Management Approach

As a National Historic Landmark and home to over 15,000 accessioned plants, it is crucial to take a careful approach to landscape maintenance and stewardship. Today at the Arnold Arboretum, all work in the landscape is guided by the Landscape Management Plan. This plan was first compiled in 2007 and a second edition was created in spring of 2008. When viewing the landscape, with no staff in sight, it can be hard to remember that the landscape is entirely designed and manipulated by people, albeit in a way meant to look naturalistic and untouched by humans. Even the areas designated as “natural” are in fact managed spaces.

The purpose of the Landscape Management Plan is to communicate goals and priorities that the horticultural team hopes will result in the following:

- provide optimal growing conditions for our collections
- enhance the ecological health of the Arboretum environment
- address cultural resource management
- advance curation and landscape development
- present a landscape of outstanding quality for visitors, students, the surrounding community and other key constituencies

Modern-day maintenance at the Arboretum must respect our historic design while keeping abreast of changing horticultural practices and being mindful of environmental and human health. At the Arboretum we try to integrate new plantings within the concept of the historic planting scheme. The scheme is arranged according to Bentham and Hooker system of plant taxonomy, from the late-nineteenth-century. The scheme also attempts to accommodate specialized environmental needs of particular plant groups. For example the willows were planted at the edges of a wet meadow rather than strictly according to their taxonomic placement. Today we strive to achieve a balance between considerations of strict taxonomic grouping (for easy study and comparison), optimal environmental conditions, maintenance, and aesthetics.

The Arboretum is a living museum, and as such, we treat the plants as our “displays” or “exhibits,” also called collections. The Arboretum also a public park and a research station; maintenance must balance and respect these different uses.

In the Landscape Management Plan the 265-acre landscape is divided into 6 regions, largely defined by topography (Bussey, Hemlock, and Peters Hills), landscape type (collections area, natural area,
Urban wild, and management need. Regions facilitate the broader-scale assignment of tree-work, spraying, and hardscape and perimeter maintenance. These regions are further divided into 62 management zones comprised of contiguous areas that share similar collections themes or horticultural challenges. Each zone has been placed under the care of a staff horticulturist. Zones are treated as a unit with common specifications for daily, monthly and annual care. Specifications are written to attain targeted standards of care and presentation. This site-specific focus yields substantial cumulative knowledge, enabling staff to provide increasingly effective horticultural care and to serve as “local” experts on soils, pests and disease, collections development, hardscape maintenance, and visitor needs and impacts.

Read a summary of the Landscape Management Plan on-line:
http://www.arboretum.harvard.edu/aboutus/pdfs/AA_LMP_Summary.pdf

Staff

The staff responsible for caring for collections in the landscape includes 11 Horticultural Technologists, three Arborists, one Gardener, one Apprentice, and one Manager of Horticulture.

Horticultural Technologists are each responsible for maintaining one or more of the 62 specific zones within the Arnold Arboretum. The Horticultural Technologists follow an annual care plan outlined in the Landscape Management plan. Maintenance responsibilities include activities such as weeding, mulching, supplemental watering, mowing, snow plowing, pest and disease control and treatment, plant health assessments, planting and some pruning. Most of the “Hort Techs” are certified arborists with the Massachusetts Association of Arborists.

Arborists are responsible for the removal and pruning of the plants throughout the landscape that require climbing or the use of the aerial lift truck. They are all certified by the International Society of Arborists and have trained in aerial rescue. Plant removals are determined by the Curator of the Living Collection based on factors such as provenance, safety, health, historic and aesthetic value, research value and collection priorities.

The Gardener (yes, a misleading title) takes care of perimeter clean up, trash pick-up, some hardscape repair, and graffiti removal.

The Apprentice is a one-year position. the Apprentice is tasked with the care of all the “naturalized” zones The Arboretum created the horticultural apprentice position in 1997 to provide hands-on experience in all aspects of the development, curation, and maintenance of the
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Arboretum’s living collections to individuals with an intermediate level of experience in a public garden, who is interested in pursuing a career in the public garden field.

In addition to permanent staff, each year the Arnold Arboretum selects 12 interns from a large pool of applications. These paid interns, many of whom are college students, typically spend three to six months integrated into the daily routines of the horticulture staff. 10 work in landscape maintenance, rotating through all the various activities and jobs; two work in the Dana Greenhouses and nursery. They also attend classes, field trips, and work on a group project that benefits the Arboretum.

There is also a Curator of the Living Collections, who makes decisions about collecting priorities and changes to the collections, conducts research, and supervises research and curatorial staff. There is one Manager of Plant Records, two Curatorial Assistants, and four Greenhouse staff.

Collections Care

A service garage adjacent to the Hunnewell Building houses a wide array of vehicles and other equipment, including a backhoe loader, several large mowers, utility vehicles, and an aerial lift truck. In addition to the various responsibilities listed by job above, ongoing care of the collections includes seasonal activities dealing with invasive plants and insects, as well as problematic diseases. Every year, soil testing is also done to check the pH and nutrient content, and if needed, soils are amended. Water probes are used to monitor the amount of water in the soil and supplemental water may be applied in times of draught. Drip irrigation is in place in the Leventritt Shrub & Vine Garden (LG) and the Explorers Garden (EG) at Chinese Path. Certain high profile lawns, such as in front of the Hunnewell Building, Leventritt Garden, and the Bradley Rosaceous Collection (BRC), are irrigated with pop-up sprinklers. In all other areas, water must be trucked in, or a high pressure “rain cannon” is sometimes attached to fire hydrants within the Arboretum.

Trees

Trees are relatively easy to keep track of, since they usually have one discrete stem that can be readily found using our inventory system. If weed trees invade, they are nearly always of another taxon and do not correspond to what is shown on the map. We generally mulch a ring around trees and then mow the grass beyond the mulch ring to lessen the likelihood of weed intrusion. However, hundreds of Frangula (buckthorn), Malus (apple), Phellodendron (cork tree), and Kalopanax (castor-aralia) seedlings inevitably appear in the uncultivated space beneath and around trees.

With any collection of trees, it is important to consider the future. Over 500 of the trees at the Arnold Arboretum are over 100 years old. This is still young for many species, but what will their
condition be in 50 years? In a collection with so many old trees, we need to be careful that all will not enter a period of decline or senescence at the same time or become especially vulnerable in old age to drought or storm damage. Here at the Arboretum we frequently survey the landscape for poor-quality, inadequately documented, duplicate, or declining plants. This means that staff must survey the tree collections over time to assess the need for maintenance, repropagation, and—eventually—removal. This must be done accurately and carefully, using both paper and electronic records. We also are continually replanting, maintaining a healthy balance between acquisition of new plant discoveries and introductions, and vigorous management of old.

**Shrubs and Vines**

Many shrubs are difficult to track over time. Large shrubs with one or more trunks are as easily tracked as trees, but problems arise from those that form thickets or colonies by means of underground stolons or by rooting in where branches touch the soil. When two plants of the same colonizing shrub are planted side by side, it often becomes impossible to tell where one ends and the other begins. In just a few years they can intermix and become physically inseparable, thus muddying our understanding of their provenance, and ruining their research value. Thick colonies also make it harder to remove invasive plants like wild raspberries. An example of this is the Forsythia collection on the hillside near the lilacs. In 2006, the forsythia had become so intermingled and so overgrown with invasives that there was little value in the collection beyond the pretty spring display. In order to reach the weedy plants, the forsythia had to be cut back or removed. Once this was done, the invasives were easier to find and remove. At the same time that gardeners cut back the forsythia, they looked for identifiable “mother” plants to re-propagate. Gardeners then worked to control erosion on the hillside, adding fresh soil and seeding with grass. Once the areas were stable, forsythia plants grown from cuttings of the “mother” plants were added back in select locations, while other spots now remain as grass to allow for adequate space for future growth.

As the Arboretum aged, shrubs and vines planted beneath canopy trees slowly lost light and nutrients to the taller plants. Vines were mostly relegated to perimeter fences. In 2002, the Leventritt Shrub and Vine Garden opened, providing optimal growing conditions and sturdy trellises for sun-loving shrubs and vines. More detail on the Leventritt Shrub & Vine Garden can be found later in this chapter.

**Nursery and Greenhouse Facilities**

The Dana Greenhouses, located at 1050 Centre Street (with a mailing address of 125 Arborway), were completed in 1962. They comprise four service greenhouses totaling 3,744 square feet, the headhouse with offices, cold rooms, storage areas, and a classroom. Adjacent to the greenhouse is a shade house of 3,150 square feet, a 12,600-cubic-foot cold storage facility, and three irrigated, in-
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ground nurseries totaling approximately one and one-half acres. Also located in the greenhouse complex is the bonsai pavilion, where the Larz Anderson Bonsai Collection is displayed from the middle of April to early November. During the winter months the bonsai are held in the cold storage unit at temperatures slightly above freezing.

The Arboretum receives, on an average, 200 accessions of seed a year which represent our primary means of collections development. In addition, plant material from around the world arrives in the form of plants or propagules—softwood and hardwood cuttings, grafts, and seed being the most common. The plants are held in the nursery until they reach an appropriate size for planting in the main collections, a process that on average takes five to seven years. Rarely, plants are purchased at a commercial nursery for planting in the landscape; the vast majority of new accessions are grown in the Dana Greenhouses.

The greenhouse staff also repropagates plants whose health is threatened by age, storm injury, or damage by insects or disease, thereby ensuring genetic continuity within our collections. Thus, research in applied horticulture and propagation is ongoing.

In the spring and fall of every year, new plants are moved from the nurseries out onto the grounds. After initial planting, plants are staked, pruned and watered. New plants are overseen for their first three years by the staff responsible for the zone in which the plant is growing; staff water, weed, mulch, and do a spring and fall check. You can easily pick out newly planted trees by the stake—newer stakes have the season and year marked on them.

Plant Health

To address invasive plants and plant health, the Landscape Management Plan determines high and low priority areas and then monitors the successes and failures of treatments. Often, low priority areas such as the natural woods of Peters Hill have the highest concentrations of invasive weeds and pests, which can spread to higher priority areas. In these instances, spending time and resources to control invasives and pests in a low priority area results in stronger and less-affected collections in high priority areas. For invasive plants we prefer to use mechanical controls (mowing before seed dispersal, digging, etc). In the case of pest control, Integrated Pest Management requires careful monitoring of pest populations and a higher tolerance for pests. Chemicals are used as a last resort, with the least toxic substances chosen and the most targeted forms of application with extreme sensitivity to groundwater pollution, wildlife and human safety.
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**Maintenance Beyond the Plants**

The partnership between the Arnold Arboretum and the City of Boston stipulates that the City maintain the infrastructure of the Arboretum, which includes drinking fountains, roadways, and perimeter stone walls. However, Arnold Arboretum staff repair benches, clean graffiti, remove trash, and plow snow in the Arboretum interior and some exterior sidewalks. The City also provides security and animal control services with the Boston Park Rangers, Boston Police, and Animal Control.

Adapted from Koller: “Maintaining the living collections,” *Arnoldia*, (49)1 1989, Schulhof: “The best we can be,” *Silva*, Fall-Winter 2007-2008, Stephen Schneider, 2010