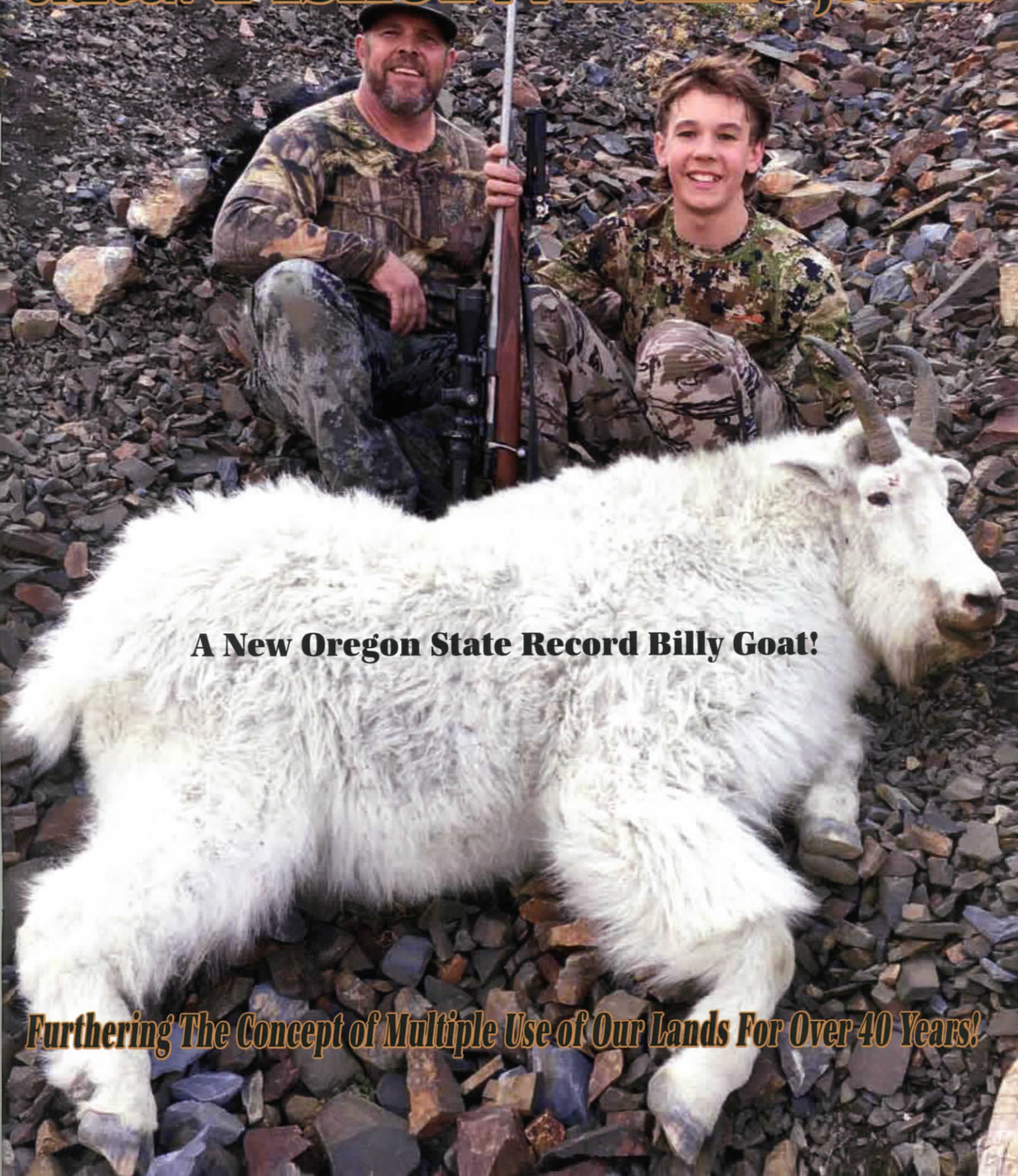


OREGON **Fish & Wildlife** JOURNAL



A New Oregon State Record Billy Goat!

Furthering The Concept of Multiple Use of Our Lands For Over 40 Years!

What's INSIDE...

- My Voice...** By Cristy Rein ... 5
- One For The Record Books!...** By Ryder Sturgell ... 7
- Front and Center, Biden Wildfire Scorecard No. 2...**
By Jim Peterson, Evergreen Foundation ... 15
- Chukar Hunting Basics...** By Dwayne Wells ... 17
- Decoding Fibs in Governor Brown's State of State Speech...**
By Taxpayer Association of Oregon ... 21
- A Burro Named Luigi...** By Cam Ghostkeeper ... 25
- Reforestation of the 2020 Labor Day Fires
in Western Oregon...** By Bob Zybach, Ph.D ... 31
- Flyfishing For Bluegills...** By Bill Palmroth ... 43
- Have We Learned Our Lesson?...** By Tootie Smith ... 47
- Standing Up For Rural Constituents...** By Karen Budd Falen ... 49
- President Biden's 30 By 30 Executive Order...**
By Sara Ghafouri, American Forest Resource Council ... 51
- Oregon Cattlemen Fight Wild & Scenic River Designation...** 52

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OUR COVER



Dennis and Ryder Sturgell with new record Billy Goat!

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Reforestation of the 2020 Labor Day Fires in Western Oregon

By Bob Zybach, Ph.D

The series of catastrophic wildfires that began on Labor Day, September 8, 2020 in western Oregon was the worst in the State's history. My previous article on this topic recounted the basic statistics: at least 10 people died, nearly a million acres burned, more than 4,000 homes were destroyed, and millions of wildlife killed -- almost all within a two- or three-day period. Toxic, acrid smoke blanketed the region for more than a week.

The rebuilding has already begun but will take years to complete. Thousands of families have relocated, hundreds of miles of roadway have been cleared, power has been restored, salvage logging operations have been underway since the beginning, and wildlife populations are on the rebound. Spring weather and rejuvenated flowers, grasses, and shrubs are carpeting the landscape.

To restore our homes and forests in such a way as to reduce the frequency and severity of such future events should be the next order of business. Tens of thousands of "protected" acres of "critical habitat" have been destroyed and can never be replaced in our lifetimes, if ever. Timber production has been greatly affected, and particularly on private lands devoted to that purpose. How to fix?

For more than 20 years I operated a small business in western Oregon that reforested more than 85,000 acres of burned and logged lands. So far as I know, none have since been damaged by wildfire, while thousands of acres have already been logged and replanted again -- creating thousands of jobs and bringing significant incomes into our rural families, businesses, and counties. Lessons learned from those experiences can provide a helpful roadmap for moving forward.



Fig. 1, Powerline right-of-way and grazing cattle. Beachie Creek Fire aftermath. November 8, 2020 video-clip by McKenzie Peters, NW Maps Co.

Land Ownership & Road Access

There were five basic types of landownership affected by the Labor Day Fires: federal; state; family farm (including tree farms); industrial timberlands (whose owners also have commercial wood manufacturing facilities); and residential, both urban and rural. Each type requires access to repair and restore, and each has differing laws and regulations regarding what can, or must, be done.

Road access is the most critical consideration in the management of these properties and is also important regarding the management of future wildfires, floods, landslides, ice storms, snowstorms, windstorms and their aftermaths.

Good rock roads may be gated on industrial timberlands, while on federal lands they may be entirely abandoned or even made inaccessible on purpose. Managing the predictable large-scale wildfires on public lands is made more difficult, costly, or even impossible for this reason.

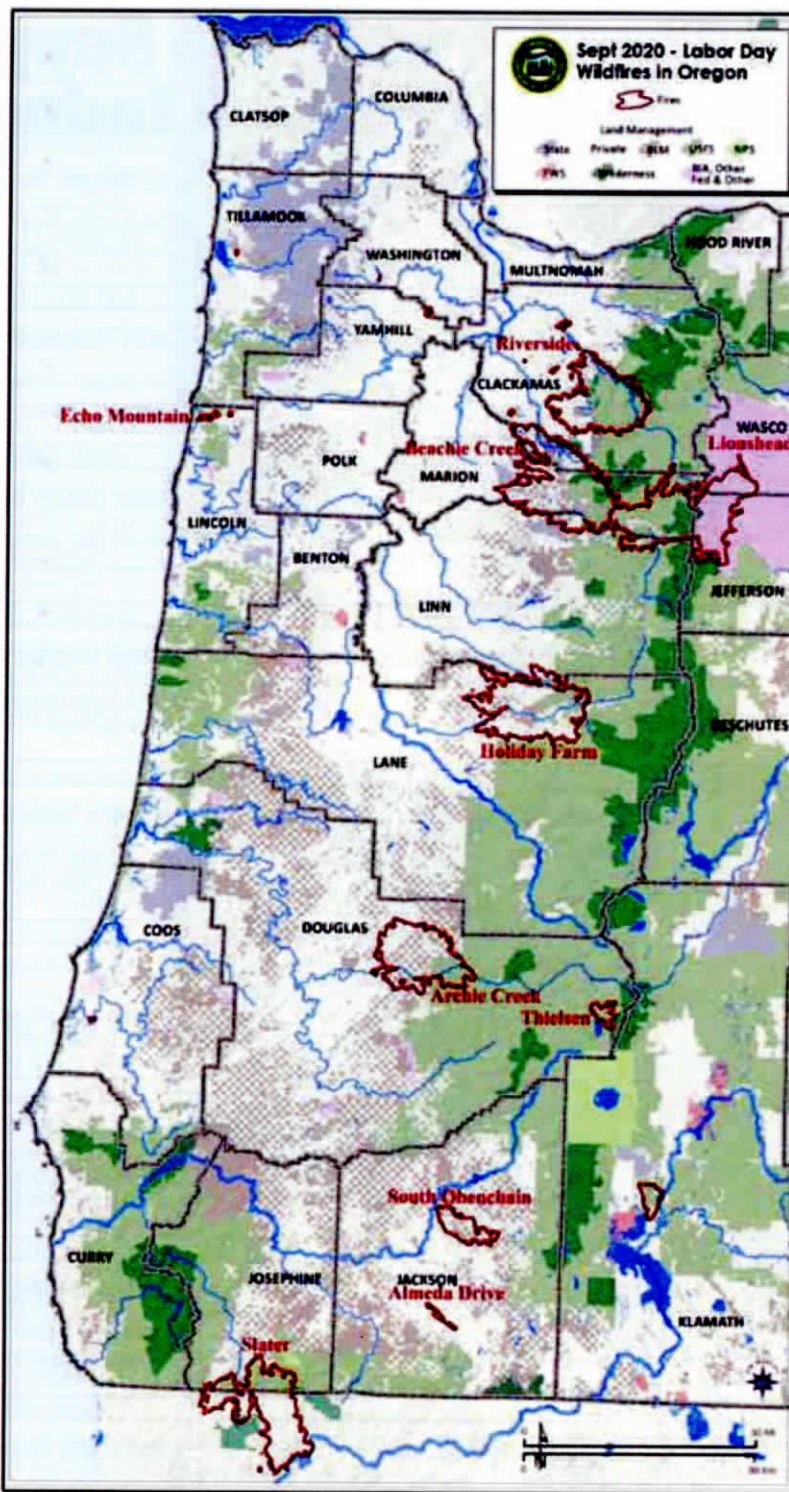
Federal lands, for example, include significant Wilderness areas that regularly burn in wildfires and in which access roads and the use of mechanical equipment is not allowed; dozens of designated Endangered Species Act "critical habitats" in which salvage logging, weeding, tree planting, or even entering may not be permitted; and hundreds of

miles of fish bearing streams with their own restrictions. Affected recreational facilities and access roads have largely been closed to the public since Labor Day, with no indication as to when they might be opened again, if ever.

The Santiam State Forest bore the brunt of damage to state lands, in which more than 16,000 acres burned in the Beachie Creek Fire. This area has similar regulations as federal properties, but with a greater mandate to be actively managed for the economic benefit of local communities. It, too, has closed affected access roads and recreational facilities to the public at this time.

Family farms and residential areas are usually located along highways and county roads, and those areas were typically opened within days or weeks of being closed by the fires. Irrigated lawns and crops, including Christmas trees, filberts, grapes, and pears, showed little evidence of fire damage -- although homes and outbuildings occasionally burned within these protected environments due to wind-driven cinders or adjacent trees.

Figure 2 shows rural cabin sites along the McKenzie Highway; among dozens that burned during the Holiday Farm Fire. Many of these were prized riverfront properties that had been within families for generations. All had a desirable market value. Now it appears that few of these structures may ever be rebuilt due to changed zoning laws and riparian regulations since they were first built and sold. This has effectively reduced the value of many of these properties to nearly nothing and made possible reconstruc-



Map 1. Western Oregon 2020 Labor Day Fire Perimeters, Names and Statistics.

- Alameda Drive.**
Jackson County. 5,700 acres,
2,400 homes, 3 deaths.
 - Archie Creek.**
Douglas County. 131,500
acres, 138 homes, 1 death.
 - Beachie Creek/ Lionshead
[Santiam].**
Marion County. 300,700
acres, 629 homes, 5 deaths.
 - Echo Mountain.**
Lincoln County. 2,600 acres,
293 homes.
 - Holiday Farm
[McKenzie River].**
Lane County. 173,000 acres,
517 homes, 1 death.
 - Riverside.**
Clackamas County. 138,100
acres, 62 homes.
 - Slater.**
Josephine County. 34,000
acres (Oregon); 700 homes,
2 deaths (California).
 - South Obenchain.**
Jackson County. 32,700
acres, 33 homes.
 - Thielson.**
Douglas County. 10,000
acres.
- GIS Mapping by Teresa Zena
Alcock, Oregon Department of
Forestry, November 18, 2020.
Statistical data courtesy of
Mason, Bruce & Girard,
December 8, 2020.

tions highly problematic.

The large majority of homes that burned in the fires were aging trailer houses, mobile homes, and RVs, closely spaced together in commercial parks along state highways. Figure 3, for example, shows the results of the Alameda Drive Fire on the Dun Rov-N RV Park: one of many such parks that burned between Highway 99 and the Bear Creek Greenway.

Maps 2 and 3 show the locations of numerous other pre-1983 trailer parks that burned in the Alameda Drive Fire.

They also illustrate the effectiveness of Highway 99 and Interstate 5 in acting as fuel breaks, as ready access to fighting the fire, and in keeping it mostly confined to those boundaries. Ironically, a primary fuel along Bear Creek, other than homes, was invasive weeds -- principally Himalayan blackberries, which could have been readily managed with little cost but may have proliferated due to riparian management restrictions.

Reforestation Planning

Reforestation planning is based on ownership. Implementing those plans is largely dependent on access. The goals of any plan are also restricted by existing and emerging laws and regulations, and by economics. Understandably, federal and state lands put laws and regulations as a first priority, while private landowners necessarily put economics first. The principal budgetary difference is whether taxes are being paid or being spent.

For private landowners, timber is the primary crop for making an income and being capable of paying taxes; on public lands it is usually more important to consider wildlife habitat regulations and public recreation and to involve the public in the planning process.

Reforestation planning, then, for private lands, can be little more than following the established industrial practices of large, successful timberland owners, such as Weyerhaeuser or Georgia-Pacific. The problem is when the resulting "tree farms" are burned before reaching maturity, such as occurred during the Labor Day Fires. How could that have been prevented?

On public lands the problem becomes a lot trickier. Even modest salvage plans are likely to be legally challenged by environmental organizations until the burned timber becomes useless or greatly devalued. Roads may be left closed or even removed on purpose. Herbicide use may not be allowed to control weeds, and trees may be kept from being planted for some reason or another. What to do?

Planning on public lands becomes even more complex when professional "stakeholder" groups and their legal representatives become involved. The great costs and marginal results of these processes are well documented. Many of the large-scale wildfires of the past 30 years have predictably resulted from these efforts. Something as simple as replacing a few culverts after several years of meetings and studies can be declared a "success." You could look it up.



Fig. 2. Burned cabins near Finn Rock, north bank of the McKenzie River. Holiday Farm Fire aftermath, October 6, 2020 video-clip by McKenzie Peters, NW Maps Co.

The goals of reforestation planning, then, can be measured in jobs, profits, wildlife populations, and recreational visitor days -- and aesthetics, clean water, clean air, and



Fig. 3. Burned trailer park on Highway 99, west bank of Bear Creek. Almeda Drive Fire aftermath, October 26, 2020 video-clip by McKenzie Peters, NW Maps Co.

public access. Wildfire mitigation must also be included.

In recent years the public focus on forest management has been on profitable timber production and wildlife habitat designations. The objectives of the former are obvious: grow as much merchantable timber as efficiently as possible. The latter concern has largely replaced 20th century concepts of "multiple use" on our public lands; and often specifically refers to habitat creations containing large, older trees, understory trees, snags, and dead wood on the ground. And few jobs.

Recent events have shown that these methods have not been working. The Labor Day Fires burned nearly as much timberland as designated habitats. Recreational uses were ruined, people and animals killed, and homes lost. Now

would seem an excellent time to consider alternative approaches -- maybe even abandoned methods that have proven successful in the past.

When possible, reforestation planning can best be considered at a subbasin scale: that is, the land that is visible from ridgeline to ridgeline and is defined by a primary creek or stream. Fish spawn and birds nest within subbasins; insects, reptiles, amphibians, and small mammals rarely leave them; roads and trails within their boundaries provide systematic access, or not; and both wildfires and prescribed fires respond predictably to their individual fuel loads and firebreaks.

In precontact and early historical time there were many open areas established and maintained by people in nearly every western Oregon subbasin. Typically, villages and campgrounds were located at the mouths of major streams and rivers and well-traveled trails followed the streams and their ridgelines. Tinder and firewood were regularly gathered and used along these routes and locations, and edible roots, bulbs, greens and berries were often established and harvested in adjacent fields and meadows. In essence, a systematic network of fuel-free campgrounds and trails formed major firebreaks along nearly every stream and ridgeline for hundreds or thousands of years prior to white immigration.

Could modern day replication of these conditions be useful for mitigating future wildfires and also for creating stable habitats for native species that had previously adapted to those plants and patterns over millennia? Impacts on timber production, recreation, and aesthetics would also be positive, and needed year around jobs and additional forest products would be created.

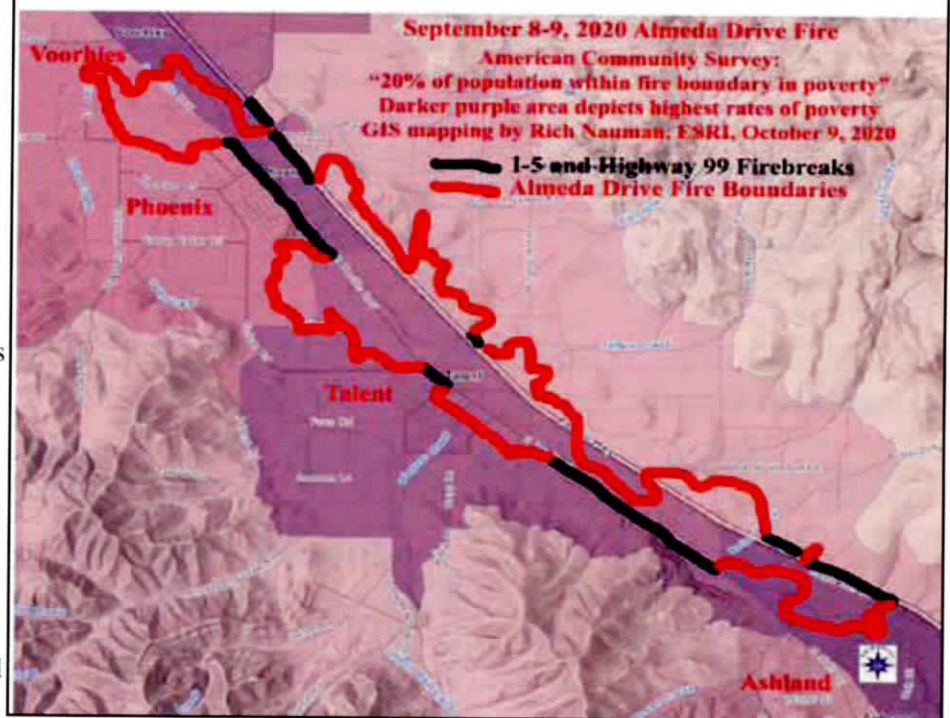
Another key difference was what foresters call "stems per acre." In past times it was common for Douglas fir trees to be spaced much wider -- and over far fewer acres -- than today. Industrial foresters commonly plant 300 to 700 trees an acre in hopes of getting 100 or so to a commercial size in areas where only 10 to 30 trees an acre formerly grew. With today's high quality growing stock and with better-quality site preparation, we should be able to plant far fewer trees, bulbs, and cuttings than in the past.

Site Preparation

Salvage logging, where possible, is the key first step in preparing a burned area for reforestation. This process is usually profitable and also performed in order to remove unsightly, flammable, and dangerous snags, which are often



Map 2. Annotated 1983 USGS map with trailer parks along Bear Creek.



Map 3. Annotated 2020 GIS map showing Alameda Drive Fire perimeter.

responsible for expensive reburns, road damage, and erosion.

Whether or not salvage has taken place, there are usually massive amounts of dead and drying fuels that remain: limbs, rotting logs, sub-merchantable trees, shrubs, duff, and flash fuels such as dry grasses and dead leaves.

These hazards can be eliminated through mechanical brush piling on flat and sloping lands and by prescribed cutting and broadcast burning on steeper lands. Brush piles can be safely burned in winter and spring while broadcast burns do best -- with the least damage to native plants -- in late summer and early fall.

A second problem -- and an opportunity -- created by wildfire is the exposure of unwanted weed species, such as exotic grasses, Himalayan blackberries, tansy, and scotch broom. These plants are generally located and spread along

roadsides and streams and are rejuvenated by greater amounts of sunlight, the removal of competing vegetation, and the added nutrients following a fire. Such exposure makes them very vulnerable to spot spraying with herbicides for precise control before they seed or otherwise spread, rather than considering more costly and controversial aerial applications.

A well-prepared site is cheaper and easier to reforest and maintain and is more likely to be profitable and useful over the life of the next forest, however long. If a site is not properly prepared it is also more likely to burn again, and with greater damage, as clearly documented by the 1902-1928 Ya-colt fires, the 1933-1951 Tillamook fires, and the 1987-2018 Kalmiopsis Wilderness fires. By contrast, there is little record of well-prepared sites being subjected to such reburns.

Tree Planting

Once a subbasin has been successfully weeded and mostly cleared of standing and ground fuels, no matter the time involved, it is ready for planting and seeding; either to safely replicate past habitat patterns or to focus on timber production and recreation. Wildfire risk has been greatly reduced and site productivity -- whatever the measure -- has been greatly increased by this process.

In western Oregon planting is accomplished almost entirely with Douglas fir seedlings. These trees typically grow in nearly pure even-aged stands from slightly inland of the Pacific coast to the higher elevations of the western Cascades. For this reason, forest wildlife conditions for the past several thousands of years have been largely defined by these trees, whether as even-aged seedlings, saplings, second-growth, or old-growth -- which also defines some of the most profitable forestlands in history.

In the past, stands of Douglas fir developed after wildfires, volcanic eruptions, windstorms, clearcuts, and plantations. In early historical times these stands were bounded by oak savannahs, huckleberry fields, open ridgelines and streamsides, camas meadows, southern balds and grassy prairies. Now these latter environments have been largely replaced with cities, farms, highways, riparian buffers, and expanded stands of more densely spaced even-aged Douglas fir.

With redesigned reforestation strategies, other species and habitats, such as open roads and trails, sunny meadows, cedar stands, ash swamps, and myrtlewood groves might be good to consider. Tree planting projects could be enhanced by the simultaneous planting of native root plants, such as camas and iris; shrubs, such as huckleberries and currants; and seeding with native bunchgrasses and wildflowers.

Assuming a site has been well prepared, and plans have been made regarding desired species and their locations, the next things to consider are planting specifications and stock qualities.

In the past, tree seedlings were often planted in grids at precise eight to 12-foot distances, resulting in anywhere from 300 to 700 trees per acre. Mortality, precommercial thinning, and occasional commercial thinnings typically reduced this number to less than 60 or 90 trees per acre at time of harvest.

This great amount of costly mortality was often caused

by poor-grade site preparation and/or low-grade seedlings to begin with, and poor-quality planting and stand maintenance standards to follow.

Without going into technicalities, planting stock often consisted of one- and two-year old seedlings lifted straight from the nursery and often poorly grown or handled. Large numbers of these seedlings -- sometimes all of them -- would die after planting and it would be necessary to replant the area again. Seedlings that were grown for two years and then transplanted and root-pruned an additional growing season ("2-1s") did far better but were less common and more costly to grow and plant.

In the last several years of my reforestation career, we began favoring "plug-1" seedlings for uniformity and quality and the fact that, being initially grown in a greenhouse, they could be obtained in less than two years. With a constant 90% to 100% survival rate for the plug-1's and a shift to "micro-site" planting densities, we were able to significantly reduce per-acre planting and subsequent stand maintenance costs -- and the trees grew larger, faster.

"Micro-site planting density" involves selecting the best available location for an individual seedling within a given radius. For example, to plant 150 trees within an acre, a planter would place the seedlings in the best locations -- such as the downhill side of stumps or deep mineral soil above a stream's highwater mark -- every five to 20 feet at an average 16 or 17 feet apart. It is easier to learn than describe.

Active Management

After a burned forest area has had its roads opened and

The Great Fires



Indian Burning and Catastrophic Forest Fire Patterns of the Oregon Coast Range 1491-1951

By Dr. Bob Zybach

Reprinting of Dr. Zybach's 2003 PhD dissertation. Includes: 364 pages, full text; 60 maps (47 color); 38 figures (17 color), and 26 tables.

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power restored, any potential salvage completed, site prepared, and then planted, the results will still have to be actively managed in order to achieve long-term management goals. This is true whether the intent is to grow timber, create recreational opportunities, and/or develop wildlife habitat.

Roads and trails will need to be maintained in order to retain commercial and recreational access to affected lands, and also to help address any future wildfires, windstorms, insect outbreaks, noxious weed infestations, etc.

Dead and heavily damaged seedlings may need to be replanted and selective uses of herbicides and animal control measures might be necessary.

Spot spraying of herbicides around individual trees, rather than aerial applications, is often a cheaper and more effective process. This uses a minimum of chemical, little fossil fuels, and leaves significant alternative browse available for animals that might otherwise favor the seedlings, such as deer, elk, mice, or rabbits.

After seedlings have become well established, pre-commercial thinning of stems to desired commercial or habitat densities become important options. Thinning when seedlings are only five or six years of age is a lot cheaper, safer, and more effective than typically waiting until they are 15 or 20 years old. The earlier thinning also reduces the time and amount of dead wood and foliage on the ground and keeps areas of shrubs, grasses, and wildflowers open between the trees.



Fig. 4. Gordon Meadows with Bob Tom, Don Day, and Wayne Giesy, June 17, 2007. This area formed an ancient and effective firebreak in the South Santiam headwaters. It was regularly visited and occupied by Molallan Indians for many years in order to hunt, trade, and to harvest camas, nearby huckleberries, and beargrass. Deer, elk, bears, cougar, butterflies, and songbirds would have also been regular visitors, due to available food and water. Nearby forestlands had far fewer trees and would have been regularly scoured for firewood for camping, cooking, drying and camas baking purposes. For the past 500 years, most trees would have also been smaller and younger. The restoration of early historical Molallan villages, campgrounds, camas meadows, huckleberry fields, and trail networks would produce significant local work and income for many years, greatly reduce wildfire risk and severity, be far more attractive by most standards, and would be a much safer environment for people and wildlife. Photo by the author.

Prescribed burning can be done to rejuvenate berry fields and grasslands, to dispose of brush piles, and/or to keep roads and trails open, as people have done for thousands of years. Traditional burning practices also greatly reduce the likelihood of damaging wildfires.

If these strategies are generally followed, the resulting forests will continue to provide safe, quality habitat for a wide range of species, greatly reduce risk and severity of wildfires, and timber crops will reach merchantable size and better quality much sooner.

The differing landowners affected by the Labor Day Fires will necessarily have different approaches to reforesting their properties, as described. It will be interesting to see what they do and what the results will be five and 10 years from now.

