

A giant Oregon wildfire shows the limits of carbon offsets in fighting climate change



By Hal Bernton (Special to OPB)

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To help counter their greenhouse gas pollution, Microsoft and other companies invested millions in a project to store more carbon in Southern Oregon trees. The 2021 Bootleg Fire upended that plan.



Green Diamond's Justin Kostick, left, and John Davis look over dead trees on one of Green Diamond's Klamath Basin properties, June 29, 2023. The 2021 Bootleg Fire killed all the trees in this area owned by the Seattle-based timber company. Starting in January 2022, the area was salvage logged and then replanted with lodgepole pine, ponderosa pine and white fir in the spring of 2023.

Kristyna Wentz-Graff / OPB

In this patch of Southern Oregon forest, young stands of ponderosa and lodgepole pine once pulled carbon dioxide out of the air, storing this greenhouse gas in their trunks, branches and roots.

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Today, these trees are charred black snags that bake in the summer sun. Most stand erect, a few so bowed that their tops curl down to touch the ground.

They were killed by the fierce heat of [the Bootleg Fire](#), which raged through here in July 2021, sending up huge pyrocumulus clouds of smoke and ash some 30,000 feet into the earth's atmosphere — generating their own thunderstorms.

For Justin Kostick, forestry manager for the Green Diamond timber company, this bleak landscape has become a familiar, depressing sight. He spent days and nights on fire lines in a largely unsuccessful effort to slow Bootleg's advance through the company's Klamath Basin lands. Since then, he has returned to the burn zone again and again to supervise the planting of some 4.2 million new seedlings.

"As much as I've come up here in the last two years ... it never feels good," Kostick said.



Justin Kostick, forest manager for the Green Diamond timber company, shows a cellphone photo shot when this stretch of trees was burned during the Bootleg Fire in 2021. Today, June 29, 2023, only blackened trees remain. The massive Bootleg Fire destroyed trees in the Klamath Basin, including portions of two carbon offset projects covering 570,000 acres and operated by Green Diamond.

Kristyna Wentz-Graff / OPB

This was supposed to be a showcase for Seattle-based Green Diamond's forestry strategy for a warming world. The company had committed to century-long plans to slow the pace of logging on some 570,000 acres. In exchange, the company received millions of dollars in payments from Microsoft and other companies seeking to offset their carbon dioxide pollution from fossil fuels by paying to grow more wood on this land.

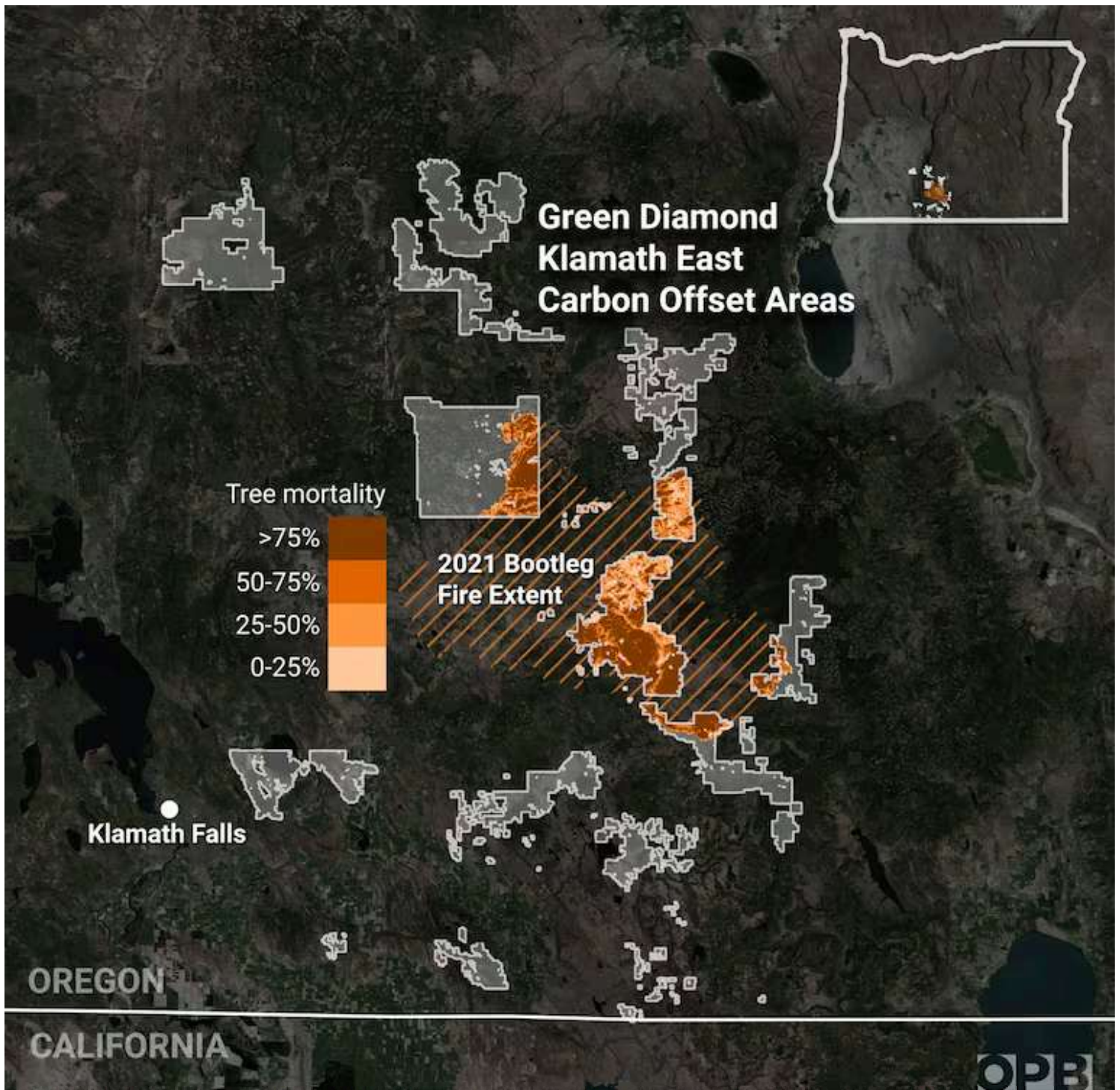
As temperatures rise due to the buildup of greenhouse gas pollution, removing carbon dioxide from the atmosphere has emerged as a

technologies now under development that can take carbon dioxide out of the air and put it in long-term storage. Yet, so far, almost all of that removal has come from forest or other land-based projects, according to a global assessment released earlier this year by scientists who concluded these efforts must greatly expand to keep global temperatures from rising more the 1.5 degrees Celsius — which is the increase nations agreed to try not to exceed in the [2015 Paris climate agreement](#).

The Bootleg Fire upended the Green Diamond carbon storage plans in Southern Oregon. In burning through nearly 20% of the company's Klamath project lands, it also has helped to stoke a broader debate about the ability of multibillion-dollar forestry offset markets to deliver the carbon savings that are supposed to happen from these deals.

Earlier this year, Green Diamond filed documents with a California state regulatory board that calls for an offset project covering most of the company's Southern Oregon acreage to be "terminated."

The Bootleg Fire's toll on Green Diamond carbon offset projects



The 2021 Bootleg Fire burned through more than 100,000 acres of Green Diamond timber lands that were in a Southern Oregon carbon offset project.

MacGregor Campbell / OPB

The project depended on live trees. Year after year, they would act like worker bees, collecting carbon dioxide and — with the aid of the sunlight and water — use photosynthesis to store more of it in their wood.

During the fire, Green Diamond lost live trees that stored some 3.3 million metric tons of carbon dioxide. That is equivalent to the greenhouse gases produced through the course of a year by more than 700,000 cars driving 11,500 miles.

A small portion of Green Diamond's lost carbon went directly into the atmosphere through combustion as the fire swept through the forest. The vast majority now resides in dead trees. They will eventually release this carbon as they topple to the ground and begin the decadeslong process of decay, or perhaps more quickly should another fire sweep through this land.

Fires also have caused big losses in two other Pacific Northwest forest tracts that had been used to offset fossil fuel pollution. In Northeast Washington, wildfires have repeatedly buffeted a large carbon offset project on the lands of the Confederated Tribes of the Colville Reservation. In Central Oregon, the Lionshead Fire torched most of the acreage of a carbon offset project developed by the Confederated Tribes of Warm Springs. That project — like Green Diamond's — is likely to be terminated.



A charred tree on one of Green Diamond's Klamath Basin properties, June 29, 2023. The majority of carbon collected when the tree was alive remains stored in the charred wood. As these dead trees decay, the carbon will be released. During the massive Bootleg Fire in 2021, Green Diamond lost live trees that stored some 3.3 million metric tons of carbon dioxide.

Kristyna Wentz-Graff / OPB

“Our field inventory and modeling indicates that the project [carbon] has fallen below the baseline and is subject to cancellation,” said Malcolm Vollmer, forester for the Confederated Tribes of Warm Springs. “Some watersheds out there were pretty severely damaged.”

Green Diamond, one of the largest privately held timber companies in the country, has emerged as a high-profile booster of forest offset projects.

The company traces its roots to Sol Simpson, who in 1890 innovated by using [draft horses](#), instead of oxen, and later developed a mechanized machine to haul away timber. He forged a powerful timber industry player that joined in the early logging of Northwest old growth forests and — as technology developed — clear-cutting that eventually expanded to California’s coastal redwoods, where the company clashed with conservationists seeking to protect more forests.

“Some serious scientists are part of the Environmental Movement, but many of the serious concerns about global warming, ozone depletion, unsustainable industrialization, and resource depletion or devastation are based on pseudoscience or no science at all — just wildly exaggerated claims,” said then-Simpson Timber Company vice president John Walker, in an Oct. 1, 1990, University of California, Berkeley, [lecture](#) that marked the 100th anniversary of the company’s founding.



A small ponderosa pine seedling, June 29, 2023, planted in the spring of 2022 on Green Diamond land in the Klamath Basin. Green Diamond has forest carbon projects covering 751,000 of its 2.2 million acres.

Kristyna Wentz-Graff / OPB

Green Diamond is a spinoff formed in 2002 and today is headed by a fifth-generation Simpson, Douglas Reed. Within the past decade, Green Diamond has put together forest [carbon projects](#) covering 751,000 of its 2.2 million acres, and is developing more in Montana.

In July 2022 [testimony](#) to the U.S. House Agriculture Committee, Reed called working forests “a critical natural climate solution” and

achieving our climate goals.”

The Green Diamond projects, as well as most other U.S. forest carbon projects, have been formed under [the rules](#) developed by the California Air Resources Board, which regulates a state program that puts a cap on greenhouse gas emissions. Rather than pay for pollution allowances, the board offers major emitters the chance to offset a small portion of their greenhouse gases through investments in forestry projects. As of last fall, 149 of these projects have been approved on 5.5 million acres spread across 29 states.

Washington state established a similar forestry offset program in the aftermath of 2021 legislation that put a price in carbon pollution while Oregon has yet to enact such a law.

Meanwhile, many corporations, such as Microsoft, invest in forestry projects to help meet their own goals for reducing carbon emissions, and that has helped to boost demand for carbon credits.

Green Diamond first moved into the carbon offset market on some Klamath Basin acres acquired in 2014. All of this land had been heavily logged for decades by a succession of owners.

Some had been cleared of timber, then replanted. Other acreage was selectively cut to remove the biggest, most valuable timber.

When Green Diamond acquired the land, most of the regrowth was still too small to profitably harvest. Many trees were spindly and crowded together, competing for scarce moisture in a forest landscape radically altered by the earlier harvests.

The logging legacy also left behind a massive amount of unmerchantable timber heaped in piles scattered across thousands of acres alongside the road network. These were deemed a fire hazard and targeted for burning as Green Diamond acquired ownership.



In this Google Earth image from July 2021, light-colored rectangles indicate slash piles left behind by decades of logging by previous land owners. When Green Diamond acquired the land, they burned many of the piles, but the remaining ones provided fuel for the Bootleg Fire.

Google Earth / OPB

In the Klamath Basin, Green Diamond formed two carbon projects covering 570,000 acres, the largest of which was struck by the Bootleg Fire and is now proposed for termination.

Green Diamond does not disclose the money earned from the sales of carbon credits from this land.

But company officials say the money paid by Microsoft and other purchasers of carbon credits was “transformative” in the corporation’s

“It was a forest that needed a period of rest and relaxation while it continued to grow and mature, and the way we really could afford to do that was through carbon finance,” said Dave Walters, a Green Diamond vice president.

A good idea, but how good?

As the carbon forestry markets expand, they face increased scrutiny. Critics say they are no substitute for reducing global dependence on coal, natural gas and oil, and may often fail to provide the carbon savings needed to offset fossil fuel emissions.

One of the most scathing assessments has come from an industry insider: Jim Hourdequin, chief executive of Lyme Timber, whose own company has put together forestry carbon deals.

“Our assessment is that many forest carbon offset projects in the U.S. have probably delivered relatively little carbon storage and climate benefit,” Hourdequin said in an [October 2022](#) talk to the Yale Forest Forum.

“While our commercial forests do store a lot of carbon ... these climate benefits are likely to be realized whether or not the property is enrolled in a carbon offset project.”

That often amounts, he maintains, to paying landowners to “not do what they were not going to do.”

In Oregon, the Confederated Tribes of the Warm Springs gained California certification to market carbon credits from a 24,000-acre roadless tract of land that the tribe had traditionally not chosen to harvest and was not part of its commercial timber base.

“These were areas that were set aside for ecological reasons, cultural reasons,” said Vollmer, the tribal forester.

Yet because the tribes had the legal right to harvest this timber, the land could still qualify for credits, some of which were used by Chevron U.S.A. and Tesoro Refining and Marketing to offset fossil fuel emissions in California, according to a review of documents filed with the California board.

Skepticism about carbon forest storage projects also has been voiced by some investors.

Microsoft is buying offset credits as part of a push to make the corporation “carbon negative” by 2030 and intends to “ultimately remove” the corporation’s greenhouse gas pollution footprint. A Microsoft executive once responsible for investing in forest projects, Elizabeth Willmott, reported that the company received 189 proposals to remove 154 million metric tons of carbon, mostly through trees.

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Just 2 million tons’ worth of projects passed corporate review.

“Today, there’s simply not a lot of really secure forest carbon projects,” Willmott said in a [2022 interview](#) with National Geographic. “We see a problem with that across the U.S. and across the world.”

Microsoft, in a statement, said Green Diamond projects met Microsoft standards for “high-quality carbon removal.” The corporation declined a request to make Willmott available for an OPB interview, according to a spokesperson, because she had moved on to a new corporate position.

“For that balancing act of pollution and offsetting to really equal out for us we need to match the duration of the storage of CO2 with the duration of how long it stays in the atmosphere.”

Some researchers also cite what they view as a more fundamental flaw in using forests to offset fossil fuel emissions. Under the California board rules, the projects commit to store carbon dioxide for at least a century, yet the greenhouse gasses released by the combustion of oil, gas and coal may linger in the atmosphere for 1,000 years or more.

“It’s a really, really big mismatch,” said Grayson Badgley, a forest ecologist with [CarbonPlan](#), a California-based nonprofit that ~~watches the state’s forestry offset program.~~ “For that balancing act of pollution and offsetting to really equal out for us ... we need to

California regulators acknowledge the possibility that carbon storage projects will be undermined by wildfires, disease or financial stresses that prompt a landowner to abandon a plan and increase logging.

To deal with this risk, the state regulatory board requires landowners to refrain from selling some of their carbon credits. Instead, they dedicate them to a kind of insurance policy called the buffer pool. If wildfires or disease kill lots of trees and undermine a project, or financial stresses prompt a landowner to abandon the plan and step up logging, the insurance pool can be drawn down to cover the losses.

The buffer pool, as it pays out credits, enables purchasers of carbon offsets to say they are still meeting their climate goals. It also reduces risks for developers like Green Diamond, because they can potentially retain all the revenue from selling carbon even when a project is terminated.

The California state buffer pool currently has some 31 million credits, including nearly 6 million credits that were put in to cover fire risks. Already, the carbon losses from fires on six Western projects are expected to exceed 7 million credits, according to reporting documents filed by project developers that were reviewed by Badgley, of CarbonPlan.

The biggest hits to date on the buffer pool will come from the more than 3.7 million in wildfire carbon credit losses reported by the Colville Tribes in northeast Washington state, according to documents filed by the tribe.

The tribe fashioned one of the most ambitious forestry projects yet. It encompasses more than 500,000 acres of heavily timbered lands that had lots of stored carbon. By pledging to keep the logging well below a maximum yield scenario, the project generated more than 12 million in carbon credits, all of which were purchased by BP.

The selling price was undisclosed, but at market prices in recent years, the credits would have generated more than \$120 million. The money went into a tribal investment account that funds projects like construction of drug treatment and health clinics, said Cody Desautel, the Colville's executive director who helped develop the project.

As the project was being put together in 2015, one big wildfire raged on Colville lands, prompting a reshuffling of the boundaries. That fire and subsequent blazes have burned across half of the tribal lands during a six-year period.



In this file photo from July 2021, Shane Durant watches the Bootleg Fire smoke plume while walking his dog near Bly, Ore. Large wildfires, such as Bootleg, are occurring with more frequency in the past several years.

Nathan Howard / AP

“It’s kind of an odd duck that there has been so much fire on such a big landscape,” Desautel said. “Bad luck, I guess.”

And the carbon losses from fire that hit the Warm Springs project have yet to be publicly disclosed. But they will add to the drawdown from the buffer pool.

California state officials say that the buffer pool still has plenty of credits to cover any carbon project setbacks.

David Clegern, the public information officer for the California board, said that all of the credits initially put into the account to cover financial or disease setbacks also can be used for fire losses.

But as the wildfire toll on carbon projects mounts, California board officials are reviewing the risk formulas used to calculate contributions to the buffer.

“We said wildfires are going to become a bigger deal. We’ve been saying that for a long time,” Clegern said. “So, we can adjust. I’m just not sure we’ve gotten to the point where we’re ready to discuss what we’re going to do.”

Climate change comes home

The summer of 2021 brought a stunning heat wave to Oregon that helped to drive home the extremes of climate change.



In this file photo provided by the Bootleg Fire Incident Command, a firefighter works during nighttime firefighting operations on July 15, 2021.

Bootleg Fire Incident Command via InciWeb

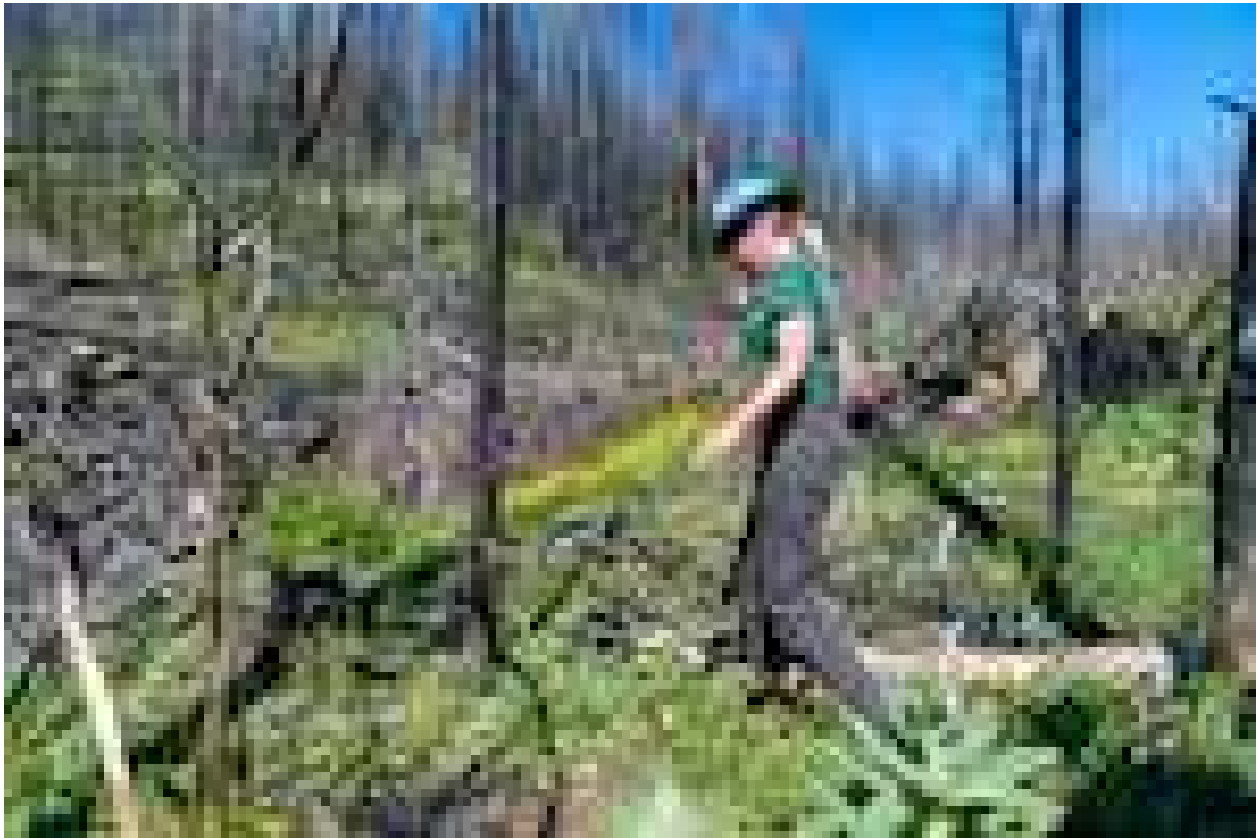
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On June 28, temperatures reached 116 degrees Fahrenheit in Portland. Eight days later, lightning ignited the Bootleg Fire amid a prolonged Southern Oregon drought. The fire spread from west to east. It sent up giant plumes of smoke that would collapse on themselves, creating fierce downdrafts that acted like bellows to spread flames that eventually destroyed more than 400 buildings.

Green Diamond forestry crews quickly mobilized, using bulldozers and feller bunchers to carve out lines to try to block the flames' advance. In a single day, the fire moved more than 7 miles to the east and overwhelmed that effort. It ripped through young stands, and — in a few isolated areas — fed on slash piles that had yet to be burned during the earlier years of Green Diamond's land ownership.

“The conditions that year, when the fire got up and ran on any given day, all you could do is get out of the way, and wait for it to lay down and start chipping around the edges and push it in some direction,” said John Davis, a Green Diamond vice president based in Klamath Falls.

After the fire, Green Diamond salvage logged a small amount of timber that had value at the mills.



Leigh Ann Vradenburg, project manager for the Klamath Watershed Partnership, walks along Brownsworth Creek east of Bly, Ore., June 30, 2023. The area is important for threatened bull trout and was heavily damaged in the 2021 Bootleg Fire.

Kristyna Wentz-Graff / OPB

Along some stream lengths, a restoration crew dropped hundreds of standing snags into channels to help catch the silt from eroding slopes and create cool new pools where fish could find refuge. These jumbles of logjams are intended to help the waterway recover.

“It’s really challenging for people’s perceptions. ... You imagine this nice little quiet stream, and it’s all open,” said Leigh Ann Vradenburg, who is project manager for Klamath Watershed Partnership, which organized those efforts on Green Diamond lands. “But any functional stream is messy. The downed wood is a necessary part of any stream ecosystem, especially post-fire.”

Within the Green Diamond burn zone, which stretches across more than 100,000 acres, the vast majority of the dead trees have been left on the land. They had scant market value, and clearing them away would have been a massive, expensive and time-consuming task.

Davis and Kostick, the forest manager, hope that the dead trees will provide a benefit. They can act like sunscreen, cooling the hot summer air for the young seedlings that have been planted underneath them in this arid forest.

On a 90-degree day earlier this summer, they parked their trucks along a roadway, then entered a severely scorched area to inspect several tiny ponderosa pines that grew in powdery white soil beneath a graveyard of older trees.

their size when planted a year ago.



A small ponderosa pine seedling in its second growing season in Klamath Basin forest, June 29, 2023. The 2021 Bootleg Fire burned through some 100,000 acres of the Seattle-based company Green Diamond's Southern Oregon timberlands that were part of a carbon offset project now proposed for termination. In some areas, the fire killed nearly 100% of the forest cover.
Kristyna Wentz-Graff / OPB

“I don’t know if it will work out or not, but the theory is having the dead trees is a shade benefit,” Davis said. “It’s an experiment on a large scale ... I think we are off on a really good trajectory here.”

Continuing to try carbon offsets

All through this century, climate change will continue to up the risks to the Klamath Basin forest.

Snowpacks that provide key moisture are [forecast to shrink and melt off earlier](#). Warmer, drier and hotter summers could slow the growth of the next generation of trees. In some areas, forests are likely to give way to brush or grasslands. Fires are forecast to grow larger.

The standing dead trees, which still retain most of the forest carbon, would provide plenty of fuel should a new fire reach the Bootleg burn zone.

To try to fend off the next runaway blaze, Green Diamond has embarked on a short-term strategy of removing carbon from the forest to try to up the chance for its long-term survival.

Along some stretches of road, Green Diamond crews have stripped away 100-foot-wide swaths of timber to create a stronger network of fire breaks.

Some 7,000 acres burned by Bootleg went through a major thinning that turned smaller trees into chips hauled to a Klamath Falls fiberboard plant and left larger trees with more space to grow. The tree density, in some 20 different tracts, was reduced by some 75%.

Even without an additional treatment — prescribed fire undertaken on some nearby parcels of Forest Service land — most trees in the thinned forests are still alive in what Davis said was one of the few “silver linings” to emerge from the Bootleg Fire.



The Klamath tribes worked in collaboration with the Forest Service, to thin and conduct prescribed burns in this area months before the Bootleg Fire swept through, resulting in less fuel for the fire.

Kristyna Wentz-Graff / OPB

All of this gives Davis hope that another big fire can be avoided, and that a new forest will mature.

Already, Green Diamond is thinking about putting another carbon project on these same Klamath lands.

“We’re not abandoning this strategy,” Davis said. “That’s definitely on the table.”

Jefferson Public Radio reporter Roman Battaglia and OPB reporter Tony Schick contributed to this story.

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