

Reforestation on the Lincoln National Forest – 2017-2023:

- 2017 – planted 20 acres in South Fork Campground as a pilot project for the LNF reforestation program. The forest had not planted since early 2000's and had very poor survival rates, around 0-3% survival at 5 years.
- 2018-2022 – Planted 400 acres/year - 200 acres with 20,000 seedlings in the Little Bear fire scar (fire year 2012) on the Smokey Bear Ranger District; and 200 acres in the Scott Able fire scar (fire year 2000) on the Sacramento Ranger District.
- 2023 – Planted 660 acres, 69,000 seedlings across the two districts, preparing for full ramp up next year.
- We plant in areas of severe wildfire mortality where 75% or more of the overstory has been killed. We request these data maps from the USFS Rapid Assessment of Vegetation Condition After Wildfire (RAVG) program.
- Plant containerized seedlings only
- Tree shelters are used for protection
- Planting is done in the summer (August) during monsoon season in the SW
- Cluster (nuclei) planting arrangement to mimic natural seed dispersal and utilize micro-sites such as nurse-logs and natural depressions and drainages
- Hand planting only
- We plant ponderosa pine, Douglas-fir, and southwestern white pine

Reforestation program planning 2024-2030:

- REPLANT Act (Repairing Existing Public Land by Adding Necessary Trees, 2021)
- 2024-2030 we plan to plant 1000 acres per year, 500 acres/50,000 seedlings per District
- Biggest hurdle we will face is getting the seedlings as there are limited nurseries available for storing and sowing the seedlings
- This Region (3) is currently looking at establishing a FS nursery in Flagstaff to accommodate the estimated 4-6 million seedlings per year needed for the projected growth of the Regional reforestation programs. This would include cone processing, seed extraction, and storage.

Cone Collection:

- Cones are collected during “good” cone years. We get a good cone crop about every 5 years, and a mast crop every 10-15 years
- Strict rules for collecting to preserve genetic diversity and record elevation, seed zone, lat/long, species, date collected, and average viable seed count for cut cones from that tree
- Cone testing begins in early June. Cones are cut with a cone cutter to see the developing seed.

- Are there bugs or fungus inside? Are they developing successfully? How many viable seeds per cone?
- What species is needed for upcoming projects? What elevational bands will you be planting in?
- Seed plans should be developed and consulted to reflect your current seed inventory and projected needs for the next 10-years

Seedlings:

- Seedlings must be stored at 32-34 degrees F
- Refrigerated box trucks; these work well as they can be moved around to different Districts and gas stations. Expensive to rent and difficult to find
- Refrigerated semi-trailers. This is cheaper but cannot be moved and needs to be filled on-site with diesel fuel every 3-4 days while operating
- Portable semi-permanent refrigerated trailers
- Seedlings must be stored out of the direct sunlight when on the project site waiting to be planted. We use a large, enclosed trailer to transport the daily amount to the site

Obstacles and issues we have faced with the program:

- Communication Barriers, Access and transportation issues, Cluster (Nuclei) planting , Site selection, Rocky soils, Tree shelters, Ungulate grazing, Delays in the contracting, Timing and weather , Site selection for individual groups, Limited capacity in the Forest Service silviculture/timber program.

Tree Shelters:

- We use Tree Sentry shelters
- 18" tall conical tube made of high UVA resistant resin with 3 metal ground stakes
- Designed to protect from heat scorch, ungulate browsing, and retain moisture. Improves survival rates
- Removed after 2 years, then re-used on that year's seedlings
- Removal is done by the planters and built into the contract, but we must transport them from site to site which can be very difficult and time consuming
- Costly at about \$3.65/shelter (includes delivery) but can be used multiple years, I'm on my 7th year for some

Selecting Planting Sites:

- S/SW aspects are drier, harsher sites
- They have much less competing vegetation
- Ponderosa pine should be favored on these S/SW sites

- At higher elevations they seem to do okay, but at lower elevations (Below 7500ft) N/NE aspects should be favored for planting in extreme dry sites.
- N-NE aspects are cooler, moister sites
- They have a lot of Gambel oak, NM locust, and variety of grasses and forbs. These may provide better protection against ungulate browsing
- May have too much competing vegetation and hinder seedling growth
- Douglas-fir should be planted on these N/NE aspects if they are in your prescription
- Look for sites with well-established downed logs and stumps that are stationary and settled. These “nurse logs” provide some protection, shade, and moisture retention for seedlings
- Standing snags can be a hazard to humans and fall on seedlings. Heavy fuel loads can be a risk for future re-burns.
- Small drainages and depressions that hold water make a big difference in the dry SW. These are good planting sites. The soils are usually deeper and richer.
- Sites that were salvaged logged heavily after the fire:
 - Pros - Much less standing dead hazards, less chance of re-burn, very minimal competing vegetation.
 - Cons - rocky, churned up soils and much fewer nurse logs/stumps on ground. May have soil deficiencies due to lack of organic matter in the soil and nitrogen fixers such as locust

Southfork Campground, outside Ruidoso, NM. Little Bear fire burned through in 2012

- Planted 20 acres, 4000 seedlings total, 200 seedlings/acre, Elevation: 7400ft, planted ponderosa pine and Douglas-fir
- 1st year survival: 85%; 3rd year survival: 40%; 5th year certification: 20%

Shared Stewardship – Opportunities for collaboration

- Helping each other across agencies to administer contracts, inspect planting projects, and completing survival surveys
- Cone collection collaboration
- FS could provide seedlings for state projects
- State nurseries can grow seedlings using approved seed from FS lands



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