



# Barriers to Increased Tree Seedling Production in California



In 2019, California produced **12.9 million seedlings** that were then planted in the state. That is enough to plant trees to cover roughly 32,000 acres of land. But it does not come close to meeting the need for seedlings. There are more than 4 million acres of land suitable for reforestation in California, including 500,000 acres in national forests where the trees had been destroyed by wildfires in 2020. This need touches every part of the state, such as lost floodplain forests of the Central Valley, recently burned Sequoia groves in the Sierras and the retreating pine forests of southern California.

To better understand this challenge and then develop solutions, American Forests and The Nature Conservancy led a research team that **surveyed and interviewed public, private and tribal nurseries across the country, including seven in California, in 2020**. These seven nurseries represent a majority of the state's total seedling output. Key findings from the research are summarized in this document.

At their peak, California's federal nurseries had capacity to produce nearly 36 million seedlings per year and state nurseries could produce 11.5 million. With investments from the public and private sectors over the next decade, **annual production for reforestation in the state could nearly double, to 20 million seedlings**. That would open the door to being able to replant the top 10% to 20% of land needing reforestation within 10 years, a marked increase from the current rate of 2% of the need per year.

Doing so will take time — as much as four years for a bareroot nursery and up to three years for container nurseries — but it is an essential step to creating healthy and resilient forests in the region for this and future generations.





California

# The Barriers

## Factors Limiting Expansion of Production

- 1 **infrastructure**
- 2 **labor**
- 3 **financing**
- 4 **regulations**
- 5 **transportation**
- 6 **market**
- 7 **land**
- 8 **seed availability**
- 9 **water**



Systemic barriers need to be addressed in order to increase seedling production and reforestation activities.

For labor, survey respondents cited the difficulty of public sector hiring practices (e.g., a 2+ year hiring backlog, lack of trained/qualified applicants, multiple unfilled nursery and forester positions, frequent turnover, loss of institutional knowledge and a preference for hiring veterans over experienced staff). They also mentioned the difficulty of providing year-round employment at smaller nurseries, and limited availability of H2B workers due to immigration policies.

Infrastructure challenges mentioned include limited financing and training to upgrade to modern equipment and pay for ongoing repairs.

Also, there is a lack of consistent long-term growing contracts to support new greenhouse capacity (and, for public sector nurseries, getting the permits needed to do so). In general, acquiring seedling production contracts of sufficient size and duration from landowners is a main constraint to the ability of nurseries to add new seedling production capacity. On federal lands this often comes down to staffing capacity constraints in field staffing that is needed to advance reforestation projects and place orders with nurseries.



## More Regional Context

**Seed shortages** are an emerging challenge to large-scale reforestation.

There are not many seed collectors, limiting foresters' ability to take advantage of seed collection opportunities.

**There are also a limited number of federal contracting officers to administer cone collection contracts.**

California's seedbanks and seed collection system are having a hard time keeping pace with replanting efforts, climate change and wildfires.

Seed supplies from low-elevation trees, in particular, are running low even as demand for them skyrockets. Fires are killing valuable seed sources, **and climate change is making cone crops less predictable and productive.**

On a positive note, **the state is actively improving its systems for seed collection, storage and climate planning.**

California's seed zone system is already a model for the rest of the U.S. **The California Department of Forestry and Fire Protection, University of California, Davis and U.S. Forest Service geneticists are pioneering an approach to guide California's seedbanks.** They are using existing tools — like the Seedlot Selection Tool and the Climate Zone Seed Tracker — to better link the climate adapted seedling needs of land managers with the seed availability, production capacity and needs of nurseries.



**More information is available at [americanforests.org/nurseries](https://americanforests.org/nurseries).**

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