

# It starts with a seed

How the Garden is helping to make sure the West wins restoration battles

Photos by BLM and BLM New Mexico

There's a sort of tallgrass prairie seed collection command center inside the Daniel F. and Ada L. Rice Plant Conservation Science Center. From across the Midwest, seed accessions—collections of 10,000 seeds from at least 50 plants—arrive at the National Tallgrass Prairie Laboratory packed in brown bags and accompanied by a newsprint-wrapped herbarium voucher, a data sheet, and a leaf sample that carries a signature of the plant's DNA.

After cleaning, half of each accession goes immediately to the USDA's National Center for Genetic Resources Preservation in Fort Collins, Colorado. The remaining seeds go to the Dixon National Tallgrass Prairie Seed Bank, where they are counted, weighed, and X-rayed before being dried to 15 percent relative humidity, sealed in airtight foil envelopes, and preserved at minus 20 degrees Celsius. These accessions—more than 4,000 to date—are preserved as a potential supply of genetically appropriate seed stock for research and future ecosystem restoration.

The work inside the lab hardly scratches the surface of the Chicago Botanic Garden's native seed banking, collection, and research efforts—and it is a role that keeps growing.

Along with advocacy through the Plant Conservation Alliance Non-Federal Cooperator Committee, a network of more than 300 U.S. organizations interested in native plant conservation, the Garden has become a key part of the National Seed Strategy for Rehabilitation and Restoration, announced by the Bureau of Land Management (BLM) in August in Boise, Idaho.

The Garden's role in the national seed strategy operates on two levels: It teamed with other non-governmental agen-

cies focused on native plant conservation to help create the seed strategy, and it will be a key resource for research and seeds for future restoration needs.

Through the five-year strategy, officials hope to create a network of seed collectors, growers, nurseries, storage facilities, and restoration ecologists so enough

native seeds are available immediately after natural disasters to avoid erosion and prevent invasive species from taking hold and fueling future wildfires. The goal, said Megan Haidet, national collection curator for Seeds of Success, a native seed collection program led by BLM, is to supply the right seed in the right place at the right time.

"I'm hoping this national seed strategy will help us fill in the gaps in our seed collections. If funding comes through, it will allow us to collect in areas we have not collected previously, and increase the number of collectors, the number of collections made, and species diversity," Haidet said.

Much of the strategy targets western rangelands, where drought-stricken terrain has fueled recent wildfires, such as the Soda fire in Boise Idaho, which, according to a report in the *Los Angeles Times*, charred close to 300,000 acres. "The first step is to determine what the seed needs are, what is currently available, and whether those are local, genetically appropriate sources," said Kay Havens, Ph.D., senior director of ecology and conservation and Medard and

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*Seed-collecting trips like this one to New Mexico enable Garden scientists to expand their research.*

The goal is the right seed in the right place at the right time.







## The Cycle of a Seed

1. Collect

2. Research

3. Produce

4. Store

5. Restore



*Restoring local ecosystems requires hands-on work.*

Elizabeth Welch director of plant conservation science at

the Garden. “Each species is a new crop that someone has to learn how to germinate, grow, harvest, and store. That requires a lot of investment on the part of the seed industry. Understanding the needs will help in the development of business models for restoration.”

Even when the right seeds are available, reseeding fire-damaged areas is complex. It requires knowing which seeds are genetically and geographically appropriate, how climate change is influencing the tolerance range of native species, and what plants work in competition with invasive species to improve restoration outcomes, Dr. Havens said.

Garden scientists are at work on several studies in the western United States to help answer these questions, said Greg Mueller, Ph.D., chief scientist and Negaunee Foundation Vice President of Science at the Garden.

Andrea Kramer, Ph.D., conservation scientist at the Garden, makes frequent trips to the western slope of the Rockies to study hardy “native winner” plants that have the potential to outgrow cheatgrass, a pesky plant that

burns easily, increasing wildfire risk, and provides poor pasture for livestock and rangeland birds such as the sage grouse. Shannon Still, former adjunct assistant conservation scientist at the Garden, modeled 571 rare species from the western United States to determine how their ranges might move and help prioritize restoration needs.

The Garden’s seed research efforts also extend to students in the Plant Biology and Conservation graduate program, run jointly with Northwestern University. Maggie Eshleman investigated how well and how far seeds can travel. Her study of six high-priority western restoration species is helping to verify the boundaries of USDA Forest Service provisional seed transfer zones and adding to mounting evidence that locally sourced seeds provide the best long-term solution.

“If you have a site that burns in Oregon and a potential grow-out location in New Mexico, it becomes important to figure out the boundaries of genetically appropriate seed transfer,” Eshleman said. “Until reciprocal studies like ours are conducted on restoration species, then we can’t know how well seeds will do when collected at one site and planted in another.”

On the collection side, the Garden and its Seeds of Success (SOS) partners have banked more than 14,000 native seed collections. The support of the Garden’s Conservation and Land Management (CLM) internship program, which annually places more than 100 college graduates in internships across the western and northeastern United States, has been integral in fulfilling SOS collection needs. About 60 percent of CLM interns are involved in gathering priority seed species, Dr. Mueller said.

The strategy is a big and complicated task, involving 12 federal agencies and interests of the commercial seed-growing industry. But a more localized model of seed production, storage, and restoration will have long-term benefits.

“The challenges will be ongoing, but if we can accomplish a good chunk of what’s in the strategy, we will be much more likely to be able to successfully restore damaged ecosystems,” Havens said.

### Learn more

For more information on the National Seed Strategy, visit [blm.gov/wo/st/en/prog/more/fish\\_\\_wildlife\\_and/plants/seedstrategy.html](http://blm.gov/wo/st/en/prog/more/fish__wildlife_and/plants/seedstrategy.html)



