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Cliff DeMastus found this dead ponderosa pine seedling beside a gopher hole. He suspects the rodent uprooted the seedling.

*“What I’ve learned in reforestation is there’s a lot outside my control. We’re very dependent on the weather.”*

— Cliff DeMastus, silvicultural technician for the Whitman Ranger District who’s heading the effort to reforest areas burned in the 2015 Comet-Windy Ridge fire

## FOREST

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“What I’ve learned in reforestation is there’s a lot outside my control,” said DeMastus, who’s the silvicultural technician for the Whitman Ranger District. “We’re very dependent on the weather.”

And the weather on Dooley Mountain is far from ideal for growing ponderosas and the two other conifers — tamaracks and Douglas-firs — that DeMastus and other Forest Service officials want to help gain a foothold.

(Ponderosa pine is the predominant species, both before the fire and in the newly planted seedlings, constituting about 75% of the total trees in the burned area.)

The biggest impediment to tree survival is a lack of moisture, particularly during the summer, DeMastus said.

The contractors the Forest Service hires to plant trees can work successfully only during the limited period in spring after the snow has melted and the soil temperature has warmed above 40 degrees, but before summer heat has leached moisture from the ground.

But if thunderstorms — often the only source of rain from about mid June through September — bypass Dooley Mountain, then the seedlings are as vulnerable as a newly dropped calf left alone among the coyotes.

### Successes and failures

During a Tuesday morning visit to Trail Creek, on the northern side of Dooley Mountain and just east of Highway 245, DeMastus saw signs both positive and negative in the ongoing four-year reforestation campaign that started in 2017 and will put about 1.4 million seedlings into the soil on about 5,000 acres, including plots both east and west of Highway 245 that burned in 2015.

This effort likely will cost close to \$2 million.

The two main expenses are the seedlings, which the Wallowa-Whitman buys from Forest Service nurseries at an average of about \$600 per 1,000 seedlings, and contracts with companies that employ the tree-planters, said Roy Cusick, silviculturist for the Whitman Ranger District.

The tree-planting contracts vary in cost, but Cusick said this year’s contracts, for about 2,000 acres, totaled about \$350,000.

### Tallying the Tab

The four-year campaign to replant forests burned in 2015 started in 2017, and the main effort is slated to conclude in 2020. Among the estimated numbers:

- COST — Likely close to \$2 million, including about \$800,000 for seedlings
- TREES — contract crews and Forest Service employees will plant approximately 1.35 million seedlings on 5,000 acres

This year the National Arbor Day Foundation gave the Wallowa-Whitman \$120,000 to buy seedlings, which reduced the tab for the 2019 replanting effort, Cusick said.

In a 60-acre parcel where flames denuded the ponderosa forest almost four years ago, DeMastus strode through knee-high patches of cheatgrass — an invasive species that tends to spread after fires and other disturbances — searching in vain for a seedling that survived since the site was planted in 2017.

The absence of thriving little green trees is not a surprise — DeMastus has walked this ground before.

“I don’t know if we’ll find a tree,” he said. “This site has had very poor survival.”

The plot, which was logged after the fire to remove some of the burned trees that could be sawed into lumber, is afflicted by most of the flaws that make reforestation so daunting on Dooley Mountain.

The ground slopes down toward the west and south, so the seedlings were exposed to sun for much of each day, DeMastus said.

And because this site is at a relatively low elevation the winter snowpack, and annual precipitation overall, is stingy compared with the ridges above.

“We know trees are going to die out here,” DeMastus said.

The expectation, he said, is that from 50% to 75% of seedlings will survive.

Officials can choose from multiple strategies intended to ensure enough seedlings will persist to yield what foresters call a “fully stocked” forest, DeMastus said.

One approach is to plant “heavy” — approximately 300 seedlings per acre — to offset the anticipated mortality rate.



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Ponderosa pine seedlings are showing good survival in some places burned in the 2015 Cornet-Windy Ridge fire.

In other cases officials plant far fewer seedlings, in part to avoid the expense of returning later to remove some of the trees to avoid overcrowding.

DeMastus said Wallowa-Whitman foresters opted for a compromise, planting from 100 to 200 seedlings per acre.

After repeated inspections of this 60-acre parcel near Trail Creek, he said it’s clear that crews will have to return and replant the site.

Because the plot was logged after the fire, the National Forest Management Act requires that it be replanted, even if that requires reforestation crews to return, Cusick said.

As DeMastus hikes into an adjacent plot to the south, his attitude shifts from disappointment to optimism.

Workers planted seedlings here about three months ago, and DeMastus quickly finds more than half a dozen tiny pines that are thriving.

The biggest difference is the terrain. This unit is in a draw, and much of the land is on a north-facing slope that’s much more sheltered from the sun than the nearby unit.

DeMastus is also getting his boots soaked, something that would likely annoy most hikers but which pleases him greatly.

The leaves of lupine and blades of pinegrass are beaded with water from the previous evening’s thunderstorms, and the ground feels almost spongy. There is no dust.

Such soggiess was exceedingly rare during the summers of 2017 and 2018, DeMastus said.

Seedlings planted in those springs — including those in the 60-acre adjacent unit — suffered from the rapid drying of the soil.

The trees are especially vulnerable to drought the first summer after they’re planted, he said.

As he strolls around the draw, stooping now and again to examine a puny pine, DeMastus seems almost to identify each as an individual.

“I like this guy’s chances,” he said, using his finger to estimate that a seedling has added four inches of growth since its roots were laid in the ground. “We’ll see in September what he looks like.”

### Efforts to save seedlings, before and after planting

The world is a decidedly

harsh place for little trees once they’re plucked from their well-tended rows at a nursery.

Even in this relatively protected draw at Trail Creek, DeMastus comes across a handful of seedlings that are either clearly dead, every needle a rusty brown, or looking little different from when it was planted.

“There’s a guy that clearly did not survive,” he said, pointing to one. “This guy’s life is to be determined” was his description of another seedling that still bears green needles but has no new growth.

Although the plight of any single pine is largely a matter of fate, DeMastus said there are tactics that can boost the survival rate.

One is called “micrositing.” The basic idea, he said, is to direct tree-planting crews to use features on the ground that can, in effect, serve as shelter for the seedlings. A downed log or a stump, for instance, can protect a seedling from sunlight.

“You don’t want that feeling, when you’re putting trees in the ground, that they’re not going to survive,” DeMastus said.

Planters also aid seedlings by scraping away vegetation from a one-foot radius around the tree. This reduces competition for moisture in the soil — a particularly important matter in the parched ground typical of Dooley Mountain.

Species that tend to thrive after fires, such as snowbrush and pinegrass, can crowd out seedlings before their roots are thick enough to get their share of water.

The effort to give baby trees an advantage starts long before the planter plunges a hoedad into the soil to create a hole for the roots, however.

DeMastus, who grew up in Baker City, has experienced the entire process. He transferred from the Wallowa-Whitman’s timber staff to silviculture in 2016 — just as the reforestation effort was ramping up not only for the Cornet-Windy Ridge fire but also for the 2016 Rail fire southwest of Unity.

It all starts, naturally, with seeds.

Or more precisely, in the case of pines and other conifers, with cones.

The seedlings planted on Dooley Mountain and



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This lodgepole pine seeded naturally. Lodgepole cones need the heat of a fire to release their seeds.

elsewhere on the Wallowa-Whitman were grown from seeds collected on the forest, DeMastus said.

The concept, from a genetic standpoint, is quite simple — forest officials want to grow seedlings that are the offspring of trees that have proved they can thrive in the unique local conditions.

The selection process is relatively specific, DeMastus said.

The pines growing among the burned trees at Trail Creek weren’t bred from seeds collected from cones at this exact site, he said, but the parent pines did grow at a similar elevation and in similar conditions.

Seeds can remain viable for decades — DeMastus said the seedlings planted in the Cornet-Windy Ridge fire were extracted from cones collected in the late 1980s and early 1990s on the Wallowa-Whitman.

DeMastus is continuing the tradition, collecting cones each year to add to the forest’s seed bank for future reforestation projects. Next year crews will plant trees in the Rail fire area grown from seeds he gathered.

“That’s kind of exciting,” he said. “One of my favorite parts of the job is cone collecting. I get to climb a lot of trees. I love that.”

Seeds are stored at the former site of a nursery in Bend, and when the Wallowa-Whitman needs trees it has seeds sent to Forest Service nurseries at Central Point, near Medford, and one near Couer d’Alene, Idaho.

When the seedlings arrive in Baker City they’re treated with considerable care.

They’re stored in a cooler at 33.5 degrees, DeMastus said — cool enough to keep the seedlings dormant, but not too cold to freeze them.

Workers strive to avoid dropping the boxes that contain several hundred seedlings, as the impact can “stress” the trees, he said.

And he instructs planters to avoid holding a seedling in one hand while digging the hole, as that can damage the roots.

“We want to give these trees the best chance at survival,” DeMastus said.

### Another fire?

The Wallowa-Whitman embarked on a similar reforestation project, in the 1990s, following the 1989 Dooley Mountain fire. As with the 2015 blaze, it was sparked by lightning.

The 2015 Cornet-Windy Ridge blaze burned through many of those replanted units, with varying — and in some cases puzzling — effects, DeMastus said.

As he drove the steep road toward the top of the divide between the Powder and Burnt rivers, he pointed at stands of ponderosa pines planted in the 1990s, some 15 feet tall, that survived the flames four years ago even as an occasional neighboring tree was scorched.

“That’s just fire,” he said. DeMastus said workers have, or will, replant some of the areas that were reforested in the early 1990s but were burned in 2015.

The Cornet-Windy Ridge fire, the largest in Baker County history, covered 104,000 acres. That included about 27,700 acres of the Wallowa-Whitman that were forested (the fire also scorched tens of thousands of acres of rangeland, with only scattered juniper trees).

Cusick said the Wallowa-Whitman couldn’t afford to replant all the burned acres, but a post-fire assessment showed that wasn’t necessary across the burned zone. About 6,100 acres were burned lightly enough that they remain “fully stocked” with healthy trees, Cusick said.

Of the remaining approximately 21,600 acres, forest officials concluded that about 6,500 acres will reforest naturally, because enough green trees remain to provide seeds for a new generation, he said.

These areas include stands with lodgepole pines. Lodgepole cones, unlike other conifers, usually don’t release their seeds except in the heat of a fire, so the species typically colonizes quickly after a blaze.

DeMastus walked through another reforestation unit on a ridge above Trail Creek where the seedlings planted this spring, including tamarack and Douglas-fir, are interspersed with little lodgepoles that grew naturally.

Roughly 10,500 additional acres are in what Cusick calls the “natural recovery” category.

Some of those areas probably will reforest naturally, he said, but others, due to the harsh growing conditions, might revert to shrubland rather than forest.

Ultimately, Forest Service officials had to use a process similar to triage in an emergency room, Cusick said — with a limited budget, they picked places for replanting where the seedlings have the best chance of surviving.

But no matter how judicious the selection process, another fire could reverse much of the progress.

“We’ll get trees on the landscape,” DeMastus said with a rueful chuckle. “But it would be nice if these megafires stopped for a while.”



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A tamarack seedling, planted this spring, is thriving on Dooley Mountain.