of designers. There will always be enough variety in the campus environment because of its diverse building design and the irregular patterns of space between buildings. It is not necessary or desirable for the landscape design do other than seek the profound repose that derives from well composed unity and consistency.

5.4. Informal Character

With the exception of the Krentzman Quadrangle, the Hurtig Hall quadrangle, the Huntington Avenue corridor, and a few other secondary pedestrian corridors, the organization of the campus plantings is informal, free of repetitive geometric patterns. Except in streetscapes and the few formal quadrangles, the dominant order of the campus plantings should continue to be informal. The advantages of informal, naturalistic arrangements are flexibility, reasonableness of maintenance, and perfection is achievable in many ways. Compared to regular geometric arrangements, informal plantings are more resilient to change over time. As plants are lost to damage or disease, they can be readily replaced without losing the overall effect of the design.

5.5. Biomorphic Form

One of the principal aesthetic motives for planting design on the campus shall be to provide a biomorphic contrast to the man-made, geometric built forms that dominate the campus environment. The introduction of the biomorphic forms of trees and shrubs should be an intentional means of achieving visual interest and providing contrasting naturalistic scenery. Careful designs that juxtapose the elegant forms of branching, foliage, fruit and flower against a background of buildings and pavements will amplify the effect of plants. To achieve this effect the plantings must be sufficiently bold, carefully composed and proportional to the geometric context. They also must be well maintained to convey health and vitality.

5.6. Seasonal Effect

The selection of plants shall consider the benefits that a particular species will bring with respect to visual interest throughout the seasons. Attention shall be directed to achieving winter interest by selecting plants with evergreen foliage, ornamental bark, persistent fruit, and/or attractive branching habit. Coordination of seasonal effects with the university calendar shall seek to optimize the benefits of flower, foliage, form and fragrance.

COLLECTION POLICIES

COLLECTION POLICIES

1. Purpose

The Northeastern University Arboretum Collections Plan (NACP) provides uniform direction to assist in the maintenance, expansion, and development of the Northeastern campus tree and landscape collections. This document identifies collection priorities within the framework of the institution's mission, vision, and available resources.

1.1. The Northeastern University Collections Plan shall:

- 1.1.1. Provide a definition of the campus landscape as a designated arboretum
- 1.1.2. Guide future development of the Arboretum to increase value to the Northeastern community and general public.
- 1.1.3. Guide and create transparency on the curation decision process of accessioned and deaccessioned plants, while enumerating priorities for collections in order to better manage living
- 1.1.4. Give vision for an ideal collection in order to balance the mission of the University, the desire of Campus horticulture staff, the needs of stakeholders (including students, faculty, staff, alumnae, and the general public) and future campus landscape needs.
- 1.1.5. Serve as a training tool for horticulture staff and a depository for institutional knowledge as part of a greater succession plan as leadership staff changes.

2. Policy Governance

The Program Director for Landscape in University Facilities Services has responsibility for implementing and updating the NACP with guidance from the Arboretum Advisory Committee (Sec. 4) and Vice President for Facilities. All communications regarding the Arboretum programs are the responsibility of the Vice President of Communications. All Grounds Staff play a role in curation by responding to stakeholder feedback, proposing acquisitions that increase the value of the collection, identifying opportunities to replace accessions, and nominating plant materials for deaccessioning. Decisions about accessioning and deaccessioning are the primary responsibility of the Program Director for Landscape.

The Program Director for Landscape will also consult with the Arboretum Advisory Committee and Northeastern University faculty, lecturers, and students to address needs to ensure that the collections are of maximum academic benefit to the Northeastern University community.



3. Arboretum Advisory Committee

The Arboretum Advisory Committee will provide oversight of the living collections to ensure alignment with the Northeastern University mission, original collections intent, academic opportunities as they evolve over time. The Arboretum Advisory Committee, comprised of representatives of Northeastern University and the City of Boston serves in an advisory role to ensure collection changes are aligned with policy, management issues, and available resources.

3.1 Membership

The committee is comprised of representatives from the student body, faculty, University Facilities, and the City of Boston Tree Warden.

3.2 Committee Charge

The committee develops and supports initiatives that promote the campus Arboretum. Areas of interest include the following:

3.2.1 Formulation and review of Arboretum goals, plans and policies. This will include topics such as plant selection for future plantings, formulation of programs, memorial tree policies, tree removal policies, coordination with campus design and planning efforts that will influence the Arboretum.

3.2.2 Review and formulation of campus Arboretum management and implementation



activities, including tree collection documentation and labeling activities; tree hazard removals; pruning methods; disease and pest management; tree purchasing guidelines; planting methods and program or event planning.

3.3 Meetings

The committee will meet at least twice annually to address its charge.

4. Review and Revision of Plan

The NACP shall be referred to as a living document and is to be reviewed and updated as the Arboretum Advisory Committee and Program Director for Landscape deems suitable to fit the needs of the University and collection goals. A comprehensive assessment of this policy shall occur no less than every five years with guidance from the Arboretum Advisory Committee. Stakeholder input and review will be sought during any substantial revisions of the NACP.

5. General Purpose of the Collections

The Northeastern University Arboretum Collections serve as landscape and material resources for educational activities, recreation, and enjoyment of the University community and visiting public. Important secondary purposes of the collection serve as examples of native and adapted plant diversity within New England, providing ecosystem services beyond the campus landscape.

6. Collections Priorities

The collections maintained at the Northeastern University Campus Arboretum fall within two broad categories: General and Specialized Collections.

6.1 General Collection

General or non-specialized collections that are managed for support of the University's landscape with special focus on environmental and aesthetic values befitting the urban-influenced climate and conditions of Boston, MA. This primarily public display contains plants whose role is primarily aesthetic and to illustrate landscape design concepts (e.g. right plant, right place, formal or naturalistic garden elements, four season interest, pollinator habitat, water conservation, and native plant landscapes.) When practical, the general collection is used to trial new species, cultivars, and hybrids in order to inform the University community and general public of new landscape plants that are performing well in our current climate and show promise of performing well in future climate scenarios.

6.2 Specialized Collections

Collections slated for continued and robust growth in both taxonomic diversity and conservation value add value to student education and observation. They include the following:

6.2.1 Curriculum Collection: This teaching collection focuses on plant specimens already present or future accession priorities to aid class work in plant identification, systematics and taxonomy. This important tangible learning resource provides critical hands-on learning outside of the classroom and creates opportunities for collaboration between University planners/horticulture staff, faculty, and students.

6.2.2 Phylogeographic Collection: The Northeastern University Arboretum holds a wide array of plants native to North America and Central and East Asia which share family lineages and illustrate various morphological traits depending on geographic location. These continental disjunctive plants, when displayed together, create opportune scenarios for teaching. Genera of collection interest and focus include Acer, Cornus, Rhododendron, and Viburnum among others.

6.2.3 Northeastern US Collection: Approximately 20% of the trees in the Northeastern University Arboretum are native to Northeastern states including Massachusetts, Maine, New Hampshire, New York, Connecticut, and Rhode Island.

COLLECTIONS POLICY

Northeastern University Arboretum

7. Collection Documentation

The value of an accession to the collection is augmented by the extensiveness of its documentation within the plant database. Plants with more complete documentation (provenance data, collection information, biological performance data, cultural significance, and history of use by students, faculty, and staff) are more valuable than those with less documentation. When practical, plants with less extensive documentation should be replaced by those with more thorough or significant documentation.

7.1 Digital Inventories: Digital plant records are to be updated by the Program Director of Landscape as specimens are accessioned or deaccessioned to the permanent collection on a monthly basis. Grounds staff are encouraged to document plant health and condition and report to the landscape curator as they are encountered on a weekly basis. An annual review of the collections inventory should be attempted at five-year intervals.

7.2 Baseline Inventory History: The Northeastern University Arboretum was inventoried by an outside consulting group, SavATree in March and April 2018 which included onsite ID, 360-degree visual inspection, and creation of a tree index Microsoft Excel file including species, breast-height diameter, condition, maintenance recommendations, zone location, and GPS coordinates. Northeastern University also maintains a separate Microsoft Excel file for identification and maintenance of shrub species. These two Excel files are the foundation of the Arboretum collections database.



7.3 Arboretum Database Inventory Fields

Category	Field Entry
Accession Number	Alphanumeric
Family	Accepted Families
Genus	Accepted Genera
Species	Accepted Species
Cultivar / Selection	Known Cultivar / Selection Names
Provenance	Place of Acquisition
Acquisition Date	Numeric Date: Year/Month/Day xxxx/xx/xx
Nativity	Accepted Area of Nativity or "Garden Origin"
GPS Coordinates	Numeric: Latitude, Longitude
Landscape Maintenance Primary Zone	Defined Primary Zones
Landscape Maintenance Sub Zone	Defined Sub Zones
Latest Review Date	Numeric Date: Year/Month/Day xxxx/xx/xx
Condition	Missing, Removed, Dead, Poor, Fair, Good, Excellent
DBH	Numeric: Inches
Maintenance Priority Category	NA, Low, Medium, High, Critical
Maintenance Action Notes	Text Field
Collection Affiliation	Collection Category 1
Collection Sub-Affiliation	Collection Category 2
Collection Notes	Text Field
Tribute – Memorial Affiliation	Yes / No
Tribute – Memorial Donor	Text: Official Donor Name
Tribute – Memorial Date	Numeric Date: Year/Month/Day xxxx/xx/xx
Tribute – Memorial Comments	Text Field



7.4 Landscape Archive Photography

The campus landscape plays an important role in the identity of Northeastern University and in Alumnae memories and perceptions of their alma mater. As Northeastern continues to develop and in-turn, its landscapes evolve, photo documentation is a critical component to archive.

In scenarios of construction which may alter large sections of the collection, photo documentation of the affected area and specimens is to be created and plant records archived for historical reference. After construction, new photos and plant records are to be created and added to the plant records database.

7.5 Labeling Standards

7.5.1 Accession Labels

All collection specimens will have an accession label, which is referred to, monitored, and maintained by Grounds Staff and the Program Director of Landscape. Under no circumstances will the accession label be removed from the plant. In cases of large numbers of individuals linked to one accession number (clonal plants) and maintained in one location, only one permanent label is required and the circumstance noted in digital records.

Accession labels will ensure plant specimens are accurately inventoried and referenced. In most cases, these labels will not be intended for public view. Plants that are deaccessioned may not have their accession label information or label transferred to another specimen.

Accession labels will include:

Accession Number

Plant Family

Scientific Name

Common Name

Accession Date

Source / Collection Data or Provenance

Location Information

7.5.2 Display Labels

Plants of significant merit including historic or educational value and those on publicized Arboretum interpretation shall have labels that denote botanic taxonomy (Family, Genus, Species, Cultivar, Variety, etc.) and relevant information which may include area of nativity, names in other languages, or cultural identifiers. Public display labels are to be oriented for easy view and appropriate size, scale, and attachment method depending on the particular plant.

8. Inventory Documentation Goals

Baseline Survey Inventory – Completed Spring 2018

Organization of Baseline Inventory and Data Field Creation – Winter 2019

Identification of General and Specific Collections, Including Interpretation Outline – Winter –Spring 2019

Accession Label Prioritization – Spring 2021

- New Acquisitions Post Spring 2019 – shall be labeled with accession labels for collection purposes at time of installation, with a time period not exceeding 30 days after installation
- Existing Collection Acquisitions – shall be labeled with accession labels in five increments, each representing 20% of the entire collection over a period of three years: Spring 2019, Fall 2019, Spring 2020, Fall 2020, Spring 2021.
- Public Interpretation Labels – Installation shall be the decision of the Program Director of Landscape with priorities extending to labeling curriculum-based collections.

- Online Collections Portal – Implementation and creation of a publicly accessible interface to visualize the Northeastern University Arboretum’s collections will be decided upon the Program Director of Landscape as deemed necessary.

9. Collection Management Considerations

9.1 Climate Change and Ecology

As stewards and advocates for the Northeastern University campus, the Arboretum has an obligation to proactively address climate change through planning and action. Plant accessions will be evaluated for their water needs, disease and pest resistance, drought tolerance, and hardiness and resilience to extreme temperatures in the current and near future climates. The specifics of soils, drainage and hydrology, habitat, landform and orientation, and ecological function should guide selection and placement of accessions in the landscape. Accessions will, when possible, be replaced with taxa of comparable collection value if the replacements help mitigate climate impact, enhance campus adaptation to climate change, or increase ecosystem functions.

9.2 Legal and Ethical Acquisition of Plants

The Northeastern University Arboretum follows all State of Massachusetts and federal laws governing the collection, dissemination, and propagation of plants including the Endangered Species Act (1973) and the Lacey Act (1900, amended 2008). The Arboretum also adheres to the Convention on Biological Diversity (1993) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975).

The Northeastern University Arboretum will not knowingly purchase, acquire, or curate plants, propagules, or other plant materials that have been or are suspected of having been illegally collected or imported, with the exception of confiscated plants legally procured from the United States Department of Agriculture. The Arboretum will perform due diligence to ensure that purchases and acquisitions are not contributing to habitat destruction or over-collection of plants from the wild. Material transfer agreements, collection permits, and other acquisition agreements that regulate plant ownership, propagation, or distribution will be archived for the life of the accession and properly noted in collection records.

9.3 Controlled Substances

The Northeastern University Arboretum complies with all local, State of Massachusetts, and federal laws regarding prohibited compounds and controlled substances. The Arboretum shall not acquire or possess plants, plant materials, plant products, or plant compounds that are regulated by such laws without proper state and federal permits. If the Arboretum is



in possession of a plant that is found to violate local, state, or federal laws, the plant will be safely destroyed under the supervision of at least two Northeastern University employees, one of whom will be the Program Director for Landscape.

9.4 Invasive Species

With proximity to important ecological connectors like the Emerald Necklace open space, Back Bay Fens and Charles River Basin, Northeastern University Arboretum actively seeks to limit the introduction and spread of invasive species. The United States Department of Agriculture, Invasive Plant Atlas of New England, and Massachusetts Department of Agricultural Resources lists of invasive species will be used to review the plant collections and potential accessions. Plants that are known to pose a risk of escape in Massachusetts will not be accessioned unless there is evidence that the accession can be monitored and reasonably safeguarded from escape. Plants on the Massachusetts Invasive Plant Advisory Group (MIPAG) lists of “invasive” and “likely invasive” plants shall not be used on the campus. Accessions that are not on these invasive species lists may still be removed from the collection if there are concerns about their potential invasiveness.

10. Donations, Tributes, and Memorials

From time to time the University receives gifts and requests for memorial trees to be installed on the campus to commemorate events or individuals. The following guidelines will regulate commemorative plantings.



Purpose

Reasons for planting commemorative trees include but are not limited to: commemoration of visits to the campus by celebrated people; commemoration of events of significance to the University; or commemoration of individuals of significance to the University.

Applications

Applications for commemorative trees will be made to the Arboretum Advisory Committee. The committee will make a recommendation to the University senior leadership team. The senior leadership team will rule on the application. All commemorative trees shall be approved by the senior leadership team prior to installation.

Details

The tree location, size and species selection will be the responsibility of the Program Director with advice from the Arboretum Advisory Committee. Commemorative trees shall be selected to be consistent with the overall Collections Policy of the Arboretum. Commemorative trees will be located in areas where it is reasonable to assume that the tree will not be displaced by campus development or infrastructure projects for the foreseeable future as defined in current campus master plans.

Maintenance

All commemorative trees will be maintained as part of the Campus Arboretum until such time that the tree dies; becomes a safety hazard and must be removed; becomes diseased or damaged and must be removed; or is displaced by planned campus development. After the loss of a commemorative tree, the University is not under obligation to replace the tree; however, if the proponents of the commemorative tree would like to renew the commemoration with a replacement tree at the same or other location, the University will accept such application.

Documentation - All commemorative trees and the names and contact information for the original applicants will be documented and maintained by the Program Director.

Guidelines shared - The commemorative tree guidelines will be shared with all proponents of commemorative trees.

11. Accessions & Deaccessioning

11.1 Accessions

Plants selected for retention in the Northeastern University Arboretum for greater than 12 months and that serve one or more of the collection priorities may be nominated for inclusion. Plants included for temporary aesthetic value (e.g. seasonal displays) will not be accessioned.

Criteria for Accessions:

- The taxon is particularly well-suited culturally for the Northeastern Arboretum grounds, context, and climate.
- The taxon adds to the Arboretum's species diversity and aligns or fills gaps in special collections.
- The taxon is of particular merit for landscape use within the Boston metro region

11.2 Initial Procedure for Accessioning

Information for all incoming plants designated for permanent collections must be recorded in the plant database and be accompanied by bills of sale, shipping documents, or documents which disclose the plants provenance, date of acquisition, purchase size, and vendor, collector, or donor. An accession label with a unique identifier shall be distributed to installed specimens within one month of installation.

11.3 Removal or Deaccession of Specimens

To improve the quality of the living collections or to permit essential University-related construction, it is sometimes necessary to remove accessions from the collection. In normal conditions, removal occurs when the plant is in decline, has been damaged, concerns about invasive potential arise, or general loss of functionality for display or educational purposes has occurred.

In scenarios where construction may impact the University's living collections, care and consideration must be taken to limit the affected area and specimens, including soil disturbance and compaction, branch or trunk damage, hydrological or drainage changes, shading, etc. Appropriate tree and landscape protections shall be in place to protect adjacent collections during the length of construction. Refer to the Campus Tree Care Plan for more details in this required process.

11.4 Typical Reasons for Deaccessioning

During evaluations of individual specimen conditions that routinely result in a decision to deaccession include:

- Plants exhibiting disease or decline, due to numerous factors such as incompatibility with climate, poor stock, mishandling, etc.
- Plants deemed to be redundant for mission fulfillment, or of no current or likely future use under provisions of the Arboretum Collections Plan
- Plant material requiring excessive maintenance effort not justified by the benefits of retaining it in the collection.
- Plant material that may be readily and economically obtained in the commercial trade at a lower cost than is required to maintain in the collection.



TERMS & DEFINITIONS

Northeastern University Arboretum

Accession - The acquisition of an individual plant specimen regardless of taxonomic or cultivar designation which is recorded with a unique identifier for record keeping.

ANSI - American National Standards Institute

Biomorphic - Design suggestive of forms and patterns found in the natural world.

Collection - A particular grouping of plant specimens, regardless of spatial arrangement which create educational value through interpretation or investigation.

Commemorative Tree - Trees dedicated to a prominent individual, either living or deceased, through the application of a label signifier.

CRZ - Critical Root Zone, the zone where tree root density is greatest and is variable based on tree age, species, and site context.

Cultivar - A plant of a particular species bred or propagated for desirable characteristics.

DBH - Diameter Breast Height

Deaccession - The act of removing a plant accession from an arboretum collection.

Ecosystem Services - Varied services provided to humans from properly-functioning ecosystems and components of ecosystems which range from food provisioning, climate regulation, stormwater filtration, etc.

Ericaceous - Denoting plants from the heather family *Ericaceae*.

Fastigiate - Plants displaying an upright growth pattern, where branches are more or less parallel to the main stem.

Genera / Genus - A principal taxonomic category that ranks below family and above species.

GIS - Geographic Information System, often used in digital display and analysis programs like Autodesk ArcGIS.

ISA - International Society of Arboriculture

Microclimate - The climate patterns of a very small zone, relatively outside those of the surrounding area. Often corresponds to slope, aspect, solar exposure, environmental sheltering, and shadow impacts.

Nativar - A native plant species selected for certain desirable characteristics.

Provenance - A plants original or earliest recorded place of origin. Often referred to as the source of the plant material.

Species - A principal taxonomic category that ranks below family and species and defines variants, selections, and cultivars or hybrids.

Taxon / Taxa / Taxonomic - The classification of plants through class, family, genus, and species, which forms relationships between plant evolutionary lineages.

The Northeastern University Arboretum
Guidelines and Policies were drafted in
collaboration with Northeastern University
staff by Sasaki in 2019.



64 Pleasant Street
Watertown, MA 02472
United States

T +1 617 926 3300
F +1 617 924 2748

sasaki.com

[@SasakiDesign](https://www.instagram.com/SasakiDesign)

