WELLESLEY COLLEGE BOTANIC GARDENS

COLLECTIONS POLICY

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1. INTRODUCTION

A. Overview and History of the Plant Collections

The Wellesley College Botanic Gardens (WCBG) include thousands of plants representing over 1500 different taxa from more than 150 plant families, a remarkably diverse collection for a college or university. The Margaret C. Ferguson Greenhouses house the most diverse collection of plants under glass in the greater Boston area, and the Alexandra Botanic Garden, H. H. Hunnewell Arboretum, Creighton Educational 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 their design intent.

Wellesley's botanical legacy goes back to Henry Durant, who founded Wellesley College in 1875. Mr. Durant had a strong interest in botany and an impressive collection of plants in his own greenhouses, which he 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 greenhouse complex that bears her name, 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.[1] All four of these women emphasized the educational value of diverse plant collections, echoing and building on Henry Durant's original ideas for botany at Wellesley.

B. Mission Statement

The mission of the WCBG is two-fold:

- to **increase participation in science** by engaging people with a diverse array of outstanding botanical resources for teaching, research, and exploration, and

- to **promote scientific and environmental literacy** in the college and broader communities, using aesthetic appeal and innovative programming to stimulate interest in the natural world.

This mission statement, adopted in 2007, complements Margaret Ferguson's vision for the Botany department upon completion of the greenhouse complex in 1925: "It is our purpose that the department shall stand, primarily, in the future as in the past, 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."[2]

[1]Kass, L.B. 2007. Landmarks and Milestones in American Plant Biology: The Cornell Connection. Plant Science Bulletin 53:90-99.
[2]Ferguson, M.C. 1925. Botany at Wellesley 1875-1925. Wellesley Alumnae Quarterly.

C. Current Implementation of the Mission (2008)

With 22 acres of gardens and 7235 square feet of greenhouse adjacent to the Science Center, the WCBG provides many opportunities for a person's instinctive affinity for plants, nature, and harmonious landscapes to grow into a science-based understanding and appreciation of them. Programs and courses such as Botanical Art and Environmental Horticulture are appealing bridges into science for broad audiences. A docent program engages students and volunteers in the natural history of the gardens and plant collections. The botanical resources and the accumulating body of knowledge about them provide ever-increasing opportunities for teaching and research at the College. The collections database, available online for easy access, is rich with information about both the taxa and the individual specimens in the collections. A substantial archive provides valuable historical context for both the collections and the landscape.

Throughout their history the WCBG have emphasized educational value, primarily via the impressively diverse plant collections. An important 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."[3] 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 great biodiversity of the gardens keeps them healthy while providing educational opportunities not often found on college campuses. The greenhouse plant collections also have a 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."[4] The greenhouses dramatically expand the diversity of plants available for study as well as enabling a broad range of investigations at any time of year.

In addition to the historic emphasis on diversity, the WCBG plant collections have a new 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 greenhouses feature 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.

[3]Ferguson, ibid.
[4]Ferguson, ibid.

D. Purpose and Administration of the Collections Policy

This Collections Policy guides the development and management 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.

The Policy is written and administered by the WCBG Director and full-time staff, and reviewed by an advisory committee, including representatives from Biological Sciences, Environmental Studies, and the Friends of Horticulture as well as experts from other botanical institutions. The Director leads a formal review of the Policy every ten years. Final approval of the original (2008) Policy and any substantial revisions is by the Dean of the College.

E. 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 seeks 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).

2. 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.

A. Habitat collections

a. Worldwide habitats (GH)

i. Desert

The Desert House showcases cacti and succulents in a series of miniature landscapes, demonstrating a range of adaptations to different desert environments and providing examples of convergent evolution. Individual planters contain succulents from the Cape

Province and from the Succulent Karoo bioregion of South Africa, from Madagascar, and from Africa in general, while another series highlights cacti and other succulents from the Chihuahuan Desert and elsewhere in North and South America. There is also a planter demonstrating diversity within the genus *Euphorbia*, and another on *Haworthia*. These plantings exhibit existing strengths in the desert collection as of 2007; subsequent plantings from other desert regions could be developed if space is available. While these planters allow the succulents to grow and spread more naturally than they probably could in small individual pots, the plants still need to be maintained at a reasonably small size, or propagated and replaced as necessary.

The larger landscape plantings in the ground allow specimens to reach much larger sizes, to give a more realistic impression of desert plants in nature. These are also organized by continent, with American plants on the north side and African ones to the south. Annuals such as Desert Bluebells (*Phacelia campanularia*) are added to enhance the landscape as appropriate. Miscellaneous desert plants of interest, such as *Aloe vera*, are maintained in individual pots as well.

ii. Tropics

The Tropical House is the tallest of the greenhouses, allowing small trees such as many palms, cycads, and banana to grow in a central in-ground planting area. The current goal for this house is to provide a general impression of a tropical forest understory, and to demonstrate relevant 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. To serve the Tropical Ecology course which visits the La Selva field station in Costa Rica, plants from that area have special priority as potential study species for student research projects.

iii. Hydrophyte

The aerated pools in the Hydrophyte House provide suitable growing conditions for aquatic plants such as *Azolla* and *Salvinia*, and for plants adapted to wet root zone conditions, such as mangroves and papyrus. A range of water-loving plants, from floating aquatics to rooted emergents to floodplain species, is demonstrated in and around these unique pools.

b. Eastern North American habitats (BG)

i. Meadow and forest edge

The area below the Observatory consists of 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. An inventory needs to be completed and a maintenance plan finalized. Currently invasive and woody plants are removed by hand but burning the meadow would be the most ecologically appropriate maintenance method.

The forest edge bordering the meadow presents an opportunity to establish native hardwood trees, understory shrubs and wildflowers. There are existing populations of

several wildflower species but as of 2007 the seed bank overwhelmingly contains invasive plants.

ii. 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*). Water levels vary dramatically over time, from below ground to at least 50cm 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.

iii. 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.

iv. Wet meadow and pond edge

Paramecium Pond is the most prominent landmark in the Botanic Gardens. This groundwater-fed pond supports many aquatic plant and animal species. Because it is small and biologically active it has a fast rate of succession and has needed to be dredged every twenty years to maintain its size. The pond is very popular with visitors for bird watching and frog catching.

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 decade to allow wet meadow species like tussock sedge (*Carex stricta*) 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 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.

v. 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 right along with the relevant technology. In order for green roofs to provide "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 growing medium composed mostly of expanded shale). 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 are spreading (*Fragaria virginiana*) or seeding in in large numbers (*Sedum nevii*). No additional plantings are planned.

The plants are monitored each spring and fall to evaluate the species' suitability to green roof conditions in New England. Tap-rooted weeds are pulled, but no other management applied. Species persisting on the roof as of fall 2007 are a mix of forbs, grasses, low-growing shrubs and a fern, quite a diverse community. Individuals of many of the species on the roof are also planted in the adjoining garden, for comparison of growth and survivorship under the contrasting growing conditions.

B. Taxonomic collections

a. Conifers – miniature and wild types (BG)

Over 50 dwarf and miniature conifers, chosen by Dr. 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 great 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 homolepsis*). 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.

b. Ferns (GH and BG)

The Mabel Stone Cryptogam House contains a diversity of ferns and other cryptogams in a landscaped greenhouse with tufa rocks and a small pool. The goal for this house is to showcase a diversity of non-flowering plants in an attractive setting. 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. Hay-scented Fern (*Dennstaedtia punctilobula*) was planted on the Green Roof, where it persisted but had not spread as of November 2007.

c. Family Collections in the Arboretum and Botanic Garden

As in many botanic gardens, the plants in the outside 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 outside 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 may be 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.

C. Plants as food

a. Ethnobotanical collections

i. Plants of cultural value as food and spice from around the world (GH)

Many plants in the greenhouses have high teaching value for Ethnobotany and related courses and for docent-led tours. Lists of plants used in an excellent 2007 Ethnobotany course at Wellesley and requests from faculty, docents and students guide the

development of this collection. A goal for this collection is to provide examples of culturally important and botanically interesting food plants from around the world.

ii. 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.

b. Native animal support (BG)

i. 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 food 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*).

ii. 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.

iii. 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. Also, woody plants under consideration for other outdoor areas are given priority if they serve as host species for native lepidopterans.

D. 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 130+ year old Durant Camellia which came from the founder 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 a plant 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 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.

E. Miscellaneous collections

a. Caudiciforms (GH)

Brought together for a fall display in 2006, 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. To encourage caudex development and enable future displays, caudiciforms should be maintained in individual pots rather than incorporated into landscape plantings (e.g. in the Desert House).

b. Sensory plants (GH)

A low bench provides access to 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.

c. Carnivorous plants (GH)

Carnivorous plants adapted to boggy areas are grown in terraria to maintain humidity year-round. Others are displayed in mini-landscapes with their natural associates, as collected by botanist Doug Goldman. Larger carnivorous plants such as *Nepenthes* are kept in individual pots. Taxonomic and morphological diversity is a goal for this collection.

d. 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.

e. 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. Plants requested by faculty for teaching or research purposes meet this criterion as well.

3. CRITERIA FOR INCLUSION IN THE WCBG PLANT COLLECTION

To be added to the collection a plant must:

- support the objectives of one or more of the specific collections listed above
- be accurately identified
- be healthy and free of pests and disease
- not be known as an invasive species in Massachusetts, unless contained and used specifically to illustrate invasive plants

Unless they contribute significantly to the educational value of one or more of the above 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 plants being considered for Greenhouse or Educational Garden collections is that plants have a potential size that does not exceed the physical constraints of these spaces.

Plants of unknown identity (e.g. donated plants or plants arising spontaneously in the gardens) may be maintained 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.

4. COLLECTIONS MAINTENANCE

The various specific 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, and is performed in an ecologically and environmentally sound manner.

All collections 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. 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.

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. The Greenhouse collections should not normally include more than three specimens of a given taxon, unless the plants in question are requested in quantity for teaching or research purposes. Surplus plants are normally given away or exchanged, but in some cases may be sold to support the educational mission of the WCBG.

The plant collections are open daily to the public for viewing and to the college community for educational use. 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.

5. NON-LIVING BOTANICAL COLLECTIONS

The botanical resources at Wellesley College include some important non-living collections, such as extensive wood samples and botanically accurate paper 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://sciweb.nybg.org/Science2/VirtualHerbarium.asp

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.