Plant Collections Policy
Connecticut College Arboretum

Maggie Redfern, Director
Jason Eklund, Curator/Information Resource Manager

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Table of Contents

Connecticut College Arboretum Mission Statement

The Connecticut College Arboretum is owned by Connecticut College and operated for the benefit of the College and the community. The Arboretum functions in support of the College's mission by helping to prepare people for a lifetime of learning about and interacting with the natural world. The mission of the Connecticut College Arboretum is:

Teaching — To provide outdoor teaching, laboratory, and performance space for use by faculty and students in all College departments and programs. In both teaching and research, the Arboretum is a unique and valuable academic resource and support facility.

Research — To support and conduct research in a broad range of subjects, including ecology, field biology, geology, conservation, archeology, cultural and natural history, land management and others. Arboretum research emphasizes long-term studies.

Conservation — To provide stewardship of College lands by protecting, sustaining and enhancing biological diversity of natural areas and other large tracts of open space. The Arboretum also provides leadership statewide and beyond in conservation matters.

Collections — To maintain, develop and interpret well-documented plant collections for teaching, research, public and professional education and enjoyment.

Stewardship of Cultural Resources — To provide stewardship of cultural resources on College lands by protecting, studying, and interpreting archaeological and heritage sites.

Public Education — To provide programs and publications about conservation, horticulture, gardening, botany and natural history that enhance people's understanding of the natural world and foster an understanding of the Arboretum's mission.

Recreation — To provide a place where people from the College and the community may enjoy passive recreation and where they may come to learn, reflect and renew themselves through contact with the natural world. The Arboretum enhances the quality of life both for the constituents of the College and the citizens of southeastern Connecticut.

Endorsed by the Executive Committee, Connecticut College Board of Trustees in 1990.
Updated 2015.

Introduction to the Plant Collections Policy

The Arboretum at Connecticut College is a unique resource that allows students, faculty and visitors to use the landscape as an outdoor classroom, laboratory and sanctuary for wellness. The botanical landscape at Connecticut College is strongly aligned with the identity of the College along with the campus's historic buildings and physical environment. It distinguishes us from our NESCAC peers as we are the only institution with an accredited Arboretum meeting all the requirements of the internationally recognized ArbNet certification (Level III) for botanic gardens.

The Arboretum is a living museum made up of collections of trees, shrubs, vines, perennials and herbaceous plants. These collections are professionally maintained and curated to support teaching, research, conservation, education and to fulfill the mission of the College and Arboretum. The Living Collections of the Arboretum are comprised of a diversity of plants that are intentionally selected to fulfill specific objectives set forth by the Plant Collections Policy. Curated collections are one of the defining characteristics that make an arboretum distinct from a park, farm, golf course or other types of managed landscape.

The plant collections contain approximately 6,469 scientifically documented trees and shrubs of over 800 taxa (as of Jan. 20, 2020) from around the world. Information about the collections is disseminated through teaching, publications, digital media (website, Facebook and Instagram), as well as labeling, tours, lectures, and seminars.

Land Acknowledgement

Connecticut College Arboretum honors the Mashantucket Pequot, Western Nehântick, Eastern Pequot, Mohegan, and other tribal nations who are indigenous to Nameaug, now called New London, and the land surrounding Coastal Algonquin, also known as the "Long Island Sound Region." We appreciate your careful stewardship of the land over many generations and acknowledge the suffering endured by your ancestors through the historical period of settler colonialism. Finally, we express gratitude that your tribal nations remain as neighbors in the region and that we continue developing opportunities for greater connection and partnership.

Purpose of the Plant Collections Policy

The Plant Collections Policy serves as a guide to what plant materials are grown and displayed on the College's cultivated lands. This policy serves as a roadmap for the development, management and enhancement of the plant collections. The collections policy is applicable to all plants growing on the Campus, the Native Plant Collection, Caroline Black Garden and Greenhouse. This document is designed to provide direction to those responsible for the planning, development, management and maintenance of the plant collections.

Policy Governance

Connecticut College Arboretum is responsible for the implementation of the Plant Collections Policy. Interpretation, development and authority of the Plant Collections and its Policy is the responsibility of the Arboretum Director in consultation with the Plant Collections Committee. The Committee is composed of the Grounds Supervisor, Arboretum Director, Horticulturist and Curator. All Arboretum employees have a role in the curation of the collections by responding to stakeholder feedback, proposing plant acquisitions that increase the value of the living collections and proposing plants for deaccessioning. (*Collections Committee Policy* needs to be updated.) Accessioning and deaccessioning and plant records are the primary responsibility of the Curator in accordance with this Collections Policy. Collections policies are reviewed and updated on an as needed basis with comprehensive review every five years. During comprehensive review input is sought from Arboretum stakeholders and ad hoc Collections Committee Members. Revisions to the Collections Policy shall be presented to the Plant Collections Committee. The Director shall be responsible for the administration of the Policy and the implementation of the Policy will be the responsibility of the Arboretum staff.

Scope of the Plant Collections

The plant collections at Connecticut College are comprised of all accessioned trees, shrubs, vines and herbaceous plants growing on the 750 acres of land owned and managed by the College. The individual taxa of plants grown within the landscape are defined by the Plant Collections Policy and are planted within specific plant collections across the landscape. Plant collections are distinct geographic areas within the 750 acres (e.g. Native Plant Collection, Campus Landscape, Caroline Black Garden, etc.) each of which has individual collections priorities and criteria. Review and update of the collections is a continual process. The Plant Collections Committee conducts reviews as necessary for the Arboretum, during which goals are set for collections expansion.

Collections Priorities: Priorities are given to new accessions and lineages that meet one or several of the following criteria. All new accessions are required to be justified within the collection's priorities scope for consideration in the collection. During accessioning the collections priority is noted in the plant records database.

1. Academic Collections

- **a. Teaching Collections**: These collections support the mission of the College by providing plant materials and gardens for education and teaching. Plant taxa in these collections are used for specific courses, workshops and programs supporting both academic and public education. Acquisition of plant material for teaching collections should be justified and defined within the context of the curriculum of the course, workshop or program. Input for these collections is provided by faculty, instructors and staff who will be teaching.

b. **Research Collections:** Collections that support research within the College and the broader scientific community on a local, national and international scale. Expansion of these collections promotes scholarly use of the Arboretum.

2. **Core Collections**:

a. **Germplasm Collections**: These collections focus on plants of known wild provenance with the goal of maximizing representation of diversity on the family, genera and species level. Individuals in these collections represent wild populations of plants and play a primary role in supporting conservation through ex-situ collections. Diversity on the generic and species level are defined by representation of a minimum of a single individual for each species and genus within families that are hardy to southeastern Connecticut. On the species level, diversity should be maximized through genetic and morphological diversity on the infraspecific level, and when appropriate inclusion of cryptic species and isolated populations containing unique alleles and phenotypes. Priority is always given to accessions of known wild provenance.

b. **Conservation Collections:** These collections comprise a broad range of plants that are rare or endangered species in their native habits. Priority is given to plants of known wild provenance and germplasm representing the genetic diversity of the species. Conservation collections plants should be supported with ex-situ conservation protocols and management plans within the College and when appropriately coordinated with other botanical institutions.

c. **Sustainability & Ecosystem Services Collections**: These collections are comprised of plants that exhibit characteristics and tolerance mechanisms allowing them to grow and be cultivated in high stress environments (urban, drought, flooding, high or low soil pH, pest and disease, climate change tolerant) and plants that can provide ecosystem services. Ecosystem services refer to benefits people, plants and animals derive from ecosystems. These collections feature species and cultivars with known stress tolerance characteristics, plants from regions of the world that naturally exhibit characteristics of high stress environments or fill specific environmental niches (wetlands plants, calciphyte, xeric plants, etc.). In the landscape these plants are used to create sustainable landscapes by adhering to the Sustainable Sites Initiative standards and associated environmental horticulture principles.

d. **Agroecological and Ethnobotanical Collections**: Collections and gardens with a focus on the interaction between plants, people and culture. These collections are inclusive of both traditional and contemporary cultures and methods of landscape management, cultivation and utilization of plants and

fungi. These collections are inclusive of sustainable and organic agriculture, agroecology, permaculture, fungiculture and ethnobotany.

e. Connecticut College Heritage Collections: These collections represent unique plants and gardens that are of cultural significance to the College. Efforts should be made to preserve these plants using heritage tree care methods, plant protection and IPM protocols to ensure their longevity in the landscape. Appropriate re-propagation to maintain these lineages is priority for the collection and should be conducted prior to removal of these specimens when possible.

Heritage Tree Collection

i. Tulip tree at College entrance (Accession # 92-761A)
ii. White pine in Native Plant Collection (Accession # 80-49A)
iii. Crimson Queen lace leaf maple (Type specimen) north of Blunt House (Accession # 98-19A)
iv. Dawn redwood in Caroline Black Garden (Accession # 95-59A)
v. Mature American Elms
    - Native Plant Collection entrance (Accession # 32-1A)
    - Williams Street entrance (Accession # 92-340A)
    - Tempel Green (Accession # 92-124 A)
    - Tempel Green (Accession # 92-289 A)
    - Blaustein southeast (Accession # 92-627 A)
vi. Paper birch in Castle Court (Accession # 92-186A)
vii. Hemlock Grove East and West of the Gries Conifer Collection
viii. Nut Collection, including oak, hickory and disease-resistant American chestnuts

f. Display and Ornamental Plant Collections: These collections are comprised of cultivars with high ornamental and/or environmental horticultural qualities. Priority is given to taxa with documented pest and disease resistance and/or known tolerance specific site conditions and stressors. Preference is given to cultivars not currently represented in the living collections. New cultivars in this collection are primarily added during major site renovations and new landscape installations.

g. Endowed and Memorial Collections and Gardens: These collections and gardens are created with a specific intent and purpose through an endowment or memorial fund and are maintained in accordance with wishes of the donor. As needed, the purpose and intent of these collections are occasionally updated should the landscape need to be relocated or reconsidered. Reconsideration and repurposing are done in consultation with the donor whenever possible.

The Plant Collections of the Connecticut College Arboretum

i. Native Plant Collection

The Native Plant Collection is devoted to native woody plants of eastern North America for teaching, conservation and research. This collection is displayed in approximately 30 acres west of Williams Street and south of Gallows Lane. The focus of this collection is to assemble trees, shrubs, and woody vines that are native to the Eastern deciduous forest of North America which can be grown successfully in southeastern Connecticut. Priority and special attention is given to taxa native to Connecticut and plants of known wild origin. Herbaceous plants and ferns are of secondary importance and are typically not accessioned.

The Native Plant Collection is an educational tool which serves to:

- Provide an outdoor, living laboratory for teaching and research
- Highlight the beauty and diversity of our native flora
- Provide examples of ways to landscape with native plants
- Promote environmentally sound landscape management
- Acquaint people with native plant identification
- Promote the conservation and protection of our native flora

The Native Plant Collection contains several smaller collections and gardens which are of educational, horticultural and aesthetic interest. Specific acquisition objectives pertain to the following existing gardens:

a) **Nancy Moss Fine Native Azalea Garden:** Established in 1978 in memory of Nancy Moss Fine '51, this garden displays nearly all deciduous azalea species native to North America. At least one species can be found in bloom from late April through mid-August. In addition to species, there are some natural hybrids and cultivars of native azaleas. This garden is part of the specialty Native Azalea Collection and holds a national accreditation through the Plant Collections Network, a program hosted by the American Public Gardens Association. Development of this specialty collection is guided by the Native Azalea Collection Development Plan, Appendix VII.

b) **Josephine Hooker Shain Mountain Laurel Garden**: Established in 1985. Cultivated varieties of the Connecticut state flower, mountain laurel (*Kalmia latifolia*), comprise this June blooming collection. Many of these cultivars are the work of Dr. Richard Jaynes of Cheshire, Connecticut.

c) **Lincoln and Lillian Dauby Gries Conifer Collection:** Established in 1988 in memory of Lillian Dauby Gries '27, this 3-acre garden contains

slow growing or dwarf conifers (firs, spruces, hemlocks, junipers, pines, etc.) and a variety of native shrubs as companion plantings.

d) Edgerton and Stengel Wildflower Garden: This naturalistic woodland garden is composed mostly of wildflowers that bloom in spring before the trees leaf out; many species of ferns are conspicuous all summer. The garden includes trillium (*Trillium* spp.), cardinal flower (*Lobelia cardinalis*), turtlehead (*Chelone* spp.) and many other species of interest. The herbaceous plants and ferns which are the primary feature of this garden are not accessioned as part of the Arboretum collections.

e) Nationally Accredited Plant Collection™: For selected genera determined by the Director and Curator, the Arboretum will seek to participate in the American Public Gardens Association's Plant Collections Network. The Arboretum will participate with individual and multi-institutional applications where appropriate. The following applies to such specialty collections:

- Such collections are already, or will become, collections of distinction recognized nationally.
- They are collections for which the Arboretum has made a long-term commitment. They will be maintained for depth and diversity for multiple plant generations.
- Scientific investigations will be ongoing and will include research, evaluation, and dissemination of research results.
- These collections will be displayed within an aesthetically pleasing garden context.
- These collections will include all of the taxa from wild and cultivated origins adapted to southern New England environments.
- Divestiture of a specialty collection will proceed only after another institution has agreed to accept responsibility and has made a commitment to preserve the genetic material represented in the collection.

ii. The Campus Landscape

The Campus Landscape at Connecticut College is an integral part of the plant collections of the Arboretum featuring an exceptional assortment of mature specimen trees and ornamental plant species. The landscape is strongly aligned with the identity of the College along with the campus's historic buildings and physical environment. Beginning in 1960, maps of the campus were drawn showing the location and names of plants and buildings. These maps were updated every ten years through 1992 at which time all of the campus trees were accessioned and brought into the arboretum record-keeping system. The campus landscape has been considered part of the Arboretum since 1996 when its collections were incorporated into those of the broader

Arboretum. The Campus Landscape, for the purpose of this policy, is the area of Connecticut College bounded by Williams Street, Benham Avenue, Mohegan Avenue, and the Lyman Allen Art Museum. Due to the purpose and use of the campus, there are limitations with regard to plantings which need to be considered, such as: vehicular and pedestrian flow, parking, safety, and its academic, athletic, and recreational uses.

Plant Collections of the Campus Landscape include taxa that are both native and nonnative to the United States. Priority is given to species outside the range of Eastern deciduous forest of known wild provenance. Plant species growing on campus should be strongly aligned with academic and core collections goals of this Collections Policy.

iii. Caroline Black Garden

The Caroline Black Garden collections are assembled and display, in a pleasantly designed setting, select woody species and cultivars from around the world which are desirable and suitable for landscaping in southern New England. In addition, the garden provides examples of mature landscape plants. The CBG collections are expanded to maintain the integrity of the design of the garden with additions of ornamental species. The garden was recognized and dedicated as an International Garden for Peace due to the tranquility and introspection the landscape fosters for its visitors. It is located east of Mohegan Avenue between Emily Abby House and Vinal Cottage.

iv. Non-collection Lands

a) **Natural Areas:** The Arboretum landscape contains several natural areas representative of New England vegetation. The goal in designated Natural Areas is to minimize human influence on natural processes, and to promote observational research and passive recreation. Generally, these areas are maintained through natural regeneration of the present vegetation; however, intervention may occur under certain circumstances (e.g., restoration following major disturbance; exotic species invasions). Three tracts designated as Natural Areas total about 200 acres and are Bolleswood, Goodwin and Mamacoke Island.

b) **Managed Areas:** The Arboretum also provides stewardship of about 400 acres of College lands that exist in an undeveloped, wild or lightly managed state, and are neither Natural Areas, nor Plant Collections. These areas are available for more manipulative types of research and demonstration projects including controlled burning, mowing, herbicide use and forestry practices.

Plants in Arboretum non-collection lands are not individually accessioned or inventoried and are therefore not subject to plant collection policies.

Acquisition of Plants

Plants shall be acquired by Arboretum staff under the guidance of the Director and the Curator through collecting activities in the field, on-site garden projects, exchanges with other institutions and individuals, and purchases. Acquisitions shall comply with the selection criteria described in the Scope and Collections Priorities section of this Policy. Plants obtained shall be relevant to the specific collection for which the taxon is intended. A list of *desiderata,* prepared by the Plant Collections Committee to fill obvious deficiencies within present holdings while looking ahead 25-50 years to determine what is needed to preserve the future integrity of the collections, should be consulted.

Acquisition of Plant Material

Acquisition of plants for the collections should comply with all of the following criteria and specific objectives set forth in the Collections Priorities section:

1. Plants should only be acquired if their maintenance and care can be assured with regard to space, staff time, water, resources and horticultural capacity of employees.

2. Taxa should be able to grow under reasonable cultural practices. For practical reasons, this means that all specimens should be able to withstand occasional dry conditions and a temperature range between -15^0 F and 105^0F.

3. Specimens acquired for the Native Plant Collection must be indigenous to eastern North America, and should be of known wild origin whenever possible.

4. Plant material may be acquired from botanical institutions, field collectors, reputable commercial sources, or as gifts.

5. Plants shall not be included in the collections with known invasive characteristics (Table 1)..

Collections Priorities

Collections priority across all landscapes is given to plant taxa of:

1. Known wild provenance.
2. Conservation concern that support in-situ and ex-situ conservation.
3. Connecticut native trees and shrubs.
4. That support teaching and research for faculty and staff.
5. Taxa not already present in the plant collections.

Rare and Endangered Taxa

A primary objective of the plant collections is to support conservation of rare and endangered plants through ex-situ and in-situ conservation measures. The Arboretum is committed to observing all Federal and State laws and regulations regarding rare and protected taxa. The Arboretum will not knowingly purchase or accept any plant material in which its origin is in doubt, or is of conservation concern.

Endangered or rare taxa may be considered for acquisition when written legal permission has been granted by an appropriate authority. Whenever possible, the Connecticut College Arboretum shall cooperate with government and private agencies to promote the protection and survival of rare and endangered taxa through educational programs, propagation, publications, field work, and plant exchange programs.

Gifts

Gifts are the unconditional transfer of ownership of plants between the Connecticut College Arboretum and other institutions or individuals. Gifts to the Arboretum's Plant Collections are accepted with the express intent of augmenting the collection and must be consistent with this Policy. Decisions relating to accepting gifts are made at the discretion of the Arboretum Director.

Gifts of money for a collection must include a sufficient endowment to allow for general and curatorial maintenance. Endowed collections will be named in consultation with the donor. Endowments will also allow for replacement of plant material, proper labeling and interpretation and/or any needed restoration of a named collection.

The Connecticut College Arboretum reserves all rights to the control, display and ultimate disposition of gifts that it receives. Memorial gifts are subject to the College's Physical Memorials Policy in the appendix or associated policy .

Also See: "Physical Memorials Policy Final" for funds set aside to replace memorials.

Recommendations for and Approval of Acquisitions

Administrative personnel, staff, volunteers and other interested parties may initiate recommendations for acquisitions to the collections. Final approval of acquisitions is the responsibility of the Arboretum Director and the Collections Committee. Acquisition of herbaceous plants will be approved by the Arboretum Director and the Grounds Supervisor and Horticulturist responsible for their care.

Plant Records

The Connecticut College Arboretum is committed to up-to-date, well-maintained, and relevant plant records. Accessioning is the formal process by which a plant becomes a permanent part of the collections and, more specifically, a part of the records.

Accessioning Criteria

Woody plant material of all types shall be accessioned soon after acquisition. Normally, plants obtained for temporary educational use, research purposes, member dividends, or resale, as well as any herbaceous plants, shall not be accessioned. Any specimens existing in a collection that have not been previously accessioned, and which enrich the overall collections, shall be accessioned.

The curator has the capacity to accession new plants and add them to the collection. This is done to add novel or unique germplasm to the collections that enhances the value of the living collections or fulfills a specific management objective (Ex: accessioning ash for biocontrol release or IPM treatment).

Minimum Information Required

The following information shall be kept on all accessions within the plant collections of the Arboretum:

Accession Records

- Botanical name (cite author and reference)
- Common name
- Date of acquisition
- Source of material
- Accession number
- Date of accession
- Size and condition of specimen
- Planting location / Purpose
- Justification for why plant was selected for the collections.

Deaccession Records

- Date of deaccession
- Reason for deaccessioning
- Means of disposition

Mapping Records

Collection area maps are critical to the inventory and for location control of plants within the collections. All permanently accessioned plants will be mapped in the plants mapping system, ArcGIS. The Connecticut College Arboretum has developed coordinate-based maps using a map-making software called ArcGIS (Geographic Information System). These maps rely on fixed, real-world orientations associated with State and Federal authoritative mapping agencies. Aerial photographs and Global Positioning System (GPS) technology are used to map the location of prominent features in the collections. These cartographic files are composed of hard-copy and electronic maps. The Collections are divided into smaller sub sections and delineated with a number corresponding with their collection location. Area numbers include: The native plant collection (0-99), Campus (100-199) and Carolyn Black Garden (200-299). An assessment of map accuracy will be an ongoing process and shall be performed by the Arboretum Curator.

Collection area maps and field inventory records shall be kept for all collections, as outlined in the Collections Inventory Protocol *(See Appendix II)*.

Additional Records (where appropriate)

- Evaluation records
- Propagation records
- Information on rare and endangered accessions
- Provenance information
- Label records
- Memorial and Gift records

Other relevant information concerning a specific accession will be kept as is needed, or by request of the Arboretum Director.

Responsibility of Plant Record Maintenance

The Curator is responsible for the accuracy and timely updating of the plant record system with pertinent information regarding the plant collections, as outlined in this Policy. Administration and oversight of the plant records system is the responsibility of the Arboretum Director. Taxonomic questions should be addressed to the Arboretum Director, the Curator, or a knowledgeable member of the Botany Department.

Plant Identification and Verification

For reference and research purposes all plants need to be correctly named if they are to have any value beyond the collection in which they are grown. One should not assume that all plant material comes into the collection correctly named or that it is correctly identified even after it has been accessioned and studied.

A verification program assures that the nomenclature attached to our plants is as accurate

as can possibly be determined. Verification is essential for the Connecticut College Arboretum to maintain credibility as a scientific and horticultural institution. Verification involves checking that a previous identification is correct or assigning a name to an unnamed accession. Checking the name involves two procedures:

- Identification, which is the determination of a plant as being identical with or similar to a particular taxon. This procedure uses taxonomic experts, taxonomic reference books such as floras and monographs and other scientific material such as accurately named herbarium specimens or living plants.

- Nomenclature, which is concerned with the determination of the correct scientific name of a known plant. This naming is regulated by internationally accepted rules laid down by the "International Code of Botanical Nomenclature," published by the International Botanical Congress.

Collections Evaluation and Inventory

Collections evaluations provide for the continual review of a plant collection and its relevance to the Arboretum's Mission. A collections inventory involves plant record updating and map improvement.

Collections Evaluation

Periodic field evaluations of all plants in the collections should take place as needed and shall be the responsibility of the Arboretum Curator in consultation with the Director. The reasons for field evaluations of the collections are: 1.) to determine a plant/plant collections relevance to the Arboretum's Mission, and 2.) to ascertain a plant/plant collection's performance. In addition, recommendations can be made during an evaluation regarding maintenance, plant acquisition, and deaccessioning.

An evaluation may explore some of the following questions: Is the plant/plant collection relevant to the Mission of the Arboretum and the collections policy? Is it an outstanding specimen? Is the plant rare, endangered, unusual, or otherwise notable? Is the plant/plant collection of historical value?

Can the plant/plant collection be properly maintained with the current staff and resources? Is the plant/plant collection in good health and representative of its natural state? Does the plant need specific treatment or maintenance? Is it located in the proper location within the Arboretum with regard to specific growing conditions? Is there sufficient space to allow for appropriate maintenance in the future?

Collections Inventory

Because plants continually change throughout their lifetime, it is necessary to inventory

living collections on a timely basis. This allows for updated, accurate and meaningful records concerning the plant collections.

An inventory should help answer some of the following questions:

- Are the records concerning the plant collection in proper order?
- Is the plant labeled properly?

A field inventory of the Arboretum's plant collections should take place at least every 5 years. All inventories shall be conducted according to the procedures outlined in the Collections Inventory Protocol (*See Appendix II*) and should be carried out by the Arboretum Curator.

An inventory of all nursery and seed material should be performed every year. This inventory will be carried out by the Arboretum Horticulturist. Inventories will be submitted to the Arboretum Director, Curator and Collections Committee upon completion.

Deaccessioning and Disposal of Plant Material

Deaccessioning of Plant Material

Accessions may be removed from the collections when they no longer fulfill any of the Arboretum's missions of education, research, outreach, horticultural display or Collections Priorities. The process of deaccessioning documents the loss of individual specimens in the plant collections. Timely updating of plant records is necessary following removal of plant material. All records and data relating to deaccessioned material will be maintained in perpetuity. Deaccessioning is the responsibility of the Curator. In certain instances, deaccessioning is conducted in consultation with the Arboretum Director or other staff with special interest in a particular collection.

Criteria for Deaccessioning Plant Material

Specific reasons for deaccessioning include (but may not be limited to):

- When plants are dead, dying or in poor health.
- When plants are no longer appropriate to the scope of each collection.
- When plants are damaged beyond reasonable recovery and deemed so by a certified Arborist preferable with Tree Risk Assessment training (ISA TRAQ).
- When plants are missing (lost, stolen, or destroyed).
- When a plant/plant collection is deteriorating and is no longer relevant to the objectives of the collections.
- When plants have become invasive or damaging to the collection or surrounding landscape.

- When plants are overly aggressive and have the potential to escape and become pest plants in our local area.
- When the accession harbors a disease or pathogen that is likely to spread to other accessions in the collection. These specimens will be destroyed.
- When the plant poses a threat or is potentially hazardous to persons on the property and is deemed so by a certified Arborist preferable with Tree Risk Assessment training (ISA TRAQ).
- When the plant is determined not to be true to name and the correct identity cannot be determined
- When a plant is surplus (i.e. there are at least two other healthy plants of the same species found in the collection)
- When plantings become crowded or encroach upon landscape design elements such as open spaces or vistas

Disposal of Plant Material

The means of disposal of deaccessioned plant material shall be approved by the Arboretum Director and the Grounds Supervisor. Whenever possible, disposition should be directed to other Arboretum, Grounds or campus programs, such as: education, plant sales, and exchange to other institutions.

Distribution

Accessions that are deemed to be surplus by the Curator, in consultation with the Arboretum Director will be available for distribution. Institutions and individuals to whom these plants may be made available include (in decreasing order of priority):

- Fellow botanical institutions
- Arboretum supporters, especially those who support plant exploration
- Arboretum staff
- Commercial nurseries and nurserymen
- Arboretum plant sale

Labeling

Labels, signs, and plaques are an important part of communicating information to the Arboretum visitor. Labels may be used to give directions, memorialize or honor donors, educate visitors and identify special gardens and plants in our collections. A consistent set of graphic standards and vocabulary is essential. The need to inform the visitor must be balanced with esthetics. Labels and signs should be unobtrusive.

Labeling is also an essential part of recordkeeping and interpretation of the Arboretum's collections. All permanently accessioned plants in the Native Plant Collection and the Caroline Black Garden are labeled with anodized aluminum accession tags that contain the accession number and the scientific name. Significant accessioned plants throughout the Arboretum may have display labels containing the common name, the scientific

name, the scientific family name, and the native range of the taxon. Plants in the nursery will be labeled with the scientific name and accession number, at minimum.

Access

The Arboretum encourages the use of its plant collections to the greatest extent possible. Physical access is unrestricted during normal hours of operation. Propagation material is available for qualified individuals and only with permission from the Curator or Director. The Arboretum supports free and open access to its plant collections and information related to it.

Preservation

The Arboretum takes reasonable and necessary measures to prevent loss of or damage to the plant collections. The Arboretum safeguards its collections from vandalism, damage, or theft to the best of its ability. Collections shall be renovated as needed through ongoing evaluations in order to ensure their long-term viability, maximize visitor experience and enhance the collections' educational value.

Care and Maintenance

The Connecticut College Arboretum and Grounds staff are committed to maintaining its plant collections in as aesthetically pleasing and as healthy a state as possible, given local growing conditions and budget limitations. In accordance with the conservation concerns of The College and sustainability plan, conservation of irrigation water is important. Plants will be irrigated plentifully only during their establishment period. After this time, most plants should require little or no irrigation for their care. Methods designed to ameliorate cold temperature affects should be provided only in very special cases. Removal of exotic plants from the Native Plant Collection, and any invasive species from other collections, shall be an ongoing priority (see Invasive Plant Removal Policy Appendix III).

Public safety and liability are the highest priority for the maintenance of the collections. Maintenance is prioritized based on periodic reviews by the Director, Horticulturist and Grounds Supervisor in conjunction with the Curator.

The Arboretum and Grounds will make the best efforts to use sustainable horticultural practices to support the health and vitality of its plant collections. Detailed horticultural approaches to plant and grounds care will be outlined in the Landscape Management Plan and Integrated Pest Management (IPM) Plan.

Minimum (Sustainable) Standards of Care

The Arboretum and Grounds plans its collections, trains its staff, and organizes its maintenance program to ensure the best care of the collections in the most environmentally sound manner. Because of this commitment to reducing the level of pesticide use, it maintains an IPM (Integrated Pest Management) approach in its plant maintenance program. Key components for the success of this program include: plant selection, plant replacement, plant maintenance, collections monitoring, and careful selection of pest control methods. (See Sustainable Standards of Care Appendix IV).

A. Staff training: Staff expertise and current conservation practices are essential for the proper care of the collection. Staff is offered short courses on-site as appropriate, use of tools, communications, etc. Staff is also encouraged to attend seminars in their areas of specialty and offered tuition reimbursement for courses related to their work.

B. Assessment: The Arboretum Horticulturist and the Supervisor of Grounds are responsible for the year-round care and quality of their specific collections. Periodic assessments, conducted by the Landscape Management Committee and the Plant Collections Committee, are to provide an overview of design and establish large-scale corrective strategies where necessary.

C. Conservation measures: Where possible, the best plants shall make up the collection to reduce the need for special care. Good sanitation, weeding and other cultural practices shall be followed. Certain sub-areas within the collections may require higher maintenance.

Invasive Plant Removal Policy (See Appendix III)

Implementation of the Invasive Plant Removal Policy will be the primary responsibility of the Landscape Management Committee and the Plant Collections Committee. This committee will conduct periodic evaluation of the collections to track the effectiveness of this policy. Determining which plants should be added or removed from the target list (*Table 1*) will also be the responsibility of the Plant Collections Committee.

Risk Management

Trees are inspected routinely for signs of disease and damage. Those nearest to high value targets are monitored more frequently. Hazard tree evaluation should be conducted by a Certified Arborist (International Society of Arboriculture [ISA] or equivalent) with Tree Risk Assessment Qualifications (TRAQ) training. Arboretum and Grounds staff will always be alert to potential hazard trees on College and Arboretum property and will bring such trees to the attention of the Arboretum Director or Supervisor of Grounds, depending on location.

References

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Leadlay, Etelka and Jane Greene, eds. *The Darwin Technical Manual for Botanic Gardens.* Botanic Gardens Conservation International, London, U.K. 1998.

Tolmach, L. et al. *Collections Policy: The Basics*. The Public Garden. Fall 1986.

In addition to the above works, we consulted and borrowed from Plant Collections Policies of several arboreta and public gardens including Arnold Arboretum of Harvard University, Holden Arboretum, Morton Arboretum, Morris Arboretum, Polly Hill Arboretum, Rancho Santa Ana Botanic Garden, and Smith College Botanic Garden.

Coates, D.J., Byrne, M. and Moritz, C., 2018. Genetic diversity and conservation units: dealing with the species-population continuum in the age of genomics. *Frontiers in Ecology and Evolution*, *6*, p.165.

APPENDIX I: Definition of Terms/Glossary

To avoid confusion with other uses of terms for collections at Connecticut College Arboretum, the following definitions are provided as they pertain to this document:

Accession - the unit for a single collection. For the Plant Collection, this may represent a single plant clone, a subset of a population of plants that share the same collection method and date, a seed collection from a single plant, a seed collection from a population, etc. Under no circumstances are different materials combined in a single accession: seeds, cuttings, divisions, whole plants, etc. are always separate accessions.

Accession Number - the number assigned to a single accession. It is composed of the year the plant is entered into the system, followed by a sequential number for that year. In the case of accessions with more than one individual plant, a capital letter, called a qualifier, is sequentially assigned to each plant. Example: 2013-11A.

Cultivar - a plant under cultivation that differs from other members of the same species in one or more significant characteristics. A cultivar may be derived from an abnormal individual in the wild, be developed through hybridization or be selected under cultivation. It is maintained in cultivation primarily through vegetative propagation or by selection because of its unique characteristics. Cultivar names are capitalized and should be placed within single quotation marks or preceded by cv. (abbreviation for cultivar). They are not underlined.

Cryptic species - a complex of closely related organisms with similar phenotypes that show genetic diversity but lack sufficient characters and evidence to warrant species delineation.

Curation - the process of managing a collection to ensure its preservation and perpetuation, guide its development, ensure its documentation, and facilitate its enhancement.

Ecosystem services - Ecosystem services include carbon sequestration, water catchment, stormwater runoff mitigation, chemical and particulate pollution reduction in the air, soil and water, reduction of the heat island effect, etc.

Accessioning - the process of adding specimens to the collection. This process includes assignment of a unique reference (accession) number and entering its collection information in BG-BASE(our computerized database). Accession information for all collections is maintained in perpetuity.

Deaccessioning - the process of actively removing an accession (or a portion of an accession) from the Plant Collection. The data about these deaccessioned plants will be maintained in perpetuity.

Infra-specific - taxonomic delineation below the species level often referring to varieties and sub-species and cultivars originated from a single species.

Seed (or **Seeds)** is inclusive of all types of seeds, pollen, and spores.

A **taxon** (plural, taxa) - a unit of any rank within the taxonomic hierarchy (e.g., family, genus, species, variety, cultivar).

Plant Collection - composed of all accessioned plants. These include: A) all wild documented collections of plants from Eastern North America; B) all cultivars of, or involving, plant species native to Eastern North America; C) all other accessioned plants. All Plant Collection accessions should have voucher specimens on file in the Connecticut College Herbarium.

Pteridophytes - ferns and their allies including horsetails and club mosses.

Wild Documented Collections are collected propagules (seeds, cuttings, divisions, spores, small plants, etc.) from wild populations of plants or from an individual plant for which information (documentation) has been recorded on a field record and herbarium voucher specimens have been collected.

Reference consulted

Much of this section (APPENDIX I) came from the Rancho Santa Ana Botanic Garden's Living Collection Policy.

APPENDIX II: Collections Inventory Protocol

Introduction

This document outlines all procedures that shall be used to conduct inventories of the Arboretum's plant collections and nurseries in a successful, timely and efficient manner.

Purpose of a Collections Inventory

Plant accessions change dramatically throughout their existence, making living collections particularly dynamic. Therefore, it is necessary to inventory plant collections on a regular basis. Such inventory is a valuable tool because it allows for:

- updated, accurate and meaningful plant records
- the production of valuable plant data relating to growth rates, growth forms, hardiness, phenology, and insect problems
- pinpointing areas of concern, including:
    - plant record discrepancies
    - plant identification discrepancies
    - accuracy of collection maps
    - missing or stolen plants
    - missing or damaged accession and display labels
    - accessions that are in need of maintenance
    - specimens that should be deaccessioned
    - accessions that are in need of replacement
    - plants that should be acquired

Components of a Plant Collections Inventory

An inventory proceeds in six major steps:

- orientation and preparation
- field checks
- accession label production
- label mounting and follow up field checks
- updating/editing computer and accession records notebooks
- collection map updating

Orientation and Preparation

For those who are not familiar with the plant collections, the first step in an inventory is to become fully acquainted with all aspects of the collections that are to be inventoried. This includes all collection areas, sub-areas and their corresponding location codes.

The person whose duty it is to inventory the plant collections should become familiar with the use of BG-BASE. BG-BASE is a database application specifically designed to

manage a wide variety of biological information. A BG-BASE user manual and orientation sessions conducted by the Director of the Arboretum or another knowledgeable staff member will aid in this process.

One should become familiar with the format of the accession records notebooks and the accessions contained within them, as well as the card file system used until the early 1980s to document accessions. It is these records, along with the computerized plant records, that are used to verify questionable accession numbers and other plant record discrepancies.

Before the field checks are conducted, BG-BASE inventory reports should be prepared which group accessions by their current location. These lists represent all the specimens in a given area that need to be located during the inventory.

The following materials and equipment are available for field checks and mapping:

- Field equipment:
  - field maps and corresponding computer lists
  - clipboards
  - DBH measurement tape
  - cloth tape measure for measuring shrub width
  - hand-held computer (mobile device) with software for data entry and access to data that has been downloaded from BG-BASE
  - hand lens

- Taxonomic equipment for lab:
  - dissecting microscope and light
  - dissecting probes
  - appropriate taxonomic literature and keys

- Labeling equipment
  - laser engraving machine
  - anodized aluminum accession labels
  - supply of 2 - 2.5 inch stainless steel screws (for accession labels)
  - supply of 3 inch stainless steel screws (for display labels only)
  - large reel of pure copper wire (for accession labels)
  - hammer
  - crow-bar
  - wire cutters
  - pliers and/or nail pullers

- Mapping Equipment
  - GPS unit
  - computer with GIS mapping software

Field Checks

During an inventory, all specimens listed as 'alive' in the plant records must be located in the collection, and relevant accession information must be obtained for each accession. The accession information required for each specimen includes the following:

- location of accession
- condition of accession
- size
- accession label verification
- display label verification, when present
- comments and maintenance needs

Accession labels are usually located on the north side of each plant. If a pathway runs close to the north side of a specimen, then the accession label should be located on the side opposite the pathway.

A field check data sheet should be created to record and organize accession information. In addition, the date of a field check and the area where it was conducted should also be recorded on this data sheet.

The following code system should be used to rate the condition of each specimen during field checks:

E = excellent
G = good
F = fair
I = Indistinguishable
P = poor
R = removed
U = unable to locate
Q = questionable
A = alive
D = dead

Measurements

For trees, diameter at breast height (4.5' above ground level) is measured using a DBH tape. Currently, centimeters are the units of DBH for all the collections. If a tree is multi-stemmed, record the DBH of the individual stems. For shrubs, record the height and spread using meters as units. Some accessions may be clumps or clones containing several stems In this situation, record the number of stems, as well as the height and the spread of the clone or clump. If a plant has had one of its main stems or trunks removed, be sure to record this information onto the data sheet.

Mapping

While inventorying a given area, the accuracy of the field maps should be evaluated. Eventually, all field maps generated from an inventory will be used to update the GIS collection area maps. Are the accessions and other landmarks mapped properly? If a specimen is dead, or removed, is its accession number crossed off the field map? Are there any significant landmarks which are not mapped?

To map an accession, place a small 'x' on the map to designate where the specimen is located, and clearly write its accession number near the 'x'. Be sure to record an accession's position on a map in relation to the plants around it.

For mass plantings, outline the perimeter of the mass planting with a neat dashed line. Next, within this dashed area, use each specimens' accession number qualifier (a letter given to an individual plant of an accession) to designate where each plant is located. Then, place the accession number for the planting within or near the dashed line. For denoting the spread of large clones and spreading plants, use complete lines.

Consistency is best achieved when field checks are conducted sequentially. Only when inventorying has been completed in one area should the field work advance to a new location.

Misidentified plants

There may be an accession which is misidentified in a collection area. If so, the specimen's true name must be determined. On the field data sheet, note that a new accession label will have to be made. If the plant’s identity cannot be arrived at through inspection, collect plant material to be used to key the specimen to its accurate name. Once the identification is complete, update, with the correct name, the accession record notebooks, BG-BASE, and GIS.

If the identity of the plant cannot be determined, record on the field data sheet that this accession needs to be identified. Indicate this in the accession record notebooks. Also, document any characteristics of the collected plant material which may aid in keying this plant in the future. At a later date, the names for those accessions which were misidentified need to be changed to their correct ones in the Names Table of BG-BASE. For those plants whose identities remain unknown, their specific epithet needs to be changed to ‘sp.’

Plants with missing, girdling, or damaged accession labels

A label may be missing on a plant, girdling a specimen, or in need of replacement. Record this information on the field check data sheet.

If the accession label wire is girdling the stem of an accession, remove the wire and re-apply the accession label onto another stem. Make sure the loop formed by the accession wire is large enough to prevent girdling in the future.

If the accession label is missing, refer to the collections area map to verify the plant's accession number.

Accessions which are not mapped

If an accession is not found on the location area map, check the accession label on the plant and verify if the specimen is listed on the inventory list. Also verify that the label is on the correct plant. If it is, map the specimen.

If a specimen is found in the field that has an accession label, but is not on the computer list, nor is it indicated on the collections area map, map the accession number as indicated on the label, record the accession number and name of the plant on the data sheet and document this problem on the field data sheet.

Using the accession number of this plant, search for the corresponding entry in the accession records notebook. If a corresponding record cannot be found, and the plant does not exist in BG-BASE, then the accession history of this plant will never be known. In this case, use the number found on the accession label to create a record for the specimen in the accession records notebook. Then enter this plant record into BG-BASE.

If a record is found, verify whether the accession information stated in the record corresponds to that of the specimen in the field. For instance, do the name, location and relative size of the plant correspond to the information stated in the accession records notebook? If the record matches, enter it into BG-BASE and record on the field data sheet that the status of this accession has been verified.

At times, a record may be found that matches the plant in the field in all respects, except for the location. This can occur, for instance, if an accession was moved, and then subsequent amendments documenting this change did not take place in the plant records. In this situation, one usually needs to amend the record by simply recording the present location of the specimen. However, the previous location referred to in the record should be visited to verify whether or not two or more specimens having the same accession number exist in the plant collection.

If this is the case, then the two accessions were most likely given the same accession number qualifier (the letter given to individual plants within an accession) when they were accessioned. To correct this problem, arbitrarily set the accession number qualifier of the original plant being inventoried to the next available qualifier within that accession (e.g. if both are *'A',* assign to one of them the next unused letter).Then be sure to seek approval for this change from the Arboretum Curator and record the change in both the accession records notebook and in BG-BASE.

Plants with a questionable status

During a field check, a plant may be found that has no accession label, is not mapped and is not present on the BG-BASE Inventory Report. This presents a difficult situation. It is possible that this plant has been accessioned in the past. In order to keep track of the plant during the inventory, the specimen must be identified and given a temporary accession number. The next available accession number for that year is an acceptable temporary number. Record this information on the field data sheet and record the temporary accession number on the field map. In addition, clearly describe this situation on the field data sheet.

Because the plant does not exist in the computer records, one must rely on the accession records notebook to trace its history. Ask the Arboretum Director, Curator, or Horticulturist about the plant. They may know about its history and/or when it was planted. This could narrow the search in the accession records notebook.

Search for an entry that has a description which matches that of the plant in question. Because the accession number and the history of this specimen is being sought, it is important that the "accession information required" on the field data sheet correspond to the information in the accession records notebook. It should be noted that the size and age of the specimen must be consistent (i.e. probably not smaller in size) with the description in the accession records notebook. If a match can be made with complete certainty, then enter the record into BG-BASE and record on the field data sheet that the history of the plant is no longer in question.

If no match can be found, then the history of this plant cannot be determined with any accuracy. The temporary accession number then becomes permanent. Be sure to document this situation in the accession records notebook in case new information becomes available in the future.

Accessions in Groupings

At times, multiple individuals of an accession are grouped together, particularly ground-covers like: *Zanthorhiza simplicissima,* and *Arctostaphylos uva-ursi*. With time, the individual plants of these larger accessions may become indistinguishable from one another, and therefore impossible to inventory as single plants. If individual plants become indistinguishable, eliminate the use of the accession number qualifiers, and regard the grouping as an accession containing many plants. Be sure to make the appropriate changes in both the accession records notebook and in BG-BASE.

APPENDIX III: Invasive Plant Removal Policy

Adopted Dec. 2005, Updated 2017
Plant Collections Committee

Invasive plants are defined as those plants that escape from cultivation, or their original location, and spread relatively rapidly without human assistance. Spread may be by vegetative or sexual reproduction. These plants are usually exotic, non-native species, although this depends on the definition of native.

It is the intention to manage invasive plant populations with the goal of complete eradication when possible and practical, and of maintaining low, controlled levels of invasives if eradication is not practical.

Implementation of the policy is based on the following considerations:

1. Location of the infestation – removal from cultivated landscape settings is a higher priority than minimally managed or wild locations.
2. Invasiveness of the species – Plants known to be extremely invasive are a higher priority.
3. Resources available – Invasive removal is often very labor intensive and the limitations of staff numbers and budget levels must be considered.

An Integrated Pest Management approach will be used in invasive plant management. Control procedures will be based on an understanding of species biology and ecology, and mechanical and "organic" methods will be evaluated before herbicides are used. Herbicides will be used in strict conformity with state and federal law. Only the most selective herbicide application technique that is deemed effective, and the lowest effective concentration of chemical, will be used.

Since our natural areas have been the location of long term ecological research for many decades, some of which monitor the spread of invasive plants, invasive plant control must occur on a case by case basis, and include consultation faculty who may utilize the area in question for research or teaching.

See Arboretum Conservation Policy regarding Natural Areas.

TABLE I: Plant Lists

Plants to be Targeted for Removal

The following species should not be distributed from the Arboretum and should be considered for removal from some or all areas of the Connecticut College Arboretum because of their demonstrated invasive qualities. These lists should also assist in determining species that should not be offered for sale or distribution, however, these lists are by no means complete or sufficient for that purpose. Additional species may be added as needed. Monitoring the collections and determining which plants should be added or removed from the following lists will be conducted by the Plant Collections Committee.

Acer ginnala
Acer platanoides
Acer pseudoplatanus
Ailanthus altissima
Amorpha fruticosa
Ampelopsis brevipedunculata
Berberis thunbergii
Berberis vulgaris
Celastrus orbiculatus
Eleagnus umbellata
Euonymus alatus
Ligustrum vulgare
Ligustrum obtusifolium
Ligustrum ovalifolium
Lonicera x *bella*
Lonicera japonica
Lonicera maackii
Lonicera morrowii
Lonicera tatarica
Lonicera xylosteum
Morus alba
Paulownia tomentosa
Populus alba
Pueraria montana
Rhamnus cathartica
Rhamnus frangula
Robinia pseudo-acacia
Rosa multiflora
Rosa rugosa
Rubus phoenicolasius
Sassafras albidum

Species that should be watched for invasive tendencies:
Acer pensylvanicum
Eleagnus angustifolia
Halesia carolina (syn. *H. tetraptera*)
Hibiscus syriacus
Ilex opaca
Photinia villosa
Taxus cuspidata

APPENDIX IV: Sustainable Standards of Care

Reduce the need for supplemental watering.
- Water is a finite resource that will only become more valuable as time goes on.
- Emphasize plants that require little or no supplemental water to survive after establishment.
- Group together plants with similar water needs.
- Zone plants according to natural moisture requirements.
- Practice tough love: be willing to let plants die if they can't survive in the moisture zone where you've placed them.
- Use drip and other low-output irrigation systems in place of high-volume spray heads.
- Keep turf-irrigation to a bare minimum and avoid permanent in-ground sprinkler systems.
- During droughts raise the cutting level of lawnmowers to between 2 and 3 inches. This causes less stress and encourages deep root growth.
- Practice soil and water conservation. Stabilize slopes with natural plantings, mulch around plants, and install drought-tolerant species.

Reduce reliance on fertilizers, herbicides and pesticides.
- Nitrates in streams and groundwater are often traced to misuse of fertilizers.
- A vast palette of plants are available that require no supplemental fertilizing.
- Use native plants. Since they have adapted to local conditions, they are more resistant to pest problems.
- Organic-based and green fertilizers are wise alternatives.
- Many common pesticides do more harm than good. Reduce the use of pesticides and practice integrated pest management instead.
- Insects and pathogens are a natural part of the ecosystem and should be tolerated as much as possible.
- The vast majority of insects and pathogens are benign to most healthy plants and landscapes.
- A wide variety of organic pesticides are available and should be favored over chemical pesticides.

Eliminate the negative consequences of turf-grass maintenance.
- Mower and trimmer damage, excessive irrigation and misuse of pesticides in relation to lawn care are widespread and common problems in the landscape.
- Reduce use of turf. Where possible, replace high-maintenance turf with lower-maintenance alternatives or landscape plantings.
- Where lawns are needed, follow best management practices to reduce harmful impacts and use composting mowers.
- Most turf grass species do not grow naturally under trees - especially where shade is heavy. Mulch it, or plant shade tolerant perennials and ground covers. The trees will be much healthier.

Maintenance Recommendations

1. Keep the mowers and string trimmers away from trees and shrubs. Mower blight causes more harm to young trees than most insects and diseases.
2. Mulching is beneficial when done properly. Trees and shrubs should be mulched with a layer of organic material (wood chips typically) three to four inches deep and in a five to six foot diameter circle around the trunk (or to the drip line). Avoid burying the base of the trunk in a deep pile of mulch. Trees and shrubs in groups should be mulched together in one large bed. Mulching should be considered a yearly and ongoing activity.
3. Use only organic materials for mulch. Avoid the use of rock mulch as it reradiates heat back onto the plants.
4. Compost and mulch on site. Generate free mulch: a soil additive that can replace the need for most fertilizers.
5. Plastic weed barriers and edging are often unnecessary and can cause more problems than they solve. Never use plastic sheeting as a weed barrier since it prevents the exchange of important gasses in the root zone.
6. Don't over-prune. There is no law that says all trees must be single-stemmed or pruned to eight feet above the ground. The natural growth habit of trees and shrubs should be considered when pruning. Leave lower branches on evergreens unless there are visual/safety issues that need be addressed. Leave lower branches on young deciduous trees until they are well established in the landscape.

Reference Consulted:
STANDARDS & GUIDELINES, PRELIMINARY REPORT. The Sustainable Sites Initiative, 1 Nov. 2007.

APPENDICES V - VIII are not published online.
Please contact the Arboretum office for more information.

APPENDIX V: Policy on Commemorative and Memorial Gifts

Revised and implemented spring 2021
Connecticut College Office of Advancement

Overview:

Connecticut College's long and rich history as an Arboretum campus holds significance and nostalgia among alumni, parents, and friends. The College is pleased to work with individuals who wish to establish a physical expression of those feelings in honor of or in memory of an individual or a group of individuals, or to commemorate an event, such as a reunion year. Commemorative and memorial gifts are a thoughtful way to recognize a student, parent, faculty or staff member, or a group of individuals, such as a class year or an academic department. Such gifts also enrich the College's campus aesthetic and beauty.

The following policies and procedures apply to naming opportunities associated with physical memorials.The director of donor relations is the initial contact for an individual who wishes to inquire about a physical memorial. As with all gifts to the College, the director works with the donor(s) to ensure proper crediting, an appropriate tribute, and donor satisfaction.

Administration:

The director passes the request to the Arboretum Collections Committee (director of the arboretum, horticulturist, curator and the grounds supervisor) regarding the details of the request. The committee offers choices for the selection and placement of the item (trees and benches) or potential sites and designs (memorial garden) and wording for accompanying plaques. The director of donor relations then contacts the donor to inform them of the selection of tree, bench, or garden and possible locations, and to determine the wording for a plaque, if appropriate. Once these details are finalized, the Director of Horticulture oversees the installation and maintenance of the item and related plaque. The donor may be invited to the planting or installation, or to come view the item once planted or installed.

The director of donor relations also will inform the donor of the cost for the requested item. This information is shared up front to ensure that the prospective donor understands the financial commitment. This approach is appropriate especially when the prospective donor expects to solicit funds for the item with gifts from a group of donors whose level of financial commitment is unknown at the time the inquiry is made.

The Collections Committee maintains a listing of campus locations where commemorative or memorial trees, benches, or gardens are appropriate in keeping with the College's overall master plan. It is important that any memorial designations fit appropriately into the overall physical environment of the campus, are installed in sites free of underground utilities, and are placed in areas where future construction is not anticipated.

The College reserves the right to move physical memorials should the need arise. Every effort will be made to contact the donor(s) to discuss the need to change the location and to appropriately relocate the memorial.

Gift Criteria:

Commemorative or memorial gifts may be given in honor or in memory of alumni, students, faculty, staff, or friends of the College. The College does not accept memorials given in honor of pets, projects, issues, anniversaries or birthdays. Connecticut College cannot allow the spreading, burial or interment of any remains on campus.

Pricing Structure for Commemorative or Memorial Gifts:

The following costs include the price of the tree or bench, design fees, delivery, site preparation, installation, and perpetual maintenance.

Commemorative or Memorial Tree: $5,000

Trees are selected by the Arboretum Collections Committee, which suggests a few areas of the campus and the varieties of trees that are appropriate. The College will work closely with the donor(s) to select the most appropriate area on campus. The selection may be an existing tree on the campus or a new tree.

The tree is identified with a 4" x 5" recognition plaque affixed to a wooden mounting post. Language on plaques is kept simple and brief. The common and botanical tree names are included in all such plaques. The director of donor relations works with the wishes of the donor(s) to include a brief but meaningful inscription as well as with Arboretum Curator to ensure design consistency and continuity. The director sends the donor a mock-up of the exact wording for his or her approval.

Delivery and installation of the tree and associated plaque varies with the seasons. Normally trees may be planted during spring and fall.

Commemorative or Memorial Granite Bench: $10,000

The bench site and style are selected by the Collections Committee, in consultation with the director of donor relations and the donor(s), to ensure a consistent aesthetic on the grounds of the campus. A simple inscription is engraved on the bench.

Delivery, inscription and installation of the bench normally takes 2 months.

The College does not offer the option of a metal or wood bench and does not accept donated benches.

Commemorative Garden: $100,000 + cost of implementation ($30,000-100,000 and up)

The site and plan are selected by the Collections Committee, in consultation with the director of donor relations and the donor(s), to ensure a consistent aesthetic on the grounds of the campus. A simple inscription is sandblasted on the bench.

Gift Processing:

Trees and benches:

Trees and benches require outright gifts paid either in full or pledged over one fiscal year. The minimum gift amounts ($5,000 for a tree, $10,000 for a bench) must be received by the College before the order for the item and any associated plaque may be placed.

Donations are processed by Advancement Services and are acknowledged for tax purposes with a written receipt.

Commemorative gifts may not be credited to the Connecticut College Annual Fund since they are by definition restricted, rather than unrestricted, gifts.

Physical memorial gifts are credited to the College's Living Gift Program. Advancement Services splits each gift between two designations; 50% is credited to a current-use restricted fund, and 50% is credited to an endowed fund. The money in the current restricted fund is used to purchase and plant the tree and to create a plaque, or to purchase and install the bench and carve the inscription. The money in the endowed fund generates annual income (spend rule distribution), which is used to care for the upkeep and maintenance of the tree or bench in the future.

The gift designations and fund numbers for physical memorials are:

Living Gift Program: BELIVINGGFT, 225080

Endowed Living Gift Program Fund: EPLLIVING, 625060 (spend rule distribution is credited to 275060)

Related expenses should be charged only to the current restricted gift fund (225080) or the endowment distribution fund (275060) using the account code that is appropriate for the expense.

Memorial Gardens:
Installation costs for memorial gardens must be outright gifts paid either in full or pledged over one fiscal year. This gift must be received by the College before the order for plantings in the garden and any associated plaque may be placed.

The endowed fund for perpetual maintenance of the garden can be pledged over up to 5 years.

Donations are processed by Advancement Services and are acknowledged for tax purposes with a written receipt.

Commemorative gifts may not be credited to the Connecticut College Annual Fund since they are by definition restricted, rather than unrestricted, gifts.

Two new funds should be established (with signed gift agreements signed by the donor): a restricted current use fund for installation / implementation costs, and an endowed fund for perpetual maintenance of the garden.

Stewardship Plan:

Gifts of $25 or more that are made in honor of an individual are acknowledged by Donor Relations to the honoree. All gifts made in memory of an individual are acknowledged to the memorialized individual's family to the extent possible.

Donor Relations provides donor(s) with photos of the item / site and plaque, if applicable, as soon as possible after installation. In addition, if appropriate and upon request from the donor(s), Donor Relations will plan a dedication program in consultation with other appropriate offices (e.g., Chaplain's Office, College Relations). As some species are best planted in specific seasons, the timing for a dedication service may be dictated by the optimal planting or installation period.

The donor relations team maintains an inventory of most items and spaces — including trees, benches, artwork, athletic areas, gardens, rooms, and entire buildings — on the Connecticut College campus that are named either a) in honor or memory of an individual, a group of people, or an event, or b) in gratitude for a gift from (a) donor(s). The inventory of these named spaces includes, where applicable and possible, the type of item or space, campus location, donor(s), class year(s) represented, the text that appears on associated signage, and the location of the folder in which a photograph of the space or item can be found.

Memorial Longevity:

The College will make every effort to maintain a memorial or commemorative item or site for the full length of the given material's life.

If a bench becomes unsafe or unacceptable from an aesthetic or safety standpoint, the College will inform the donor(s) that it will be removed and either relocated or replaced with a similar one.

Memorial trees have a defined lifespan of 25 years, although depending on the individual tree species selected, it could grow for many decades longer. Every effort is made to plant trees in locations that will not be impacted by future construction or development. Should a tree decline before its lifespan and require removal, the donor(s) will be informed and presented with a new planting location and tree selection.

Memorial gardens, in their original design, have an intended lifespan of 25 years, although depending on the site and design, the original elements may be in place for longer. Every effort is made to implement gardens that can be maintained in its original design for at least the 25-year lifespan. Should the garden decline before its 25-year lifespan and require changes, the Collections Committee will choose new plantings and design elements aligned with the original intent. Should a garden decline and require substantial changes after 25 years, donor(s) will be given the opportunity to make a gift (consistent with the Commemorative and Memorial Gift Policy at that time) to fund a new design and implementation of the garden. The endowed fund will support the named garden in perpetuity.

Maintenance of named gardens is an important aspect of land stewardship at Connecticut College and requires perpetual investment. When existing gardens are impacted by ongoing campus changes, every effort will be made to notify donors and/or families of those memorialized or commemorated, and to give them the opportunity to make a gift (consistent with the Commemorative and Memorial Gift Policy at that time) to fund a new design and implementation of the garden.

Gifts for Large Scale Memorials, Buildings and Other Physical Spaces:

The College offers opportunities for more substantial giving for physical memorials. For example, donors may wish to establish an endowed or current-use fund for the creation of a garden within the Arboretum. Such funds support specific areas of interest.

Individuals who are interested in larger capital projects or endowed gifts may contact the director of leadership gifts for further information.

Donors whose gifts allow for the naming of buildings or physical spaces will be recognized appropriately at the site, based upon the overall design determined for that location, in connection with the individual gift.

APPENDIX VI: Invasive Plant Species: Voluntary Codes of Conduct for Botanic Gardens & Arboreta

Endorsed by American Public Gardens Association, February 2002

The Connecticut College Arboretum adheres to this voluntary code of conduct:

- 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.
- 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.
- 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.
- Seek to control harmful invasive species in natural areas managed by the garden and assist others in controlling them on their property, when possible.
- Promote non-invasive alternative plants or, when possible, help develop non-invasive alternatives through plant selection or breeding.
- 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.
- 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 those 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.
- 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.

- 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.
- Become partners with other organizations in the management of harmful invasive species.

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 VII: Native Azalea Collection Development Plan

Approved February 8, 2018

This Collection Development Plan defines the goals for the Connecticut College Arboretum **North American Deciduous Native Azalea Collection** and guides the manner in which it will be developed.

This specialized collection will be developed as an authority and an outstanding example in this collection type. The arboretum's efforts will be focused on materials with the highest significance that satisfy the goals set forth in this document.

Scope:
The scope of this collection includes all the deciduous *Rhododendron* species (azaleas) native to North America.

Goals:

1. Acquire and maintain a complete collection of the North American native azalea species. In 2018 there were fifteen out of the total twenty species. The five species needed to make the collection complete are: *R. eastmanii*, *R. canadense, R. albiflorum, R. pilosum* and *R. menziesii*.
2. Prioritize the acquisition of plants and propagules from known wild populations originating from appropriate regions of their native habitat.
3. In order to develop an outstanding collection, existing plants with poor or no documentation will be replaced by plants from documented wild collections. The short-term goal is to obtain at least one new wild-collected plant for each taxon. Over the long-term, multiple acquisitions from varying parts of their range will ensure broad genetic representation.
4. Prioritize adding species that are under-represented in the collection.
5. Verify the identity of all individuals in the collection.
6. Develop complete reference materials documenting the collection:
    a. Acquire digital accession level images of all individuals.
    b. Collect herbarium voucher specimens of each individual.
7. Enhance interpretation with online resources (web pages, ArcGIS Story Map), guided tours, and publications (maps and guidebooks) that expand the public's understanding of the value of native plants and botanical diversity.
8. Develop the collection in a meaningful way that dovetails with the coordinated efforts and goals of a larger collaborative, namely the Plant Collections Network.

The Arboretum strives to display a landscape that is visually appealing and collections that utilize the unique characteristics of our site, the ability of our staff, and needs of the college, as detailed in the Plant Collections Policy of the Connecticut College Arboretum.

Appendix VIII: Natural Disaster Plan

Approved as of 5/31/2018
Updated 8/1/2023

Connecticut College has a comprehensive Emergency Response Plan that is regularly reviewed and updated. The plan provides detailed information on responding to emergencies of all types, including natural disasters. The College is also in regular contact with first responders for the City of New London.

The College's internal emergency response team includes representatives from all relevant divisions and offices. Team members meet regularly and use training and tabletop simulations to improve their ability to respond to emergencies.

Connecticut College Emergency Numbers:

Campus Safety: **860-439-2222**
Environmental Health & Safety: **860-439-2252**
Facilities Management - Work Control Desk: **860-539-2253**
Emergency Weather Hotline: **860-439-5000**
New London Police or Fire: **911**

Specific information regarding severe weather and natural disasters can be found on the Environmental Health and Safety Department website:
https://www.conncoll.edu/offices/environmental-health-and-safety/emergency-response/severe-weather-and-natural-disasters/

Resources

- Arboretum staff contact list (verify safety and coordinate recovery after a disaster)
    - Maggie Redfern, Director 617-327-3683, 860-439-5060 office
    - Kraig Clark, Senior Groundsperson 860-625-7654
    - Jason Eklund, Curator 857-406-9576

- Clean-up effort (resource list of contractors/vendors)
    - Bartlett Tree Experts: Megan Kacenski 203-453-1357
    - Tomorrow's Trees: 860-848-8746
    - SaveATree: 860-395-0780

Hazards

- Hurricanes, severe thunder/lightning storms, tornadoes
- High winds
- Ice storms
- Fire

Mitigation Plan

Before hazardous event:

- Identify and preserve plants critical to the collection. Indicate Level 1 and Level 2 plants in the plant records database.

- Plant collections database and map records are backed up on a server daily, on an ongoing basis.

- High value accessions/collections mitigations: (Such collections include Rhododendron (native azaleas), Kalmia and Salix.)
  - Duplicate plants of listed, rare, unique, and high value in on-site and off-site locations (i.e. private gardens and other public gardens)
  - Collaborate with institutions with similar climate zones
  - Create reciprocity agreements
  - Utilize seed banks

- General plant collection mitigations:
  - Redundant collection plantings
  - Plant and seed sharing

- Reduce soil compaction damage by limiting access of heavy machinery.

- Keep approximately 10 yards of mulch on hand to minimize drought stress.

- Keep all chainsaws in excellent condition. Have extra sharpened chains, gas and oil always available.

- Prioritize salvage
  - Level 1
    - Federally Listed Species, State Listed Species, Candidates for listing
    - Rare plants from extirpated populations
    - High value collections
  - Level 2
    - Rare plants
    - Unique hybrids
  - Level 3
    - Labeled specimens
    - Plants of known provenance
  - Level 4
    - Unlabeled specimens
    - Plants of unknown provenance

Disaster preparation when storm is imminent:

- Hurricanes, severe thunder/lightning storms, tornadoes
  - Close and lock arboretum gates. Check events calendar, cancel events, drop/break-down tents so they do not become a hazard.

    - Cut power to systems that may be damaged by lightning strike.
    - Push 1 gallon and smaller containers together to keep them from blowing around in plant storage areas. Power off computers.
- High Winds
    - Check events calendar, cancel events, drop/break-down tents so they do not become a hazard
    - Push 1 gallon and smaller containers together to keep them from blowing around in nursery areas
- Fire
    - Know location of fire extinguishers in every building.
    - There is an emergency telephone outside of Buck Lodge.
    - Be prepared to call 911 and/or contact New London Fire Department 860-437-6340, Quaker Hill Fire Department 860-447-3333
    - Quaker Hill Fire Department has gate keys.

***After hazardous event**:*

- First priority is making the Arboretum safe for staff, volunteers, and visitors. Do not open collection gates until safety assessment is complete. Caution-tape off any areas deemed unsafe for entry until work can be done to make it safe.
- Before paths are cleared or heavy equipment brought in assess and document damage through photographs and notes; check on listed, rare, and unique plants important to the collection.
- Use best pruning practices and other horticulturally appropriate triage measures on damaged plants.
- Consider removal of level 4 plants.
- Some specimens have back up plants at other gardens to avoid total loss of an accession. Replace dead specimens from these sources if possible.

Mitigation Plan Responsibilities

- Team-based responsibilities
    - Arboretum Director initiates disaster preparation before an imminent disaster.
    - Director/Horticulturist will be responsible for safeguarding the highest priorities.
    - Director/Horticulturist will be the first person back on scene.
    - Director/Horticulturist/Curator are the initial recovery group that will immediately document damage and assess safety of the damaged area before others (especially volunteers) are let back in.
    - Horticulturist/Curator will assess the Azalea and other high priority collections
    - Other available staff can assess the rest of the woody plant collection, structures, and facilities/
    - Director communicates damage assessment to Dean of Faculty and VP for Administration and Finance.

Response, Mitigation, and Assessment

In the event of a natural disaster or severe weather (e.g., blizzard, heavy snow, ice, torrential rain, hurricane, or tornado) normal field check workflows and procedures are modified. Director, Curator, and Horticulturist are mobilized to conduct collections appraisals (field checks) that primarily quantify damage and propose action (e.g., pruning, removal, deaccessioning, re-propagation).

Damage assessments must meet institutional agreed upon standards and are typically customized to the weather event. Likewise, standardized database entries and best practice ensure reporting is timely and resource allocation is appropriately considered. A typical storm damage database entry/report contains six key elements: 1. Date 2. Name of storm or storm category (e.g., hurricane, ice, tornado, etc.) 3. Condition of plant (health assessment) 4. Accession number, if available 5. Recommended action 6. Assessor(s) names. In addition to the data, photographs will be taken for visual documentation of the damage.

Examples of field check notes made by horticultural staff after Hurricane Irene, August 28, 2011 include:

- AUGUST 28, 2011 HURRICANE IRENE - RECOMMEND REMOVAL – trees with more than 50% crown damage or large fissures in the trunk
- AUGUST 28, 2011 HURRICANE IRENE - MAJOR DAMAGE – trees with more than 25% to 50% crown damage
- AUGUST 28, 2011 HURRICANE IRENE - MINOR DAMAGE – trees with less than 25% crown damage

Examples of field notes cataloged by arborist and horticulturist after curatorial reports quantifying damage were distributed include:

- REMOVED – ACCESSION # (if available)AUGUST 28, 2011 HURRICANE IRENE –Not of accession quality after removing all storm breaks and deadwood.

Implement the Plan and Monitor Progress

- Keep the plan in a safe place (back-up in a shared drive).
- Engage all team members in the process.
- Training. Test the plan periodically.
- Evaluate the plan. Make changes as the collections change.
- Interagency coordination
    - Agreements with local, regional and out-of-region organizations and businesses that could help the garden prepare or recover if necessary.
    - Contact local university extension offices, and county agencies to find regional disaster research and planning materials for horticulture/arboriculture.
- Updates (performed January each year)
    - Review staff contact lists and responsibility designations.
    - Account for priority plants that were acquired or died.

- Have an annual review during the same week every year so that it becomes routine.
    - Do a "walk through" with local emergency responders, and or horticultural contacts to build relationships during this week.
- Test the plan and adjust accordingly.
- Evaluate the effectiveness of the plan after a disaster event.
- Communicate the disaster plan to new staff members.

Other Possible Threats requiring Mitigation:

- Theft/Vandalism Protection
- Herbivory Protection
- Drought
- Insects, Disease, and Invasive Species Protection

Threats Mitigations:

- **Theft/Vandalism Protection:** (primarily rough treatment by visitors)
  Members of the arboretum staff are often present or nearby during regular work hours. Campus safety officers regularly patrol on weekends and holidays. The Native Plant Collection is fully enclosed by a 10-foot high metal fence that is kept locked after dark. The Caroline Black Garden is also fenced, but not currently locked.
- **Herbivory Protection:** (primarily deer)
  Deer. The deer population (currently an estimated 5 deer in the Native Plant Collection) is monitored with wildlife cameras. Driving entrances are gated and equipped with cattle grates. Fences are patrolled to find and repair damage in a timely manner.
- **Extreme Drought Protection:**
    - Daily observations for new plantings and drought-sensitive plants
    - Protected by manual watering as required.
    - Maintain mulch supply.
    - Increase frequency of field checking for stressed plants.
    - Restart watering of plants that were installed up to three years prior to the event.
- **Insects, Disease, and Invasive Species Protection:**
    - Destructive insects and pathogens—routine observations. Mechanical and chemical controls as needed.
    - Invasive species—routine observations. Mechanical and chemical controls as needed.

- **Other Storm Events:**
    - Flooding—not a threat. Collection is not in a flood zone. Surrounding areas have surface and subsurface drainage in place.
    - Tree destruction—mitigated by redundant collection plantings. Proactive tree-work conducted to minimize effect.

Disaster Assessment Report (Sample)

Date:_____Assessor(s)Name(s):_____

Event (name of storm or storm category):

_____

Preparations:

_____
_____
_____

Effectiveness:

_____
_____
_____

Initial Damage report:

_____
_____
_____

Safety Assessment:

_____
_____
_____

Collections and Accessions assessments:

_____
_____
_____

Structures and Exhibit assessments:

_____
_____
_____

Salvage Priorities:

_____
_____
_____

Recommended Actions:

_____
_____
_____