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Our cover photograph taken by Cristy Rein is of Roosevelt Elk along Highway 26 west to the Oregon Coast.

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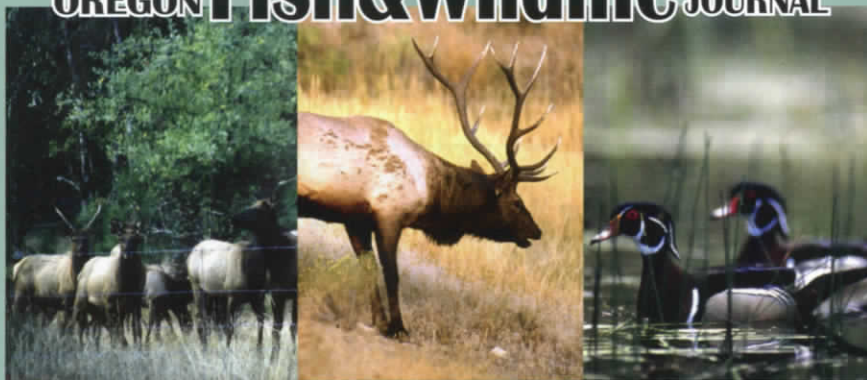
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Oregon Coast Range Old-Growth: The 1945-1947 Weyerhaeuser Coos Bay Study

Dr. Bob Zybach

In 1945, during the final months of WWII, Weyerhaeuser Timber Company (“Weyerhaeuser”) initiated a comprehensive timber inventory of its so-called “Millicoma Tree Farm” and recently acquired “Pillsbury Tract” in preparation for conducting one of the largest forest clearcuts in history.

The combined areas of these two holdings totaled more than 149,000 acres, forming the largest contiguous stand of unburned and unlogged Douglas fir that remained in the Oregon Coast Range at that time. Of this amount, 126,000 acres were to be systematically measured for species, age, volume, condition, and location. The remaining 23,000 acres were scheduled to be traded or sold in exchange for 58,000 acres of BLM O&C Lands.

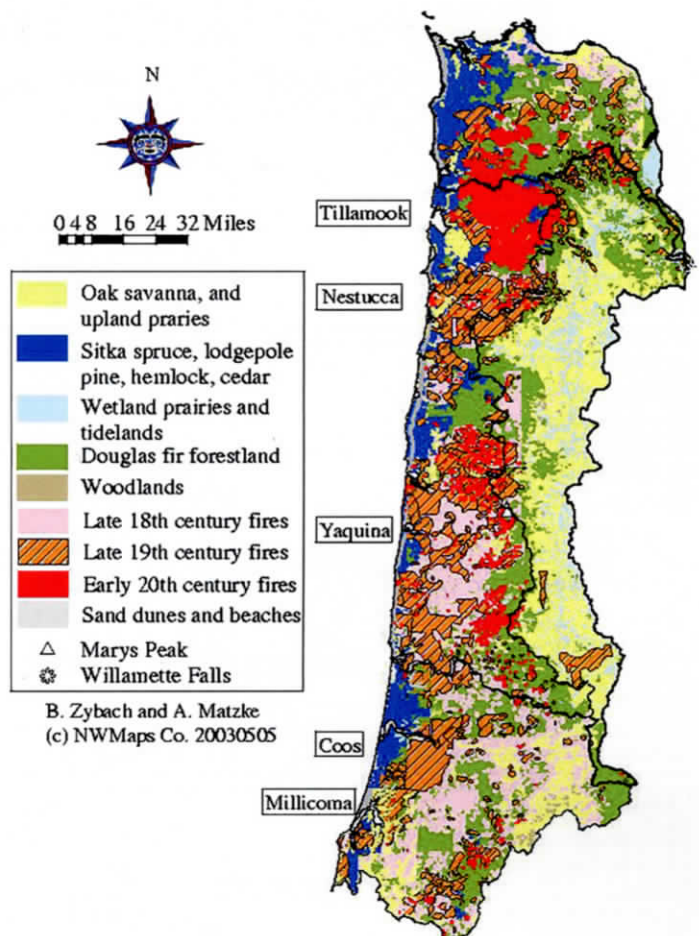
Following these actions, Weyerhaeuser holdings in Coos and western Douglas Counties would total 184,000 acres by 1950 -- almost all of which were scheduled to be cut over the following 30 to 40 years. To put these numbers in context, note the size of the historic wildfires shown on Map 1. Each of these historic fires has been measured at 100,000- to more than 300,000-acres in size, and most of these events took place in a matter of days and weeks, not decades.

The majority of the Millicoma Tree Farm was comprised of even-aged stands of commercially-prime, mature second-growth Douglas fir that had regenerated from the Millicoma Fires of the mid-1700s and averaged 180 years of age. Only scattered trees and pockets escaped these fires; they averaged 225 years of age and likely were principal seed sources of the younger stands.

The Pillsbury Tract, by contrast, contained some of the oldest and largest trees ever measured in the Coast Range. Most of the stands dated to the 1600s, and a number even to the 1500s. Some stands and trees approached 400 years of age -- among the oldest Coast Range trees ever recorded.

Background

The Millicoma Tree Farm was assembled by Weyerhaeuser in eastern Coos County, beginning by 1913 and totaling more than 100,000 acres of prime second-growth Douglas fir timber by 1945. This land encompassed most of the South Fork Coos and East Fork Millicoma River drain-



Map 1. Oregon Coast Range Fire History, 1745-1945. This map illustrates the synthesis of my PhD research at OSU regarding the fire history of the Oregon Coast Range. Precontact patterns of Indian burning are most apparent in the prairies and oak savannahs of the eastern Coast Range, while catastrophic-scale Douglas fir wildfires have typified most of the western slopes during historical time. The Millicoma Fire is the only known wildfire of this magnitude that took place before white discovery and settlement.

ages; the latter for which it was named.

The 48,000-acre Pillsbury Tract was acquired by Weyerhaeuser in 1944 and constituted the adjacent headwaters of the South Fork Coos River, extending eastward to western Douglas County and Umpqua River tributaries.

In a January, 1944 letter to an officer in the First National Bank Building in St. Paul, Minnesota, Minot Davis, (long-time western timberland manager for Weyerhaeuser) produced a table showing the disparity -- and resulting tax and purchase value consequences -- “between the County cruise and the actual production” on the Pillsbury Tract by the “Coos Bay Logging Company,” and further noted:

“The above map carries considerable interest in connection with our consideration of the Pillsbury timber. I believe there is no more heavily timbered area in Coos or Douglas Counties than the area now being logged by Mr. Vaughan. Out of the total Pillsbury ownership of a little less than 48,000 acres, there is quite an appreciable amount of old burn which

is very lightly timbered, and I shall be very much surprised if the tract as a whole averages better than 40 M. ft. per acre.”

In 1945 Minot authorized the Coos Bay Growth and Yield Study, to determine the true volume and value of his employer’s new holdings, and also to plan for their future regeneration and harvest.

Survey Methods

Arthur V. Smyth was a young Weyerhaeuser forester in 1945 and was given responsibility to complete the proposed Coos Bay study. He subsequently wrote an excellent book regarding his experiences and interpretation of the history of this project and area, “Millicoma: Biography of a Pacific Northwestern Forest.” Figure 1 is used by permission of Smyth and taken from that source.

The study area was divided into two portions: the 96,472-acre Millicoma-North Pillsbury (“Millicoma”) area and the 29,509-acre South Pillsbury (“Pillsbury”) area. During the summers of 1945 and 1946 two-man crews running parallel lines one mile apart took 1/4-acre plots every “ten chains” (660 feet):

“All live trees were recorded by diameter and species. To determine growth over the past 50 years 1466 trees were bored. All standing dead trees were recorded by diameter and estimated years dead. Visible fruiting bodies of fungi (conks) were recorded to give an index of rot.

“959 sample plots were taken in the [Millicoma] area and 617 in the [Pillsbury] area, a total of 1576 plots or 393 measured acres, making a 0.3 percent cruise of the area.”

The Millicoma area, more than three-times the size of the Pillsbury area, contained more than 60% “mature” timber, more than 25% “immature”, and only 10% “old-growth.” By comparison, the Pillsbury tract contained more than 70% old-growth, less than 25% immature, and less than 5% mature. Further, “The immature stands, mostly 10 to 40 years old, have come in after fires and contain scattered decadent old-growth trees and snags.”

What was meant by the term “old-growth,” and why was it important to Weyerhaeuser?

Definition of Old-Growth

The Douglas Fir Region contains some of the oldest, tallest, largest, fastest growing, and most voluminous trees and tree stands in the world. This area includes western Washington, western Oregon, and much of northern California. In addition to vast even-aged stands of Douglas fir trees, the region also has Sitka spruce, redcedar, redwoods, hemlock, and true firs that reach great heights, girths, ages, and volumes.

For most of the past century, the commonly accepted definition of an “old-growth” tree, grove, patch, or stand in this Region is one at least 200 years of age. Because native conifers can commonly achieve 300-, 500-, and even 700-years of age – with some even attaining 1,000-years or more – the 200-year figure has often been considered overly conservative. Forest scientists in the mid-1900s, for example, reasonably argued that regional oak and conifer trees be at least 400- or 450-years old to be considered old-growth.

The western slope of the Coast Range is in the very



Map 2. Arthur Smyth map of the ca. 1765 Millicoma Fire boundaries, superimposed on H. G. Taylor’s “Map of Coos Bay and Vicinity, Oregon” produced for Weyerhaeuser Timber Co. in 1944. Northwest of Smyth’s 1765 boundary is the Elliott State Forest -- which mostly burned in 1840 and 1868 -- and a portion of the Pillsbury Tract (which escaped all three fires: 1765, 1840, and 1868) can be seen to the southeast.

heart of the Douglas Fir Region and contains some of the tallest, largest, and fastest-growing Douglas fir ever measured – but not nearly the oldest, or even close. Trees and stands in the western Cascades, on the Olympic Peninsula, and Vancouver Island are where the 500-year, 700-year, and older trees are found. Not a single 600-year old, or older, Douglas fir has ever been documented on the Oregon Coast Range. Volume, size, and annual growth records are set here, but almost all of them are achieved in less than 300 years.

In recent decades there has been an effort to consider trees even younger than 200 years as old-growth. The Coos Bay Study, for example, listed trees 165-years of age and less as “immature,”; from 166- to 190-years as “mature”; and 191-years and older as “old-growth.” The total volume of Douglas fir timber, for all ages, in the study area was 90%, with hemlock (<7%) and redcedar (>2%) constituting most of the remainder.

Whether 191 years or 200 years is considered “old-growth” is statistically insignificant. Either number serves reasonably well as a marker separating “mature second-growth” from “old-growth” when considering older conifer forest conditions in the Coast Range.

The oldest tree in the study area was dated to 1565, which would have been 380-years old at the time of the inventory, or nearly 450-years old if it had survived until now.

Coast Range Fire History

The Oregon Coast Range runs on a north-south axis along most of the Oregon coastline. The Pacific Ocean forms its western boundary, it is bounded to the east by the great Willamette River and Umpqua River interior valleys, the northern boundary is the Columbia River, and the southern boundary is the Middle Fork Coquille River. It is the heart of the Douglas Fir Region.

To understand where and why stands of old-growth trees have existed in the Coast Range, including Coos County, it is necessary to understand its fire history -- where some of the very largest wildfires in world history have taken place.

These events have occurred because the western slopes of the Coast Range mostly consist of thousands of tons of giant, pitchy, fast-growing trees per acre; creating massive amounts of contiguous fuels that help develop ideal conditions (along with topography and seasonal weather patterns) for historic catastrophic-scale wildfires: defined as those forest fires covering 100,000 acres or more forestland during an event.

Map 1 depicts the history of catastrophic wildfires in the Oregon Coast Range. The Millicoma Fire, estimated by Smyth to have been 200,000 acres in size (Map 2), is the only one depicted that occurred before historical time and has not been corroborated by eye-witness accounts. The 1945-1947 Weyerhaeuser timber cruise provided the first compelling evidence of a Coast Range catastrophic fire that predated historical times, although it remains possible the trees became established following some other form of disturbance, such as



Figure 1. Weyerhaeuser Timber Co. forester standing next to an “old-growth” Douglas fir dating to the 1600s, while surveying a stand of even-aged “second-growth” trees dating to the mid- or late-1700s. Photo probably taken in 1945 or 1946 and used by permission of Arthur Smyth and Weyerhaeuser Archives (RG#9 Photographs, Millicoma Tree Farm, ca. 1951: T50-0022).

windstorm, bugs, or disease.

Thornton Munger was an influential, pioneering forest scientist for the US Forest Service in the early 1900s. Beginning in 1908 he began to focus his studies on Douglas fir trees, which continued until his retirement in 1946. It was his observation that:

“The paths of the great forest fires of the last century or two are plainly marked by even-aged stands, consisting to the extent of at least 90 per cent of Douglas fir (if within the preferred habitat of this tree), regardless of the proportion of Douglas fir in the original fire killed stand.”

William Morris, a US Forest Service scientist focused on Douglas fir wildfire history in the 1930s and 1940s, mirrored Munger’s observations:

“When land in western Oregon and western Washington is deforested by fire or cutting and then left unmolested, within a few years it is clothed with a new stand of trees almost uniform in age.”

Those insights are what convinced Smyth that his extensive measurements of even-aged trees dating to specific years in the 1700s strongly indicated a catastrophic “Millicoma” wildfire during that time, followed by reforestation by scattered trees and groves that escaped the fires. This insight also provided an accurate model of wildfire and regeneration supported by subsequent catastrophic Coast Range wildfires.

If “191 years” is used as the definition for old-growth, then it appears most of the Coast Range has been in regeneration and second-growth conditions for most of the past 500 years. The arithmetic is simple: because most of the Coast Range has been burned or clearcut in the past 191 years, then those lands cannot contain old-growth today; conversely, all of the 250- to 350-year old and younger stands burned or logged from the 1840s to the 1940s had to have spent more than half their existence as regeneration and second-growth, dating back to the 1500s and 1600s.

Based on documented fire history and tree ages, a primary characteristic of western Oregon Coast Range landscapes has been extensive stands of mature, second-growth Douglas fir forests for most of the past 500 years/

Survey Findings

Weyerhaeuser Forestry Department completed the summary report of the 1945-1946 Coos Bay timber cruises in December, 1947. The following quotes provide strong insights into old-growth Douglas fir ages, sizes, volumes, and conditions for both the study area and for the western Oregon Coast Range:

“The main block of timber in the [Millicoma] area is 166- to 190-year old Douglas fir averaging 180 years of age and 58,100 net board feet per acre according to this study. Ten percent of the timber in this area is over 190 years old, averaging about 225 years.”

“A high average net volume of 73,900 board feet per acre was found for the 180-year old stands on site I in the [Millicoma] area.”

“Stands of the [Pillsbury] area are less uniform and more defective.”

“Several trees were over 300 feet tall

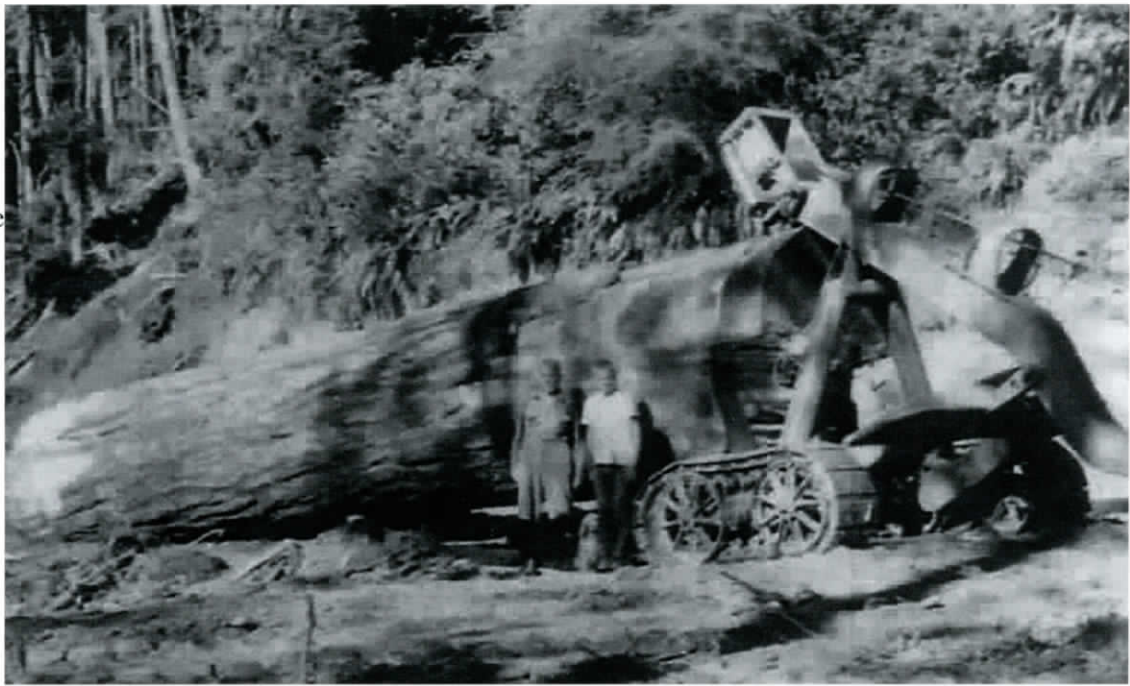


Figure 2. Clarence and David Gould, grandfather and grandson, stand next to old-growth Douglas fir log felled at head of Kentuck Slough – west of the Millicoma Tree Farm in Coos County -- in the early 1950s. Tree was isolated from surrounding second-growth trees and was estimated to be 350-years old. Ring count was incomplete due to dry rot in the center of the tree. Photo by Glae Gould.

and one 332-footer may be a record for Douglas fir.”

“Forty-nine percent of company ownership has timber that is about 180 years old . . . Defect accounts to only 6 percent of the stand volume . . . mortality [is] due to bark beetles, suppression, wind and fire . . .”

“Twenty-five percent of the area has timber more than 190 years old . . . It is largely overmature, containing 40 percent defect and losing volume at the rate of about 40 board feet per acre per year.”

“Twenty-six percent of the area is occupied by stands of immature timber, less than 166 years old.”

Summary and Conclusions

The 1945-1947 Weyerhaeuser “Coos Bay Growth and Yield Study” remains one of the most systematic and comprehensive measures of “natural” or “virgin” Douglas fir forest

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conditions ever completed on the Oregon Coast Range.

In 1945 the nearly unsettled, unburned, and unlogged Millicoma Tree Farm and Pillsbury Tracts were comprised of nearly 50% (61,870 acres) mature second-growth trees, 25% (32,480 acres) unfor- ested and young second-growth, and 25% (31,650 acres) old-growth.

These proportions appear to be fairly typical for most of the Coast Range during the past 350+ years, and the sizes, volumes, and ages are among the largest ever recorded.

If we use the Weyerhaeuser Coos Bay definition of Coast Range “old-growth” trees as being 191 years of age or older, we can derive the following conclusions:

1) Following the Millicoma Fires of the mid-1700s, none of the future Weyerhaeuser lands in the Millicoma Tree Farm or Pillsbury Tract contained stands of old-growth – it would take until the early 1800s before a significant number of these trees became at least 191 years old;

2) The western slope of the Coast Range has been mostly comprised of even-aged, second-growth Douglas fir forests for most of the past 500+ years;

3) Coast Range Douglas fir typically begin taking on “yellow fir” old-growth characteristics from 200- to 300-years of age;

4) A significant percentage of Douglas fir trees die, begin dying, become infested with bugs and/or disease, and have been damaged by wind, lightning, and/or wildfire after attaining 200- to 300-years of age;

5) Coast Range Douglas fir very rarely reach 400 years of age and have never been documented as reaching 600 years of age.



Figure 3. Wayne Giesy, Jerry Phillips, and David Gould, July 8, 2017, in Elliott State Forest’s 52-acre “Silver Creek Heritage Grove.” Creation of this site involved a 40-acre purchase from Weyerhaeuser by the State of Oregon via former forest manager Phillips. The combined age of these men (more than 250 years) is greater than the estimated 250-year age of these trees – which are also estimated to be greater than 250-feet in height. These are among the last remnants of the ca. 1770 Millicoma Fire that were considered “second-growth” in the 1940s. Photo by author.

