ECONOMIC IMPACTS TO OREGON'S FOREST SECTOR
SUMMARY REPORT – NOVEMBER 2021

Oregon Forest Resources Institute

2020 LABOR DAY FIRES

A HISTORIC FIRE SEASON

U.S. Forest Service

More than 1 million acres burned

The Labor Day 2020 windstorm resulted in five simultaneous "megafires"– fires greater than 100,000 acres in size – in Oregon, as well as 12 other fires ranging from 112 to 50,951 acres. All these fires either started or blew up on Sept. 7 and 8, 2020, and in a matter of days more than 1 million acres burned.

These fires destroyed thousands of structures, displaced tens of thousands of Oregonians, and caused nine deaths. Hundreds of millions of dollars were spent fighting them.

While 2020 was not the largest fire year in Oregon's history, the Labor Day 2020 fires burned more acres in the Cascade mountain range than any other year, and set a record for fire acreage on lands protected by Oregon Department of Forestry fire crews. Also unusual is the fact that nearly half the burned area was privately owned

Cover photo: Douglas Forest Protective Association, Archie Creek Fire

timberlands, which sustainably provide the bulk of Oregon's timber harvest that local mills use to make a variety of wood products. Despite the herculean challenge of salvaging timber and reforesting such a large swath of burned forestland, Oregon's forest-related businesses and industries have made rapid progress in restoring forests affected by the Labor Day wildfires.

In light of 2020's historic fire season, the Oregon Forest Resources Institute (OFRI) commissioned a study examining how the Oregon forest sector, the portion of the state economy that's reliant on forests, was affected. Conducted by experts from the natural resource consulting firm Mason, Bruce & Girard, in partnership with the forestry economic analysis and forecasting firm Forest Economic Advisors, the 104-page report looks at the economic impacts of last year's Labor Day fires on the sector, which ranged from lost timber and forestry and logging equipment to forest restoration efforts made more difficult by unanticipated demand for resources such as tree seedlings.

2020 Labor Day Fires: Economic Impacts to Oregon's Forest Sector — Full Report looks at the various ways forest landowners and businesses such as logging companies and sawmills were affected by last year's fires, presenting its finding that the Labor Day wildfires had substantial impacts on the sector and will continue to impact Oregon's timber supply, forest-related employment and other economic factors well into the future.

Key points from the report are summarized on the following pages.

To download the full report, go to **OregonForests.org/publications**

LABOR DAY FIRES SIGNIFICANTLY IMPACTED OREGON'S FOREST SECTOR

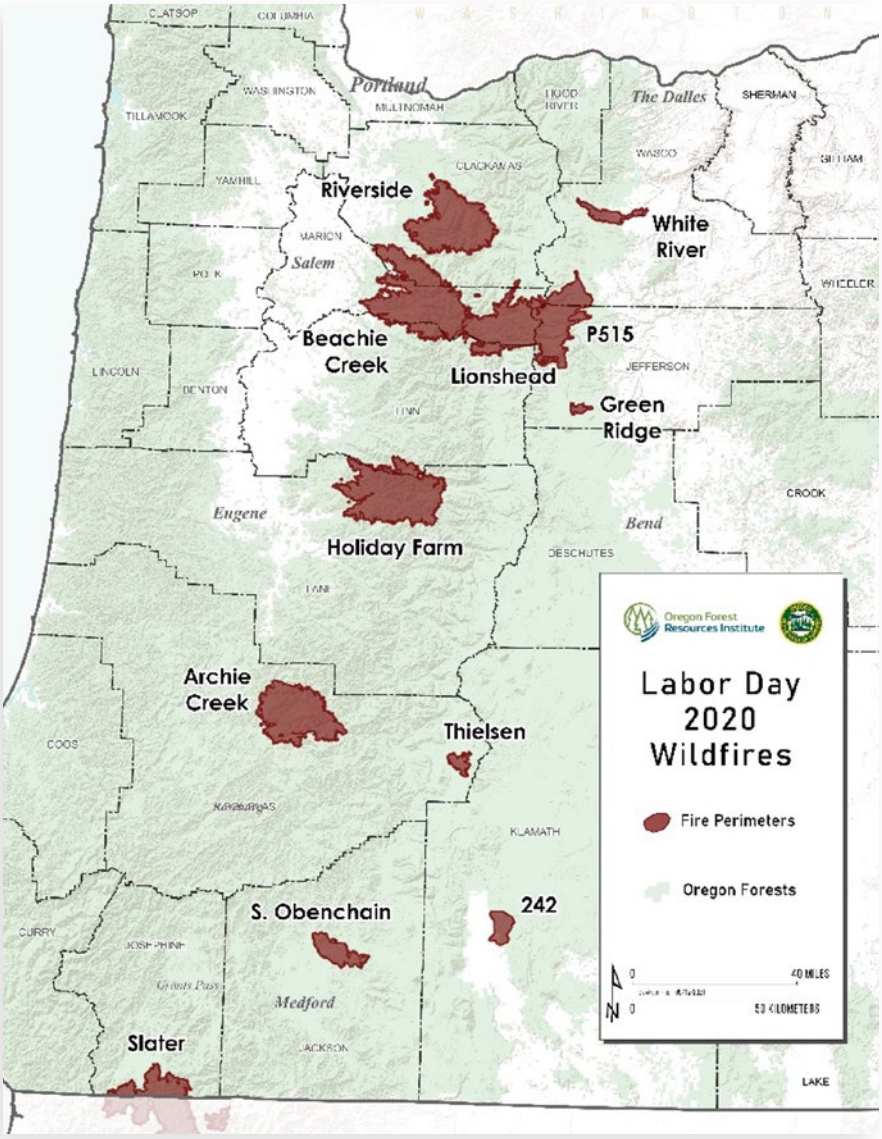
- The 12 wildfires examined in the *2020 Labor Day Fires* report burned about 971,000 acres, containing nearly 15 billion board feet (bbf) of green timber with over $30 billion of end-product value.
- Areas that burned with medium and high severity covered nearly 600,000 acres, containing 9.2 bbf of timber and having an end-product value of $18.6 billion.
- Areas that were potentially available for salvage timber harvest and restoration and reforestation would encompass 157,000 acres, with a volume of 3.9 bbf and an end-product value of $7.5 billion.
- Private lands account for 46% of the forested acres burned in these fires, 17% of the volume on burned acres, and 19% of the value of timber on the burned acres. Private landowners are expected to salvage about 860 million board feet (MMbf) of burned timber, which is 64% of the total expected to salvage logged.
- Timber volumes and values on burned public federal lands were proportionally higher, as these lands typically have older timber. Salvage logging from the burned public lands will be more limited than on private lands, due to limitations imposed by policies, budgets, staffing and the likelihood of environmental challenges.
- Across all landowners, expectations are that about 106,000 burned acres will undergo salvage harvest, producing about 1.4 bbf with an end-product value of $2.6 billion. Overall, about 14% of the value of the timber on acres burned with medium or high severity is expected to be recovered.
- The loss of timber on merchantable and pre-merchantable timber stands will reduce future harvests by 115 to 265 MMbf per year over the next 40 years. This will cost Oregon's forest sector 1,200 to 3,000 jobs each year during that time period.
- Taking into consideration the unrecovered value of the burned timber on forests affected by the Labor Day wildfires that would be available for sustainable harvest and the costs of restoration and business losses, the total economic impact of the 2020 fires on Oregon's forest sector is about $5.9 billion.

Disclaimer: The *2020 Labor Day Fires* report examines **only** the economic impact to Oregon's forest sector, and does not include general economic impacts and other non-economic impacts.


Oregon Department of Forestry

THE FIRES AND ACRES BURNED

Labor Day fires burned across western Oregon



This map shows the location of the wildfires covered in the *2020 Labor Day Fires* report. Included are the five Labor Day mega-fires (Lionshead, Beachie Creek, Holiday Farm, Riverside, Archie Creek), four large Labor Day fires that have important impacts to Oregon's forest sector (Slater, South Obenchain, 242, Thielsen) and three fires that burned prior to Labor Day but have important impacts in central Oregon (White River, Green Ridge, P515). Collectively, these fires are referred to in the report as the "Labor Day 2020 Fires." Note that while there were other wildfires that burned on Labor Day 2020 that had catastrophic human impacts, particularly the Almeda Fire in southern Oregon, they are not included in this report because they minimally affected the forest sector.

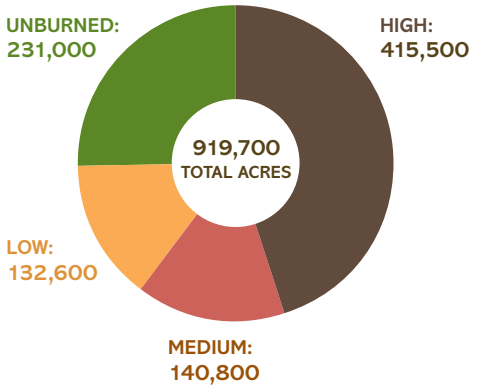
The Labor Day 2020 fires covered nearly a million acres of public and private forestland, primarily in western Oregon. Compared to the average Oregon fire year, the Labor Day 2020 fires were unusual for involving more private land and burning more acres in western Oregon.

LABOR DAY 2020 FIRES

Fire	Total Forested Acreage
Lionshead	192,900
Beachie Creek	182,600
Holiday Farm	165,800
Riverside	131,900
Archie Creek	125,500
Slater *(Oregon acres only)*	43,800
South Obenchain	31,000
White River	15,000
242	13,300
Thielsen	9,500
P515	4,400
Green Ridge	4,200
TOTAL	**919,700**

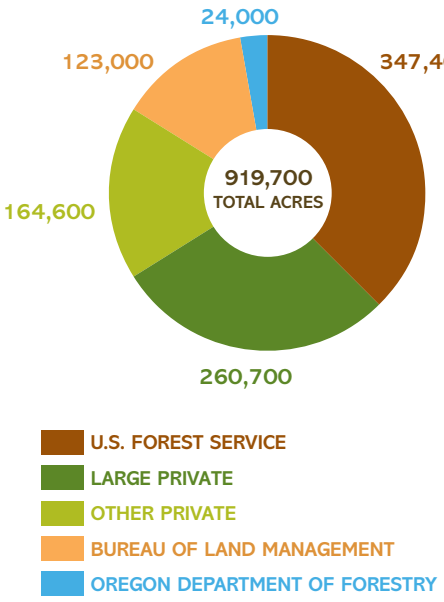
The total forested acres burned in each of the Labor Day 2020 fires. Note that the total acreage within the perimeters of these fires is 970,900 acres, which includes non-forested land and roads.

Acres burned, by fire severity level



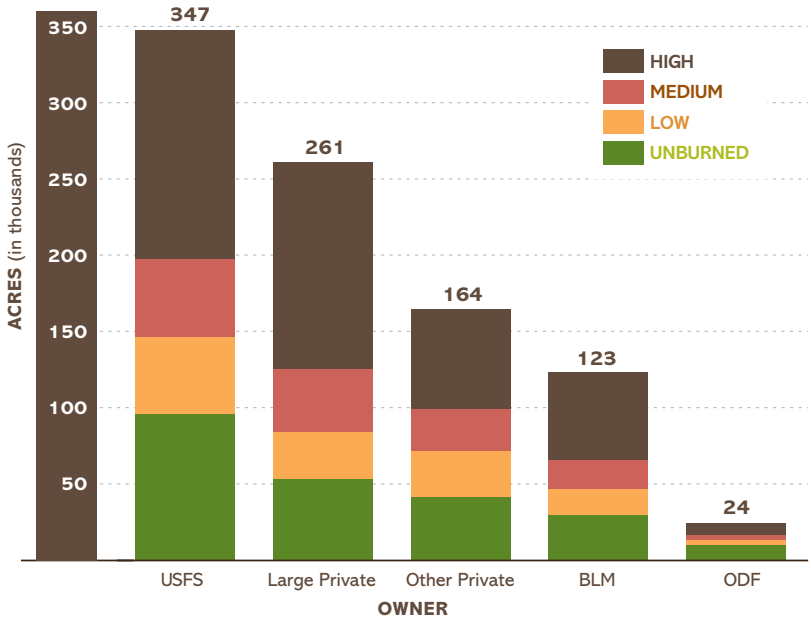
Forested acres burned in the Labor Day 2020 fires by severity class, along with the percentage of burned acres in each class. Most wildfires are a mosaic of fire severity. The 2020 fires had a total of more than 60% of their acres burned with high or medium severity.

Acres burned, by ownership



Forested acres burned in the Labor Day 2020 fires by ownership group, and the percentage of burned acres in each group. "Large private" includes larger tracts of forestland owned by timber companies. "Other private" includes small woodlands and tribal forests. Overall, private land accounts for 46% of the forested acres burned in these fires. This is much higher than the 7% of average private land percentage for the past ten years, as shown in OFRI's *Oregon Forest Facts 2021-22 Edition*.

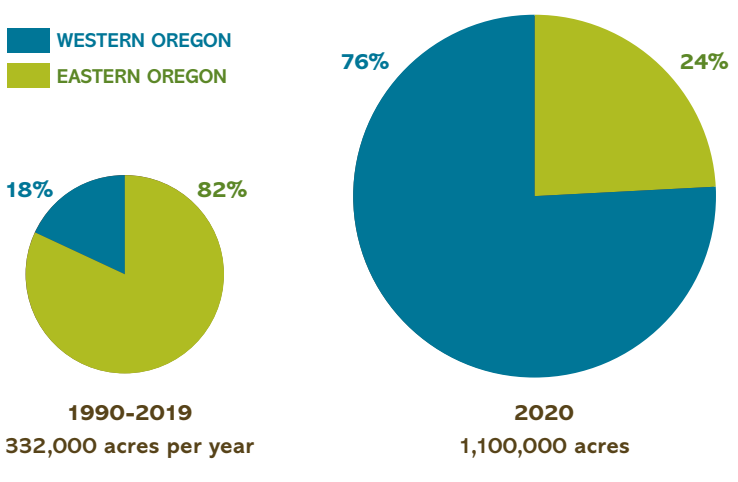
Acres burned, by ownership and fire severity class



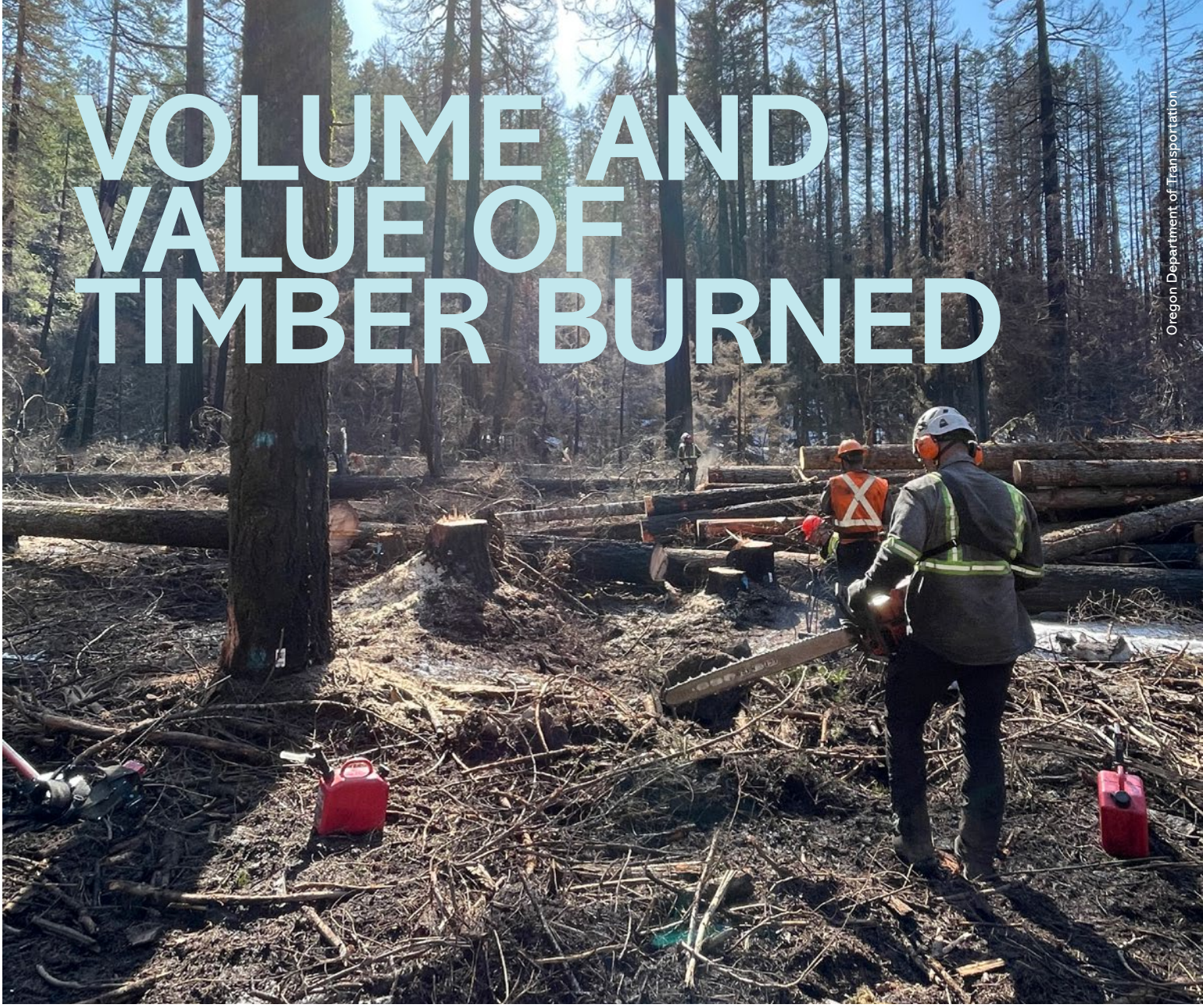
Acres of forestland burned by ownership group and fire severity, which is measured by the percentage of the forest canopy killed by fire as estimated in the U.S. Forest Service's Rapid Assessment of Vegetative Condition after Wildfires. High = >75%, Medium = 25-75%, Low = <25%, and Unburned = no damage.

Eastside versus Westside

Data collected annually by the National Interagency Fire Center were used to compare the total acres burned by wildfires in eastern Oregon versus western Oregon. For the 30 year period from 1990-2019, wildfires burned an average of 332,000 acres in Oregon each year, with an average of 18% being in western Oregon. In 2020, there was a total of more than 1,100,000 acres burned, with 76% of them in western Oregon, where multiple large wildfires broke out following a historic windstorm around Labor Day.



VOLUME AND VALUE OF TIMBER BURNED



Oregon Department of Transportation

Study examined fires' economic impact

To examine the economic impact of the Labor Day 2020 fires on the Oregon forest sector, an accounting was made of the acres, volume and value of timber burned in total, and by the various public and private landowner groups. Fire severity and potential for salvage harvest were also examined.

In assessing the acres, volume and value of timber burned in the Labor Day 2020 fires, the Mason, Bruce & Girard and Forest Economic Advisors analysis used a "waterfall" approach, as shown in the first table on page 7. First, the total forested acres burned are estimated. Then the acres that burned with medium and high severity are estimated, since these are the areas most in need of restoration and most likely to be candidates for salvage timber harvest. The number of potential burned acres available for salvage logging is then listed. Finally, the probable value of salvaged timber is calculated. The full report addresses a number of salvage-related issues, and the complexity of this calculation. Board-foot volume of timber burned is estimated for each group of burned acres, and end-product value is estimated using $1,929 per thousand board feet (Mbf).

ACRES, VOLUME AND VALUE OF BURNED ACRES

	Acres	Volume	Value
Total forested acres burned	919,700	14.9 bbf	$30.1 billion
Areas that burned with medium and high severity	594,800	9.2 bbf	$18.6 billion
Potential areas available for salvage timber harvest	157,000	3.9 bbf	$7.5 billion
Probable areas that will be salvaged	105,800	1.4 bbf	$2.6 billion

More details can be found in Tables 8, 12 and 16 of the *2020 Labor Day Fires* full report.

ACRES, VOLUME AND VALUE OF BURNED ACRES BY OWNER

	Forested acres burned	Volume of timber burned*	Monetary value of timber lost**
U.S. Forest Service	347,400	5.3 bbf	$3.47 billion
Bureau of Land Management	123,000	2.2 bbf	$1.19 billion
Oregon Department of Forestry	24,100	0.2 bbf	$293 million
Large private	260,700	1.1 bbf	$1.79 billion
Other private	164,500	0.4 bbf	$764 million
TOTAL	**919,700**	**9.2 bbf**	**$7.5 billion**

Acres, volume and value of timber burned, estimated by owner group, including federal, state and privately owned forests. *The volume of timber burned is merchantable timber that burned at medium or high severity. **The monetary value of timber lost was estimated based on the volume potentially available for salvage.

DISTRIBUTION OF END-PRODUCT VALUE

Measure of value	$/Mbf	% of value
Net stumpage to landowner	$ 370	19%
Production costs	$ 330	17%
Delivered log value	$ 700	36%
Manufacturing, sales, shipping	$ 1,229	64%
End-product value	$ 1,929	100%

The *2020 Labor Day Fires* analysis based the value of timber on the value of end-products that could potentially be produced by Oregon's wood products manufacturing sector from the burned (salvaged) timber. This end-product value is distributed between manufacturing, sales and shipping costs, and delivered log value, which includes logging and log hauling costs and net stumpage (return) to landowners.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WHAT IS SALVAGE HARVEST?

Salvage harvest is often the first step many professional forest managers take to restore forestland that's burned in a wildfire. It involves harvesting fire-killed trees while they're still merchantable timber. Revenue generated from the sale of the salvaged timber can help forest landowners fund reforestation and other post-fire forest restoration work.

In addition to recovering the financial loss from burned timber, removal of burnt trees reduces future fire hazard, improves public safety, especially along busy roads and highways, and makes it easier to conduct post-fire reforestation and repair fire-damaged access roads. Of course, measures must be taken to reduce soil erosion and stream sedimentation during salvage harvest.

Salvage harvest needs to happen within one to two years following a wildfire because the utility and value of wood from fire-killed trees rapidly deteriorates as the dead trees quickly succumb to decay and damage by wood-boring insects.

2020 LABOR DAY FIRES PROFILE: JEFF PLIKAT

When the Archie Creek Fire burned more than 131,000 acres east of Roseburg in the late summer and fall of 2020, it affected Jeff Plikat both professionally and personally.

The fire immediately shut down the work of his family's business, Roseburg-based Plikat Logging, leading to a scramble to save equipment they had set up in the woods from the approaching flames. "We hauled up what equipment we could get at the time, and started putting in fire lines," he says. The Archie Creek Fire was also headed straight toward 250 acres of timberland his family owned near Rock Creek.

For two weeks, about a dozen Plikat Logging employees helped dig fire lines on private forestland using company equipment "till the fire dropped and we were able to get back to logging," Plikat says. That's when the true impact of the Archie Creek Fire became apparent.

Plikat Logging during the fires lost 12 pieces of heavy equipment, including a yarder, which is a large piece of equipment that uses a cable system operated by a rigging crew to fly whole trees from the stump to a roadside. As for the timberland his family had purchased with plans to turn it into a private campground and outdoor retreat, the entire property burned in the fire.

"It was going to be a family escape," Plikat said. "That all literally went up in smoke."

Once the fire was out, Plikat Logging immediately transitioned from logging green trees to burnt ones, both on their own forestland and those of their clients, he says. Salvage logging continued to be a good portion of their work in 2021, as private landowners recouped some of their decades of investment before the charred trees rotted and were devalued by wood-boring insects.

"It seems like it's something we're going to have to adapt to. It's the new normal," Plikat says. "We're going to have to learn to deal with more burnt trees."

Despite the losses he and his family suffered in the Archie Creek Fire, Plikat remains committed to the logging and trucking business his father started, with its 75 employees, which include his sister, brother-in-law and wife.

"We're not in it alone. Every logging company here threw everything at fighting this fire," he says. "It's our livelihood that we watch go up in smoke every summer."


Jeff Plikat


Jeff Plikat

Andrew Yancy, Skyline Video

SALVAGED WOOD FINDS NEW LIFE IN PORTLAND AIRPORT ROOF

When the 2020 Labor Day wildfires burned through the forests of the Santiam Canyon about 50 miles south of the Portland International Airport, one impact was altered plans for a $2.2 million terminal renovation and expansion project that called for the use of as much locally sourced wood as possible.

Now much of the wood for the new roof over the airport's main terminal, designed by Portland-based architecture firm ZGF to pay homage to Oregon's vast forests, will be built using wood salvaged from those wildfires. The mass timber roof features a lattice design inspired by local weaving traditions, with each lattice traceable back to its forest of origin, including areas that burned in the Labor Day fires.

Andrew Yancy, Skyline Video

Among the Oregon mills supplying salvaged wood for the project is Lyons-based Freres Lumber. It has been using timber salvaged from a portion of its forestland that burned in the Beachie Creek Fire, as well as other burned forests, to create mass plywood panels, or MPP, a veneer-based mass-timber product that's being used to construct the terminal roof.

Portland International Airport expects to open its new terminal in 2025. Its design aims to bring a sense of calm to frantic travelers with its ample greenery and forest-like atmosphere.

RESTORATION AND REFORESTATION

of the burned area

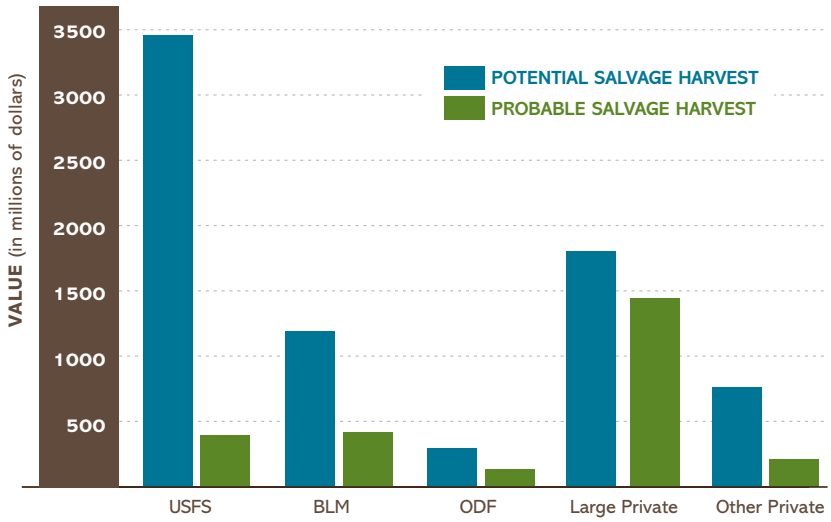
Forest restoration after the Labor Day 2020 wildfires will take many forms and face many challenges. This restoration can include post-fire rehabilitation activities – restoring forests without salvage, timber salvage and reforestation. Which restoration treatments are carried out depends on the intensity of the burn, the age of the forest, and the owner's objectives.

Post-fire rehabilitation activities include actions taken immediately after the fires to limit soil erosion and stream sedimentation. Additional rehabilitation may involve reducing hazards and repairing infrastructure such as forest roads, hiking trails, campgrounds and other recreation sites. Federal agencies prepare Burned Area Emergency Rehabilitation (BAER) plans to identify the need for post-fire rehabilitation on their lands. Private forest landowners create rehabilitation plans as well.

The amount of timber salvage anticipated differs widely by owner group. The *2020 Labor Day Fires* analysis estimates that 64% of the expected total salvage volume will be from private land.


Andrew Yancy, Skyline Video

Potential and probable salvage harvest value



*More details can be found in Tables 16, 18 and 19 of the *2020 Labor Day Fires* full report.

The chart above shows the value of timber available for salvage, and the value likely to be recovered in salvage harvest, by landowner group.

Private landowners commonly manage their forests primarily for sustainable timber production, and are therefore more likely to salvage log and then reforest burned areas. Publicly owned forests face more obstacles to salvaging and restoring burned forests, including non-economic objectives and litigation seeking to stop salvage logging on public lands. Some private forest landowners are also less likely to salvage harvest because of factors such as the cost.

Post-fire restoration and reforestation plans also vary widely by forest owner group. The table below shows expected acres to be planted with new trees post-fire, in comparison to forested acres burned with medium and high severity.


Andrew Yancy, Skyline Video

REFORESTATION ON FORESTED ACRES BURNED (with medium or high severity)

	Acres burned	Acres to be replanted
U.S. Forest Service	215,000	75,000
Bureau of Land Management	79,700	39,844
Oregon Department of Forestry	11,400	6,600
Large private	187,700	178,237
Other private	101,000	60,597
TOTAL	**594,800**	**360,278**

Private landowners who have the highest rates of expected salvage also have the highest rates of expected reforestation. Oregon's Forest Practices Act requires reforestation after salvage harvest, but does not require reforestation on acres that are not salvaged.

LABOR DAY FIRES PROFILE: KATE MCMICHAEL AND THERESA HAUSSER

As avid hikers and backpackers, Kate McMichael and Theresa Hausser were thrilled when they acquired 39 acres of forestland near the Oregon town of Vida in 2019, allowing them to leave behind their urban lifestyle in the San Francisco Bay Area and retire in a place where they'd be surrounded by nature.

The property, which had a stand of trees about 10 to 15 years away from being ready to harvest, was their retirement investment. They'd just started building a house there when all their carefully laid plans for the property changed in late summer 2020. That's when the construction site and their entire forest burned in the Holiday Farm Fire. While their home-building project was minimally impacted because it was still just a hole in the ground, the forest around it was not so lucky.

Suddenly, McMichael and Hausser went from not planning to log any trees on their property until a decade or more in the future, to salvage harvesting 12 acres of their 35-year-old trees that burned in the fire, and learning about the ups and downs of reforesting and restoring forestland after a wildfire.

"We've had a lot of having to reset our expectations," McMichael says.

Once the salvage harvest was completed, McMichael and Hausser, with the help of a neighbor who is a consulting forester, hired a professional crew to plant Douglas-fir and grand fir seedlings to reforest the harvested area. They also got some seedlings from a local timber company forester and bought 300 Willamette Valley ponderosa pines and 100 incense-cedars from a nursery, which they planted themselves to replace other trees on their property that were killed by the fire.

Then the rain stopped, and much of Oregon was gripped by a record heat wave in the summer of 2021. Determined to keep their trees alive, McMichael and Hausser watered as many seedlings as they could, using a backpack water sprayer commonly used by firefighters.

All photos courtesy of Kate McMichael and Theresa Hausser.

Despite their efforts, the young trees turned a rust color a few days after the "heat dome," and they only managed to save about a dozen by taking them out of the ground and putting them into pots.

In spite of the setback, they plan to try again next planting season and are hopeful they'll have better success this time around. It helps to put the whole experience of the wildfire and trying to reforest their property afterward into perspective, Hausser says.

"As we heard over and over again in our Forestry and Natural Resources Extension classes, forests begin and end in disturbance," she says.

"We repeat that a lot," McMichael adds.

As novice forest landowners thrust into a challenging situation, McMichael and Hausser say they're grateful for the assistance they've gotten through informative resources such as Oregon State University Extension and Oregon Women in Timber.

"This is really an amazing community of people in forestry and timber," McMichael says. "There are so many people who are willing to help."

Although they had very different expectations when they first bought their forestland, both remain just as passionate about caring for it, she says. "The forest we fell in love with is gone, but the woodland we have come to love is still here."

SEEDLING SHORTAGE HAMPERS REFORESTATION PLANS

Post-fire reforestation efforts following the Labor Day wildfires are being complicated by limited tree seedling supply and nursery production. Planting the 360,000 acres that are planned for will take about 126 million seedlings, assuming 350 seedlings planted per acre. Nursery production in Oregon is about 71 million seedlings per year. Accounting for up to 40 million seedlings per year for other reforestation efforts unrelated to the fires, it will take more than three years of seedling production to reforest these acres.

CHALLENGES FACING SMALL WOODLAND OWNERS

According to the Oregon Department of Forestry (ODF), a total of 5,660 family forest landowners were affected statewide by the Labor Day fires. The vast majority, 4,193 landowners, own five acres or less. The remaining 1,467 landowners hold properties ranging in size from five to 5,000 acres.

Family forest landowners face several hurdles to rehabilitating and reforesting their lands after a fire. The first barrier is financial. Federal cost-share programs can aid landowners, but some are unwilling to become involved in federally funded assistance programs. Some landowners may also be dealing with other factors such as the major impact of losing their homes and being displaced from their properties.

In addition, many landowners lack the technical know-how when it comes to restoring their forestland following a wildfire. ODF stewardship foresters and Oregon State University Extension foresters are a big help here. Landowners can find contact information for their local stewardship or extension forester, as well as other sources of technical assistance in their area, at **KnowYourForest.org**.


Pilkat Logging Inc.

FUTURE timber harvest and employment IMPACTS

Over the next few years, most of the fire salvage logging, restoration and reforestation activity will be focused on the 157,000 acres of forestland that burned with medium or high severity, which have merchantable timber, and are considered available for long-term timber management under current plans and regulations. However, the impact of the 2020 Labor Day wildfires will be felt for at least the next 40 years, because a total of 222,000 acres of private lands were burned with medium and high severity. This includes pre-merchantable acres that will not be providing timber harvest that was anticipated prior to the fires.

Large private forest landowners and many family forest landowners are managing their land for economic returns derived from periodic timber harvest. The table in the bottom left corner of this page summarizes the impact of the fires on the future timber harvest compared to what would have been anticipated prior to the fires. An expected average reduction of 161 million board feet in annual timber harvest over the course of the next 44 years will lead to a total loss of about 7.1 billion board feet of timber that could have been harvested from these lands.

Employment impacts

The economic value of the burned timber was accounted for as $7.5 billion in the table on page 7. However, there are additional impacts in terms of employment. The table to the left also shows the direct job impacts of the projected timber harvest reduction at the rate of 10.9 jobs per million board feet. Over the long term, the loss of the timber on the burned acres is expected to affect about 1,200 to 3,000 direct jobs per year in Oregon's forest sector. To put that in context, OFRI's *The 2019 Forest Report* indicates there are about 36,000 direct jobs in Oregon's forest sector. Direct sector jobs, as shown in the graphic on page 15, include those related to growing and harvesting timber for manufacture into primary wood products such as lumber, plywood and engineered wood products.

FUTURE ECONOMIC IMPACTS OF LOST TIMBER

Years	Harvest shortfall (million board feet)	Direct jobs impacted
2021-25	17	0
2026-30	113	1,229
2031-35	122	1,327
2036-40	129	1,404
2041-45	144	1,567
2046-50	172	1,871
2051-55	229	2,492
2056-60	267	2,905
2061-65	222	2,415

The harvest shortfall and direct jobs impacted due to loss of merchantable and pre-merchantable timber.

TOTAL ECONOMIC IMPACT to the forest sector

The *2020 Labor Day Fires* study focused on the portion of Oregon's forest sector related to the production of primary wood products by Oregon-based manufacturers. Included are all the subsectors related to growing and harvesting timber for manufacture.

The estimated $5.9 billion total net economic impact of the Labor Day 2020 fires is even more significant when compared to the $12.7 billion annual economic output of the Oregon forest sector. This means the total negative economic impact of the fires is equal to about 46% of the sector's annual output.

The Labor Day 2020 fires have had a significant impact on Oregon, Oregonians and the Oregon forest sector. Nearly a million acres were burned and 9.2 billion board feet of timber was lost and with a net economic impact of $5.9 billion.

A story of resilience

The effects of the Labor Day wildfires will be felt for years to come, but – like the forests that burned in those fires – Oregon's forest sector is resilient. Foresters, loggers, tree planters, scientists and other forest professionals have been working ever since the smoke cleared to restore the forests that they pride themselves in stewarding, as well as to better understand how our forests respond to and recover from wildfire. As we start to see the burned forests across western Oregon slowly turn green again, we can be proud of all their hard work.

Oregon's forest sector includes direct jobs in forest management, timber harvest and manufacturing.

SUMMARY OF ECONOMIC IMPACTS

Impact description	Amount
Value of merchantable timber available for harvest	$7,513 million
Value of pre-merchantable timber	$704 million
Road reconstruction costs	$27 million
Losses to forest contractors	$100 million
Reforestation costs	$144 million
Gross economic impact	**$8,488 million**
Offset – value of timber likely to be salvaged	$2,604 million
Net economic impact	**$5,884 million**

The economic impacts of the 2020 Labor Day fires were found in various parts of Oregon's forest sector.

Andrew Yancy, Skyline Video

ABOUT THE OREGON FOREST RESOURCES INSTITUTE

The Oregon Legislature created the Oregon Forest Resources Institute (OFRI) in 1991 to support and enhance Oregon's forest products industry by advancing public understanding of forests, forest management and forest products, and encouraging sustainable forestry through landowner education. A 13-member board of directors governs OFRI. It is funded by a portion of the forest products harvest tax.

Oregon Forest Resources Institute

OregonForests.org

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