

North American Botanic Garden Strategy for Plant Conservation



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Contributors

This document would not be possible without the extensive contributions of many people and organizations, including the following:

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Canadian Botanical
Conservation Network
le réseau canadien pour
la conservation de la flore



Foreword



When as a teenager I began to explore the botanical riches of California, it never occurred to me that any of them might be at risk. I thought that any species would still be there if one simply looked in the right place! Since those days, though, the explosive growth of the human population — which has more than doubled in the United States and the world at large — our seemingly inexhaustible appetite for consumption, and the use of many technologies that are destructive to the environment have changed the situation, and our perception of it, drastically. The loss of habitats, selective gathering of plants for medicines and other purposes, spread of invasive non-native plants and other organisms, and increasingly apparent climate change have put as much as half of the world's plant species at risk.

How many kinds of plants and other organisms we will be able to save depends directly on us: we are the cause of the extinction, and we have the capability to control its course and the magnitude of its devastation. The Global Strategy for Plant Conservation, issued in 2002, is an effort to map out effective steps for plant conservation throughout the world, and each country is preparing a response to it. This document outlines the North American botanical garden community's efforts to specify an appropriate role for itself in realizing these objectives.

An unprecedented partnership of botanic garden associations in the U.S., Canada, and Mexico has forged this comprehensive strategy for fully realizing the desired objectives. In the U.S., for example, the Center for Plant Conservation has long played an effective role in planning and executing *ex situ* and increasingly *in situ* conservation, and in that sense laid the foundation for these efforts. The wider application of techniques such as tissue culture and the formation of seed banks, and the mutual encouragement of collective efforts, will be among the important results of the actions outlined in this document. Perhaps most originally, botanical gardens are urged to undertake formal recovery plans for specific plant species in the wild. The ongoing evaluation of the status of North American plants in nature is fundamental to the realization of effective conservation objectives. In partnership with other kinds of institutions, botanical gardens also can make important contributions to public appreciation of the problem of extinction and its amelioration.

This *North American Botanic Garden Strategy for Plant Conservation* will help to further progress toward the goal of providing a richer, more diverse world, one with greater resilience and more beauty than could be achieved in any other way. We should try to ensure that the teenagers of the future have the same kind of optimism I did when contemplating the flowery fields of California a half century ago, and that human beings continue to enjoy fully the material and spiritual benefits of our magnificent green planet forever

Peter H. Raven

President, Missouri Botanical Garden, St. Louis, Missouri, USA

Introduction

Threats to the world's plants continue to increase as a result of human activities. Among the well-documented threats are habitat loss, invasive species, poor land management, over-collection, and climate change. Most studies suggest that the rate at which plant species are being lost, or at least reduced in numbers, is faster than the speed at which scientists, land managers, policy-makers, and others can or will respond.

Botanical gardens are uniquely positioned to play a leading role in plant conservation. Building on their existing scientific and educational activities they can develop plans of action to:

- document local, regional, and national floras;
- assess threats and levels of risk to species and populations;
- prescribe appropriate courses of action;
- create educational programs for professionals and the public; and
- craft messages to raise awareness about human impacts on plant diversity.

By working together, individual gardens and associations of gardens can significantly improve their ability to respond to the current floristic crisis. North America is fortunate to have several associations devoted to mobilizing the scientific resources of the botanical garden community and developing educational and other programs to increase public awareness of the importance of plants and plant conservation.

Recognizing that an effective response requires joint action, the associations that have produced this document formed a partnership to address how North American botanical gardens can contribute to the targets set forth in the *Global Strategy for Plant Conservation* (GSPC) issued by the United Nations Convention on Biological Diversity in 2002. The GSPC provides an innovative framework for international action to conserve plants, including 16 outcome-oriented targets aimed at achieving a series of measurable goals by 2010 (for more information on the GSPC, see www.bgci.org/worldwide/gspc).

Each of the associations comprising this partnership brings a unique perspective and set of talents to the process of meeting the GSPC targets. As a result, duplicated effort is minimized and the capacity to make progress is maximized.

Because plant distributions do not follow political boundaries, the most effective course of action is not to develop separate GSPC strategies for Canada, Mexico, and the United States but rather the cooperative and collaborative approach adopted here. Since 2003 we have met on several occasions, in Barcelona, Brooklyn, Boston, Atlanta, St. Louis, Chicago, and Montreal, to develop this North American Botanic Garden Strategy for Plant Conservation (NABGS).



To strengthen our efforts, in 2005 we reached out beyond the botanical garden community by meeting in Montreal with representatives from other non-governmental organizations, government agencies, and university researchers with an interest in plant conservation. At this meeting discussions were initiated on how gardens and other groups might cooperate more closely in the common effort to save our floristic heritage. This effort will be an ongoing one.

The goals of the North American Botanic Garden Strategy for Plant Conservation are:

- A. Understanding and documenting plant diversity;
- B. Conserving plant diversity;
- C. Using plant diversity sustainably;
- D. Promoting public education and awareness about plant diversity;
- E. Building capacity for conservation of plant diversity; and
- F. Building support for the NABGS.

An estimated 70 million people visit North America's botanical gardens each year.

To accomplish each of these major goals, specific and measurable targets and sub-targets have been developed. These targets largely follow those of the GSPC but are adapted to our particular North American context. They set benchmarks for measuring the success of both existing and future conservation efforts. To help achieve these targets, action plans will be developed cooperatively in the near future.

In accordance with the GSPC, we have adopted 2010 as the deadline for assessment of this strategy. Progress has already been made in some target areas, such as the representation of threatened species in botanical garden plant collections. This is a dynamic document. We will continue to revisit the targets, assess our progress, and refocus our efforts on a regular basis.

We hope this document will spur our member gardens to participate in plant conservation in any way possible, whether through research, land stewardship, education, or other programs consistent with their mission and strengths. The dedication and energy of each of our organizations, our staffs, and our members makes it feasible for us to make a significant contribution. We invite all readers to play a role as we work to better understand, document, and sustain North America's vast plant diversity.

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Center for Plant Conservation, Kathryn Kennedy, Executive Director

November, 2006

Targets for Botanical Gardens

A. Understanding and documenting plant diversity

A1. All botanical gardens in North America with the capacity for programs in plant systematics review and contribute to their respective national flora projects in an effort to achieve a complete North American flora, part of the larger effort to achieve a complete world flora.

Subtarget 1: A working group is convened to facilitate the reporting and compiling of existing comprehensive national and North American plant lists related to various types of plant diversity (native, agricultural, horticultural, medicinal, etc.).

*Number of North American
native vascular plants
by country:*

Canada - 3,900

Mexico - 30,000

U.S. - 17,000

TERMS AND SUPPORTING INFORMATION

A list of all known plant species is a fundamental requirement for plant conservation. Botanists engaged in plant systematics provide this primary measure of diversity.

The Flora of North America North of Mexico (FNA) project's work in producing the requisite checklists and floras is fundamental to the plant conservation efforts of the botanical garden community. FNA integrates with recent research the wealth of knowledge acquired since botanical studies in Canada and the U.S. began more than 200 years ago. More information is available at: www.fna.org/FNA. Botanical gardens in Mexico are collaborating with national botanical institutions to inventory the flora of Mexico.

A2. All botanical gardens with the capacity review and contribute to the assessment of the conservation status of the plant species of North America, using the criteria and standards developed by NatureServe and the IUCN.

TERMS AND SUPPORTING INFORMATION

Conservation assessments are vital for the effective management and allocation of conservation efforts. Botanical gardens have the unique skills and knowledge necessary for this work.

A preliminary assessment of the conservation status of all known plant species is one of the targets outlined in the Global Strategy for Plant Conservation. Currently, only 3% of the estimated 300,000 known plant species have been assessed using the accepted global standards of the World Conservation Union, IUCN, which produces the IUCN Red List of Threatened Species of plants and animals. 70% of the assessed species, or 8,400 plants, currently have been classified as threatened with extinction. More information is available at www.redlist.org

The NatureServe system evaluates the conservation status of plants and animals of Canada and the United States. More information is available at www.natureserve.org

B. Conserving plant diversity

B1. Botanical gardens actively seek ways to work collaboratively to support *in situ* conservation of threatened natural areas, habitats, and ecosystems locally, regionally, and internationally.

Subtarget 1: 30% of U.S. and Canadian botanical gardens support international *in situ* conservation.

Subtarget 2: 40% of Mexican botanical gardens participate in *in situ* conservation programs for areas of high biodiversity.

TERMS AND SUPPORTING INFORMATION

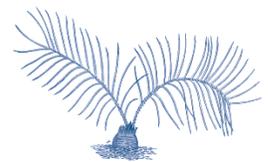
In situ conservation measures are those that occur “on site,” in the natural habitat of the species at risk. The goal of contemporary conservation is an integrated approach that concentrates first on *in situ* measures, complemented by appropriate *ex situ* (off site) measures, preferably in the country of the species’ origin. The primary conservation work of most botanical gardens, which by definition hold off site collections of plants and seeds, is *ex situ*. Many botanical gardens have developed technical staff and expertise to work on both *in situ* and *ex situ* conservation activities, and collaborate on integrated conservation efforts with government agencies and other organizations involved principally in *in situ* work.

The botanical gardens of North America hold some of the most diverse collections of plants from around the world. Many gardens have the expertise, knowledge, and resources to expand their plant conservation efforts beyond North America and assist in conserving non-native species in the countries of origin.

B2. Botanical gardens increase *ex situ* conservation efforts.

Subtarget 1: 75% of threatened native plant species in the U.S. and Canada are represented in botanical garden *ex situ* collections of plants, tissue, and seeds that have good genetic representation and are managed according to nationally or internationally recognized standards, such as those of the Center for Plant Conservation.

Subtarget 2: 40% of the native species in Mexico categorized as “at risk” under NOM-059 are represented in Mexican botanical garden *ex situ* collections of plants, tissue, and seeds.



Zamia spartea, Camotillo
Mexico. IUCN: Critically Endangered

B. Conserving plant diversity

Subtarget 3: Botanical gardens collaborate with the international community in *ex situ* measures such as seed banking and tissue culture, and duplicate collections for the conservation of non-North American species.

TERMS AND SUPPORTING INFORMATION

Historically, botanical gardens have been involved primarily in *ex situ* conservation, and have provided global leadership in such efforts. It is estimated that the world's botanical gardens hold more than 90,000 vascular plant species in their vast collections, more than one third of all known plant species. Botanic Gardens Conservation International estimates that within these collections 12,000 plant species threatened with extinction have been safeguarded to date. More information about the management and genetic representation of these species is needed for collections worldwide and for those held specifically in North American collections. The Global Strategy for Plant Conservation (GSPC) target is 60% of all threatened species in *ex situ* collections, preferably in the countries of origin. Because the Canadian and U.S. botanical garden communities currently are at or near this GSPC target, a more ambitious target of 75% by 2010 has been set.

In 2000, the Estrategia de Conservación para los Jardines Botánicos Mexicanos 2000, a conservation strategy for Mexican botanical gardens, was developed by the Asociación Mexicana de Jardines Botánicos, the first for the North American botanical garden community. A major objective of this strategy is the creation of an action plan for the conservation of threatened species of the Mexican flora. This action plan is currently being developed within the context of the GSPC and the North American Botanic Garden Strategy (NABGS). Prior to the NABGS no country-specific botanical garden strategy had been developed for Canada and the U.S. The goal of the NABGS is to provide a regional framework to both address the absence of Canadian and U.S. botanical garden plant conservation strategies and include the strategic objectives of the existing Mexican plan.

Information on the genetics and population biology of rare plants and their relation to conservation is available on the Center for Plant Conservation website, www.centerforplantconservation.org



Hackelia venusta, Showy Stickseed
U.S. ESA: Endangered

B3. Botanical gardens increase their participation in formal recovery planning and plan implementation for species in their regions, working with state, provincial, and federal agencies.

Subtarget 1: 20% of botanical gardens in Canada are partners in formal recovery planning for species in their regions.

Subtarget 2: 20% of botanical gardens in the United States are partners in formal recovery planning for species in their regions.

B. Conserving plant diversity

Subtarget 3: 10% of botanical gardens in Mexico are partners in formal recovery planning for species in their regions including 5% of the native species categorized as “at risk” under NOM-059.

Subtarget 4: Botanical gardens increase their capacity to support recovery actions for non-North American species.

TERMS AND SUPPORTING INFORMATION

North American federal, provincial, and state agencies have a legal mandate to protect threatened species on public lands. Botanical gardens can help extend government conservation efforts by increasing their role as partners in the formal recovery and restoration process. The Center for Plant Conservation and its member gardens have a well-established relationship with federal agencies and are a model for collaboration and assistance with both *ex situ* and *in situ* methods in the recovery and planning process. More information is available at www.centerforplantconservation.org

The Plant Conservation Alliance (PCA) is a consortium of ten federal government Member agencies and over 220 non-federal Cooperators representing various disciplines within the conservation field: biologists, botanists, habitat preservationists, horticulturists, resource management consultants, soil scientists, special interest clubs, non-profit organizations, concerned citizens, nature lovers, and gardeners. PCA Members and Cooperators work collectively on native plant conservation and habitat restoration. More information is available at <http://www.nps.gov/plants>

The goal of the Global Strategy for Plant Conservation is 10% of all world threatened plant species in recovery and restoration programs by 2010. It is estimated that only 2% are included today.

B4. Botanical gardens contribute to the conservation and preservation of economically and socially important plants.

Subtarget 1: A North American gap analysis is conducted to identify priorities and set targets. A list of relevant categories, such as ethnobotanical, food and related wild crop, and medicinal plants, is developed, current conservation activities are determined, and potential partners are identified.

Subtarget 2: A conservation program for ornamental plant varieties is developed, especially heirloom plants and plants of historic or social importance.

Mexico and the U.S. are among the 17 megadiverse countries that contain more than two-thirds of the earth's biodiversity. The primary criterion for megadiverse status is the number of endemic plants, those found nowhere else in the world.

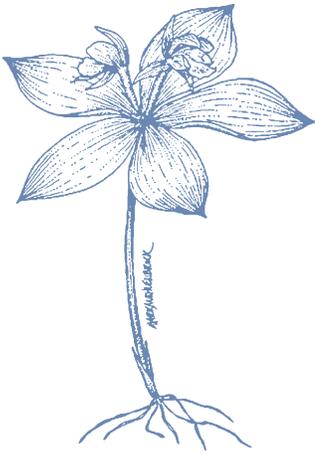
B. Conserving plant diversity

Subtarget 3: 75% of gardens that maintain plant records share their plant collections list with the global Botanic Gardens Conservation International database of plants in cultivation.

TERMS AND SUPPORTING INFORMATION

Halting the loss of diversity in specific areas often requires an understanding of culturally and economically important plants. As community-oriented institutions, botanical gardens have a unique ability to address such needs and challenges to plant conservation in their areas.

The North American Plant Collections Consortium (NAPCC) is a network of botanical gardens and arboreta taking a continent-wide approach to plant germplasm preservation. Priorities for conservation include plants with genetic variability for crop improvement; plants from difficult or restricted-access locations; plants that are rare and endangered in the wild; and historic cultivars. NAPCC collection holders make germplasm available for selection and breeding, taxonomic studies, evaluation, and other research purposes. The NAPCC is a program of the American Public Gardens Association in cooperation with the U.S. Department of Agriculture and the U.S. National Arboretum.



Isotria medeoloides,
Small Whorled Pogonia
Canada. COSEWIC: Endangered

Botanic Gardens Conservation International (BGCI) maintains the Plant Search database, a unique database of the plants in the living collections at botanical gardens around the globe. This plant accession data plays a crucial role in understanding how many threatened plants are safely held in the *ex situ* collections of the world's botanical gardens. The Plant Search database is being used to measure progress toward meeting Target 8 of the Global Strategy for Plant Conservation — having 60% of threatened plant species in *ex situ* collections. All botanical gardens are being asked to contribute to these international conservation efforts by sharing their accession data with BGCI. More information can be found at the BGCI website: <http://www.bgci.org>

B5. Botanical gardens recognize their role in invasive species management and education.

Subtarget 1: 80% of botanical gardens, including 100% of botanical gardens with actively managed plant collections, develop an invasive-species policy that is comprehensive and integrated.

Subtarget 2: 80% of gardens, including 100% of those with actively managed collections, formally endorse relevant national strategies and the voluntary codes of conduct in the St. Louis Declaration on Invasive Plant Species.

Subtarget 3: The number of botanical garden staff serving on invasive-species working groups increases.

Subtarget 4: The number of botanical gardens providing the public with opportunities to become engaged in the prevention, reporting, and control of invasive species increases.

B. Conserving plant diversity

Subtarget 5: Awareness of non-plant invasive species and the role that botanical gardens have in their management increases.

TERMS AND SUPPORTING INFORMATION

Non-native invasive plants and other non-native biological invaders are one of the greatest threats to natural ecosystems. Native plant species and plant communities are increasingly being degraded and displaced by these invasive species, compounding the well-known threat of habitat destruction.

An actively managed collection is a living plant collection that is actively developed, curated, and managed in support of the garden's mission. Examples of collections that are not actively managed include historic landscapes, cemeteries, and "natural" or "wild" areas under the control of a botanical garden.

The St. Louis Declaration on Invasive Plant Species includes Voluntary Codes of Conduct for Botanic Gardens and Arboreta, which can be found on the website of the Center for Plant Conservation, www.centerforplantconservation.org/invasives/home.html

B6. Botanical gardens and their networks expand support and contributions to pure and applied conservation biology research concerning plant diversity.

TERMS AND SUPPORTING INFORMATION

The botanical garden community has a distinguished legacy of scientific research that is fundamental to the knowledge and expertise needed for the conservation of plant diversity. All botanical gardens can play a role in scientific research. Those that currently lack the resources for major research initiatives can contribute by making their collections available to researchers and making their constituents aware of the importance of conservation research.

An estimated \$30 billion a year is spent to control invasive non-native plants in the U.S. alone.



Castilleja levisecta, Golden Paintbrush
Canada. COSEWIC: Endangered
U.S. ESA: Threatened

C. Using plant diversity sustainably

C1. Botanical gardens and their networks support and contribute to the sustainable use of plant resources.

Subtarget 1: Botanical garden networks develop a set of best practices to ensure that plant-based products procured and used by botanical gardens are derived from sustainable sources.

Subtarget 2: All botanical gardens promote public awareness of the need for sustainable use of plant resources.

Subtarget 3: All botanical gardens comply with state, national, and international laws and regulations regarding the collection, importation, sale, and use of plant material, and advocate compliance among affiliated groups, including nurseries, members, plant societies, and the general public.

TERMS AND SUPPORTING INFORMATION

Among the key national and international laws and regulations concerning plant conservation are the Convention on Biological Diversity (CBD), www.biodiv.org; Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), www.cites.org; Committee on the Status of Endangered Wildlife in Canada (COSEWIC), www.cosewic.gc.ca; U.S. Endangered Species Act (ESA), www.fws.gov/endangered; and Norma Oficial Mexicana (NOM-ECO-059), the endangered species law of Mexico.

C2. Botanical gardens contribute to the awareness and protection of cultural and local indigenous knowledge and uses of plants.

Subtarget 1: Targets in this area are set, current levels of local, national, regional, and international activity are determined, and appropriate partners are identified.

TERMS AND SUPPORTING INFORMATION

Sustaining the long-term future of plants and plant-based products is as much good business practice as it is a good conservation ethic for the botanical garden community. The sustainable use of plants should imbue all aspects of a garden's operations, from administration and public education to horticultural displays and retail outlets.

*North American
regions designated as
biodiversity hotspots:*

- *California Floristic Province*
- *Caribbean Islands*
- *Madrean Pine-Oak Woodlands*
- *Mesoamerican Forests*

D. Promoting public education and awareness about plant diversity

D1. Botanical gardens reach 50 million visitors each year with educational messages about the importance of plants, and inspire visitors, local community members, partners, staff, and volunteers to take appropriate action to protect plant diversity.

Subtarget 1: The importance of plant diversity is promoted to all visitors by incorporating conservation messages in interpretation and providing educational programs for all ages and audiences.

D2. Botanical gardens promote and participate in existing public-awareness campaigns for plant diversity and conservation.

TERMS AND SUPPORTING INFORMATION

As respected scientific institutions, botanical gardens have tremendous credibility and influence when interpreting the importance of plants within their communities. Public outreach campaigns and education programs are key communication tools.

Example campaigns include:

- National Invasive Weed Awareness Week, February 27 to March 4
- Earth Day, April 22
- Arbor Day, April 27
- National Wildflower Week, May 7 to 13
- National Endangered Species Day, May 11
- Plant Conservation Day, May 18
- International Day for Biological Diversity, May 22



Quercus hinckleyi, Hinckley Oak
Mexico. IUCN: Critically Endangered
U.S. ESA: Threatened

E. Building capacity for conservation of plant diversity

E1. Botanical gardens increase national and international capacity for conservation and sustainable use of plant diversity.

Subtarget 1: All appropriate certificate, diploma, and degree programs offered by botanical gardens in North America include conservation components.

Subtarget 2: Botanical gardens support and promote existing regional, national, and international programs providing professional plant-conservation and best practices training, and develop new programs as needed.

TERMS AND SUPPORTING INFORMATION

Increasing the number of well-trained professionals is paramount to meeting the challenges of plant conservation. According to the Global Strategy for Plant Conservation, the number of trained professionals worldwide will need to double by 2010.

The Applied Plant Conservation Program, a joint partnership for education by the Center for Plant Conservation, Denver Botanic Gardens, and the United States Botanic Garden, is a notable example of professional training and institutional capacity building. More information on the program is available on the institutions' websites.



Spiraea virginiana, Virginia Meadowsweet
U.S. ESA: Threatened

E2. Botanical gardens integrate a conservation ethic and environmental awareness into all operations.

E3. Botanical gardens that are leaders in greening their operations provide guidance to fellow institutions.

E4. Botanical gardens take a leadership role and increase their involvement in advocacy and public policy issues for plant conservation.

Subtarget 1: Botanical garden associations contribute to and advocate for public policy at the national and international levels to increase the resources available for plant conservation.

Subtarget 2: Botanical gardens contribute to and advocate for public policy at the local, regional, and national levels to increase the resources available for plant conservation.

E5. Botanical gardens build a broader public constituency for plants and their conservation within the garden and larger conservation community.

E6. Botanical gardens and their networks better share and promote existing information and resources on how to achieve plant conservation objectives.

F. Supporting the North American Strategy

F1. Botanical gardens demonstrate their support by adopting the North American Strategy and implementing the targets appropriate to their institutions.

TERMS AND SUPPORTING INFORMATION

Each botanical garden is encouraged to consider specific and relevant actions that demonstrate and publicize support for this Strategy. The North American botanical garden organizations that sponsored this document will encourage their members to take action on targets for which gardens can take a leadership role and make significant strides toward achieving these objectives.

American Public Gardens Association, APGA, formerly the American Association of Botanical Gardens and Arboreta, serves and strengthens public gardens by supporting their work, value, and achievements in horticultural display, education, research, and plant conservation.

APGA Headquarters, 100 West 10th Street, Suite 614, Wilmington, DE 19801
Phone (302) 655-7100, Fax (302) 655-8100
www.publicgardens.org

Asociación Mexicana de Jardines Botánicos, AMJB, is a network of botanical gardens dedicated to promoting the investigation, distribution, conservation of, and education about Mexican plant diversity.

Asociación Mexicana de Jardines Botánicos, Km.2.5 carretera antigua a Coatepec No. 351, Congregación el Haya, C.P.91070. Xalapa, Veracruz, México.
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www.ecologia.edu.mx/amjb

Botanic Gardens Conservation International, BGCI, including the U.S. program, is a global organization that networks more than 800 botanical gardens in 118 countries, mobilizing them to secure plant diversity for the well-being of people and the planet.

Botanic Gardens Conservation International (U.S.)
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Brooklyn, New York 11225
Phone (718) 623-7362, Fax (718) 941-4774
www.bgci.org/usa

Canadian Botanical Conservation Network, CBCN, preserves the biological diversity of Canada's rare and endangered native plant species, wild habitats, and ecosystems through the education and conservation programs of its members, including botanical gardens and arboreta.

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Phone 905-527-1158, Fax 905-577-0375
www.rbg.ca/cbcn

Center for Plant Conservation, CPC, is dedicated solely to preventing the extinction of America's imperiled native flora. The Center is a network of America's leading botanical gardens.

Center for Plant Conservation
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www.centerforplantconservation.org

Contact these organizations for additional copies of this publication.

PHOTO/ILLUSTRATION CREDITS

COVER (clockwise from top):
Cypripedium candidum, White Lady's Slipper. Canada. COSEWIC: Endangered. USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service.

Echinocactus grusonii, Golden Barrel Cactus. Mexico. IUCN: Critically Endangered. Source photo: Dan Shepherd.

Sarracenia leucophylla, White Topped Pitcher Plant. U.S. Florida, Georgia: Endangered. IUCN: Vulnerable

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Zamia spartea, Camotillo.
Illustration: Wanadoo

PAGE 6
Hackelia venusta, Showy Stickseed.
Source photo: Florence Caplow

PAGE 8
Isotria medeoloides, Small Whorled Pogonia. USDA-NRCS PLANTS Database/USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service.

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Castilleja levisecta, Golden Paintbrush.
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Quercus hinckleyi, Hinckley Oak.
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Spiraea virginiana, Virginia Meadowsweet. USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 2: 246.

