

# WELLESLEY COLLEGE BOTANIC GARDENS

## COLLECTIONS POLICY

2019 Update

	<h3>Royal Azalea</h3>
Planted 1926	<i>Rhododendron schlippenbachii</i>
Ericaceae	Manchuria, Korea, Japan

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Provost or Dean of the College

# TABLE OF CONTENTS

<b>INTRODUCTION</b>	<b>4</b>
Mission Statement (adopted in 2007, updated in 2019)	4
Overview and History of the Plant Collections	5
Purpose and Administration of the Collections Policy	6
Legal and Ethical Considerations	6
<b>CURATION OF THE WCBG PLANT COLLECTIONS</b>	<b>7</b>
Acquisitions	7
Memorial Trees	8
Accessions	8
Deaccessions	9
Landscape Management	9
Collections Inventory	10
Disaster Planning	10
<b>SCOPE OF THE BOTANICAL COLLECTIONS</b>	<b>10</b>
Habitat Collections	11
Plants from Around the World (Global Flora), with a Focus on Diversity of Plant Form (GH and nearby BG)	11
Arid (Xeric) Biome of Global Flora	11
Wet (Mesic) Biome of Global Flora	11
Aquatic Habitats of Global Flora	12
Global Flora Outdoors	12
Eastern North American Habitats (BG)	12
Meadow and Forest Edge	12
Maple Swamp	13
Bog Garden	13
Upland Woods	14
Wet Meadow and Pond Edge	14
Green Roof	15
Taxonomic Collections	17
Conifers – Miniature and Wild Types (BG)	17
Ferns (GH and BG)	17
Family Collections in the Hunnewell Arboretum and Alexandra Botanic Garden	17
Plants as Food	18
Edible Plants Suitable to Wellesley’s Climate and Habitats (BG)	18
Edible Ecosystem Teaching Garden (EETG)	18

Kitchen Garden (BG)	19
Native Animal Support (BG)	19
Fruits and Nuts at Appropriate Seasons for Native Animals	19
Nectar and Pollen Flowers over Pollinator Flight Season	19
Butterfly Host Plants	20
Teaching Collection with Ethnobotanical Emphasis (GH)	20
Historic Collections (GH and BG)	20
Miscellaneous Collections	21
Sensory Plants (GH)	21
Carnivorous Plants (GH)	21
Rock Garden Plants (BG)	21
Plants with High Teaching Value Independent of Other Collections (GH and BG)	21
<b>NON-LIVING BOTANICAL COLLECTIONS</b>	<b>21</b>
<b>THE USE OF WCBG'S COLLECTIONS</b>	<b>22</b>
Educational Use	22
Special Events	22
Photography Policy	23
Access to Plant Material	23
<b>Appendix 1. Voluntary Codes of Conduct for Botanic Gardens and Arboreta</b>	<b>24</b>
<b>Appendix 2: Native Plant Policy</b>	<b>25</b>
Geographic Distribution	25
Ecological Niche	25
Resources	25

## INTRODUCTION

### *Mission Statement (adopted in 2007, updated in 2019)*

The mission of the [Wellesley College Botanic Gardens](#) (WCBG) is guided by Botany Department Chair Margaret Ferguson's vision at the founding of the greenhouses and gardens in the 1920's: "It is our purpose that the [WCBG] shall stand, primarily, ...for the dignity and educational value of its scientific work. At the same time we shall not fail to emphasize the humanistic aspects of our subject; and we shall endeavor to form a center that shall be of interest to all."<sup>1</sup>

The WCBG mission is three-fold:

- to **increase participation in science** by engaging people with a diverse array of outstanding botanical resources for teaching, research, and exploration;
- to **promote scientific and environmental literacy**, using aesthetic appeal and innovative programming to stimulate interest in and stewardship of the natural world; and
- to **contribute to the sense of place** at Wellesley, by developing and maintaining exemplary spaces within this iconic campus to support community, personal well-being, education, sustainability, and connection to nature for everyone.

### *Current Implementation of the Mission (2019)*

With 22 acres of gardens and a beautiful new collections greenhouse adjacent to the Science Center, the WCBG provides many appealing opportunities for a person's instinctive affinity for plants, nature, and harmonious landscapes to develop into a knowledge-based understanding and appreciation of them. The nearly completed Global Flora Conservatory at the Margaret C. Ferguson Greenhouses, along with new gardens planned for post-construction landscapes around the greenhouses and Science Center, will enhance further this remarkable resource for connecting people to plants, biodiversity, and science, as part of the reimagining of Science Hill at Wellesley.

Throughout their history the WCBG have focused on educational value, primarily via the highly diverse plant collections. An important original goal for the outdoor gardens is to present "all the wild flowers and shrubs that are native to Wellesley, and many, from other parts of the world, that can be encouraged to grow here."<sup>2</sup> There are many different habitat types within the gardens to support a range of plant communities. The gardens are managed ecologically so as to encourage the most complete foodwebs, both above and below ground, possible in these fragmented habitats within a suburban context.

The curated biodiversity of the gardens provides educational opportunities not often found on college campuses. The greenhouse plant collections also have an original diversity goal: to provide "opportunity to study and compare plants that are native to different regions of the earth, and others that are found growing under a great variety of habitats."<sup>3</sup> The greenhouses dramatically expand

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<sup>1</sup>Ferguson, M.C. 1925. Botany at Wellesley 1875-1925. Wellesley Alumnae Quarterly.

<sup>2</sup>Ferguson, *ibid.*

<sup>3</sup>Ferguson, *ibid.*

the types of plants available for study as well as enabling investigations at any time of year.

Programs and courses such as Botanical Art and Environmental Horticulture are appealing bridges into science for broad audiences. The botanical resources and the accumulating body of knowledge about them provide ever-increasing opportunities for teaching and research at the College. The new collections database, IrisBG, provides ready access to information about the species and the individual specimens in the collections. A docent program engages students and volunteers in the natural history and human uses of the plant collections.

In addition to the historic emphasis on diversity, the WCBG plant collections have a special focus on the fundamental role of plants as makers of food, sustaining life on earth. This focus informs management practices as well as collections priorities, as we aim to grow plants that are healthy and tolerant of reasonable levels of herbivory rather than horticulturally perfect specimens that require more human intervention, particularly with pesticides. Priority for addition to the outdoor plant collections is based in part on a plant's food value for native insects, birds, and other animals.

The gardens are maintained with minimal disruption of ecological interactions, so that herbivore populations can be kept in check by their natural predators and diseases, and the whole suite of trophic interactions is available for study. The greenhouse teaching collection features plants from all over the world that have economic value as food or medicine, providing a resource for studies of human cultures as well as botany, agriculture and related sciences. Food from plants is a theme that attracts participants to everything from "study break" events to docent training to summer internships in the Botanic Gardens. Exploring our common dependence on plants for sustenance helps to connect humans to the rest of nature, supports Wellesley's sustainability goals, and emphasizes that plants are not optional for human existence.

### ***Overview and History of the Plant Collections***

The WCBG house and curate a remarkably diverse plant collection for a college or university. The Margaret C. Ferguson Greenhouses have long held the most diverse collection of plants under glass in the greater Boston area, and the spectacular new (2019) Global Flora Conservatory will provide year-round access to even greater biodiversity. The Alexandra Botanic Garden, H. H. Hunnewell Arboretum, Creighton Educational Garden, Edible Ecosystem Teaching Garden and other outdoor gardens provide an abundance of habitats and horticultural conditions for a broad range of plants hardy to this climate. The landscapes and gardens were thoughtfully designed, in some cases many decades ago, and care must be taken to preserve the design intent.

Wellesley's botanical legacy goes back to Henry and Pauline Durant, who founded Wellesley College in 1875. The Durants had a strong interest in botany and an impressive collection of plants in their own greenhouses, which they made available to students. Several notable botanists helped develop Wellesley's botanical resources, including Susan Hallowell, who was Wellesley's first Professor of Botany and formed the original department; Margaret Ferguson, who oversaw the creation of the arboretum and botanic garden as well as the original greenhouse complex, and later served as the first woman President of the Botanical Society of America; Helen Davis, who designed the Alexandra Botanic Garden and the Hunnewell Arboretum; and Harriet Creighton, who made widely recognized contributions to botanical education, and whose dissertation work

under Barbara McClintock was the first demonstration of recombination at the cellular level, an important part of the work for which McClintock won the Nobel Prize.<sup>4</sup> All four of these women emphasized the educational value of diverse plant collections, echoing and building on Henry and Pauline Durant's original ideas for botany at Wellesley.

The following documents provide historic context prior to the [first \(2008\) Collections Policy](#):

[Margaret Ferguson, Botany at Wellesley, 1875-1925](#)

[Harriet Creighton, The Ferguson Greenhouses, Wellesley Magazine 1947](#)

[Harriet Creighton, Appendix to the Annual Report to the President, 1972-73](#)

[Harriet Creighton, Wellesley College 1875-1975](#)

[Lisa Stanley, Paradise at Wellesley: The Greenhouses, Scientia, 1985](#)

[Thomas Zanoni and Eileen Whalen, Wellesley College Herbarium at NYBG, Brittonia 1995](#)

### ***Purpose and Administration of the Collections Policy***

This Collections Policy guides the development and curation of the WCBG plant collections. It serves as a point of reference for decisions on whether to acquire, maintain, or discard a plant, so that such decisions are consistent and informed, and can be justified if challenged. The Policy also provides continuity during times of staff turnover or changes in funding.

As most of the accessioned plants are in landscape settings, either outdoors or in the Global Flora greenhouse, collections curation intersects with management of these landscapes. Management plans for each area, including monitoring protocols, regular maintenance needs and potential intervention projects, should be "living documents" that are kept current and shared with any new staff or students who help care for the landscapes, and with anyone who studies them.

The Policy is written and administered by the WCBG Director and full-time staff, and reviewed by an advisory committee with representatives from Biological Sciences, Environmental Studies, and Friends of the Botanic Gardens. The Director leads a formal review of the Policy every ten years. Final approval of the Policy and any substantial revisions is by the Provost or Dean of the College.

### ***Legal and Ethical Considerations***

New plants must be acquired from reputable sources, in compliance with any applicable legal requirements, including the Convention on Biological Diversity (CBD), and the Convention on International Trade in Endangered Species of Flora and Fauna (CITES). Donated plants must meet the same requirements as any other plant material.

The WCBG strives to be ecologically and environmentally sound in all practices, to ensure its sustainability, to safeguard the health and safety of the staff and all participants, and to serve as a model for students and visitors. The WCBG aims to help minimize the spread of invasive plants, and endorses the voluntary Codes of Conduct for invasive species in botanical gardens, set by the Center for Plant Conservation in 2002 (see Appendix 1).

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<sup>4</sup>Kass, L.B. 2007. Landmarks and Milestones in American Plant Biology: The Cornell Connection. Plant Science Bulletin 53:90-99.

## CURATION OF THE WCBG PLANT COLLECTIONS

### *Acquisitions*

The Collections Policy shall guide the acquisition of all plants for the collections. Donations of plants from private individuals must be unconditional and are subject to the same acquisitions criteria as purchased plants or donations of plants from botanical institutions. WCBG does not accept the loan of plants. Once accessioned into the collection, the plant is considered to be owned by WCBG.

Acquisitions are guided by these overall considerations:

- **Utility:** Does the plant support the objectives of one or (preferably) more of the specific collections listed below?
- **Rarity:** Is the plant listed in one of the categories of assessed endangered status on the IUCN (International Union for Conservation of Nature) Red List or federal lists of rare and endangered plants?
- **Documentation:** Is the plant accurately identified? Does it come from a documented institutional collection with accompanying data?
- **Health:** Is the plant healthy and free of observable pests and disease?
- **Invasiveness:** Is the plant known to be an invasive species in Massachusetts? If so, it will not be added to the collection unless it can be fully contained.
- **Teaching potential:** Does the plant illustrate some important lesson for our students, for example in the fields of botany, ecology, art, mathematics, etc.?
- **Research potential:** Is the plant a current research subject or likely subject of future projects?
- **Diversity:** Does the plant represent a new family or genus in the collections?
- **Provenance:** Is there information that ties the plant to a particular collector and locale in the world? This is especially important to researchers who need this level of documentation for their research.
- **Outreach:** Is there something especially novel or beautiful about the plant so that it enhances the visitor experience?

Additionally, acquisitions are evaluated for their contributions to one or more of our **thematic collections:** diversity of form, plants as food, habitat collections, taxonomic collections, historical collections, and others as described in the Scope of the Botanical Collections section below.

The Greenhouse collections should not normally include more than three accessions of a given taxon, unless the plants in question are requested in quantity for teaching or research purposes.

When acquiring new species for inclusion into the collections, special attention should be paid to the degree of rarity of the plant in nature. No rare or endangered (RE) plants may be directly removed from the wild to become part of the collection. However, propagating material of RE plants such as seed or cuttings, responsibly acquired from the wild or other botanic gardens is allowed and even highly desired. RE plants on the IUCN Red List of endangered species add value to the collection from a research and conservation standpoint and are a priority for acquisition.

Unless they contribute significantly to the educational value of one or more of the listed collections, taxa known to require high levels of maintenance, particularly with respect to pest management, will not be added to the collection and may be removed.

An additional criterion for candidate taxa for Greenhouse or Educational Garden collections is that plants have a potential size that does not exceed the physical constraints of these spaces, or can acceptably be maintained within necessary size limits.

Plants of unknown identity (e.g. donated plants or plants arising spontaneously in the gardens) may be maintained without accessioning until diagnostic characters such as flowers are available for identification.

Potential additions which would bring significant educational value to the collection but have minor pest, disease, or other health problems may be maintained in quarantine until healthy, at which point they may be added to the collection and associated database.

With the acquisition of the IrisBG database in 2018, student Curation Assistants now help to build, document and interpret the plant collections in the greenhouses and gardens. They research the plants, enter information into the database, and make labels, maps, and other interpretive signage.

## **Memorial Trees**

In keeping with the [procedure approved by the Landscape and Grounds Committee and the Board of Trustees](#), all accepted landscape gifts to the Wellesley College Botanic Gardens, including memorial trees, will be subject to the following stipulations:

- Botanic Gardens staff will decide on the species and its placement in the gardens, in accordance with the Collections Policy.
- The description of the gift, the name of the honoree, the name of donor, and date of the gift will be listed in the landscape gift book held in the Clapp Library.
- There will be no plaque or marker placed on the tree.
- The donor will be reminded that landscape plantings are living things, and although we will place them appropriately and care for them well, we cannot guarantee that they will thrive or survive. If the plant dies, its replacement is subject to staff discretion.

Currently 30 or so trees exist as memorial or “in honor of trees”, some with original plaques. These trees were mostly planted in the late 1980’s and early 1990’s and some have died or been removed.

## ***Accessions***

IrisBG (or a comparable collections management database, as selected by botanic gardens staff) is used to manage all the collections data for WCBG. Plants that we expect to hold for at least three years are assigned unique, permanent accession numbers and entered into the database. Seasonally purchased annuals; bulbs; plants acquired for short-term teaching, research or display purposes; and plants of uncertain identification may be acquired but not accessioned into the collections.



Plants are to be accessioned within a year of acquisition, once propagation and initial production are successful. All accession records are to be maintained in an accurate and timely fashion.

At a minimum, accession records must include:

- accession number
- scientific (Latin) name: genus, species, variety if any, and family
- source / provenance
- location in WCBG

Plants propagated from a single parent are treated as subdivisions of a single accession and their status is tracked using IrisBG.

All accessioned plants must be accurately labeled. In the greenhouses, all plants must be identified with the accession number and scientific name, taking into account aesthetic considerations in label placement, and the possibility that a label could be moved or discarded. Each major plant in the greenhouses and woody plants in the botanic gardens should be identified with permanent labels, one containing the accession number and shorthand Latin name, and another containing the common and Latin names, plant family, and native range.

Interpretive signage provides deeper meaning and connection to the collections. WCBG's interpretive signs are written, designed and fabricated in-house, with the expectation that they can be updated easily and frequently, so that students and staff can design a wide variety of interpretive materials for specific classes, groups or events.

### ***Deaccessions***

Deaccessioning plants is an integral part of botanic garden operations. Each plant specimen is an investment in limited space and staff time, and removal of substandard specimens creates space and time for better accessions. Criteria for removal include poor documentation, poor health or death, uncertain identification, oversize, lack of educational value or course usage, commonness ("house plants"), and invasive potential.

Surplus plants are normally given away or exchanged, but in some cases may be sold to support the educational mission of the WCBG.

### ***Landscape Management***

The various living collections have different maintenance requirements according to the types of plants and cultural conditions. Plant care and maintenance is the responsibility of the horticultural staff, including student assistants, and is performed in an ecologically and environmentally sound manner.

Maintenance Plan for the H. H. Hunnewell Arboretum and Alexandra Botanic Garden:

<https://docs.google.com/document/d/1E6XuK7va3ztDazGJx8WHmYvzwXR3yW74ei6yR39OyW8/edit>

## ***Collections Inventory***

All collections should receive a regular inventory, every one to five years depending on the collection. For the Habitat collections in the outdoor gardens, an inventory consists of sampling and identifying as many taxa as possible that are resident in the collection area. For the other, more specimen-based collections, accessioned specimens are checked against the relevant inventory in the collections database. Any necessary updates to maps are part of the inventory. The collections inventory includes an evaluation of the collection for continued relevance to WCBG's mission and Collections Policy.

In collections with serious space constraints, notably in the greenhouses, plants that are in decline or outgrowing their available space should be propagated and/or replaced, except in cases where mature specimens display additional features of interest not present in younger specimens.

## ***Disaster Planning***

An emergency plan for the WCBG is being developed as part of the College's emergency preparedness efforts.

In order to recover more swiftly from a disaster to the Botanic Gardens (fire, hurricane damage, etc.), all accessions should be assigned priority levels in IrisBG:

- high priority: specimens that are impossible to replace
- medium priority: specimens that are difficult or expensive to replace
- low priority: specimens are easy and inexpensive to replace
- no priority: the specimen will not be replaced

## **SCOPE OF THE BOTANICAL COLLECTIONS**

There are several types of collections in the Botanic Gardens, each of which contributes to the educational value of the overall plant collection. Note that these collections are not mutually exclusive; an individual specimen may belong to several collections. A plant's "value" for purposes of prioritizing acquisitions and deaccessions is derived from the number of collections it contributes to, as well as its evolutionary and ecological uniqueness. Additional collections may be developed if they provide significant educational opportunities.

Following is a list of current collections, each with a brief description of its purpose and scope. Collections are grouped by type: habitat collections, taxonomic collections, collections focused on plants as food, historic collections, and several miscellaneous collections. Note: "GH" indicates Greenhouse collection; "BG" indicates outdoor Botanic Garden collection; some collections span both areas.

## ***Habitat Collections***

### **Plants from Around the World (Global Flora), with a Focus on Diversity of Plant Form (GH and nearby BG)**

#### **Arid (Xeric) Biome of Global Flora**

This section of the Global Flora conservatory features non-hardy cacti, succulents, caudiciforms, and other drought-adapted plants from subtropical and desert regions around the globe. The emphasis is on plant form as an adaptation to environmental conditions. The primary criterion for new acquisitions is that they represent species that occur in nature (“straight species” or natural variants within or between them) rather than highly selected horticultural hybrids or cultivated varieties (“cultivars”). Further preference is for responsibly sourced wild provenance specimens, particularly rare and endangered taxa.

Convergent evolution, the process whereby plants not closely related to each other independently evolve similar forms and “solutions” to environmental challenges, will be an emphasis as will the incredible diversity of adaptations that plants in arid zones display. For example, caudiciforms form a somewhat loose botanical grouping of plants that have in common a notably swollen caudex (where the stem meets the root), often as an adaptation to drought. Many are especially important for sustenance of animals, including humans, in arid regions, and some have remarkable sculptural qualities. Caudiciforms are taxonomically diverse and provide a nice illustration of convergent evolution.

Plants will be grown in in-ground beds or mounted upon the north wall of the Global Flora greenhouse. Smaller specimens will be closer to eye level in the plant table along the south wall. A special section of the plant table will enable observation of root zones of selected plants. Management plans for these areas will be developed following their initial establishment, and updated at least annually.

#### **Wet (Mesic) Biome of Global Flora**

This section of the Global Flora conservatory is dedicated to non-hardy plant species from subtropical and tropical biomes that have significant rainfall. The emphasis on plant form continues here, with a greater diversity of plant families. The collection here demonstrates architectural adaptations such as aerial roots and large leaves with drip tips. Vines and lianas are encouraged to grow up appropriate hosts, and epiphytes are grown on trees or simulated trees. Plants generally are grown in in-ground beds, mounted upon the north and west walls, or in the plant table along the south wall. Part of the plant table will include plants adapted to bog conditions, and another section will enable observation of root zones of selected plants. Management plans for these areas will be developed following their initial establishment, and updated at least annually.

The criteria for new acquisitions are similar to the rest of the Global Flora collection: wild provenance specimens, rare and endangered species, and taxa that occur in nature rather than cultivars. Diverse lifeforms of this biome should be represented: ferns and fern allies, bryophytes, gymnosperms, angiosperms, epiphytes, geophytes, shrubs, emergent trees, and carnivorous species.

## **Aquatic Habitats of Global Flora**

The Mangrove Tank and the Paludarium in Global Flora's Mesic Biome provide suitable growing conditions for aquatic plants and for plants adapted to wet root zone conditions, such as mangroves and papyrus. A range of water-loving plant species, from floating aquatics to rooted emergents to floodplain specialists, is demonstrated in and around these unique habitats, with freshwater in the Paludarium and brackish water in the Mangrove Tank. Management plans for each of these mini-habitats will be developed following their initial establishment, and updated at least annually.

## **Global Flora Outdoors**

This garden outside the Global Flora greenhouse to the north will extend the theme of diversity of form to include plants from around the world that can tolerate our local climate. Although this garden is relatively contained between the greenhouse and the rest of the Science Center, no species considered a threat to spread aggressively beyond this garden will be planted, in accordance with the Voluntary Codes of Conduct in Appendix 1 of this document.

## **Eastern North American Habitats (BG)**

Based on the Fact Sheet for the Wellesley College Botanical Gardens for Docents written by Harriet Creighton, the donor of the endowment fund for the H. H. Hunnewell Arboretum, Isabella Gould Shaw, "wanted the College students to enjoy the beauty of the New England woods with their wildflowers as she had known them when a child." The Hunnewell Arboretum has achieved that goal to some extent but needs to be more actively managed to achieve that end. Native New England woodland plants, woody and herbaceous, should be planted and non-natives phased out.

## **Meadow and Forest Edge**

On the slope below the Observatory, adjacent to the Edible Ecosystem Teaching Garden, is a meadow dominated by little bluestem grass (*Schizachyrium scoparium*) with a scattering of early successional native shrubs such as staghorn sumac (*Rhus typhina*) and Eastern red cedar (*Juniperus virginiana*). The meadow is bordered by a small wooded area with a mix of hardwood trees including America elm (*Ulmus americana*). The wooded area was cleared of many invasive plant species in 2006-2007, most notably cork tree (*Phellodendron sp.*).

The goal for the meadow is to maintain this relatively rare New England habitat by keeping it in an early successional stage, so that native species that depend on this type of habitat can establish there. Currently invasive and woody plants are removed by hand but burning the meadow would be the most ecologically appropriate maintenance method. Bristly locust (*Robinia hispida*) has noticeably increased in the meadow over the past several years and likely needs some intervention to prevent further spread.

The forest edge bordering the meadow presents an opportunity to establish native hardwood trees, understory shrubs and wildflowers. There are existing individuals of several wildflower species but the area is threatened from above by construction on the Science Center, and from below by unauthorized vehicular travel on the path beyond the water treatment vault.

When the accessible path descending into the Edible Ecosystem Teaching Garden from the top of the slope was added in 2014, the newly steepened bank on the downhill side was seeded with a mix from Ernst Conservation Seeds. The seeded area has been densely packed with a succession of wildflowers and grasses in subsequent years, and some species have seeded in further down the slope or on the uphill side of the accessible path.

An inventory of these two habitat areas needs to be completed. A management plan including monitoring, maintenance and possible intervention projects should be finalized once the Science Center construction and related disturbance is finished. This plan should be coordinated with plans for other long-term study areas nearby, developed as part of the Science Hill post-construction landscape. Management plans for these successional landscapes should be updated annually, at least during the first several years after the construction disturbance.

### **Maple Swamp**

The maple swamp is a semi-natural wetland with a canopy composed mostly of red and silver maples (*Acer rubrum* and *A. saccharinum*), as well as hybrids of the two. Water levels vary dramatically over time, from below ground to at least 50 cm at the deepest point. Natural variation is accentuated by the addition of water pumped out of nearby steam tunnels when the water table is high (delivered via an above-ground pipe), and presumed increased draw-down during times of drought via the campus wells, one of which is located in the maple swamp. Nonetheless, loud spring choruses of wood frogs attest to its usefulness as wetland habitat. For many years the understory was dominated by woody invasives, primarily Glossy buckthorn (*Frangula alnus*); these were dug up and left as brush piles in 2003-4. There is an intended vista through the swamp to the meadow behind Paramecium Pond; periodic cutting back of maples is required to maintain the vista. Removal of invasives is the major ongoing maintenance requirement.

The goal for the maple swamp is to provide a sample of a native maple swamp community. Understory plants native to maple swamps in New England should be introduced as plants or propagules and allowed to spread or decline according to their suitability to this particular swamp. Various ferns, sedges, and shrubs such as buttonbush (*Cephalanthus occidentalis*) seem reasonably tolerant of the fluctuations in water level. As there is variation in both topography and light within the area, efforts to establish appropriate species should include multiple plantings over the available range of suitable microhabitat conditions.

### **Bog Garden**

This garden, established in the summer of 2011, was designed by botanist Doug Goldman and hand-dug by Wellesley College interns, faculty and staff in a natural wet spot that is part of a meadow with acidic soil, near Paramecium Pond.

The plants are in a mixture of native soil, peat and sand that has been laid in a perforated pond liner so that the soil retains water and drains slowly. During dry periods, the bog is watered so that it remains moist. Small screens in the soil cover the *Calopogon* orchids to prevent rodents from digging them up and eating them. Other species in the garden include cranberry, sheep laurel, Labrador tea, nodding ladies tresses, yellow pitcher plants and purple pitcher plants. All of these eastern North America native plants are well adapted to the wet, nutrient-poor conditions of a bog, and most were collected from New England bogs by Doug, as part of his permitted collecting trips for Harvard and the USDA PLANTS Database.

### **Upland Woods**

The area described as upland woods encompasses the eastern border of the Arboretum. The main tree species are red and white oak (*Quercus rubra* and *Q. alba*) and white pine (*Pinus strobus*). There are several vigorous, sprouting American chestnut (*Castanea dentata*) stumps scattered throughout. The understory in part of the area was planted at the inception of the Arboretum with native rhododendrons and mountain laurels, and mostly native azaleas. Another section is thickly wooded enough to provide cover for deer and as a consequence, deer browsing and shade have left an impoverished understory. The most unique feature of this wooded area is that it has not been infested with invasive plants.

The upland woods provides a fragment of the type of mixed oak forest one is likely to find in eastern Massachusetts. The best strategy for this habitat is to catalog and interpret the existing species and the communities they represent. Planting native shrubs and herbaceous plants in the understory is a possibility but any major disturbance for redesign could open the area up to invasive plants. Deer resistance should be a factor in planning any new additions. Plants found to fit the criteria of native animal support and that are part of a moderately dry oak forest community should be added to this habitat collection.

### **Arboretum Pool and surrounding area, including Grotto**

This area is in need of substantial infrastructure work, including repair of the stonework at the Grotto and reworking of the water supply to the area. Preliminary plans are to capture stormwater for use in the Grotto (replacing the existing but nonfunctioning potable water feed) and Pool, and to rethink management of the area to improve habitat quality specifically for amphibians. A 1912 map suggests that the Arboretum Pool area included a vernal pool at the lowest point in the natural kettle. Recommendations from herpetologist Bryan Windmiller to support the most species of native amphibians include maintaining water in the pool through late summer, then draining it for a week before refilling. The lining of the pool likely needs repair. Adding a variety of stones around the edges will increase the complexity of the habitat and likely support greater biodiversity.

### **Wet Meadow and Pond Edge**

Paramecium Pond is a prominent landmark in the Botanic Gardens. The pond supports many aquatic plant and animal species. Because it is small and biologically active it has a fast rate of

succession and has been dredged multiple times to maintain its size. The pond is very popular with visitors for bird watching and frog catching.

The pond is fed by groundwater and by water piped to the start of the Silver Thread brook that enters the pond and mostly crosses its surface to an overflow drain connected to Lake Waban. Changing the source of this piped water from the potable water system (treated well water with a high pH and substantial salt content) to a more sustainable option is part of the Paulson Science Hill project currently in the planning phase.

In 1971 the pond edge was landscaped with beds of native azaleas, paperbark birches (*Betula papyrifera*), highbush blueberries (*Vaccinium corymbosum*), and winterberry (*Ilex verticillata*). Purple loosestrife (*Lythrum salicaria*) and yellow flag (*Iris pseudacorus*) have invaded in some places around the pond but are currently under control. The pond has outgrown this 1971 design and it has become the practice to plant native wetland shrubs for diversity and wildlife cover and native wildflowers to replace the showy-flowered invasives physically and aesthetically.

The wet meadow is on the west side of Paramecium Pond, and is usually underwater through May. The area was mowed and maintained as turf grass for many years until the mowing regimen was changed within the last two decades to allow wet meadow species like sedges (*Carex sp.*), Joe Pye weeds (*Eutrochium sp.*) and swamp milkweed (*Asclepias incarnata*) to grow.

Both the pond and the wet meadow offer opportunities to improve the collection to support more native animals. The sunny moist conditions here are unique in the Botanic Gardens. Management practices like late season mowing and invasive plant control rather than active planting have been helpful in encouraging a diversity of graminoid and wildflower species to move into the meadow and pond edge. The challenge is to identify invasive grasses and sedges early enough so they are not allowed to become predominant.

## **Green Roof**

In 2006, necessary construction of a new water treatment vault near the edge of the maple swamp provided an opportunity to experiment with native plants in a green roof habitat. Green roofs are becoming popular in the U.S. due to their many environmental benefits, but the list of plants recommended for green roofs has been imported from other countries along with the relevant technology. In order for green roofs to provide suitable “habitat islands” for native insects and ground-nesting birds, they should be planted with native species, but little is known about which eastern North American plants can survive the demanding roof conditions.

The goals for the WCBG green roof are to evaluate native plants for potential use on roofs, and to sustain a diverse community of native plants without supplemental water or nutrients in standard green roof growing conditions (e.g. a maximum depth of 6” of a fast-draining growing medium composed of three parts expanded shale to one part compost). Of the 28 species originally planted in April 2006, all native to eastern North America, most individuals of all but one species survived the first two growing seasons, including the extended drought of late summer 2007, and some species spread quickly (*Fragaria virginiana*) or seeded in in large numbers (*Sedum nevii*).

Individuals of many of the species on the roof also were planted in the adjoining garden at the same time (April 2006), for comparison of growth and survivorship under contrasting growing conditions. Jing Cao '08 compared the growth of several species and found interesting differences in root:shoot ratios, with many plants growing on the roof appearing smaller than their relatives in the adjoining garden, but having greater below-ground biomass. Her project nicely illustrates the concept that plants can adjust their resource allocation patterns to roots vs. shoots according to their need for water and nutrients vs. light, and is used as a case study in BISC 108 (Environmental Horticulture).

Another student, Brachi Schindler '11, studied arthropod colonization of the green roof and compared it to others in the Boston area for her honors thesis in Environmental Studies. Her results suggest that amount of vegetation cover most strongly influences the diversity and abundance of soil arthropods, more than vegetation diversity, roof size, and other factors, at least in the first few years of establishment. Her study was published in *Cities and the Environment* (<http://digitalcommons.lmu.edu/cate/vol4/iss1/5>; [PDF](#)).

In 2016, ten years after the initial planting, Bryan Connolly of Framingham State University thoroughly surveyed the green roof with Kristina Jones, and published the results with green roof specialist Jessica Lubell in *Native Plants Journal* (<https://muse.jhu.edu/article/680008>; [PDF](#)). Half of the original species were still present 10 years after planting, and the following were well established and considered strong candidates for green roof habitats in New England:

*Allium cernuum* Roth (nodding onion; Liliaceae)  
*Antennaria plantaginifolia* (L.) Richardson (pussytoes; Asteraceae)  
*Arctostaphylos uva-ursi* (L.) Spreng. (kinnikinnick; Ericaceae)  
*Campanula rotundifolia* L. (bluebell bellflower; Campanulaceae)  
*Carex pensylvanica* Lam. (Pennsylvania sedge; Cyperaceae)  
*Eurybia divaricata* (L.) G.L. Nesom (white wood aster; Asteraceae)  
*Fragaria virginiana* Duchesne (Virginia strawberry; Rosaceae)  
*Oligoneuron album* (Nutt.) G.L. Nesom (prairie goldenrod; Asteraceae)  
*Schizachyrium scoparium* (Michx.) Nash (little bluestem; Poaceae)  
*Solidago sciaphila* Steele (shadowy goldenrod; Asteraceae)  
*Symphotrichum laeve* (L.) A. Löve & D. Löve (smooth blue aster; Asteraceae).

Other plant species have migrated into the green roof community, and are not removed unless they could damage the roof (e.g. tree seedlings) or spread aggressively and reduce diversity (e.g. Virginia creeper).

### **South Slope of Greenhouse Hill**

Following the conclusion of the Global Flora construction, this area will be revegetated with native shrubs and herbaceous species to control erosion and extend the habitat created by the remaining large trees at the foot of the slope up the steep hill. A goal for this area is minimal maintenance requirements beyond removal of tree seedlings that could eventually shade the greenhouse. Given its proximity to the water catchment area for the greenhouse irrigation supply, it is especially important that no synthetic chemicals, particularly herbicides, are ever used in this area.



## ***Taxonomic Collections***

### **Conifers – Miniature and Wild Types (BG)**

Over 50 dwarf and miniature conifers, chosen by Professor Emerita Mary Coyne in consultation with the American Conifer Society, were planted in the Creighton Educational Garden in 2007. These are unusual cultivars representing many different genera and species. Corresponding wild type (typical) specimens of many of these species are found elsewhere in the Botanic Gardens, providing opportunities for comparison between the growth forms in terms of their genetics, physiology, and ecology.

Conifers also form the design structure of the Arboretum and Botanic Garden. White pine (*Pinus strobus*) is prominent on the margins of the grounds and on the Pine Knoll. Cedars (*Chamaecyparis* sp.) and mixed conifers dominate two other hills. The mixed conifers include large specimens of Douglas fir (*Pseudotsuga menziesii*), Oriental spruce (*Picea orientalis*), Western red cedar (*Thuja plicata*), pitch pine (*Pinus rigida*), Japanese larch (*Larix kaempferi*) and Nikko fir (*Abies homolepis*). The use of conifers as background trees along with the overabundance of white pine has diminished their prominence in the collection. Contrasting the wild type conifers with the miniature specimens is an opportunity to reestablish the importance of the individual species and reclaim their historical role in the establishment of the gardens.

### **Ferns (GH and BG)**

The Global Flora conservatory will have ferns and fern allies such as *Huperzia* in both biomes but predominantly in the Wet Biome. These will be mounted on the North Wall and grown among tufa rock, and display a greater taxonomic diversity and diversity of form than is possible outside.

Outdoors, several species of native ferns have been planted in the gardens and some have naturalized, especially in the Grotto, Woodland Pond, and Maple Swamp areas of the Arboretum. Additional native ferns will be planted in the area around the L-wing of the Science Center as part of the post-construction landscaping. Hay-scented fern (*Dennstaedtia punctilobula*) was part of the original planting on the Green Roof, where it persisted but had not spread as of November 2007, and was still present but barely hanging on in 2016.

### **Family Collections in the Hunnewell Arboretum and Alexandra Botanic Garden**

As in many botanic gardens, the plants in the outdoor gardens, particularly the Alexandra Botanic Garden, were planted in groups according to plant family. In general the designers followed the order given in the classification of flowering plants by Engler and Prantl (1909), which has been widely used around the world but now is known to have major shortcomings. Some of these family collections were broken down further into genus collections. The taxonomic collections provide the framework for the majority of the outdoor specimen collections, as opposed to the habitat collections found mostly in the Hunnewell Arboretum. Each family collection needs to be evaluated for condition of the plants, invasiveness of some of its members and its value when the

criteria of the collection policy are applied. Some collections like the *Lonicera* collection have been largely eliminated based on the poor condition of the plants and the invasiveness of several species. Other collections such as Rosaceae and Ericaceae contain many healthy specimens and retain value as taxonomic collections as well as support for wildlife.

## ***Plants as Food***

### **Edible Plants Suitable to Wellesley's Climate and Habitats (BG)**

Plants added to the outside gardens now are evaluated for their contribution as food plants for humans. New edible species have priority for addition over new cultivars of species already present in the gardens, in keeping with the long-standing commitment to diverse collections. As with all WCBG collections, low maintenance and disease resistance are factors in choosing food plants.

Edibility probably was not a priority when planting the outside gardens prior to 2006; consequently the edible plants in place prior to the current collections policy were planted for their contribution toward the taxonomic collection and/or their ornamental qualities. Examples of pre-existing edible plants include blueberries (*Vaccinium sp.*), crabapple (*Malus sp.*), nut trees (*Juglans sp.*, *Carya sp.*, *Corylus americana*) and autumn olive (*Elaeagnus umbellata*.) In addition a number of wild edible herbaceous plants grow on the grounds that are suitable for foraging. These plants include cattails (*Typha sp.*), sheep sorrel (*Rumex acetosella*) and marsh marigold (*Caltha palustris*).

Food plants are considered not just as individual specimens but where possible they will be planted as part of forest gardens, as a goal for this collection is to demonstrate the integration of food plants into typical New England habitats. Forest gardens are designed to fill the ecological niches which exist in open canopied woodlands with edible plants and fungi in order to maximize food production in an otherwise natural plant community. Opportunities for this type of garden exist in small patches of woods on the borders of the Botanic Garden, areas that are not currently described as parts of a habitat collection.

### **Edible Ecosystem Teaching Garden (EETG)**

The EETG is a collection of intensively designed plant communities, featuring unique edible woody and herbaceous species. The design and implementation of the garden was led by permaculture and regenerative design experts Dave Jacke and Keith Zaltzberg, beginning in 2011. Located on a prominent  $\sim\frac{3}{4}$  acre slope in front of the Observatory, the garden mimics aspects of a forest ecosystem by emphasizing functional diversity and minimizing inputs. It is an innovative model for sustainable edible landscaping based on ecological design principles. The EETG is contextualized by global environmental issues such as climate change, and it is a platform for students to try out hopeful solutions to these pressing issues through observation and experimentation. The EETG is managed with the goal of supporting high biodiversity of plants, insects, and other wildlife, and classes currently use the EETG as an educational resource for plant and insect surveys and observation. A database is contributed to regularly by students and WCBG staff, and includes information on management practices, plant health, yield, and other data used to continually improve curation and management of this unique research garden, and contribute to an

understanding of ecological principles in a built environment.

The EETG is also an accessible and aesthetic gathering place for community engagement and inclusive education. Interpretive signage encourages everyone to harvest edible plants from the garden. Additional information is available in the [EETG Management, Curation, and Community Engagement Plan](#) and on the [EETG webpage](#) and [Harvest Guide](#).

### **Kitchen Garden (BG)**

The Kitchen Garden will be re-established in approximately its original location near the E-Wing of the Science Center when construction is done. It will be enclosed once more by the decorative wooden fence created by Frank Hamm. The garden is a place for annual food plants, including herbs, chosen according to a theme. Some years, this theme is determined by the needs of faculty who will be using the garden for a class; during years when this is not the case, WCBG staff and student workers choose the garden theme. Themes usually focus on foods of a certain region, either historic or present-day. Emphasis is given to crops that are reflective of the diversity of foods eaten by Wellesley College students and their families. When not being saved for a class, the harvest of this garden is made available to students and others.

### **Native Animal Support (BG)**

#### **Fruits and Nuts at Appropriate Seasons for Native Animals**

The Hunnewell Arboretum was originally intended to provide habitat and support for birds, and it and the other outdoor gardens currently provide plentiful acorns, crabapples and other seeds and fruits for birds and mammals most years. Together with the variety and complexity of available habitats, this increases the bird and small mammal populations and brings in predators such as foxes and hawks. Wildlife sightings draw attention and visitors to the outdoor gardens. Because of disease and potential for damage to plants it is less desirable to attract deer and other large mammals (except humans).

The current emphasis is to provide food especially at critical times for native migrating and resident birds, with native fruiting plants such as red mulberry, serviceberries, dogwoods, oaks, cherries, hollies, and viburnums, and conifers such as Eastern red cedar and white pine. The role of wildlife as seed dispersers also makes it important to have native fruit and nuts available while continuing to eliminate invasive fruiting plants such as Asian honeysuckles (*Lonicera sp.*), Japanese barberry (*Berberis thunbergii*), and Oriental bittersweet (*Celastrus orbiculatus*).

#### **Nectar and Pollen Flowers over Pollinator Flight Season**

In the outdoor gardens, the availability of nectar and pollen during the flight season of native pollinators, particularly bees, should be regularly checked for significant gaps. Such gaps should be filled preferably by the addition of plants native to eastern North America and by natural species rather than cultivars, as the goal is to provide flowers that are especially suitable for native bees and their developing offspring during the growing season.

In a new garden being developed south of the Link between the Visitor Center and the Global Flora greenhouse, all species will be selected for their value as pollinator support, and maintenance practices will be cognizant of habitat requirements for ground-nesting bees and other native pollinators. With an abundance of flowers throughout the growing season, this garden may be developed as the Elizabeth J. Smith '32 Garden. If so, it must include roses among a diversity of flowers. Particular emphasis is placed on pollinator food sources in the early spring, when less food is available on the campus as a whole. This garden will also have a seating area for observation and enjoyment of the garden.

### **Butterfly Host Plants**

The goal of this collection is to support butterflies known to occur in the vicinity of Wellesley, by providing host plants for their caterpillars as well as nectar plants generally suitable for butterflies. The butterfly lifecycle section of the Creighton Educational Garden was planted in 2007 with herbaceous host plants and nectar plants. These plants are allowed to senesce naturally, to avoid disturbing any overwintering eggs or pupae. They are also allowed to spread and to seed in, although more aggressive species are thinned to maintain space for the full initial diversity of plants. Plants that fail to thrive in this location may be replaced by other species known to be acceptable host plants for the relevant butterflies.

The butterfly section of the Creighton garden is likely to be impacted by construction of the new Science building in 2019-2021. A butterfly-focused garden may be established elsewhere, or the host plants distributed throughout the Botanic Gardens. Also, woody plants under consideration for outdoor areas are given priority if they serve as host species for native lepidopterans.

### **Teaching Collection with Ethnobotanical Emphasis (GH)**

A separate range of standard greenhouses to be built as part of the new Science Center (2021) will house a permanent teaching collection of plants in pots. This teaching collection is curated according to faculty needs to illustrate course concepts. It will also feature culturally important and botanically interesting food, fiber, spice and medicinal plants from around the world. The collection is intended to be largely portable to classrooms but some larger specimens may be grown in large pots on the floor.

### ***Historic Collections (GH and BG)***

Many plants in the greenhouse and outside collections have historical significance to Wellesley College. These include actual historic specimens like the 150+ year old Durant Camellia which came from the founders of the College and the massive white oaks that preceded the existence of the gardens. Studying old plant records, articles and archived documents often turns up other plants that have a connection to the history of the Botanic Gardens. Examples of this could include plants collected during the travels of a botany professor or it might lead to the reacquisition of plants that were grown in the past, like *Ocotillo*, which is mentioned as having been grown in the original

desert house. There have been no major diversions from the original intent of the founders of the gardens to grow a diversity of plant materials for study and to establish wildflowers and habitats on the grounds. Making history a criterion in the collections policy is a way to ensure that the past of the Wellesley College Botanic Gardens informs the present.

### ***Miscellaneous Collections***

#### **Sensory Plants (GH)**

As in the former greenhouses, the Global Flora collection will include touchable plants with interesting textures, scents, and behaviors (e.g. *Mimosa pudica*, sensitive plant). These plants must be non-toxic and replaceable, as they are appealing to children who may not be constantly supervised, and should be within reach of pathways. Other plants with “sensitiveness” (Darwin’s term) include the remarkable *Catasetum* orchids with their launched pollen sac, and Venus flytrap.

#### **Carnivorous Plants (GH)**

In addition to some cold-adapted carnivorous species growing in the outdoor bog garden, there will be a collection of small carnivorous plants in a section of the plant table along the south wall of the Global Flora greenhouse. Larger carnivorous plants such as *Nepenthes* will be separately displayed. Taxonomic and morphological diversity is a goal for this collection.

#### **Rock Garden Plants (BG)**

Plants adapted to rocky slopes are planted in multiples around rocks in the Creighton Educational Garden, providing an opportunity to study microclimatic influences of rocks on plants. Plants in this garden should be slow-growing and diminutive to stay in scale with the rocks.

#### **Plants with High Teaching Value Independent of Other Collections (GH and BG)**

These plants may illustrate interesting adaptations, e.g. bullhorn acacia. Medicinal plants may be developed as a collection in the future, but in the meantime plants with notable medicinal qualities are considered to have high teaching value, e.g. Madagascar periwinkle. Plants requested by faculty for teaching or research purposes meet this criterion as well.

## **NON-LIVING BOTANICAL COLLECTIONS**

The botanical resources at Wellesley College include some important non-living collections, such as extensive wood samples and botanically accurate papier maché flowers, which have high teaching value and historic significance. The current plan is to maintain these in areas accessible to students, and ultimately they should be accessioned and professionally restored as needed.

An extensive herbarium collection, including many specimens collected in the early 1900's by Alice Ottley and others, was donated in the 1980's to the Steere Herbarium of the New York Botanical Garden, where along with the rest of the collection it is being digitized and made available via <http://sweetgum.nybg.org/science/>.

The greenhouse and grounds are enhanced by benches (some with memorial plaques), landscape features like stone walls, stairs, bridges, Betsy's Garden Classroom in the EETG, and the grotto in the H. H. Hunnewell Arboretum. The labyrinth on the northeast side of Paramecium Pond is a collaborative effort between WCBG and the Office of Religious and Spiritual Life (ORSL). ORSL maintains the materials of the labyrinth, and WCBG staff maintain the grass around and within it.

WCBG has a fossil collection to be displayed in Global Flora, including a fossilized trunk believed to be the genus *Eospermatopteris*, belonging to the Cladoxylopsida class, from the Devonian-era forest in Gilboa, New York.

WCBG's book collection includes references on ecosystems, plant biology, plant families, gardens, and horticulture; textbooks; field guides; children's books; and botanical art books. The collection can be used by WCBG staff, Friends volunteers and art students, and students working on projects for WCBG.

## **THE USE OF WCBG'S COLLECTIONS**

Priority for use of the WCBG's collections goes first to the Wellesley College community, second to other educational institutions and botanical gardens, and third to the general public. The plant collections in the outdoor gardens are open daily to the public and the college community. The Global Flora conservatory, when completed, will be open on a regular schedule to the college community, and will be open to the public when construction of the Science Center is complete. The Teaching and Research Greenhouses, when completed, will be accessible by OneCard to members of the college community, but will not be open to the public.

### ***Educational Use***

We encourage the college community to make educational use of all aspects of the Botanic Gardens. College faculty can request times for classes to make use of the collections, as well as space and resources for teaching and research.

WCBG accommodates educational use by the public, usually in the form of docent-guided tours.

The database of information on the taxa and the individual specimens in the collections is accessible to all via the website [www.wellesley.edu/WCBG](http://www.wellesley.edu/WCBG).

### ***Special Events***

Certain spaces in the WCBG (ex. the Visitor Center, the outdoor classroom in the EETG, parts of Global Flora) may be used for events by the college community, with the permission of WCBG's director or assistant director.

WCBG is not available for special events outside the college community. This includes garden club meetings, parties and weddings.

### ***Photography Policy***

Individuals are welcome to photograph in the gardens and Global Flora conservatory, so long as they follow [WCBG's photography guidelines](#). Photography can only occur during normal hours of operation, and must be respectful of the plants as well as the other visitors to the greenhouse and gardens.

Commercial photography and videography are generally not permitted, although WCBG's director may grant an exception for those projects with an educational focus, provided that the request is made well in advance.

### ***Access to Plant Material***

Researchers and staff in other institutions should contact WCBG's director or botanical collections manager regarding what plants and propagules may be available.

## **Appendix 1. Voluntary Codes of Conduct for Botanic Gardens and Arboreta**

Center for Plant Conservation, February 2002

1. Conduct an institution-wide review examining all departments and activities that provide opportunities to stem the proliferation of invasive species and inform visitors. For example, review or write a collections policy that addresses this issue; examine such activities as seed sales, plant sales, book store offerings, wreath-making workshops, etc.
2. Avoid introducing invasive plants by establishing an invasive plant assessment procedure. Predictive risk assessments are desirable, and should also include responsible monitoring on the garden site or through partnerships with other institutions. Institutions should be aware of both direct and indirect effects of plant introduction, such as biological interference in gene flow, disruption of pollinator relationships, etc.
3. Consider removing invasive species from plant collections. If a decision is made to retain an invasive plant, ensure its control and provide strong interpretation to the public explaining the risk and its function in the garden.
4. Seek to control harmful invasive species in natural areas managed by the garden and assist others in controlling them on their property, when possible.
5. Promote non-invasive alternative plants or, when possible, help develop non-invasive alternatives through plant selection or breeding.
6. If your institution participates in seed or plant distribution, including through Index Seminum, do not distribute known invasive plants except for bona-fide research purposes, and consider the consequences of distribution outside your biogeographic region. Consider a statement of caution attached to species that appear to be potentially invasive but have not been fully evaluated.
7. Increase public awareness about invasive plants. Inform why they are a problem, including the origin, mechanisms of harm, and need for prevention and control. Work with the local nursery and seed industries to assist the public in environmentally safe gardening and sales. Horticulture education programs, such as at universities, should also be included in education and outreach efforts. Encourage the public to evaluate what they do in their own practices and gardens.
8. Participate in developing, implementing, or supporting national, regional, or local early warning systems for immediate reporting and control. Participate also in the creation of regional lists of concern.
9. Botanical gardens should try to become informed about invasiveness of their species in other biogeographic regions, and this information should be compiled and shared in a manner accessible to all.
10. Become partners with other organizations in the management of harmful invasive species.
11. Follow all laws on importation, exportation, quarantine, and distribution of plant materials across political boundaries, including foreign countries. Be sensitive to conventions and treaties that deal with this issue, and encourage affiliated organizations (plant societies, garden clubs, etc.) to do the same.



## **Appendix 2: Native Plant Policy**

Native plants and native plant communities contribute significantly towards the WCBG Mission Statement of increasing participation in science, promoting scientific and environmental literacy and contributing to a sense of place.

The definition of a native plant has many aspects and, like the overall collections policy, different aspects of the native plant definition will be considered in choosing a plant for a particular garden or landscape. A combination of current and/or historic geographic distribution combined with ecological niche of a plant is an important consideration in choosing woody and herbaceous plants for habitat collections, animal support and in landscapes to be designed around the Science Center.

### ***Geographic Distribution***

In terms of geographic distribution, at a broad level, a plant can be considered native if its natural range falls within North America. The diverse woody plant collection of the Alexandra Botanic Garden contains trees and shrubs from North America, Europe and Asia. This provides learning opportunities for understanding the geological, evolutionary and climate factors that have contributed to plant geography.

The definition of native can be fine-tuned geographically to Wellesley College along a continuum from native to Eastern North America, native to the Northeast, native to Massachusetts, native to Norfolk County, down to native to Wellesley Massachusetts. Currently no garden of WCBG has a strict geographic requirement for plants.

### ***Ecological Niche***

Like geographical distribution, ecological niche can be applied on different levels. Native plants are important in supporting native specialist pollinators, and may support native herbivores and other trophic levels better than non-native species or cultivars. In future garden areas of the WCBG, native plants may be planted as specimens rather than trying to recreate a plant community.

In the larger landscapes, especially habitat collections, native plants should be chosen because they are known to exist in that community or may be able to establish in that community, e.g. a wet meadow. Because the habitat collections are on small, continually disturbed fragments of land the requirements for native should not be too restrictive. There is currently no requirement to acquire local genotypes of wild plants but locality should be considered when choosing species and sources of plants. When available, plants native to Massachusetts would be the most desirable.

Native plants are a tool when practicing ecological landscaping especially in managing ecological succession as gardens and landscapes change in the WCBG. Creating native communities with a diversity of species in the WCBG will create opportunities to study climate change as well as create resilience in the landscape.

### ***Resources***

Doug Tallamy, Bringing Nature Home, <http://www.bringingnaturehome.net/>

North American Eco Regions, <https://www.epa.gov/eco-research/ecoregions>

Massachusetts Natural Communities  
<https://www.mass.gov/service-details/classification-of-natural-communities>

Massachusetts Plants by County  
[https://www.researchgate.net/publication/284157033\\_The\\_Vascular\\_Plants\\_of\\_Massachusetts\\_A\\_County\\_Checklist\\_First\\_Revision/download](https://www.researchgate.net/publication/284157033_The_Vascular_Plants_of_Massachusetts_A_County_Checklist_First_Revision/download)