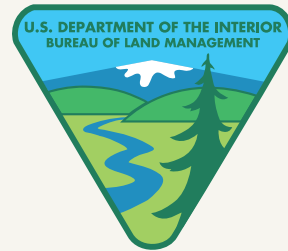


Seed Banking for Today and Tomorrow



Jojoba (*Simmondsia chinensis*) fruit collected by the Desert Botanical Garden.



SEEDS
OF
SUCCESS

Seeds of Success Partners:

Bureau of Land Management
Center for Plant Conservation
Chicago Botanic Garden
Great Basin Native Plant Selection and Increase Project
Lady Bird Johnson Wildflower Center and Mercer Arboretum
Millennium Seed Bank, Royal Botanic Gardens, Kew
Mt. Cuba Center, Inc.
National Fish and Wildlife Foundation
The Nature Conservancy
NatureServe
New England Wild Flower Society
New York City Department of Parks and Recreation—
Greenbelt Native Plant Center
North Carolina Botanical Garden
Plant Conservation Alliance
USDA Forest Service, Bend Seed Extractory
USDA National Center for Genetic Resources Preservation
USDA PLANTS Database
USDA Western Regional Plant Introduction Station, Pullman
Zoological Society of San Diego

Seeds of Success (SOS) is a program coordinated through the Bureau of Land Management and Plant Conservation Alliance that supports and coordinates seed collection from native plant populations in the United States.

Some of the seed is grown with the goal of increasing the number of species and quantity available for use in stabilizing, rehabilitating and restoring lands in the United States. Seeds are provided to researchers and growers in the US whose work supports environmental sustainability. Through a partnership with Royal Botanic Gardens, Kew's Millennium Seed Bank Project, SOS provides data on seed quality and germination, information that is crucial to the development of new native plant materials for commercial trade.

In our changing world, biodiversity is threatened by habitat destruction, invasive plants, and environmental disasters. Seeds are easily stored, making them a wonderful tool for conservation.

A portion of the seed collected by SOS is put into long-term cold storage as an insurance policy against the extinction of our wild flora and to provide options for their future use. Depending on the plant species, the seeds can last hundreds to thousands of years. Some tropical seeds cannot tolerate cold storage and are being studied to find alternate methods.

The program began in 2001 with collections by the Bureau of Land Management and now includes 8 additional institutions and 19 partners utilizing 400 volunteers across the United States.

www.nps.gov/plants/sos



Student Conservation Association Team and Desert Botanical Garden Staff harvest saguaro seeds, Summer 2005.



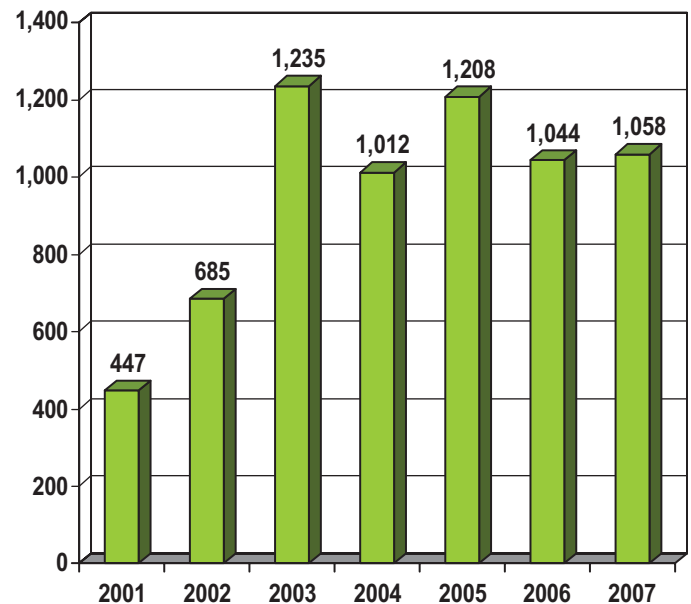
collect • evaluate • establish • grow • store • restore

SEEDS OF SUCCESS

Seeds of Success (SOS) was established in 2001 by the Bureau of Land Management (BLM) in partnership with the Millennium Seed Bank Project (MSB) to collect, conserve, and develop native plant materials for restoration across the United States. The initial partnership between BLM and MSB quickly grew to include many additional partners, such as botanic gardens, arboreta, zoos, and municipalities. These SOS teams share a common protocol and coordinate seed collecting and species targeting efforts. SOS is a vital part of the Native Plant Materials Development Program.

To date, SOS has 6,689 native seed collections in its National Collection. This material is being used for direct seeding in restoration projects, native plant materials development projects such as germination trials, common garden studies, and protocol establishment. Portions of each collection are also being held in long-term storage facilities for conservation.

SOS has partnerships nationwide for permits to collect on 30 USDA Forest Service National Forests, 10 U.S. Fish & Wildlife Service National Wildlife Refuges, 6 Department of Defense areas, The Nature Conservancy's lands and multiple state and local lands. The SOS partners, who are non-governmental organizations, have made significant collections of the Midwest, Texas, Eastern U.S., and San Diego County. They have contributed matching funds totaling approximately \$3.3 million. Below are highlights from SOS partners.



Seeds of Success yearly seed collection numbers.

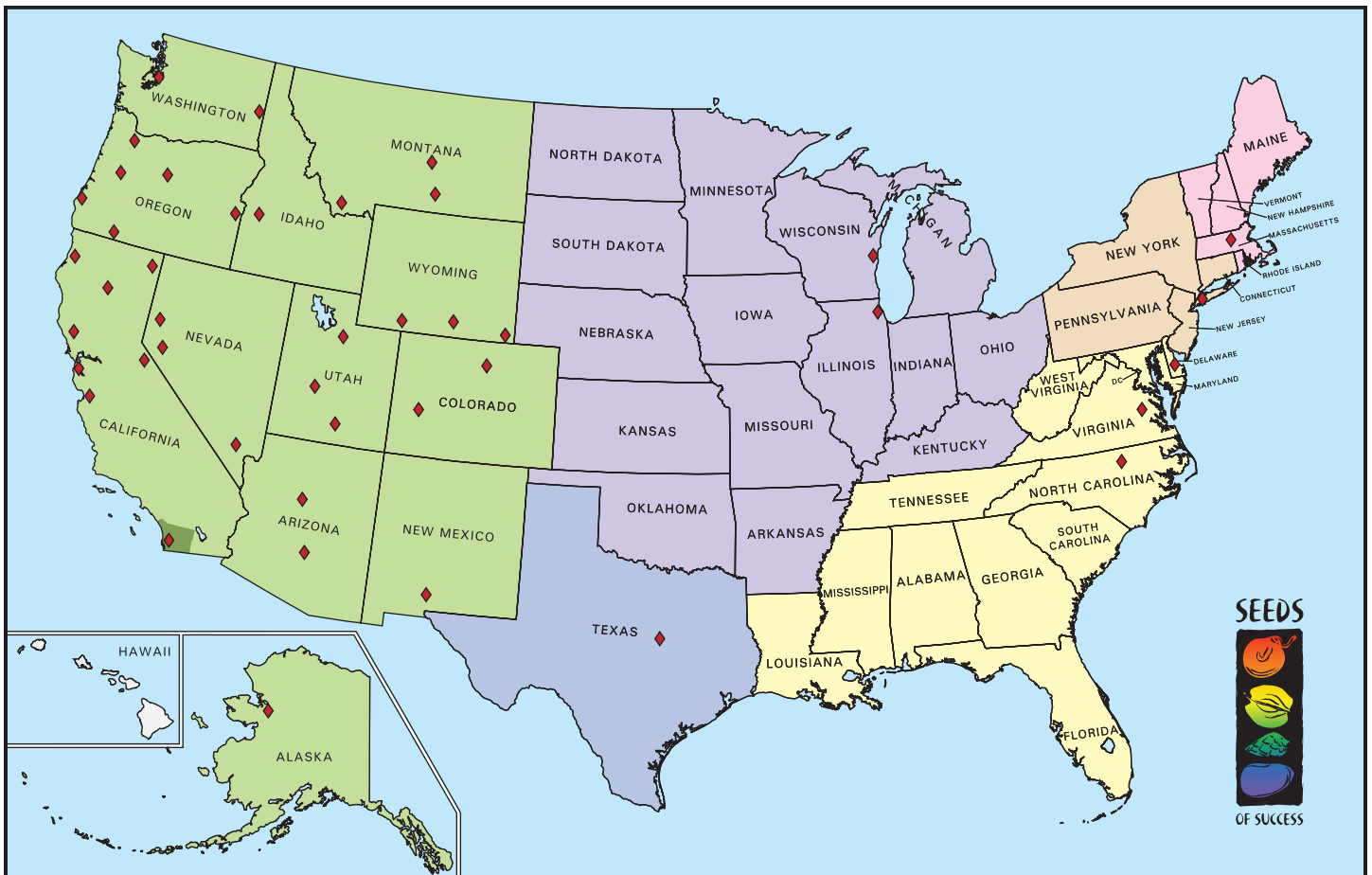
Western United States: BLM Collecting Teams

Currently, 20 BLM offices are participating in SOS. These collecting teams cover the 14 BLM states, and have made over 4000 collections that have gone towards native plant materials development. A portion of all the collections have gone to Royal Botanic Gardens, Kew and USDA Agricultural Research Service for long-term storage.

Great Lakes, Midwest, and Prairie Regions: Chicago Botanic Garden

The Chicago Botanic Garden (CBG) is involved in all phases of the native plant materials development process. The CBG SOS team has made over 600 collections. CBG has conducted: 26 seed zones and genetic variability studies, 26 pollinator biology and management studies, 19 cultural practices studies, and established plant propagation protocols for 24 species. CBG also manages the Conservation and Land Management Intern program which has placed hundreds of interns in BLM offices to work on public land natural resource issues, including native seed collection. BudBurst is another program that CBG manages. BudBurst is a national citizen science effort to record bloom dates for plant species in a centralized database, which will be used for climate change research. CBG has contributed over \$2.1 million in matching funds.

<http://www.nps.gov/plants/sos>



Map of the Seeds of Success collecting areas. The red diamonds show the locations of collecting teams. The shaded states show the different areas of coverage: green (Bureau of Land Management), dark green (Zoological Society of San Diego), purple (Chicago Botanic Garden), blue (Lady Bird Johnson Wildflower Center), pink (New England Wild Flower Society), orange (New York City-Department of Parks & Recreation–Greenbelt Native Plant Center), yellow (North Carolina Botanical Garden).

Texas: Lady Bird Johnson Wildflower Center

Taking on the entire state of Texas, the SOS team at Lady Bird Johnson Wildflower Center (LBJWC) has recruited hundreds of volunteers who have put in over 4000 hours. LBJWC has been working very closely with over 100 private landowners, growers, and U.S. Fish and Wildlife Service National Wildlife Refuges to make about 500 collections. LBJWC has made 275 native species commercially available to the public. LBJWC has contributed approximately \$1 million in matching funds.

Eastern United States: NYC-DPR Greenbelt Native Plant Center, New England Wild Flower Society, and North Carolina Botanical Garden

In 2006, SOS expanded its coverage to include the Eastern U.S. With Federal, state and local partners, the SOS Eastern U.S. collecting teams have been able to collect approximately 200 species. Without these collecting teams, much of the eastern flora would not be conserved in long-term storage for use in restoring native plant communities.

San Diego County: Zoological Society of San Diego

San Diego County has a rich flora, and the Zoological Society of San Diego (ZSSD) is working with local and Federal partners to ensure that its flora is banked. To date, the ZSSD SOS team has made over 200 collections and is also working on propagation, germination and cleaning studies with its partners including the San Pasqual Band of Mission Indians.

materials

“Using native plant materials ensures sound rehabilitation and protection of diverse habitats while providing for environmentally responsible recreation and commercial uses.”

- Bureau of Land Management

Wildland fires in 1999 and 2000 were the worst in 50 years and burned millions of acres of public lands. A shortage of native plant materials substantially increased the cost of rehabilitation and restoration efforts on the burned lands. Ecosystem restoration with native plants is the best option for restoring land health for multiple resource values and minimizing the establishment of invasive weeds. To ensure a stable and economical supply of native plant materials for rehabilitation and restoration needs, federal agencies are facilitating the development of a long-term native plant materials program.



Native Plant Materials Development

The goal of the interagency Native Plant Materials Development (NPMD) program is to promote partnerships and cooperation among Federal agencies to develop a self-sustaining long-term program to supply and manage native plant materials. To do so successfully, NPMD will include partners in private industry and involve large projects throughout the country.

- The Oregon-Washington Ecoregion Restoration Initiative, started in 2001, is working on NPMD for 15 million acres of public lands. Efforts include successful seed grow-out contracts with private industry and research on seed transfer zones & best management practices. Under this program, the Moses Coulee Project has been working to restore a 200,000 acre area that is one of only two sage-grouse habitats remaining in Washington.



Native plant materials development for the Moses Coulee Project.

- The Great Basin Restoration Initiative has conducted research on plant materials development, seed technology, seed production & germination, genetics, releases, agronomic and cultural care, diversity patterns, and pollinators.
- Since 2002, the Uncompahgre Plateau Native Plant Program has been collecting wildland seed and conducting research on seed rearing, seed production, seedbed ecology, competition, species adaptability, germination, DNA comparison, field application techniques, cheatgrass, sagebrush and other subjects.



SEEDS



OF SUCCESS

Seeds of Success (SOS) is an interagency program that supports and coordinates seed collection of native plant populations in the United States to increase the number of species and the amount of native seed that is available for use in stabilizing, rehabilitating and restoring lands in the United States. SOS is coordinated

through the Plant Conservation Alliance in partnership with the Royal Botanic Gardens, Kew. Other partners include the Chicago Botanic Garden, the Lady Bird Johnson Wildflower Center, North Carolina Botanical Garden, New England Wild Flower Society, and Zoological Society of San Diego.



Plant Conservation Alliance

<http://www.nps.gov/plants>

management

"To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations."

- Bureau of Land Management's Mission Statement



What is the Bureau of Land Management?

The Bureau of Land Management (BLM) manages over 258 million acres of public lands, mostly in the Western United States and Alaska. These lands comprise diverse ecosystems, from the sun-drenched Southwestern deserts to lush Pacific Northwest forests. Besides providing for commercial activities and recreation, BLM lands also serve as important areas for conservation programs. For more information, go to www.blm.gov.

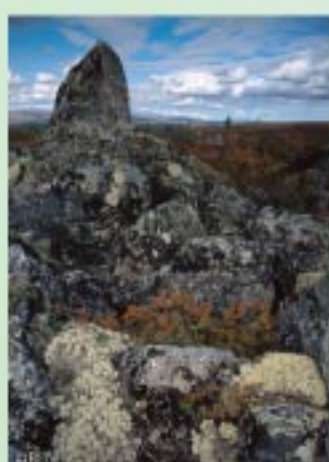
BLM Plant Conservation Program

The mission of the Plant Conservation Program is to ensure that in meeting BLM's multiple-use mandate, native plants and native plant communities on public lands are managed, conserved, and/or restored for future generations. In partnership with all publics, the Plant Conservation Program finds innovative ways to set priorities, accomplish tasks, and evaluate successes.



BLM Plant Conservation Program Goals

- I. Maintain and Conserve Native Plant Communities**
Healthy native plant communities are managed, protected and used through decisions that reflect long term considerations for a healthy environment and a sustainable economy.
- II. Restore Native Plant Communities**
Restore degraded native plant communities and seeded areas to return the public lands to a biologically diverse and productive landscape.
- III. Conserve and Recover Special Status Plant Species**
Implement actions necessary to conserve and recover special status plant species and their habitats through proper land management.
- IV. Provide Information and Outreach**
Provide opportunities for people to enjoy, understand, and value native plants and plant communities. Develop a comprehensive information outreach program that informs the public, policy makers, and land managers about native plant conservation.
- V. Supporting Information**
Obtain comprehensive information for native plant communities sufficient for BLM land managers to make informed program decisions.
- VI. Build Botanical Capacity**
Develop human resource capacity, providing opportunities for a trained and capable future workforce.



Vertical (top to bottom): Towering over stately saguaros and other desert flora, Ragged Top Mountain is a geologic crown jewel in the Ironwood National Monument east of Tucson, Arizona.; Although subjected to a winter that lasts almost nine months a year, Alaska's arctic tundra is home to a specially adapted community of plants.; Near Roseburg, Oregon, the cascading waters of Fern Falls flow into the North Umpqua River, a part of the National Wild and Scenic Rivers System.

Horizontal (left to right): Harrington's Beardtongue (*Penstemon harringtonii*), a sensitive plant species endemic to Colorado, is found on land managed by BLM.; A hillside in Bishop, California covered with Anderson's Lupine (*Lupinus andersonii*) provides a seed collection area for native plant materials development.; The beginning of autumn at Parsnip Lake in the Cascade-Siskiyou National Monument, Medford, Oregon.; As manager of half of the remaining sagebrush habitat in the United States, the BLM recognizes the critical need to maintain and restore sagebrush habitat and sage-grouse.



Plant Conservation Alliance

<http://www.nps.gov/plants>

alliance

“To protect native plants by ensuring that native plant populations and their communities are maintained, enhanced, and restored”

- Plant Conservation Alliance Mission Statement

The Plant Conservation Alliance is a consortium of federal government Member agencies and over 250 Cooperators including professional societies, trade associations, research organizations, universities, state agencies, gardens & arboreta, museums, growers, non-profit organizations, native plant societies, garden clubs, and native american tribal councils. PCA provides a forum for interacting, sharing information, and taking action. Members and Cooperators work collectively to address the issues of native plant communities and native habitat restoration, ensuring the conservation of our nation's native ecosystems.



PCA brings together organizations and individuals interested in native plant conservation, recognizing the need to pool resources and combine energies to develop innovative approaches to ensure the continued existence of our plant resources. Native plant conservation strategies are not only needed to protect the most imperiled species, but to ensure the long-term survival of all native plant species and plant communities. PCA's strategies are to:

- Bring people and organizations together to share resources and talents to effectively conserve the nation's native plants.
- Provide opportunities for people to enjoy, understand, and value native plants and plant communities.
- Ensure conservation and restoration of native plants and natural plant communities through ecosystem-based management.
- Encourage the scientific community to conduct research and technology development in support of native plant conservation.
- Encourage practices that support appropriate and sustainable uses of beneficial plants.
- Promote the development and use of coordinated databases and information-sharing to support native plant conservation.

To accomplish its goals, PCA has a Federal Committee, a Non-Governmental Organization Committee and five Working Groups. The working groups are: Alien Plant, Medicinal Plant, Native Plant Materials Development, Public Outreach, and Restoration. On an international level, PCA serves as the North American Plant Specialist Group of the World Conservation Union's (IUCN) Species Survival Commission.



PCA promotes development of conservation solutions and sharing of information to benefit declining native plant species and communities throughout North America by partnering with the National Fish and Wildlife Foundation on the Native Plant Conservation Initiative grant program. Since 1995, PCA has put out a yearly call for proposals for native plant conservation projects. The grant program seeks to provide funding for projects that provide plant conservation benefit, projects with multiple partnerships, and use of innovative ideas such as landscape approach, shareable new technologies, and teaching by example. The result has been the funding of over 225 projects worth a total of over 11 million dollars.



Plant Conservation Alliance

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conservation

“For if one link in nature's chain might be lost, another might be lost, until the whole of things will vanish by piecemeal.”

- Thomas Jefferson

From the tropical rain forests of Hawaii to the deserts of Arizona, the United States has many species of plants and animals that occur nowhere else on Earth. The landscape and wildlife we cherish, the food we eat, even the very air we breathe is connected to plant life. There are about 20,000 different species of plants alone that are considered native to the U.S. Unfortunately, one in every five of these plants is now of some concern to conservationists. Habitat destruction, invasive alien plants and animals, over collection, and other environmental damage are eroding our natural plant communities. Plant Conservation Alliance Members & Cooperators recognize that without intervention some species will be lost forever.



Gentner's Fritillary

For a short but glorious time each spring in southwest Oregon, the solitary waxy-blue stems of Gentner's fritillary (*Fritillaria gentneri*) are festooned with striking purplish-red bell-like flowers with a loose checkerboard streaking of yellow spots. Ensuring this federally endangered species' long-term survival in the wild is a collaborative process involving numerous conservation measures by public agencies, private organizations and individuals working on the Fish & Wildlife Service's Recovery Plan for the species. Included in the efforts are:

- The Bureau of Land Management in Medford, OR has been studying vegetative reproduction of this species. They have transplanted 5,600 nursery grown bulbs back into the wild where they are being monitored as a success.
- The Berry Botanic Garden has done work on genetic studies, seed banking, and germination trials.

Haleakala Silversword

Growing high on the slopes of three mountains in Hawaii, Hawaiian silverswords have antifreeze-like compounds in their leaves to help prevent them from freezing. The Haleakala silversword (*Argyroxiphium sandwicense* ssp. *macrocephalum*) was near extinction in the 1920's because of human vandalism and browsing by feral goats and domestic cattle. The plant has increased under protection, but is now threatened by the potential loss of endemic pollinators. Scientists and land managers are working together to save these and other Hawaiian plants from extinction.



Green Pitcher Plant

The green pitcher plant (*Sarracenia oreophila*) is a federally protected endangered species that is now limited to 35 wild populations in Alabama, North Carolina and Georgia, making it the rarest of all pitcher plants. Along with the threats of habitat destruction, trampling by cattle and fire suppression, the carnivorous nature of the plant makes it a prime target for plant collectors. Working with a variety of partners, the Georgia Plant Conservation Alliance coordinates conservation projects that monitor and restore bogs providing habitat for the

green pitcher plant and other carnivorous plant species.

The species with this symbol next to them are part of the Center for Plant Conservation's National Collection of Endangered Plants. The Collection contains plant material for more than 600 of the country's most imperiled native plants. An important conservation resource, the Collection is insurance in case a species becomes extinct or no longer reproduces in the wild.



Plant Conservation Alliance

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invasives

“Compared to other threats to biodiversity, invasive introduced species rank second only to habitat destruction...”

- Daniel Simberloff

Free from the vast and complex array of natural controls present in their native lands, including herbivores, parasites, and diseases, non-native invasive plants may experience rapid and unrestricted growth in new environments, allowing them to establish over large areas. Their phenomenal growth enables them to crowd out existing vegetation and form dense, one-species stands. In doing so, they also harm native animals which depend upon native plants for food and shelter. Alien invasive plants are disrupting the ecology of natural ecosystems and degrading our nation's unique and diverse biological resources.



Alien Plant Working Group

Started in 1995 under the Plant Conservation Alliance, the Alien Plant Working Group (APWG) works to develop educational materials for the general public, land managers, researchers, and others on the harmful effects of invasive plants and share methods of battling invasive plants. APWG focuses on invasive plants affecting natural areas and ecosystems throughout the United States. APWG's many partners include federal, state, and local government agencies, non-governmental organizations, industry and many individuals.

Fact Sheets. APWG's website has volunteer expert-written fact sheets using language that can be understood by the general public. Each fact sheet provides an overview of the most current information about the plant, including photos, plant descriptions, ecological threat, U.S. distribution and habitat, biology and spread, management practices, expert contacts, suggestions for native plants and non-invasive substitutes for landscaping, and references. From aquatic plants to trees to vines, a variety of species has been covered and there are always additional fact sheets in progress.



WeedUS. A referenced database of invasive plant species is in production and includes species identified by state and federal agencies, including national parks, Exotic Pest Plant Councils, The Nature Conservancy, and others as posing serious ecological threats. The database includes information on the scientific name, family, synonyms, plant habit, information source, and other useful data. To date, over 1,000 invasive plant species are in the database.



Plant Conservation Alliance

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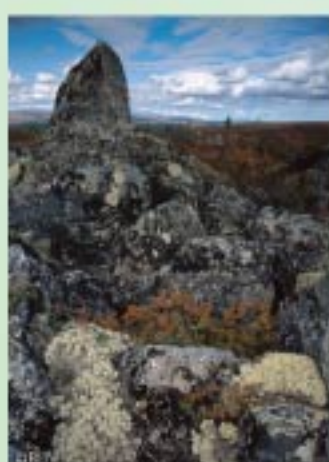
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