ATLANTA BOTANICAL GARDEN PLANT COLLECTIONS POLICY

The mission of the Atlanta Botanical Garden is to develop and maintain plant collections for display, education, research, conservation and enjoyment.

PURPOSE

The purpose of this document is to define the development and management of the plant collections at the Atlanta Botanical Garden. Consistent with the mission of the Atlanta Botanical Garden, collections will be used for display, education, research, conservation and enjoyment.

The Plant Collections Committee shall be made up of the following staff members from the Atlanta Botanical Garden: (1) the Executive Director, (2) the Horticulture Director, (3) the Conservatory Director, (4) Plant Records Manager, and (5) Chairman of the Plant Collections Committee of the Board of Trustees. Curators and other staff members will be included on an as-needed basis.

The Plant Collections Committee is responsible for defining the development, growth, and maintenance of the plant collections. The Executive Director is responsible for the administration of the Plant Collections Policy. The Horticulture Director and Conservatory Director will implement the Plant Collections Policy.

The Committee will meet semi-annually and at the request of the President of the Board of Trustees, the Executive Director, or the Chairman of the Committee. This policy will be reviewed by the Plant Collections Committee every year before the annual March meeting of the Board of Trustees. Any revisions shall be recommended by the Committee and approved by the Board of Trustees.

ACQUISITIONS

Plants may be acquired for permanent collections by exchange, donations, gift, wild source collection, or purchase. Initiation of new collections must follow the guidelines of the policy and be approved by the Committee.

Gifts of plants and/or collections must be accompanied by documentation that plants were obtained according to ethical guidelines. Curators must get approval from supervisor for acquisition of gift collections. No restrictions by the donor may be placed on gifts of plants. The Atlanta Botanical Garden encourages all gifts of collections to be accompanied by sufficient endowment

funds for long term maintenance. The Development Department will be notified of all gifts to ABG. Gifts incorporated as permanent collections shall be evaluated with the other Living Collections; the Atlanta Botanical Garden has the right to deaccession such gifts. The Atlanta Botanical Garden cannot make monetary appraisals of gifts.

Plants obtained via exchanges with other gardens and institutions should meet the selection criteria. Exchanges shall be accepted under the approval of the Horticulture Director or the Director of the Conservatory.

The Atlanta Botanical Garden will not participate in plant loans.

All plants acquired must meet the goals, objectives, and collections philosophy of the Atlanta Botanical Garden and be in accordance with the selection criteria set forth in this policy.

SELECTION CRITERIA

1. The plant, collection, or garden must fulfill the mission of the Atlanta Botanical Garden.
2. Collections must adhere to guidelines and goals set for each facility or garden section.
3. Proper maintenance and care must be provided for the plant(s), collection, or garden in terms of staff, facilities, space and endowment; priority will be given to developing plant collections of highest botanical and horticultural quality that conform to selection criteria.
4. A comprehensive ranking system may be used to determine what plants should be included in plant collections. Every effort should be made to apply this system to key plant collections described in this policy. The ranking system will be used by curators and horticulturists to evaluate individual collections with primary focus placed on how each collection relates to the ABG mission (See Appendix 1 for scoring system). The system will not be used to compare one collection to another. This system will utilize the following factors:
    a. Relevance to:
        i. ABG Mission
        ii. Individual Collection Goals
    b. Rarity
    c. Ornamental Value
    d. Documentation
        i. Nomenclature

ii. Provenance
iii. Collection/Acquisition Data

e. Significance

5. Conservation priority should be based on rankings established by the following resources:
    a. In North America, as designated by conservation rankings determined by NatureServe and state Natural Heritage Programs in online database at www.natureserve.org (See Appendix 2).
    b. On a global basis, as designated by rankings determined by IUCN in online database at www.iucnredlist.org (See Appendix 2).
    c. Other relevant sources will be used for taxa that are not included in either of the above listed databases.
6. The Atlanta Botanical Garden will adhere to ethical principles in obtaining wild collected plants. Where appropriate, wild collected plants must be fully documented in accordance with government regulations. All plants within the collections will follow the Atlanta Botanical Garden Guidelines on Benefits Sharing and Protection of Genetic Resources (See Appendix 3).
7. The ABG will not aid, abet or encourage the destruction of any natural ecosystem(s), communities or populations in developing its plant collections.

THE GARDEN

The outdoor collections fulfill the purpose of the Atlanta Botanical Garden as an urban display garden with an educational focus. Emphasis shall be placed on cultivated plant families that are environmentally suited to the southeastern United States. Duplication of existing collections at other gardens in the southeastern United States should be avoided. Plants will be chosen with sustainable principles in mind to illustrate certain botanical, horticultural, architectural, or ecological principles.

The acquisition objectives and selection criteria pertain to the following Display Gardens/Collections at the Atlanta Botanical Garden.

1. Rose Garden: Plants should demonstrate the species and cultivars of landscape and old roses best suited to the Atlanta area. The Rose Garden will be designed with sustainable principles in mind.
2. Edible Garden: TBD to include vegetables, herbs, and fruits
3. Water Gardens: Will exhibit hardy and non-hardy aquatic plants of unusual ornamental merit.

4. Howard Border: Shrubs and perennials will be chosen which are of Asian origin.
5. Perennial Borders: Herbaceous perennials, ornamental grasses, and bulbs will be chosen to provide year-round interest, specific seasonal color schemes, to exhibit the diversity available to the public, and will be displayed to promote the best use of perennials in a landscape setting.
6. Fragrance Garden: Plants will be chosen to exhibit certain fragrance, tactile, or other features of interest to the visually impaired visitor.
7. A collection of hardy, ornamental vines
8. A collection of native carnivorous plant species, cultivars, and hybrids with companion plants, in a naturalistic setting for display and education.
9. A rock garden, incorporating dwarf perennials, shrubs, trees, ornamental grasses and bulbs.
10. A collection of hardy cacti and succulents including: O*puntia*, *Yucca*, *Agave*, *Sedum,* and *Echinocereus.*
12. A collection of hardy, species *Iris*, suitable for the southeastern U.S.
13. A collection of hardy palms and palms under evaluation for hardiness
14. A collection of dwarf and unusual conifers, including a wide range of genera and species to illustrate the taxonomic diversity within the cone-bearing plants and conifers under evaluation for hardiness and landscape potential. To include *Cryptomeria japonica* cultivars for landscape evaluation.

SOUTHERN SEASONS GARDEN
15. Camellia Collection: Plants will be chosen to display cold-hardy species and cultivars of Camellias of ornamental merit for the Atlanta area.
16. A collection of exotic ferns and native southeastern ferns

Horticultural display collections under development:
Herbaceous: *Arisaema, Asarum, Epimedium, Trillium, Hosta, Hedychium, Hibiscus, Crinum, Lycoris, Zephyranthes, Canna, Musa*

Woody: *Hydrangea, Hamamelidaceae, Illicium, Lindera, Osmanthus, Itea, Acer, Taxus, Cephalotaxus, evergreen Magnoliaceae*

CHILDREN'S GARDEN

The Children's Garden will include several gardens that will demonstrate certain educational principles, including:

1. Butterfly Garden: Plants will demonstrate both larval and nectar sources (shrubs, perennials, annuals and vines) to attract butterflies.
2. Native American Garden: Plants will represent those grown by the Creek Indians at the time of European settlement. Plants will be a source of shelter, medicine and food.
3. Grandma's Roots: Plants will demonstrate those brought to the United States by immigrants for food, medicine and ornamental value.
4. Everyday Plants: Plants demonstrate to children the utilitarian ways plants are use in
   life, including the bedroom, the bathroom and the kitchen.
5. Vegetable Garden: Vegetables will represent the variety of seasonal crops grown for food in the southeastern United States.
6. Carnivorous Plant Bog: A representative sampling of native southeastern carnivorous plants and associated companion plants.
7. Bird, Bee and Butterfly Meadow: Plants chosen will be used to demonstrate plant-pollinator interactions.

SMITHGALL WOODLAND GARDEN

Smithgall Woodland Garden provides the opportunity to develop significant Woody plant collections. Collections will be displayed in a landscape style and provide an aesthetically pleasing, beautiful, and educational experience for the visitor. Collections will be focused seasonally, and integrated with educational programs and special events.

Woody Plants

Winter:

Camellia and *Hamamelis*
Broad-leaved evergreens: *Illicium*, *Osmanthus*, *Aucuba*, *Daphniphyllum*
Shade-tolerant conifers: *Tsuga*, *Cephalotaxus*, *Torreya, Taxus*
Other Hamamelidaceae (*Corylopsis*, *Sycopsis*, *Sycoparrotia*, *Parrotia*, *Distylium*,

Parrotiopsis, Exbucklandia)
Ilex: deciduous and evergreen
Stachyurus
Daphne

Spring:
Magnolia – deciduous (non-native and native)
Viburnum
Native *Rhododendron* – species and cultivars
Cornus – species and select C. florida cvrs.

Summer:
Hydrangea
Stewartia
Clethra
Aesculus

Fall:
Acer – species
Native shrubs with fall color (*Rhus, Leucothoe racemosa, Itea, Lindera, Vaccinium, Hamamelis, Clethra, Aesculus, Hydrangea quercifolia*)
Callicarpa

Others:
Berberidaceae
Small understory trees: *Carpinus, Ostrya, Amelanchier*
Vine collection
Enkianthus

Herbaceous Plants

Winter:
Helleborus, Rohdea, Asarum, Disporopsis, Carex, Cyclamen, Heuchera, Pulmonaria, Arum, Epimedium, Dracunculus

Spring:
Spring ephemerals: *Trillium, Podophyllum, Mertensia, Claytonia*, etc.
Spring bulbs (perennial): Narcissus, Muscari, Ipheon, Crocus, etc.
Arisaema, Epimedium
Native *Iris*

Polygonatum, Tiarella, Disporum

Summer:

Begonia, Deinanthe, Kirengoshoma, Hosta, Hemerocallis, Ferns, Lobelia

Fall:

Tricyrtis, Aster, Solidago, Native grasses, Salvia, Liatris
Fall bulbs: Crocus, Cyclamen, Sternbergia, etc.

DOROTHY CHAPMAN FUQUA CONSERVATORY, ORCHID AND CONSERVATION CENTER

Tropical Collections

Tropical plants form a significant portion of the living collections at Atlanta Botanical Garden and continue to play a key role in the support and implementation of the ABG mission. The high diversity of species within the collections allow for the development of first class botanical displays for the enjoyment and education of the visitors, as well as a source of material for research, conservation, beauty, and education. These collections have national and international importance as a haven and reservoir for rare and endangered plant species. Future focus should be given to the development of collaborative conservation programs with international partners and the development of strong international links.

The tropical collections are housed and displayed within the following facilities:

Tropical Display Houses

The Dorothy Chapman Fuqua Conservatory

i. Front Lobby: Revolving displays of educational and ornamental collections.
ii. Tropical Rotunda: Wet tropics
iii. Desert House: Dry tropics
iv. The Orangerie: Ethnobotanical displays
v. Special Exhibits: Nepenthes

The Fuqua Orchid Center

i. Orchid Hall
ii. Orchid Display House

iii. The Tropical High Elevation House

Support Facilities

i. The Backup Greenhouses
ii. Tissue Culture Laboratory

Selection Criteria

Given the vast number of species that exist within the tropics, and the limited resources of ABG, criteria have been developed to manage the selection of species to be included within the tropical collections. The selection criteria are based around the following principles:

1. <u>Conservation-</u> The selection of these collections is made in accordance with biodiversity and conservation priorities as identified by the global conservation community. These collections have a strong educational value.

1.1 Tropical Conifers- Tropical conifers are of high conservation priority and are greatly underutilized as ornamentals. The focus of the ABG collection will be on tropical island species. Collections will be planted in the display houses for education and public enjoyment and some will undergo trials for use. The focus will include but is not limited to taxa from New Caledonia, Madagascar and New Guinea.

1.2 Palms- Palms are of high ornamental and economic value, many of which are considered threatened or endangered. The development of the collection will focus on but is not limited to those taxa of Old World tropical islands.

1.3 Cycads- ***:*** This ancient group of plants provides a valuable tool in the teaching of plant evolution as a component of the ABG education program. The collection will be developed to include representatives of the families *Cycadaceae, Zamiaceae,* and *Stangeriaceae*.

2. <u>Ecological Collections</u>- The collections are displayed as naturalistic plantings of true to life plant communities to form a 'snap shot' of a given habitat from a selected geographical region.

2.1 Old World Tropical Islands- A collection of plants from the Old World Tropical Islands of Madagascar, Seychelles, New Guinea, New Caledonia, Comoros, Mascarene , Hawaii, Fiji and Philippines.

2.2 Old World Desert Plants- A collection of plants to include the diversity of and adaptations to arid regions of the Old World especially the SW region of Madagascar, South Africa and Namibia. Plant families of interest in this collection include *Euphorbiaceae, Asclepiadaceae, Aloaceae, Aizoaceae, Apocynaceae, Crassulaceae, Welwitschiaceae, Orchidaceae, Pedaliaceae* and *Didiereaceae.*

2.3 Tropical high elevation habitat- A collection that features plants from areas in Tropical Asia and South America that range from 4000-10000 feet in elevation and with specific focus on the Andes Mountains, the Tepuis of S. Venezuela and Mt. Kinabalu in Borneo. These montane regions are characterized by high species diversity.

2.4 Epiphytes- A key component of the tropical forest, this adaptation has been adopted by representatives of many tropical families including but not limited to Araceae*, Gesneriaceae, Rubiaceae, Bromeliaceae, Commelinaceae, Orchidaceae*, *Melastomataceae* and *Ericaceae.* Representatives of all these groups are held within the ABG tropical collections.

3. <u>Plant Interaction -</u> Plant-animal interactions and plants of economic and horticultural importance are fundamental to our understanding of ecosystems. Plants have evolved a whole series of adaptations which give them the ability to survive and flourish in difficult environments

3.1 Carnivorous Plants- One of the most interesting adaptations is that of carnivory. This unique group of plants is of great curiosity to the visitors, particularly children. The collection of *Nepenthes* (*Nepenthaceae*) at ABG has great potential in displays and education. Currently the focus has been on the *Nepenthes* of Southeast Asia and *Heliamphora* of South America.

3.2 Ant Plants As fascinating but less known than the carnivorous adaptation is the symbiotic relationship that has evolved between plants and various insects such as ants. The tropical collections at ABG house a wide range of species which exhibit this adaptation. Some examples at ABG include species from the genera *Myrmecodia, Hydnophytum, Dischidia, Monolena, Acacia* and *Hoya*.

3.3 Ethnobotanical Species- Man's relationship with plants is always of great interest to the visitor. The collection of plants of economic and ethnobotanical value at ABG is growing and has become the focus of the Orangerie which houses some 30 of the most important species used by humans.

4. The Orchid Collection

The permanent collection will consist of species orchids, as they best support the Garden's commitment to conservation and to conservation education. Artificially created hybrid orchids will be used for temporary display and will not enter the permanent collection. The overall collection will reflect the diversity within the Orchidaceae. Within the family, certain sub-collections will be selected for more intensive development, based on their strength as contributors to the Garden's mission. Within sub-collections that have research or conservation value, priority will be given to plants of documented wild source. The sub-collections include, but are not limited to, the following:

4.1 Euglossine bee-pollinated orchids A taxonomically diverse group with educational display potential and ornamental display value. One of the strengths of our current collection is its research value. Many plants are of documented wild origin. The group includes:

Stanhopeinae (esp. Stanhopea, Gongora, Lycomormium, Paphinia, Coryanthes)
Catasetinae (Catasetum, Cycnoches, Clowesia, Mormodes)
Zygopetalinae (Huntleya, Pescatorea)
Lycastinae (Anguloa)
Vanilliane (Vanilla)

4.2 Orchids of Madagascar The primary role of this group is educational—in conservation education (by addressing the impact of habitat destruction on orchids) and in interpretation of orchid-pollinator relationships. A secondary role is ornamental display.

4.3 Paphiopedilum species have ornamental value. Some have the potential to carry a strong conservation message to visitors by focusing attention on the impact of overcollection on orchid populations.

4.4 Phalaenopsis is genus with display and conservation potential. Phalaenopsis species are a genetic reservoir for modern hybrids used in commercial trade. ABG has entered a partnership with the International Phalaenopsis Alliance to build a comprehensive collection of species Phalaenopsis at the Fuqua Orchid Center.

4.5 Laelia is genus whose purpose within the collection is aesthetic and educational. Many of the species, particularly L. purpurata varieties, are underutilized in the US.

4.6 Dendrobium is an exceptionally diverse genus with display and educational interest.

4.7 High Elevation House The Tropical High Elevation House will house montane species from three geographical regions: the South American Andes, the Venezuelan tepuis; and South East Asia, especially Mt. Kinabalu. A broad sampling of the flora will be displayed in order to convey the great diversity that is characteristic of these areas. The collections will include high elevation carnivorous plants, epiphytic Ericaceae and orchids. Within the Orchidaceae, the following genera will be emphasized: Dracula, Masdevallia, Scaphosepalum, Odontoglossum and Dendrobium.

CONSERVATION COLLECTIONS:
These collections are part of the overall collection, to illustrate specific current projects of the conservation and recovery of endangered species.

1. *Nepenthes*: Safeguarding of genetically important documented plants in ABG laboratory (collaborative project with other TC labs)
2. *Torreya taxifolia*: Originally cooperative agreement with CPC, now DNR and GaPCA
3. *Sarracenia*: The three federally listed species: *S. oreophila*, *S. alabamensis*, *S. jonesii*. Includes contracts with DNR and US F&WS and The Nature Conservancy in Alabama, North Carolina and Georgia.

4. *Macranthera flammea*: Develop propagation protocol and TC.
5. *Schwalbea americana*: " " " " " " (including contract work for recovery of the species in New Jersey).
6. *Balduina atropurpurea*: Ft. Stewart.
7. *Helonias bullata*: Mountain bog restoration with DNR, TNC.
8. *Sarracenia purpurea* ssp. *venosa* var. *montana*: Mountain bog restoration.
9. *Kalmia angustifolia*: Mountain bog restoration.
10. *Pinguicula primuliflora*: Tissue culture
11. *Rhus michauxii*: DNR, TNC
12. *Scutellaria montana*: DNR, TNC
13. *Elliottia racemosa*: Tissue culture, Ga PCA
14. *Tsuga caroliniana*: USFS, US FWS
15. Native orchids: *Spiranthes parksii*, *S. delitescens*, *Platanthera integrilabia*, *P. blephariglottis* var. *conspicua* and *Cypripedium*. Tissue culture.
16. *Dicerandra radfordiana*: DNR, TNC

ACCESSIONING\PLANT RECORDS

All plants in the Living Collections will be accessioned (recorded in the plant records system). Accessioned material maintains records of distinct genetic individuals while clonally derived individuals will retain original accession number. Plant material that is not accessioned only includes plants for sale and plants as part of special temporary exhibits. The Plant Records Manager is responsible for the management of the plant records system. The plant records system will include both accession and deaccession records.

ACCESSION RECORDS: Accession records should include the following:

- unique accession number
- All information regarding the scientific name of the plant upon arrival including family
- Arrival information including type of material, number of plants and date
- Source information including source name & source accession number
- Location information including all information regarding wild collection documentation when available, as well as, natural distribution information for the taxa
- Location of material in garden

- Initials and date of person entering information

All other relevant information should be added to the record when available.

DEACCESSION RECORDS: Deaccession records should include:
date of deaccession
reason for deaccession
initials and date of deaccessioner

EVALUATION

The Horticulture Director and the Conservatory Director are responsible for regular evaluations of the Living Collections in consultation with appropriate staff members.

MAINTENANCE

The Horticulture Director and the Conservatory Director are responsible for the maintenance of the Living Collections. All staff members contribute to the maintenance of plants under their care.

DEACCESSIONING

All deaccessions will be recommended by the Horticulture Director and the Conservatory Director in conjunction with the appropriate staff members. Any staff member may recommend that a plant be deaccessioned. Major deaccessions must be approved by the Plant Collections Committee. Reasons for deaccessioning include:

1. if the accession no longer fulfills the purpose of the Atlanta Botanical Garden
2. if the accession has died or been stolen
3. if an accession has deteriorated
4. a more desirable accession could replace the current accession

The Horticulture Director, Smithgall Horticulture Director, or Conservatory Director must approve disposal of plants that have been deaccessioned. Disposal will take place by destruction, exchange, or sale. Other gardens and institutions will receive top priority for deaccessioned plants. Any money obtained from the sale of deaccessioned plants will be placed in a fund for plant acquisition and maintenance.

Appendix 1.

Ranking Scoring System:

Each plant is evaluated by assigning a score of 1-5 (1 being the lowest and 5 the highest) for each factor. An average score will be calculated to determine relevance of plant to collections. The proposed scoring system would use the following scoring assignments:

I. Relevance

ABG mission

1. Fits 1 component
2. Fits 2 components
3. Fits 3 components
4. Fits 4 components
5. Fits all components

Collection Goals

1. No
5. Yes

II. Rarity

1. Common (G5, N5, S5, LC)
2. Unusual (G4, N4, S4, NT)
3. Rare (G3, N3, S3, VU)
4. Threatened (G2, N2, S2, EN)
5. Endangered (G1, GH, CR, EW)

III. Ornamental Value

1. Lowest
2. Lower
3. Moderate
4. Higher
5. Highest

IV. Documentation

Nomenclature

1. Unknown name
2. Family identified
3. Genus identified
4. Plant received with accepted name (genus and specific epithet)
5. Full name verified, including authority

Provenance

1. No information
2. Country of collection known
3. Region, Province, County etc… known
4. Known mapped location
5. GPS or Lat/Lon data collected, preferably accompanied by altitude

Collection/Acquisition Information

1. No information
2. little
3. some
4. most
5. All information included

V. Significance

1. Institutional
2. Local/State

3. Regional
4. National
5. International

Appendix 2.

NATURESERVE RANKING CATEGORIES

Global Conservation Status Definitions

Listed below are definitions for interpreting NatureServe global conservation status ranks (G-ranks). These ranks reflect an assessment of the condition of the species or ecological community across its entire range. Where indicated, definitions differ for species and ecological communities.

NatureServe Global Conservation Status Ranks

Basic Ranks

Rank	Definition
GX	**Presumed Extinct** (species)— Not located despite intensive searches and virtually no likelihood of rediscovery. **Eliminated** (ecological communities)—Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.
GH	**Possibly Extinct** (species)— Missing; known from only historical occurrences but still some hope of rediscovery. **Presumed Eliminated**— (Historic, ecological communities)-Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut Forest.
G1	**Critically Imperiled**—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2	**Imperiled**—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3	**Vulnerable**—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread

	declines, or other factors.
G4	**Apparently Secure**—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	**Secure**—Common; widespread and abundant.

Variant Ranks

Rank	Definition
G#G#	**Range Rank**—A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community. A G2G3 rank would indicate that there is a roughly equal chance of G2 or G3 and other ranks are much less likely. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).
GU	**Unrankable**—-Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. Whenever possible, the most likely rank is assigned and a question mark qualifier may be added (e.g., G2?) to express minor uncertainty, or a range rank (e.g., G2G3) may be used to delineate the limits (range) of uncertainty.
GNR	**Unranked**—Global rank not yet assessed.
GNA	**Not Applicable**—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualifiers

Rank	Definition
?	**Inexact Numeric Rank**—Denotes some uncertainty about the numeric rank (e.g. G3? - Believed most likely a G3, but some chance of either G2 or G4).
Q	**Questionable taxonomy**—Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the

	inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority.
C	**Captive or Cultivated Only**—At present extant only in captivity or cultivation, or as a reintroduced population not yet established.

Infraspecific Taxon Conservation Status Ranks

Infraspecific taxa refer to subspecies, varieties and other designations below the level of the species. Infraspecific taxon status ranks (T-ranks) apply to plants and animal species only; these T-ranks do not apply to ecological communities.

Rank	Definition
T#	**Infraspecific Taxon** (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole-for example, a G1T2 cannot occur. A vertebrate animal population, such as those listed as distinct population segments under under the U.S. Endangered Species Act, may be considered an infraspecific taxon and assigned a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status. At this time, the T rank is not used for ecological communities.

National and Subnational Conservation Status Definitions

Listed below are definitions for interpreting NatureServe conservation status ranks at the national (N-rank) and subnational (S-rank) levels. The term "subnational" refers to state or province-level jurisdictions (e.g., California, Ontario).

Assigning national and subnational conservation status ranks for species and ecological communities follows the same general principles as used in assigning global status ranks. A subnational rank, however, cannot imply that the species or community is more secure at the state/province level than it is nationally or globally (i.e., a rank of G1S3 cannot occur), and similarly, a national rank cannot

exceed the global rank. Subnational ranks are assigned and maintained by state or provincial natural heritage programs and conservation data centers.

National (N) and Subnational (S) Conservation Status Ranks

Status	Definition
NX **SX**	**Presumed Extirpated**—Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
NH **SH**	**Possibly Extirpated** (Historical)—Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
N1 **S1**	**Critically Imperiled**—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
N2 **S2**	**Imperiled**—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
N3 **S3**	**Vulnerable**—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
N4 **S4**	**Apparently Secure**—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

N5 **S5**	**Secure**—Common, widespread, and abundant in the nation or state/province.
NNR **SNR**	**Unranked**—Nation or state/province conservation status not yet assessed.
NU **SU**	**Unrankable**—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
NNA **SNA**	**Not Applicable** —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
N#N# **S#S#**	**Range Rank** —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
Not Provided	Species is known to occur in this nation or state/province. Contact the relevant natural heritage program for assigned conservation status.

IUCN CONSERVATION RANKING CATEGORIES

IV. THE CATEGORIES

A representation of the relationships between the categories is shown in Figure 1.

EXTINCT (EX)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)
A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages (see Annex 2).

V. THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of ≥90% over the last
10 years or three generations, whichever is the longer, where the causes of the reduction are clearly
reversible AND understood AND ceased, based on (and specifying) any of the following:
(a) direct observation
(b) an index of abundance appropriate to the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors

or parasites.
2. An observed, estimated, inferred or suspected population size reduction of ≥80% over the
last 10 years or three generations, whichever is the longer, where the reduction or its causes
may not have ceased OR may not be understood OR may not be reversible, based on (and specifying)
any of (a) to (e) under A1.
3. A population size reduction of ≥80%, projected or suspected to be met within the next 10
years or three generations, whichever is the longer (up to a maximum of 100 years), based on
(and specifying) any of (b) to (e) under A1.
4. An observed, estimated, inferred, projected or suspected population size reduction of
≥80% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in
the future), where the time period must include both the past and the future, and where the reduction
or its causes may not have ceased OR may not be understood OR may not be reversible, based on
(and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 100 km², and estimates indicating at least two of a-c:
a. Severely fragmented or known to exist at only a single location.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.
c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.
2. Area of occupancy estimated to be less than 10 km², and estimates indicating at

least two of a-c:
a. Severely fragmented or known to exist at only a single location.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.
c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is
longer, (up to a maximum of 100 years in the future) OR
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least
one of the following (a-b):
(a) Population structure in the form of one of the following:
(i) no subpopulation estimated to contain more than 50 mature individuals, OR
(ii) at least 90% of mature individuals in one subpopulation.
(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of ≥70% over the last 10 years

or three generations, whichever is the longer, where the causes of the reduction are clearly reversible
AND understood AND ceased, based on (and specifying) any of the following:
(a) direct observation
(b) an index of abundance appropriate to the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years
or three generations, whichever is the longer, where the reduction or its causes may not have
ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a)
to (e) under A1.
3. A population size reduction of ≥50%, projected or suspected to be met within the next 10 years
or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying)
any of (b) to (e) under A1.
4. An observed, estimated, inferred, projected or suspected population size reduction of ≥50% over any 10
year or three generation period, whichever is longer (up to a maximum of 100 years in the future),
where the time period must include both the past and the future, and where the reduction or its
causes may not have ceased OR may not be understood OR may not be reversible, based on (and
specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a-c:
a. Severely fragmented or known to exist at no more than five locations.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat

(iv) number of locations or subpopulations
(v) number of mature individuals.
c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.
2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a-c:
a. Severely fragmented or known to exist at no more than five locations.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.
C. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

C. Population size estimated to number fewer than 2500 mature individuals and either:

1. An estimated continuing decline of at least 20% within five years or two generations, whichever is
longer, (up to a maximum of 100 years in the future) OR
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one
of the following (a-b):
(a) Population structure in the form of one of the following:
(i) no subpopulation estimated to contain more than 250 mature individuals, OR
(ii) at least 95% of mature individuals in one subpopulation.
(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years
or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible
AND understood AND ceased, based on (and specifying) any of the following:
(a) direct observation
(b) an index of abundance appropriate to the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of ≥30% over the last 10 years
or three generations, whichever is the longer, where the reduction or its causes may not
have ceased OR may not be understood OR may not be reversible, based on (and specifying)
any of (a) to (e) under A1.
3. A population size reduction of ≥30%, projected or suspected to be met within the next 10 years
or three generations, whichever is the longer (up to a maximum of 100 years), based on (and
specifying) any of (b) to (e) under A1.
4. An observed, estimated, inferred, projected or suspected population size reduction of ≥30% over any 10
year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where
the time period must include both the past and the future, and where the reduction or its causes may not
have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to
(e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least
two of a-c:
a. Severely fragmented or known to exist at no more than 10 locations.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.
c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.
2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a-c:
a. Severely fragmented or known to exist at no more than 10 locations.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.
c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

C. Population size estimated to number fewer than 10,000 mature individuals and either:

1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is
longer, (up to a maximum of 100 years in the future) OR
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least

one of the following (a-b):
(a) Population structure in the form of one of the following:
(i) no subpopulation estimated to contain more than 1000 mature individuals, OR
(ii) all mature individuals are in one subpopulation.
(b) Extreme fluctuations in number of mature individuals.

D. Population very small or restricted in the form of either of the following:

1. Population size estimated to number fewer than 1000 mature individuals.
2. Population with a very restricted area of occupancy (typically less than 20 km^2) or number of locations
(typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable
of becoming Critically Endangered or even Extinct in a very short time period.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Appendix 3.

Atlanta Botanical Garden Guidelines on Benefits Sharing and Protection of Genetic Resources

The Atlanta Botanical Garden, a private-non-profit organization incorporated in 1977, holds a mission to develop and maintain plant collections for display, education, conservation, research and enjoyment. Moreover, the botanical garden is committed to the long-term conservation of global biological diversity and seeks to promote and implement this through its mission.

The Atlanta Botanical Garden is committed to honoring the spirit of CITES (1973), the Convention on Biological Diversity (1992), and the relevant biodiversity policies of individual countries. The garden agrees to abide fully with any relevant legislation set forth by the country of origin for collected plant material in the ABG collections and to not make any outside arrangements concerning these resources without the prior written approval from the relevant national authorities. The Garden makes a best faith commitment to protect biological resources in its possession and to manage them in accordance with the requirements set forth by the country of origin.

Transfer of Materials

While recognizing the absolute imperative of *in situ* and in-country conservation (as outlined in the CBD and IUCN Guidelines on Ex Situ Conservation), the Garden promotes the conservation of biological diversity through propagation and distribution where this is appropriate, and supports the survival of both the species and associated habitat. The Atlanta Botanical Garden will ensure that the provision of all plant material that is acquired on mutually agreed terms, obtained through prior and informed consent and confirmed in a written transfer agreement, with outlined responsibilities of both parties (ABG and the source country) will be subject to a third party material transfer agreement. The Material Transfer Agreement prohibits commercialization of genetic resources unless the appropriate authorities in the country of origin provide written and prior permission.

Benefits Sharing

The Garden is committed to the fair and equitable sharing of any benefits arising from the cultivation of plant material at the Atlanta Botanical Garden. The Garden recognizes that benefit sharing can include important non-monetary benefits such as capacity building and training, transfer of technology and the

sharing of knowledge. If following the appropriate distribution of resources to a third party occurs and benefits arise then the distribution of benefits from any commercialization should be agreed upon between the country of origin and the third party.