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Group to Clone California Redwoods

The towering redwood trees that once dominated the coastal forests of the U.S. West Coast may soon be restored throughout their historic range. A group of historic tree buffs will collect genetic samples Tuesday from the tops of several old-growth redwood trees in California—the first step in cloning the trees and re-growing lost forests.

In several years, when the cloned trees are two to three feet tall (less than a meter tall), the group will plant them at various sites along the California coast. "We can rebuild our old-growth forests when we use old-growth forest genetics," said David Milarch, cofounder of the Champion Tree Project in Traverse City, Michigan. To assure genetic diversity, the new forests would be made of 20 percent clones and 80 percent seedlings, he said.

Milarch's organization has already cloned several historic trees, including copies of the trees George Washington planted at his Mount Vernon estate in Virginia in the 18th century. The redwoods project, however, represents the organization's first attempt at using clones to restore an entire forest.

Less than 5 percent of the old-growth coastal redwood forest remains, Milarch noted, mostly due to heavy logging. Not even stumps remain in more than 75 percent of the species' historic range. The Champion Tree Project hopes these forests—bolstered with tree genes that are more than a thousand years old—will once again thrive.

And by acting as "sinks" for heat-trapping carbon dioxide, such forests may help combat challenges such as global warming.
"What have those trees seen and experienced and recorded in their DNA, in their rings, in their life? It's important," Milarch said.

Necessary Conservation?

Ruskin Hartley is the executive director of Save the Redwoods, a 90-year-old San Francisco-based nonprofit group that protects and preserves old-growth forests. He said the cloning project taps the mystique of ancient redwood trees, but he questioned whether using clones for widespread restoration is necessary or appropriate.

Redwoods can already naturally reproduce using clones, Hartley said. The parent trees send out new sprouts from their bases and fallen limbs, which grow as exact copies of their parents. The trees also reproduce with seeds. Although more than 95 percent of the ancient redwood forests have been logged, Hartley said many of the damaged forests now sport naturally regenerated young redwoods from clones and seeds.

Over hundreds of years, some of the young forests will survive and take on the old-growth characteristics that naturally come with age.

"So I don't think it's necessary to clone an ancient tree to regrow a redwood forest," Hartley said. "The only way that you can really go about restoring the ancient forest is waiting a really long time—that's the essence of the oldness of these forests."

Hartley is also concerned that the clones could mix up the gene pool, since there is regional diversity within the species. The Champion Tree Project plans to avoid mixing by taking genetic samples from at least five sites along the California coast. The group will also use local clones for local forest re-growth, Milarch noted.

But Hartley said a more appropriate use of the cloned redwoods would be to beautify someone's property. "If an individual wanted to take one of those clones and plant it in their backyard because they have a big backyard, would that be a concern? No, not really," he said.

Climbing Redwoods

To create the clones, foresters will collect tissue samples from the tips of branches—the newest growth areas on a tree, said David McMaster, a project collaborator for Bartlett Tree Experts, a national tree care and service company. On a thousand-year-old redwood, this so-called budwood is found on branches more than 250 feet (76 meters) high, in the crown.

"To go up 250 feet in a tree is pretty phenomenal in and of itself," McMaster said. Tree climbers with ropes and harnesses will venture into the crown of several old-growth redwoods at Roy's Redwoods Open Space Preserve in Marin County, California. From there, the climbers will snip off young branches and lower them to the ground.

Budwood from the tips of the branches will be put on ice and shipped to a nursery in Carmel, where the clones will be developed using four different techniques:"t-budding," taking budwood and inserting it beneath the bark of a host tree; root grafting, which attempts to establish new growth onto root stock; tissue culturing, or growing new tissue in a laboratory; and use of a moisture chamber to get the budwood to establish roots on its own.

"You're not 100 percent successful in any one of the ways, [but] we'll undoubtably be successful in one way or another at all four in varying degrees," McMaster said.

Once the young saplings are established, the project team will begin planting the clones at select sites along the California coast within a few years. Milarch said his organization has yet to determine the most appropriate place to plant the clones. But "with 97 percent of those sites with coast redwoods gone, there's plenty of opportunity," he said.