Exploring the Aesthetic Benefits of Arbor Landscaping at Boston College

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Abstract:

This research paper aims to generate awareness on the importance of urban forests and tree conservation especially with regard to aesthetic impact on urban populations. Urban forestry is defined as all trees on urban land, which includes a mixture of planted and naturally regenerated trees. Urban life is generally characterized as life in a city or town. The disconnect from nature that urban life causes may contribute to negative health effects and influence the decisions that people make regarding resource use. Urban forests provide important benefits including biodiversity conservation, ecosystem services, as well as psychological and social benefits for people. Additionally, urban forests increase the aesthetic value of an area. They have been shown to improve the psychological and physiological well being of urban inhabitants. This project elucidates the established benefits of arbor aesthetics and raises awareness of the hidden benefits of the trees on Boston College's Chestnut Hill campus. In doing so this project creates a walking tour of BC's significant trees and provides suggestions towards turning BC into an Arbor-Day certified campus. With this project the authors hope to rekindle the vital connection with nature that community members surrounding urban campuses may be missing.

Introduction

This project explores the importance of maintaining and heightening awareness of urban forests on the Boston College campus. The research will be conducted in three parts 1) a background review on the significance of biodiversity and urban forests, 2) background research on the existing tree-species on campus, and 3) the creation of a walking "tree tour" for Boston College to help certify Boston College as an Arbor Day Campus. The goal of the project is to set the groundwork for future projects within Boston College that help engage the BC community in realizing the importance of urban forestry.

Part One: The Importance and Benefits of Urban Forestry

Background on Urban Forestry

Urban forestry is defined as all trees on urban land, which includes a mixture of planted and naturally regenerated trees (US Department of Agriculture, 2016). These areas are becoming more important as well as more threatened as the population in urban areas continues to rise (see fig. 4.1, table 2.1) (Wyse, et. al., 2015). Unfortunately, tree cover has been declining due to both natural and anthropogenic factors (Us Department of Agriculture, 2016). This is a problem because urban forests provide important benefits including biodiversity conservation, ecosystem services, as well as psychological and social benefits for people (Wyse, et. al., 2015). About 85% of people live in urban areas which points to the importance of urban forestry and the great influence that it has on the day-to-day lives of Americans (US Department of Agriculture, 2016). Currently, urban tree cover in the United States is estimated to be about 35% (see fig. 4.5) (US Department of Agriculture, 2016). Fortunately, efforts have been made in some cities, such as New York, LA, and Baltimore to increase urban forestry (Wyse, et. al., 2015). One study even found that most people are willing to pay for greenspace (Botzat, et. al., 2016). This all points to the necessity of a formal walking tour of Boston College's historic trees in order to promote urban forestry and all of the benefits associated with it.

Figure 4.1. Urban areas in the contiguous United States, 2000, based on the Census Bureau definition of urban land (Nowak and Dwyer 2007).

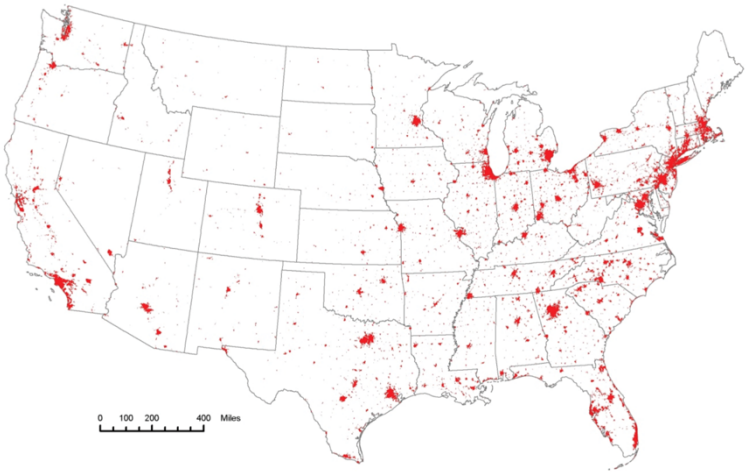
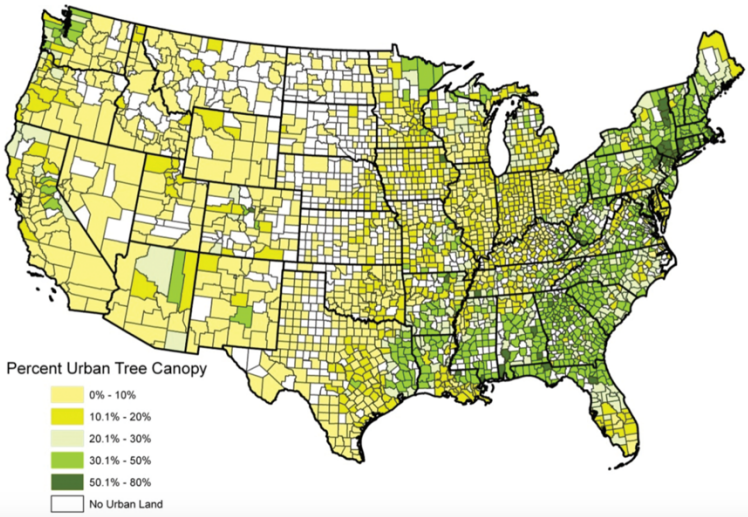


Table 2.1. U.S. population by land category (in millions).

	1980	1990	2000	2008	Change 1980–2008
Rural	46	45	49	50	4 (10%)
Urban	181	204	233	254	73 (40%)
Total	227	249	281	304	77 (34%)

Source: USDA Economic Research Service (http://www.ers.usda.gov/StateFacts/US.htm [August 2015]).

Figure 4.5. Percent tree cover in urban areas, 2000, by county (Nowak et al. 2010).



Economic

Economically, urban forests provide many benefits to the surrounding areas. Price of real estate is affected by the surrounding greenspace (Votsis, 2017). As seen in Helsinki, the closer to greenspace a property is, the more potential there is to increase the price (see fig. 2) (Votsis, 2017). Beyond increased property values, urban forestry also increases sales for local businesses in the area, as well as employment (US Department of Agriculture, 2016). The job market is not only benefitted by the fact that more sales lead to a demand increase for employees, but also the formation and maintenance of the urban forests creates jobs (US Department of Agriculture, 2016). Overall, urban forests stimulate the economy in multiple ways.

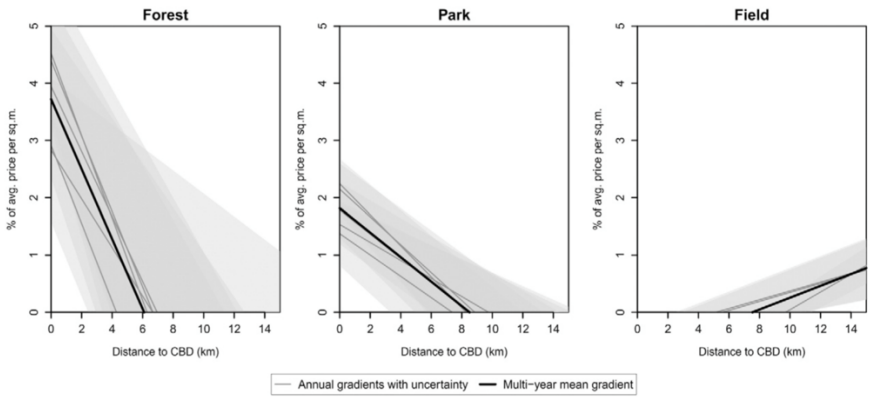


Fig. 2. Marginal effects and spatial gradients for forest (left), park (middle), and field (right). Grey lines and shaded areas denote the gradients and estimation uncertainty of statistically significant years. Black lines denote multi-year mean gradients.

Environmental Benefits

Finally, there are significant environmental impacts related to urban forestry. These forests provide a habitat for wildlife (Botzat, et. al., 2016), specifically native species. Native trees provide fruit and nectar resources to native fauna, insects, fungi, and birds greatly helping to conserve the biodiversity of the area (Wyse, et. al., 2015). Urban forests also help with water and soil retention, improve air quality, positively influence urban hydrology, conserve energy, and mitigate temperature through greenhouse gas sequestration (US Department of Agriculture, 2016).

General Aesthetic/Well-being

Additionally, urban forests increase the aesthetic of the area and the well-being of its inhabitants. The many social well-being benefits include a place for recreation, the facilitation of social interaction and cohesion, the integration of migrants into society, restorative aspects for stressed individuals (Botzat, 2016) (Smardon, 1988), the reduction of anxiety (Smardon, 1988), and increased alertness and concentration (Smardon, 1988). Physiologically, urban forests provide better air quality and temperature control (Smardon, 1988), noise reduction qualities (US Department of Agriculture, 2016) (Smardon, 1988), and studies show urban forests speed up healing times for hospital patients (Smardon, 1988). Aesthetically, it is shown that the more color an area has the more its inhabitants are pleased (Botzat, et. al., 2016). This is due to benefits such as wind reduction and glare reduction (see Fig. 1) along with a better ability to recall through cognitive mapping (Smardon, 1988).

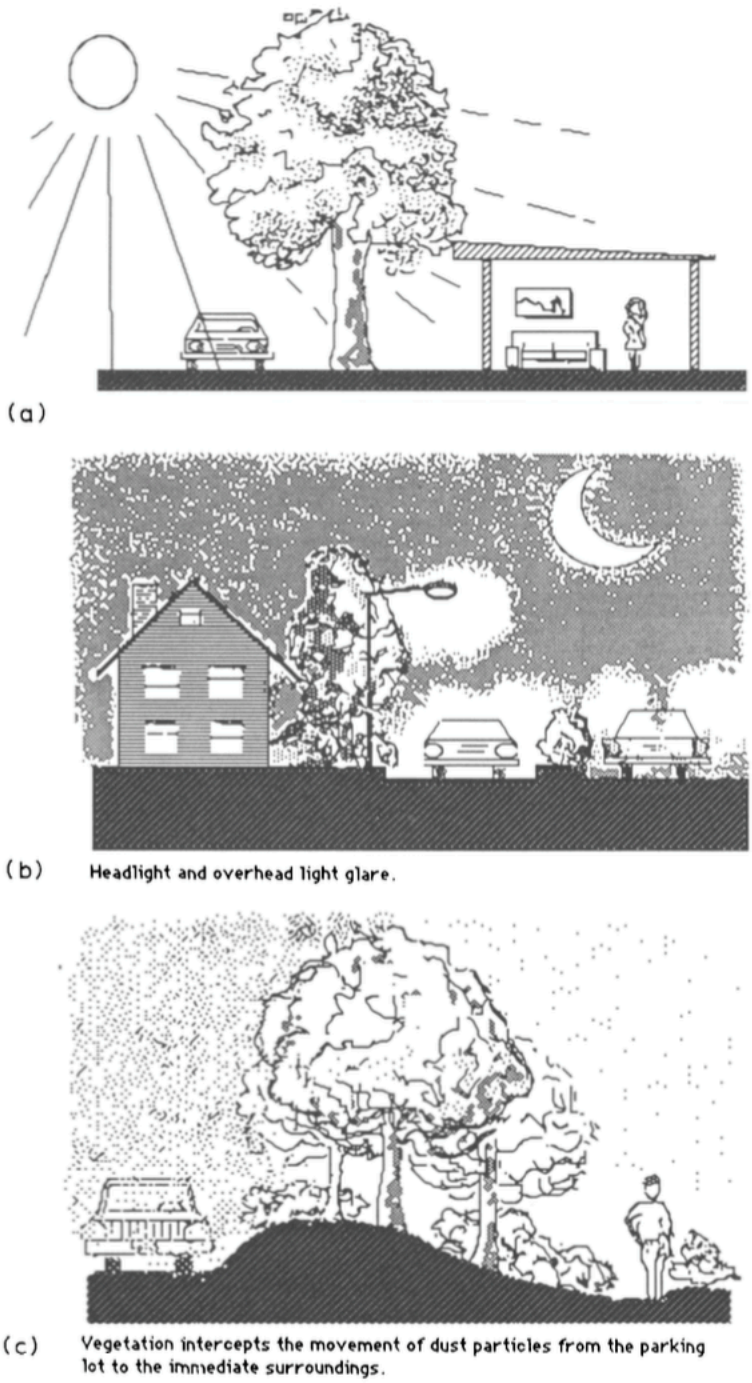


Fig. 1. Physical functions of urban vegetation. (a) production of shade; (b) glare reduction; (c) interception of dust.

Aesthetics/Well-being at Boston College

President Father Leahy and the Boston College administration place a high importance on the landscaping aesthetics of the campus. They believe that landscaping has a potentially large and positive impact on perspective students. Furthermore, perspective students are

not taken to see the inside of dorms on a tour, so the impression these students get of their possible future home is all based upon the academic buildings and landscape. In addition, hard surfaces are disliked by the administration so landscaping is pushed even more (Bellavia, 2017).

Landscaping Methods and Guidelines at Boston College

Boston College grounds does their best to make the landscaping appear as beautiful as possible. The landscaping is redone throughout the year, especially around the time of commencement ceremonies to make the area as durable and manicured as possible to accommodate the large crowds. Depending on the season, different flowers and grass types are planted based upon which species will survive best for the weather during the time. Most plant lives are short and meant to be rotated out. The turf is a specifically important part of the landscaping as it is easily damaged yet very important to keep maintained for crowds (Bellavia, 2017).

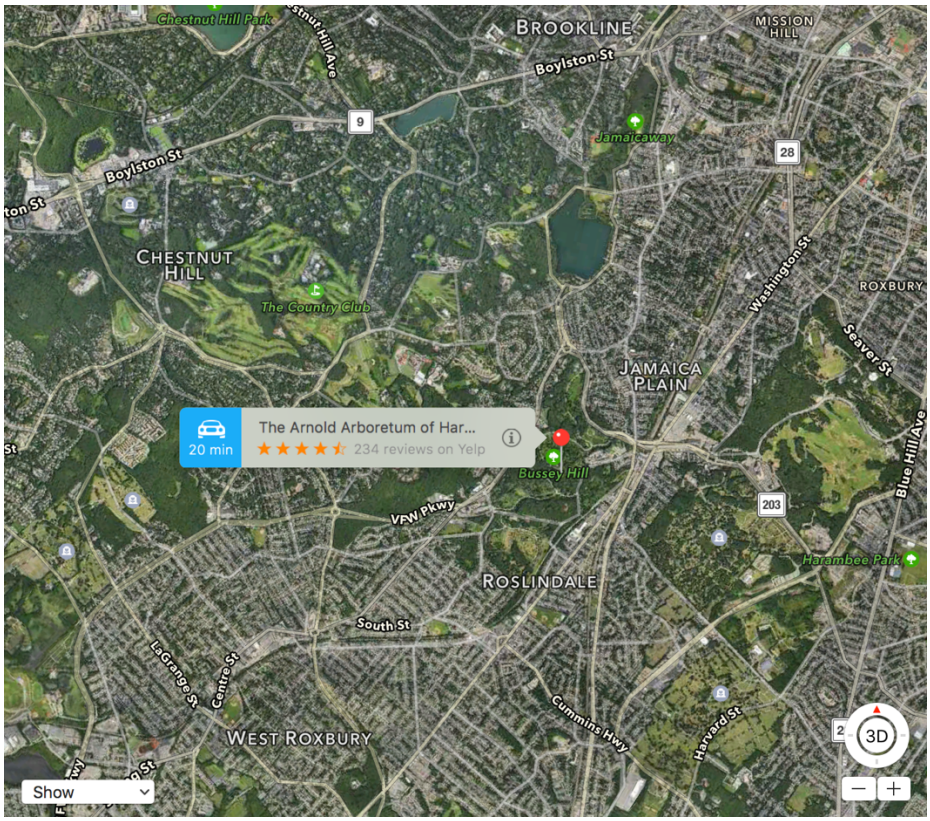
When looking at the guidelines for Boston College's landscaping maintenance there are different expectations for each of the three campuses, however it is assumed that all three will look manicured and maintained. The middle portion of the Chestnut Hill campus has the highest priority and receives the most amount of maintenance. As one moves further away from middle campus, the wear of the landscape is less and therefore the maintenance is less. There is effort put into the Newton Campus and Brighton campus however the majority of resources are allocated to the Chestnut Hill campus. The limiting factor is money so if there were adequate funds all three campuses would receive an equal amount of maintenance. Integrated pest management and the monitoring method are used to care for the landscaping on campus. Soil samples are taken from different areas on campus. If the samples reveal that help is needed, nutrients will be spread in those areas. Furthermore, the campus is monitored for pests. Pest treatment is only administered if the monitoring shows it is necessary (Bellavia, 2017).

Landscaping Funding at Boston College

In terms of the overall budget at Boston College, not much money is spent on landscaping. Over the past eleven years, the budget on landscaping has not increased despite the fact that President Father Leahy prioritizes landscaping and cites it as an important aspect of the campus. In this way, campus grounds must prioritize the uses of the landscaping budget for the most important projects (Bellavia, 2017).

Arnold Arboretum: An Urban Forest in Boston

Harvard's Arnold Arboretum is an example of an urban forest that resides in the Jamaica Plain neighborhood of Boston. These authors visited the arboretum and immediately felt a sense of calm, despite the dreary east coast weather. In walking through the arboretum, they discovered a hospital, Faulkner Hospital, and rehabilitation center, Hebrew Rehabilitation Center, on the property. Employees of the rehab center explained that when the weather is nice, they frequently utilize the arboretum from group activities and recovery exercises.



Pictured Above, an aerial view of Harvard's Arnold Arboretum vast urban forestry within the Jamaica Plain neighborhood of Boston

Pictured above, the South St. gate where the authors entered the Arboretum

Pictured above, a map of the Arboretum

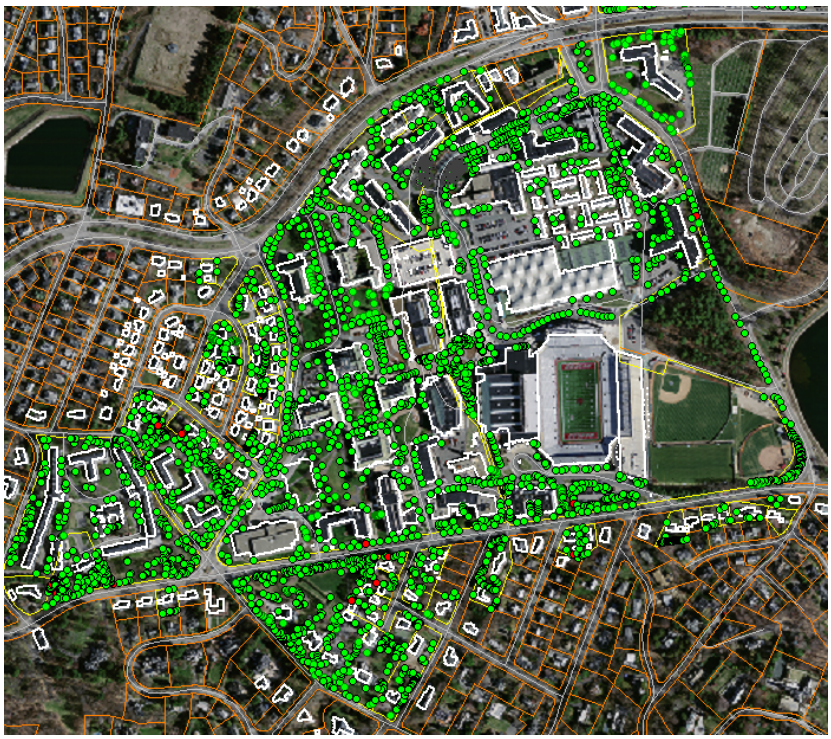
Pictured Above: Hebrew Senior Life (HSL), a rehabilitation, senior care services and senior living facility adjacent to the Arboretum grounds. Patients and residents of HSL frequent the Arboretum grounds to take advantage of the psychological and physiological benefits of urban forestry.

Pictured above, the Authors at Arnold Arboretum.

Part Two: Ecological Information on the Significant Trees on the Boston College Campus

Introduction

This section serves to provide ecological information on the significant trees on BC's campus. Tree types include: Black Walnut, Butternut, Cedars of Lebanon, Dawn Redwood, Douglas-Fir, European Larch, Littleleaf Linden, Japanese Cedar, Japanese Flowering Cherry, and the Japanese Red Maple. Other species of trees exist on campus, including those detailed in the second picture below. The significant trees were chosen based on their aesthetic appeal based on recommendation and consultation with Gina Bellavia, Director of Landscape and Planning Services. All information regarding these trees in relation to BC was obtained through the Boston College tree database owned by the Department of Facilities Maintenance.



Above: A screenshot of the tree database owned by the Boston College Department of Facilities Maintenance. This database houses ecological information (health, year last maintained, year obtained) of majority of the trees on Boston College property.

Highlighted on the map above are the 44 Littleleaf lindens on Linden Lane (A); the location of what was once a 100-foot oak across Campanella Way from Robsham Theater (B); a Dawn Redwood (C), a 60-foot conifer on the grounds of Hovey House. Also evident is the abundance of Norway maples—for example, at (D)— an invasive species whose 834 plants make it the most numerous on campus. Next most populous is the eastern hemlock (E), a native evergreen. Its 412 specimens—10 percent of the campuses' trees—are languishing due to the hemlock woolly adelgid, an Asian pest that can defoliate and kill trees within 10 years of infestation.[1]

To Note: Chestnut Hill (Zip: 02467) is in Zone 6b: -5 to 0 (F) Plant Hardiness Zone set by the United States Department of Agriculture. Gardeners use this standard to determine which plants are most likely to thrive at a location. The map is based on the average annual minimum winter temperature, divided into 10-degree F zones.[2]

[1] http://bcm.bc.edu/issues/fall_2010/linden_lane/close-up.html#sthash.UkJYXPQK.dpuf
[2] http://planthardiness.ars.usda.gov/PHZMWeb/

Black Walnut *(Juglans nigra)*[3,4]

The black walnut tree belongs to the Juglandaceae, or walnut, family. It is also called the eastern black walnut and American walnut and is one of the scarcest and most coveted native hardwoods. It is primarily planted for practicality and aesthetics. The dark brown wood of the black walnut is beautiful when polished. The nuts itself also are enjoyed for consumption.

Physical characteristics:

This tree is grows to a height of 50-75' and has a spread of 50-75' at maturity. It grows at a medium rate with height increases of 13-24" per year. It produces nuts after 12-15 years. The tree itself grows rounded

Wildlife Value:

The nuts of the butternut are eaten by woodpeckers, foxes, and squirrels. The tree itself, however, can be toxic to certain other trees and plants if planted too close.

Sensitivity:

This tree is self-fertile but requires wind for pollination. It needs full sun and requires the minimum of six hours of direct sunlight per date. The black walnut grows in acidic, alkaline, loamy, moist, rich, sandy, well-drained, wet and clay soils.

United States Zones:

The black walnut grows in hardiness zones 4-9.[5]

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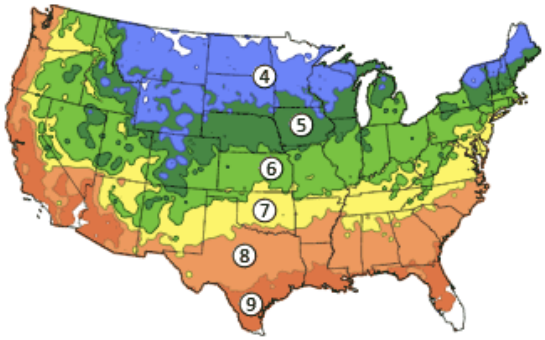
[3] https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=934
[4]https://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/juglans/nigra.htm
[5] https://shop.arborday.org/content.aspx?page=zone-lookup



At Boston College:

The Black Walnut on Chestnut Hill campus in Spring (April 27, 2017).

Butternut *(juglans cinerea)*[6,7]

The butternut is also known as the white walnut. It belongs to the Juglandaceae or walnut family. It is one of the hardiest nut trees and is popular for the buttery-flavored nuts that are produced in late October. This tree is native to North America particularly the New England area.

Physical characteristics:

The butternut grows in a rounded shape and develops a short, usually forked trunk with a wide spreading open canopy. Its nuts are produced 7-10 years after planting. It grows slowly with heigh increases of less than 12" per year. Mature trees reach a maximum of 100ft. The average height for butternut trees are 40 to 60ft.

Wildlife Value:

The nuts are valuable food for deer, squirrels and birds as well as for human consumption.

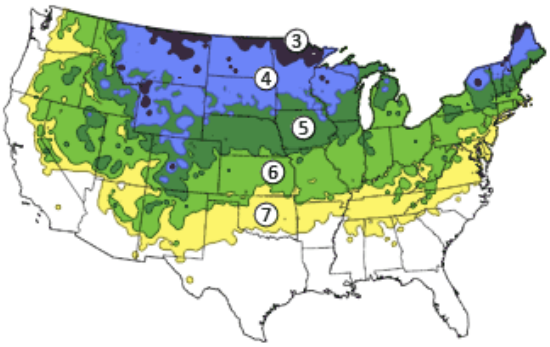
Sensitivity:

This tree needs at least six hours of direct sunlight each day. It grows in acidic, alkaline, loamy, moist, rich, sandy, well-drained and clay soils.

United States Zones:

The butternut is expected to grow in hardline zones 3-7.[8]

[6] https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=803
[7]https://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/juglans/cinerea.htm
[8] https://shop.arborday.org/content.aspx?page=zone-lookup



At Boston College:

The Butternut on Chestnut Hill campus in Spring (May 1st, 2017).

Cedars of Lebanon *(Cedrus libani)*[9, 10]

The Cedar of Lebanon belongs to the Pinaceae, or pine, family. The are trees or shrubs that are native to the mountainous areas of the Mediterranean region namely Syria, Lebanon, and Turkey. There are also native to Southwestern Asia. This tree is the national emblem of Lebanon and appears in the center of the flag of Lebanon. It is planted for its ornamental appeal in parks and gardens. The tree is often mentioned in the old testament of the bible.

Physical characteristics:

This tree is distinguished by its height. It can reach from 40 to 60' with an equally magnificent spread. It is an evergreen and has needled leaves with cones. With age, the cedar of Lebanon grows a flattened top and broad horizontal branching. Its trunk is massive. It grows slowly and may only reach 20' in its first 20 years.

Sensitivity:

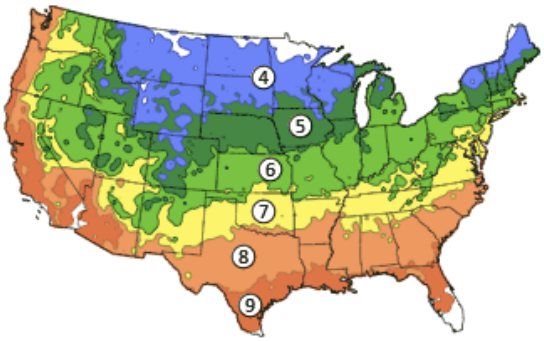
The Cedars of Lebanon grow best in deep, moist but well-drained, acidic loams. It requires full sun and is the toughest of the true cedars to winter. It is drought tolerant when aged but is intolerant of flooding and wet soils. It needs to be protected from winter winds.

United States Zones:

This tree grows best in hardiness zones 5-7.

[9] http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kemperco de=b431

[10] http://www.conifers.org/pi/Cedrus_libani.php



At Boston College:

There were originally two Cedars of Lebanon on BC campus. Unfortunately, one was uprooted due to high winds and now there is only one tree left. It is located in the lawn of the President's House at Botolph House on College Road. Interestingly enough, there was a giant sequoia near Hovey House but Boston College was required to donate that tree to Harvard's Arnold Arboretum upon purchase of the Hovey House property. The two, now one, Cedars of Lebanon were traded for the Sequoia.

Cedar of Lebanon on Botolph House lawn in Spring (April 27, 2017).

Dawn Redwood *(me tasequoia glyptostroboides)*[11,12]

The dawn redwood is an impressive tree and has been around since the age of the dinosaurs. It belongs to the Cupressaceae family, meaning that it is non-flowering. It is native to Central and western China. It is a shade tree and is capable of providing a canopy that blocks sunlight. The dawn redwoods are often the subject of conservation efforts.

Physical characteristics:

The dawn redwood is distinguished by its height, fast growth, and colorful leaves. The tree is unique because it is the only living species in its genus that is a deciduous tree rather than an evergreen. This means that it sheds its leaves in the fall and is bare in the winter. It grows to a height of 70-100' and a spread of around 25' at maturity. It can grow with height increases of more than 24" per year. The Dawn Redwood has fine and feathery leaves that are bright ggree. It also produces rounded cones and sheds leaves annually. It grows tall in a cony, pyramidal shape.

Wildlife Value:

The tree provides shelter for birds, small mammals, and deer.

Sensitivity:

The dawn redwood is a sturdy tree that does not require much maintenance. It tolerates pollution. It also thrives in larger spaces with full sun. It requires a minimum of six hours of direct sunlight per day. As for soil, the dawn redwood is very versatile and can survive in drought conditions though it prefers moist conditions. It can grow in acidic, loamy, moist, sandy, well-drained, wet, and clay soils. It can also withstand some flooding.

United States Zones:

The dawn redwood is expected to grow in hardiness zones 5-8.[13]

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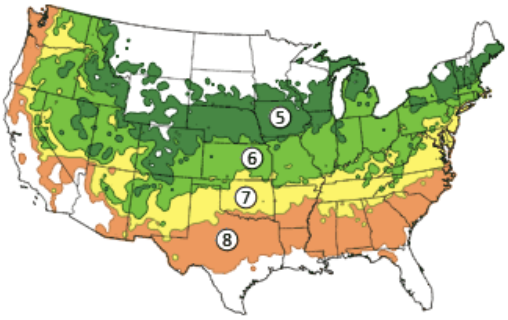
[11] https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=914
[12] https://www.savetheredwoods.org/redwoods/dawn-redwoods/
[13] https://shop.arborday.org/content.aspx?page=zone-lookup



At Boston College:

The Dawn Redwood on Hovey House lawn, in Spring (April 27, 2017)

Douglas-Fir *(Pseudotsuga menziesii)*[14,15,16]

The Douglas-fir, also known as red firs, Oregon pines, and Douglas spruce belongs to the Pinaceae family. It is not a true fir. It is an evergreen tree and keeps its foliage year round. The Douglas-fir is the United States' top source of lumber and makes up nearly half of all Christmas trees grown in the U.S. This tree is native to North America and is particularly important for American history, as its lumbar has provided railroad ties, telephone and telegraph poles, as well as a multitude of uses for GIs in World War II. It is the state tree of Oregon.

Physical characteristics:

This tree grows to a height of 40-70' and has a spread of 12-20' at maturity. It has a medium growth rate with height increases of 13-24" per year. The coloring of its spiral needles depends on the variety: the Costal Douglas-fir or the Rocky Mountain Douglas-fir. The Costal version is faster growing and long-lived. It can reach over 3000' tall while the Rocky Mountain Douglas-fir is slower growing, shorter-lived and only grows to a maximum of 130'.

Wildlife Value:

The seeds of the Douglas-fir are eaten by blue grouse, songbirds, squirrels, rabbits and other small animals. The rare northern spotted owls rely on old-growth forests of Douglas-firs for cover. The rodent the red tree vole relies almost exclusively on the Douglas-fir for nesting and feeding. It provides cover for animals. Antelope, deer, elk, mountain goats and mountain sheep also eat the twigs and foliage.

Sensitivity:

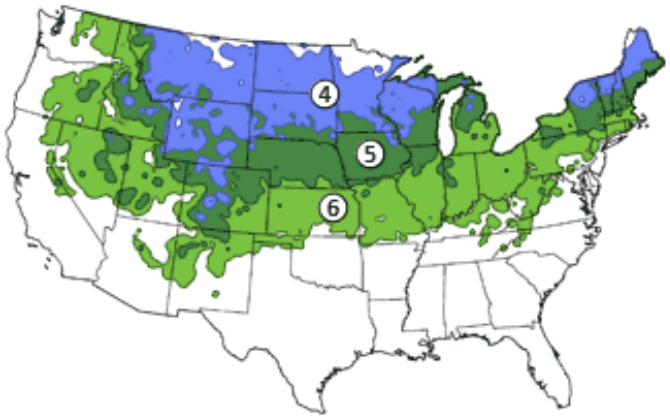
It prefers full sun or partial shade meaning that it prefers a minimum of four hours of direct sunlight per day. It grows best in acidic or neutral soil that is well-drained and is

[14] https://plants.usda.gov/core/profile?symbol=PSME
[15] https://www.nwf.org/Wildlife/Wildlife-Library/Plants/Douglas-Fir.aspx
[16] https://www.arborday.org/trees/treeguide/treedetail.cfm?itemID=836

sensitive to drought. As it is a large tree, it needs room to grow. It does best in a climate with an abundance of atmospheric moisture. It can also be injured by high winds.

United States Zones:

The Douglas-fir is expected to grow in hardiness zones 4-6.[17]



At Boston College:

[17] https://www.arborday.org/trees/treeguide/treedetail.cfm?itemID=836

The Douglas-fir on Chestnut Hill campus in Spring (April 27, 2017).

Additionally in 1925, the ship the USS Constitution needed its masts repaired. Since White Pine trees could no longer be found, the 'Old Ironsides' boasts three Douglas fir masts in the Boston Navy Yard.

European Larch *(Larix decidua)*[18,19]

The European larch belongs to the Pinaceae family. It is non-flowering and is native to central and southern Europe extending from Switzerland to Italy. It has been planted extensively in the United States and has become naturalized in Maine, Michigan, New York, Connecticut, New Hampshire, Vermont, and Rhode Island. It is planted as an ornamental tree but also holds value for rehabilitating habitats at higher elevations in the northern Appalachians that have lost vegetation.

Physical characteristics:

The European larch is a large deciduous conifer that has horizontal branching and drooping branchlets. It can grow to 60-100' tall in a pyramidal shape. It has soft green leaves that turn gold-ish yellow before they fall. In Europe, the European larch is a source of timber.

Sensitivity:

This tree is best grown in moist, gravelly loams in full sun. It is tolerant of light shade but intolerant to full shade. It is quite sensitive to dry soil and air pollution. It will not work well in hot and humid habitats. It also tolerates deer.

United States Zones:

[18]http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kemperc ode=a163

[19] https://www.fs.fed.us/database/feis/plants/tree/lardec/all.html

The European larch is expected to grow in hardiness zones 2-6.[20]

Native to northern and central Europe, planted as a timber tree and an ornamental in zones 2-6, known to escape.

At Boston College:

The European Larch at Boston College in Spring (April 27, 2017).

[20] http://dendro.cnre.vt.edu/dendrology/images/Larix%20decidua/map.jpg

Littleleaf Linden (Tulia cordata)[21, 22]

The Littleleaf Linden belongs to the Malvaceae family. It is a shade tree, meaning that its canopies are capable of blocking sunlight. The Littleleaf Linden flowers and is an ornamental tree. It blooms with flowers in the spring. The tree is planted all across America but is not native to the U.S. It is a European tree mainly used for shading purposes.

Physical characteristics:

The Littleleaf Linden grows to a height of 50-60' and a spread of around 40' at maturity. It produces clusters of yellowish flowers and blooms through the summer after most trees have finished. It is a great source of nectar and pollen for bees and other pollinators and the soft wood often provides nesting sites for cavity-dwelling birds. The tree itself grows in a pyramidal to over shape. The Littleleaf Linden can grow to be thousands of years in age though American Lindens grown in urban areas can reach ages up to 150 years.[23]

Sensitivity:

This tree is best grown in acidic, alkaline, moist, rich, sandy, well-drained, wet and clay soils. It prefers moist conditions but does not do well in wet areas. Furthermore it cannot handle severe drought. The Littleleaf Linden prefers full sun and partial shade, meaning that it prefers a minimum of four hours of direct, unfiltered sunlight per day. It is sensitive to road salt.

United States Zones:

The European larch is expected to grow in hardiness zones 3-7.[24]

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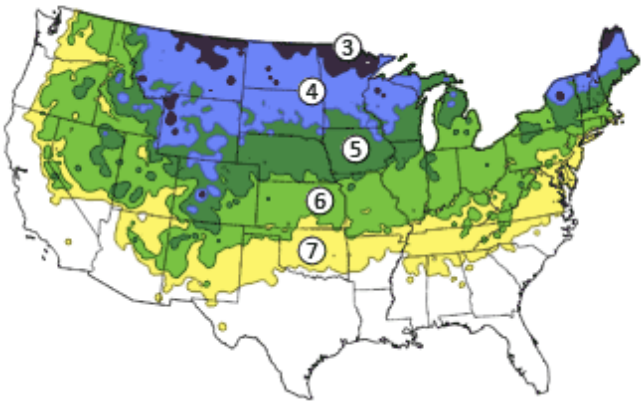
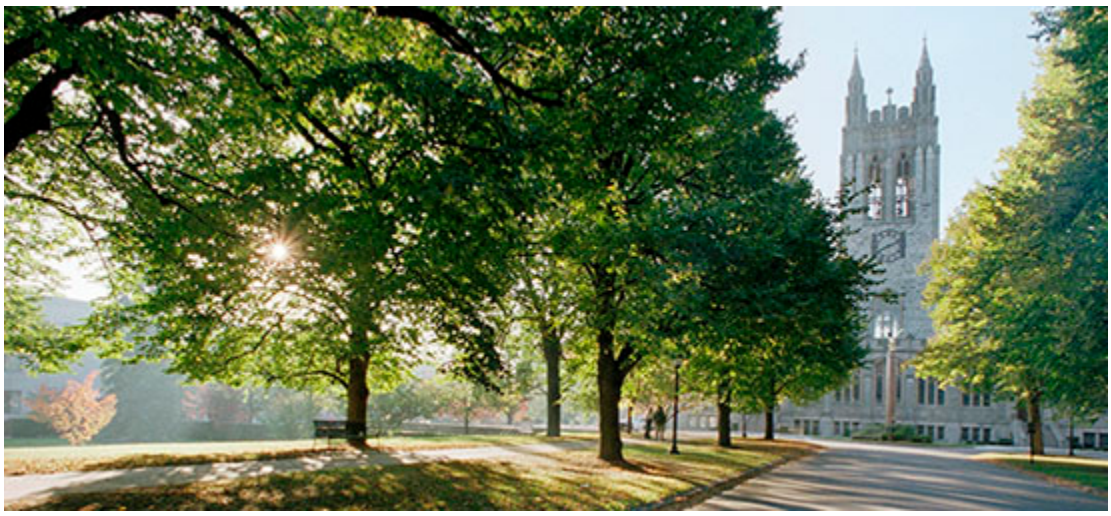
[21] https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=858
[22]http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kemperc ode=a918
[23] http://gardening.yardener.com/American-Linden
[24] http://dendro.cnre.vt.edu/dendrology/images/Larix%20decidua/map.jpg



Significance to Boston College:

The Littleleaf Lindens are iconic to Boston College and can be found along BC's Linden Lane. They were first planted in 1913 and are thus 104 years old as of 2017. Not all of BC's Lindens have survived since then, unfortunately. Two out of the 44 Littleleaf Lindens have been replaced. The trees were once pruned so people passing by on Commonwealth Avenue could see Gasson Tower. However, pruning today is done less for aesthetics and more to keep up the health of these old trees. Due to the relative little spacing between each tree and the increase urban setting of the Boston College campus, the squished root structure can only support smaller canopies. The Boston College Grounds Department manages the existing Lindens for as long as they can but replacement options are being thought of for the near future. Due to the largeness of each tree, it would be impossible to replace the trees with newer, younger Lindens one by one. The older trees and their more powerful root structures would compete with the younger trees and thus starve the younger trees of sunlight and nutrients. Since Boston College's aesthetics depends significantly on Linden Lane the project to replace Linden Lane without marring the year round aesthetic and diminishing the BC's intrinsic worth to visitors and prospective students will be a significant challenge for Boston College. The trees will, however, be Lindens.

Linden Lane, Photo courtesy of John J. Burns Library



Above: The present day view of Linden Lane, street view.

Japanese Cedar *(cryptomeria japonica)*[25,26]

The Japanese Cedar, also known as the Japanese cryptomeria or *sugi* in Japanese, belongs to the Cupressaceae, or cypress, family of trees. It is not related to the true cedars (Cedrus) as it is a monotypic genus. It is native to Japan and southern China and is the national tree of Japan. The cypress family of trees cone and are conifers. It does not flower and is mainly planted for its aesthetic appeal and as a source of timber. There are reports of cryptomeria living for more than 1400 years. It is also known in Japan as the cause of hay fever outbreaks.

Physical characteristics:

This tree has needled evergreen leaves, which may bronze in cold winters. The leaves are sharply pointed and fragrant. It is a slender and pyramidal tree that has tiered horizontal branching. In the United States, this tree grows much smaller –typically to 50-60'. In its native habitat it can grow to 150' with an 8' trunk diameter. The bark is reddish-brown.

Sensitivity:

It grows best in moist, rich, fertile, acidic, well-drained soils in full sun. It tolerates light shade but does not tolerate dry soil. It needs protection from drying winter winds.

United States:

The Japanese Cedar is not well-suited to the United States as well as its native habitat of Japan and southern China. It may grow well in the Southeast U.S. and has adapted to the

[25]http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a158

[26] https://arboretum.harvard.edu/wp-content/uploads/tree-of-the-month-cryptomeria.pdf

entire state of South Carolina.[27]

The Japanese Cedar grows in hardiness zones 6-8 (shaded area above).

At Boston College:

The Japanese Cedar on Hovey House Property, in Spring (April 27, 2017) (left). Leaves in summer (right).

[27] http://www.clemson.edu/extension/hgic/plants/landscape/trees/hgic1012.html

Japanese Flowering Cherry *(Prunus x yedoensis)*[28,29,30]

The Japanese Flowering Cherry, also known as the Yoshino Cherry, belongs to the Rosaceae family of trees. The Rosaceae family is in the major group Angiosperms/Magnoliophyta (flowering plants). It is native to Japan and is planted for the aesthetic appeal of its flowering blossoms. It was introduced to America in 1902. This tree can be found in Washington D.C. and contributes to the famous cherry blossom bloom there, where it joins its cousin the Kanzan cherry. The first Japanese flowering cherries planted in the United States capital were a gift from the mayor of Tokyo.

Physical characteristics:

This tree is known for its incredible bloom of white-pink flowers and faint almond fragrance in the springtime. It grows to a height of 40-50' and has a round spread of 25-40' at maturity. The leaves emerge red and turn dark green by summer.

Wildlife Value:

The Japanese cherry is an important source of food for many small birds and mammals including robins, cardinals, and waxwings. This allows for insignificant litter at the end of the season. It also attracts butterflies.

Sensitivity:

The Japanese cherry is very versatile. It prefers moist conditions but is tolerant to drought. It can thus grow in acidic, loamy, moist, sandy, well-drained, and clay soils. It prefers full sun and partial shade with a minimum of four hours of direct sunlight much like the Japanese maple. The blooms are sometimes damaged by late frosts or very windy conditions.

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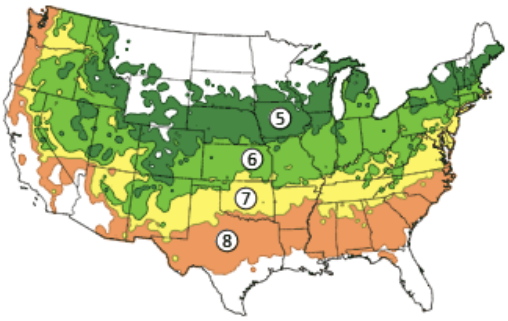
[28] https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=812

[29] http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kemperc ode=i720

[30] http://hort.ufl.edu/database/documents/pdf/tree_fact_sheets/pruyeda.pdf

United States Zones:

The Japanese Cherry is expected to grow in hardiness zones 5-8.[31]



At Boston College:

[31] https://shop.arborday.org/content.aspx?page=zone-lookup

The Japanese Flowering Cherry is adjacent to Higgins and Devlin Hall.

Japanese Red Maple *(acer palmatum var. atropurureum)*[32,33,34]

The Japanese Red Maple belongs to the Aceracae, or maple, family of trees. It is native to Japan and Korea and is called *momiji* in Japanese. The maple family belongs to the class of flowering plants (magnoliophyta). It is an ornamental tree, meaning that it is typically planed for its aesthetic appeal.

Physical characteristics:

This tree is distinguished by its reddish purple leaf color, which it produces in the spring and fall. In the summer, the leaf color is often green. These trees can be grown as a small tree or multi-stemmed shrub and often grow in a rounded shape. The leaves grow up to 4" in length and 5 or 7 lobes spread symmetrically from a central point, similar to a human hand. It grows to around 15-25 feet and averages around 20 feet at maturity. Though it flowers, the flower itself is insignificant.

Wildlife Value:

The seeds, buds, and flowers of the Japanese Maple are eaten by grouse, quail, and other songbirds. Squirrels and chipmunks also feed from the seeds of these maples.

Sensitivity:

It needs protection from high winds and late spring frosts for its young leaves. It prefers full sun or partial shade meaning that it prefers a minimum of four hours of direct sunlight per day. It grows best in acidic, loamy, moist, rich, sandy, silty loam, well drained and clay soils. It has some drought tolerance.

United States Zones:

The Japanese Maple is expected to grow in hardiness zones 5-8.[35]

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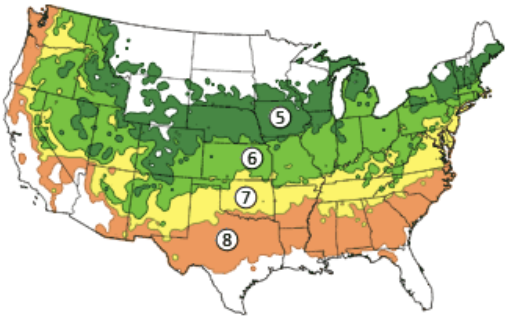
[32] https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=866
[33] https://plants.usda.gov/core/profile?symbol=ACPA2
[34]https://plants.usda.gov/java/ClassificationServlet?source=display&classid=Aceraceae
[35] https://shop.arborday.org/content.aspx?page=zone-lookup

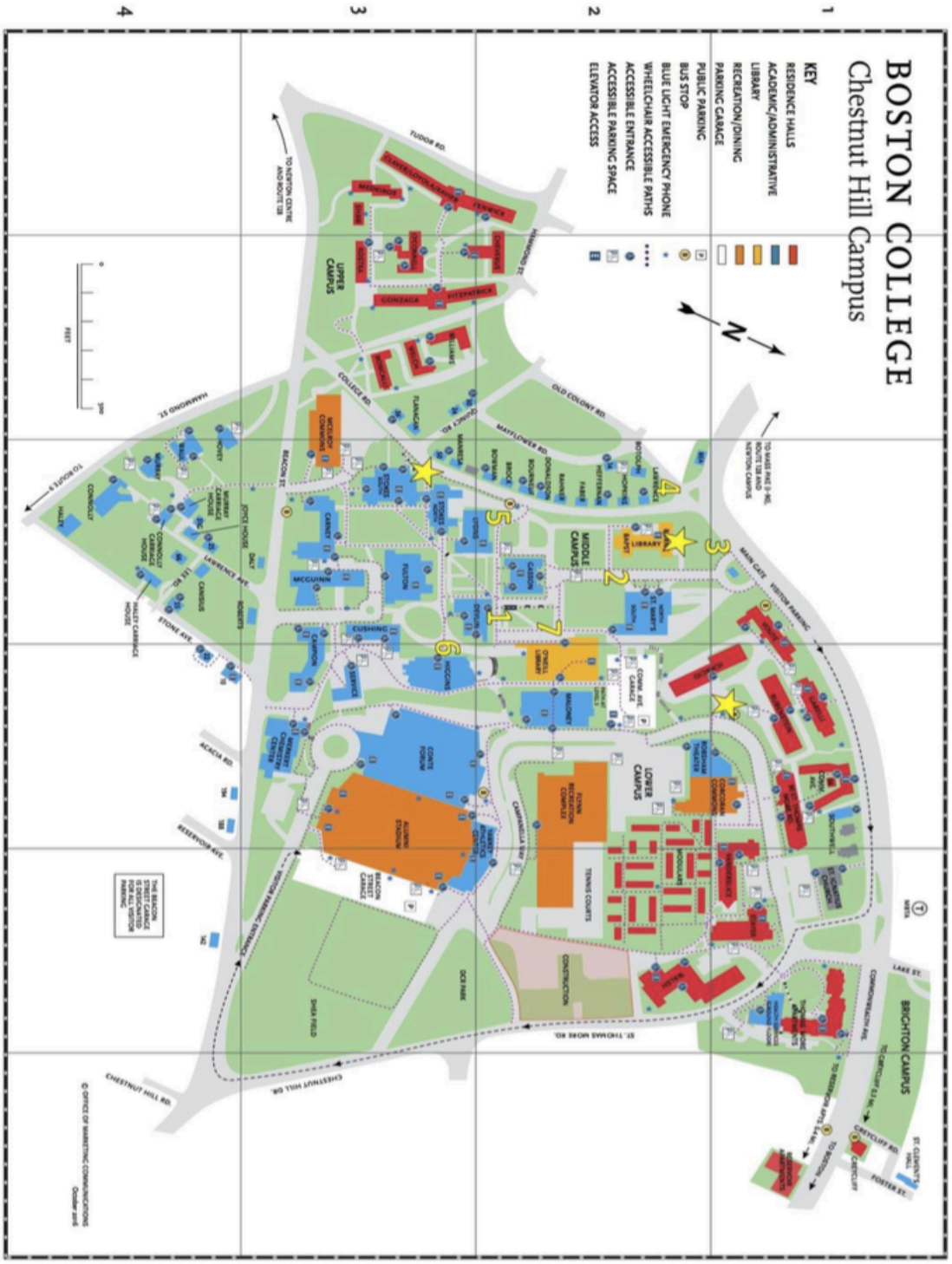


At Boston College:

BC's Japanese Red Maple used to be near Walsh Hall but was recently moved to the area behind Lyons Hall. Before the Red Maple's move, an unusually big and old crabapple tree used to be in its place behind Lyons Hall. *Photo of the Japanese Red Maple in Spring, April 27, 2010 (above).*

Part Three

The Walking Tour



Boston College Tree Tour

Stop 1: Devlin Hall Admissions

- 14,600 total students
- 9,000 undergrad
- Founded by the Society of Jesus in 1863
- Students and faculty alike agree that aesthetics are an important part of BC's campus

Stop 2: Linden Lane

- *Littleleaf Linden* trees on both sides of Linden Lane
- Bloom with flowers in the spring
- Great source of nectar and pollen for bees and other pollinators
- Can grow to be thousands of years in age, however those in urban areas reach about 150 years
- Our Lindens were planted in 1913
- 2 of the original 44 Lindens have been replaced
- Very iconic part of Boston College as the Freshman Convocation walk and senior walk to commencment begin on Linden Lane

Lower Campus, Rubenstein Hall

- If you continue right down Commonwealth Avenue you will reach Lower Campus which contains upperclassman dorms, including Rubenstein Hall
- Out front of Rubenstein Hall is a Butternut tree and a Black Walnut tree

Memorial Labyrinth

- To the left of Linden Lane is Bapst Library
- On September 11, 2003, a memorial labyrinth behind Bapst was dedicated to the 22 Boston College alumni lost in the 9/11 tragedy

Note: Stars are not actual stops on the tour, but highly recommended sites

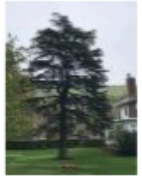
Created by Risa Kuroda and Kjirsten Ree for Environmental Studies Senior Seminar, Spring 2017

Stop 3: Bapst Library

- *Douglas Fir* next to the Link Garden
- Not a true fir
- Evergreen, keeps foliage year round
- Top source of lumber in the US and makes up for half of all Christmas trees
- Lumber has provided railroad ties, telephone and telegraph poles, and a multitude of uses for WWII soldiers

Stop 4: President's Office

- *Cedar of Lebanon* outside of Father Leahy's office
- Native to the Mediterranean region and Southeast Asia
- Stump right next to the tree was another Cedar of Lebanon that was uprooted because it wasn't properly protected from the winter winds
- When BC bought the Hovey House, the owners required that the Giant Sequoia on the property be moved to the Harvard's Arnold Arboretum and in return BC was given two Cedars of Lebanon



Stop 5: Back of Lyons Hall

- *Japanese Red Maple* that was recently relocated
- Native to Japan and Korea
- Originally the tree was located outside of Walsh Hall on Lower Campus
- The tree was appraised to be of an unusual age and monetary value so due to the construction on Lower Campus, the tree was relocated to behind Lyons Hall

Stokes Garden Archway

- Columnar upright trees furthest from the walk are *Beech Trees*
- Flowering trees closer to the walk are *White Flowering Redbuds*

Stop 6: Back of Devlin Hall

- *Japanese Flowering Cherry* or *Yoshino Cherry*
- Native to Japan
- Known for incredible bloom of white and pink flowers and faint almond fragrance in the springtime
- Leaves emerge red and turn dark green by the summer

Stop 7: Devlin Hall Admissions

- *European Larch* next to the fountain
- Native to Southern Europe
- Planted Extensively throughout the United States
- Can rehabilitate habitats at higher elevations such as in the Appalachians

Arbor Day Certification Steps for Boston College

There are **Five Core Standards of Tree Care and Community Engagement** that Boston College must meet to become and Arbor Day Certified Campus. The standards are bolded, followed by these author's recommendations.

1. ***Establishment of a Campus Tree Advisory Committee***

   Student – We recommend using the current environmental clubs and groups on campus to promote the leadership opportunity and obtain a student representative.

   Faculty – We recommend reaching out to faculty that have a connection to the trees on Boston College's campus such as the history department, the environmental studies department, or the biology department.

   Facility Management – We recommend working with Gina Bellavia and the rest of Boston College rounds to obtain a facility management representative.

   Community – We recommend reaching out to the City of Newton as it is considered a "tree city" and therefore places an importance on the vegetation of the area.

2. ***Evidence of a Campus Tree Care Plan***

   Boston College already has a campus tree care plan in place. We recommend reaching out to Gina Bellavia to obtain this plan and formally write up the methods and guidelines used for the campus landscaping, specifically regarding the trees.

3. ***Verification of dedicated annual expenditures on the Campus Tree Plan***

   Boston College already has a budget in place regarding landscaping and campus tree care. We recommend reaching out to Gina Bellavia to obtain this information and the formally write up the specific tree budget for the school.

4. ***Involvement in Arbor Day Observance***

   We recommend working with the current environmental clubs and groups on campus as many of them already hold events for Arbor Day. Furthermore, we recommend reaching out to the alum who currently cares for the apple tree grown

for Boston College as the transfer of the tree to campus could be a possible event for this observance.

5. ***Institution of a Service Learning Project aimed at engaging the student body***
   We recommend working with the current environmental clubs and groups on campus as many of them already work to educate the student body about the local environment. This Service Learning Project could be a joint effort between the Campus Tree Advisory Committee and these campus groups.

Overall Recommendations for the Certification

- Create a club to maintain the certification and Campus Tree Advisory Committee
- Market the club as an opportunity for campus leadership
- Use Gina Bellavia (gina.bellavia@bc.edu) as a resource as she is the head of BC Grounds and holds a lot of important information needed to certify the campus

Current Environmental Groups on Campus

- Climate Justice at Boston College
- EcoPledge
- Environmental Law Society – ELS
- Geology Association

For more information about Arbor Day please visit:
arborday.org/TreeCampusUSA
TreeCampus@arborday.org

Recommendations

The following are these author's suggestions for further research, suggestions for the Arbor Day Certification for Boston College, and suggestions regarding the maintenance of the Tree Tour.

Research

- Further research on aesthetic impact of trees based upon specific types of tress and the specific benefits the elicit.
- Comparison of the mental health of students on the Boston College campus versus another New England campus that does not put as much importance on landscaping aesthetics versus a truly urban campus.

Arbor Day Certification

- Work with the City of Newton, a "tree city", to gain awareness (possibly through the media) of Boston College's official Arbor Day Certification.
- Use the planting of the apple tree as an event for the certification.
- Work with already existing environmental clubs on campus to facilitate the creation of student ambassadors for the certification.

Tree Tour

- Creation of an app and/or website (possibly by Boston College students) that provides a virtual version of the tree tour to widen access and allow people to take the tour without physically coming to campus. This would include professionally taken (possible drone) photographs for the best possible visual experience.
- Creation of a hashtag to be used when people upload photos of themselves taking the tree tour in order to increase social media presence and therefore promote the existence and spread awareness of the tour.
- Incorporate tree facts into existing campus tours.
- Boston College Admissions and Boston College Grounds work together to use the tree tour as a way to attract potential students while also maintaining campus tree cover and increasing worldwide presence of Boston College.

- Redoing the tree database of every tree on campus with a new tagging system that includes QR codes.

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