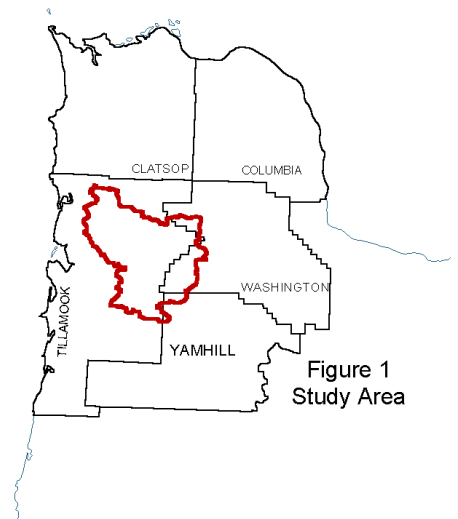


The Tillamook Burn *Separating Fact from Legend*

In 1933 a devastating wildfire occurred in the northwest corner of Oregon. The area impacted by that fire and several subsequent fires came to be known as the Tillamook Burn. In the ensuing 67 years the stories surrounding this fire, subsequent fires in the area and the eventual restoration of the forest have become legend to the people of the state of Oregon. Gail Wells has written of this legend and the worldviews that have kept it alive and in more recent years have brought it into question (Wells, 1999). The purpose of this paper is to reconstruct some of the historic facts surrounding this landscape in an

effort to separate fact from legend. Figure 1 shows the area of the study with respect to the counties of northwest Oregon. The red line represents the perimeter of the 1933 Tillamook Fire. Some studies include the Wolf Creek Fire, which occurred in Clatsop County at the same time, as part of the Tillamook Burn, but for purposes of this paper only the Tillamook Fire area is considered.



Due to the timeframe involved in completing this paper it has not been possible to look in depth at the full history of the area. Although the significant events from before European settlement to restoration of the forest will be sketched out, the emphasis of this paper will be on answering two questions that

stem from the Tillamook legend. One aspect of the legend is that the area burned was the best virgin forest left in the state of Oregon. This paper examines the extent to which this area could indeed be considered a “virgin” forest prior to 1933. A second and resounding theme of the Tillamook legend is that the 1933 disaster was the result of human carelessness. The facts presented here will show that while the spark that started the fire was the result of human activities, the extent of the devastation can and should be attributed to naturally occurring conditions.

Pre European Settlement and Early Settlement

Robert Bunting (1997) has written of the Native American landscape of the Pacific Northwest as a natural but not virgin wilderness. The Tillamook Indians which inhabited the northern coast of Oregon did impact the landscape in which they lived but at a much smaller scale than European American settlers. Native Americans used fire to manage undergrowth and also to mask their visibility and scent while hunting. (Bunting,1997). However, it is believed that they stayed close to the coast and moved only a limited distance up coastal rivers. Given that there was abundant fish and game near the coast and that their preferred woodland resource was Sitka Spruce, which was found only at the western fringes of the Tillamook Burn country(USDA Forest Service, 1944) it seems likely that Native Americans had at most a limited impact on the Burn area.

Although European sailing ships were exploring the Pacific Northwest coast as early as the 16th century, they did not become frequent visitors until late in the 18th century. It was not until the fur trade of the early 19th century that Europeans began having a significant impact on the area. However, since the fur traders did not come to stay and were focused on a limited number of

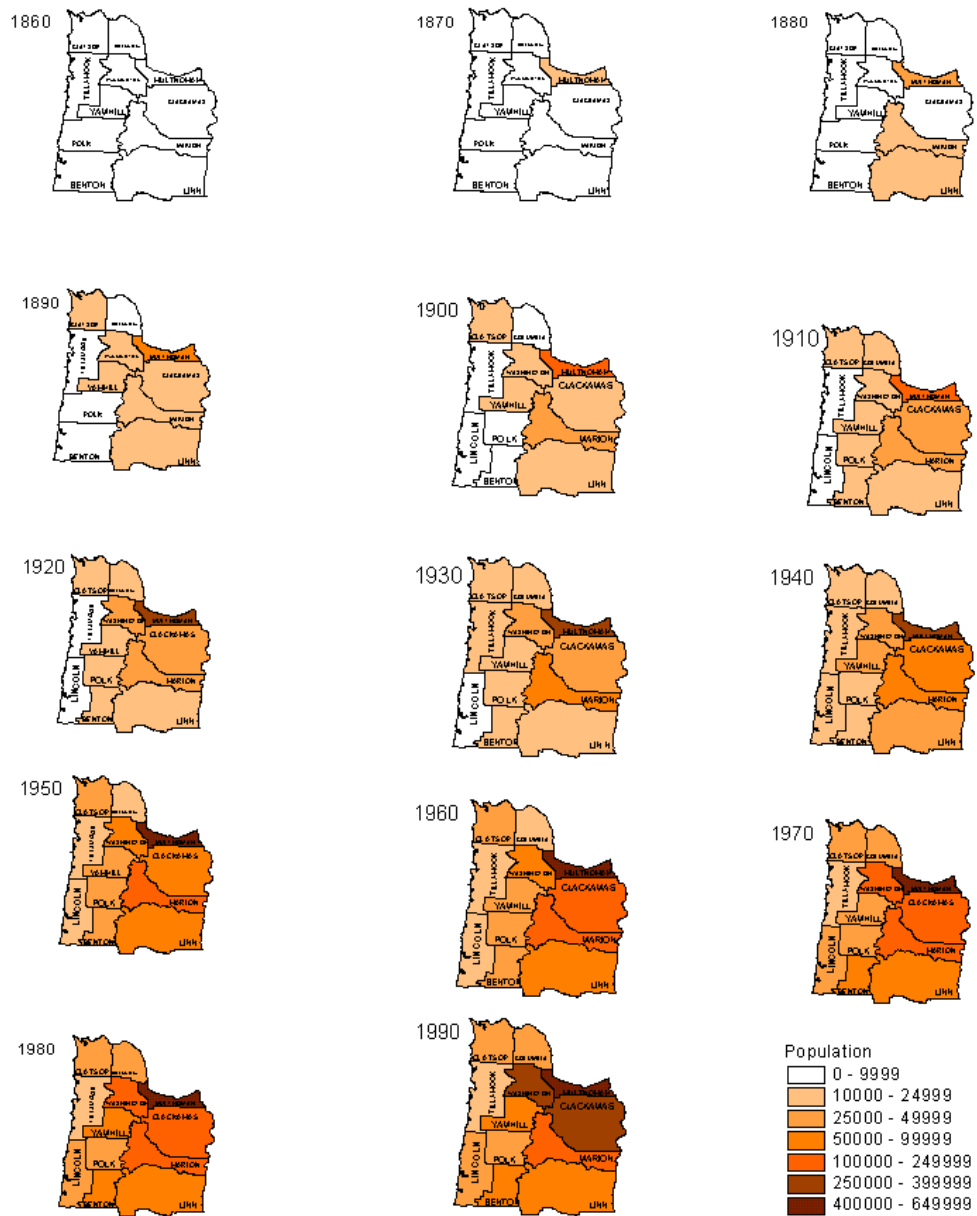
species their influence can also be considered relatively minor. Perhaps the most serious impact from the fur traders came around 1820 when British traders, aware of the threat of American interests, deliberately set out to trap all the beaver from south of the Columbia River before they could be pushed out of the area (Bunting, 1997).

As in other parts of the New World, Native American populations suffered greatly from disease brought by the Europeans. It is estimated that along the lower Columbia River Indian populations declined by 92% between 1830 and 1841 (Bunting, 1997). Tillamook county populations probably suffered similar losses since they were of the same cultural and ethnic group as the lower Columbia Indians and had regular interactions through trade.

The first Europeans to settle in Tillamook County did not arrive until 1852. By 1860, the U.S. Census Bureau found only 95 individuals in the entire county, not including Native Americans (Walker, 1872). Figures 2 and 3 show the changes in population and population density over time in Northwest Oregon Counties.

According to accounts of early settlers, by 1865 the city of Tillamook consisted of two or three houses and a store. By 1875 Tillamook had two stores and a half dozen houses. In 1880 it was reported to have grown to include two stores, a post office, a hotel and a saloon(Tillamook Pioneer Association, 1972). By 1880 the county population had grown tenfold to 970. By 1890 the population of Tillamook County had grown to 2932 (Porter and Wright, 1896).

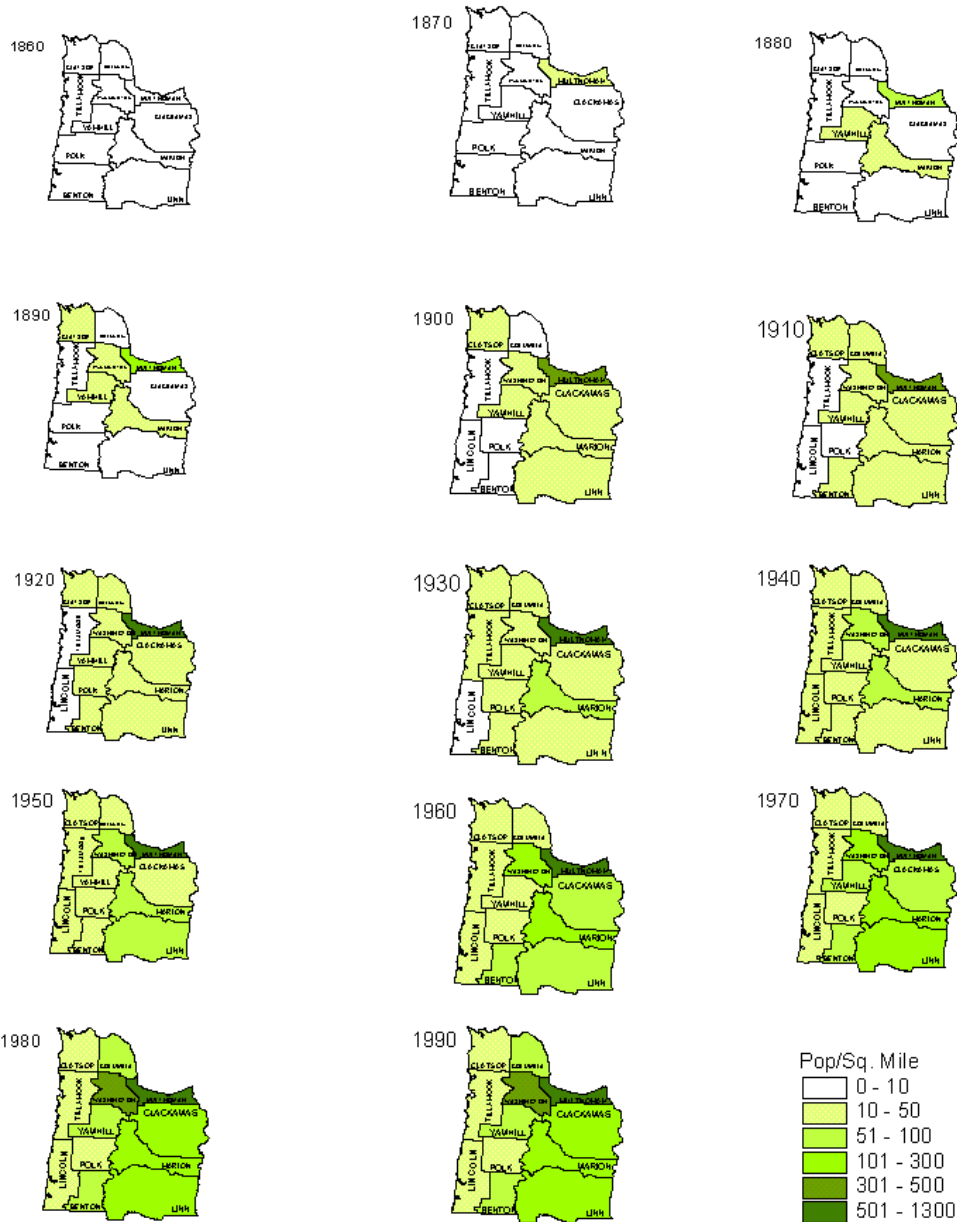
Figure 2
 Population of Northwest Oregon Counties
 1860-1990



The early settlers in this area came to establish farms. They generally came overland via Grande Ronde or the Trask River toll road, a wagon road established in 1871 (Kemp, 1967). A few came by boat from Astoria. The old timers speak of the difficulty

of getting their butter and cheese to Portland to sell, the long winters when stormy seas and snow in the Coast Range kept them isolated for months at a time (Tillamook Pioneer Association, 1972).

Figure 3
Population Density Northwest Oregon Counties
1860-1990



The Virgin Forest

Prior to 1880 settlers in Tillamook County showed little interest in the vast forest to their east. It was viewed as an impediment to transportation more than anything else. What lumber they needed could be cleared from their donation land claims, and many of the trees in the area were too big to be cut or milled with the available technology.

Early Logging

Several events came together in the 1880s and 1890s which lead to the development of the lumber industry in this area. The arrival of the transcontinental railroad in Portland was important in establishing a link to markets in the east. At about the same time the forests of the upper Midwest were becoming depleted and the big timber interests began to turn their sites west (Bunting, 1997. Meany, 1935). Prime timber land in the Northwest corner of Oregon was often acquired by the lumber barons through loose interpretations of the Homestead or Timber and Stone Acts, sometimes by downright fraud (Meany, 1935).

Technical innovations including the crosscut saw, the steam donkey, and the narrow gauge railroad made it possible for loggers to cut bigger trees and to move further into the woods (Wells, 1999). Prior to 1880 transportation was limited to oxen and rivers and trees more than a mile or two from a river capable of transporting logs were simply not accessible (Bunting, 1997).

The first mill to be operated in Tillamook County was built in 1883 by Joseph Smith. The mill was located at Hobsonville, on Tillamook Bay between Bay City and Garabaldi. Initially Smith relied on settlers to supply him with logs as they cleared their homesteads. Smith arranged for transportation of his lumber to San Francisco by sea. In

1888 the mill was sold to the Truckee Lumber Company which expanded operations. (Tillamook Pioneer Association, 1972).

In a ranking of states by lumber production Oregon does not even register until 1890 when it places 19th. By 1907 it was 10th among the states and by 1910 had risen to 4th place. In 1920 it was second only to Washington which had held on to first place consistently since 1905 (Meany, 1935).

In Tillamook County the growth of the logging industry was probably similar to the state as a whole but may have lagged behind a little due to the transportation challenges faced by the area. Construction was begun by the Pacific Railway and Navigation Company in 1905 but the line which connected Tillamook to Portland was not completed until 1911. Figure 4 shows a typical tree ready for felling along the Wilson River in 1901. One solution to the problem of transporting logs was to bring the mill to the logging camp. It was often easier to transport the milled lumber out of the woods than the raw logs. Figure 5 shows a sawmill in the Nehalem Valley in 1905.

High-lead logging was developed in the early 20th century (Wells, 1999). This technique of hauling logs into a central point for transport via rail made clearcutting the most efficient means to harvest timber (Bunting, 1997).

Transportation

Understanding transportation in this area is the key to understanding early logging impacts. For without a means to transport the logs there was no point in cutting the trees. Flow in the rivers of this area is generally too low for large scale movement of logs. A technique known as splash damming was sometimes practiced. A small dam would be built

to float logs on a pond, the dam was then blasted away to allow the logs to be carried downstream by the water from the pond. Impacts on stream banks were severe and often conflicted with other users. Meany (1935:258) reports that in 1889 the state of Oregon “authorized counties to declare unnavigable streams highways for log driving, and to provide for their improvement. Under this law, the Wheeler lumber interests sought a lease of the Nehalem River for forty-nine years, and were denied it by the county.” Meany goes on to say that “The general conclusion seemed to be that unless it was possible to drive or tow the logs on natural water, the logger would find more profit in railroading his timber to market.” (Meany, 1935:259).

Prior to the completion of the Pacific Railway and Navigation Company line in 1911 the main route into Tillamook County was the Trask River Toll Road from Yamhill County. The road was established in 1871 and took two days to traverse with travelers stopping for the night at Trask House. The road was abandoned after completion of the railroad in 1911. (Tillamook Pioneer Association, 1972).

The Wilson River Toll road was constructed in 1893. Stages left Tillamook in the summer months at 6am and arrived in Forest Grove at 3:30pm, 9 and ½ hours later. The Wilson River Road was plagued by disputes over tolls and fell into disuse after 1907. It too was abandoned with the coming of the railroad. The Wilson River Highway would be built along roughly the same route between 1936 and 1938 (City of Portland, 1938).

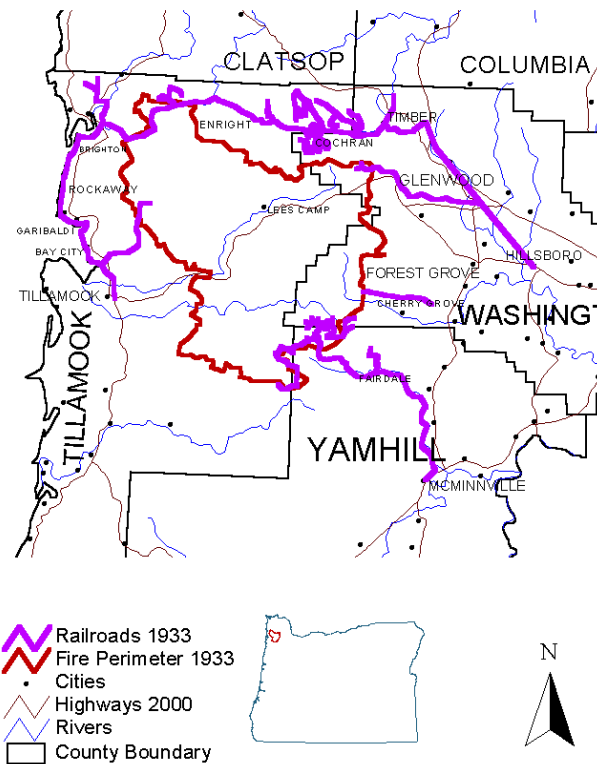
Figure 6 shows a reconstruction of railroads existing in the Tillamook Burn area in 1933 as depicted on a map of the fire perimeter prepared in 1934. The current route of the Wilson River Highway is shown only for reference. It can be seen that railroads had barely penetrated the Burn area at the time of the fire. A 1944 report on the Burn states that “In

1933 the interior was still undeveloped. There were no roads and but few trails.” (USDA Forest Service, 1944:8).

“Logging reached the fringes of the unit about 1915. Most of these were railroad operations and up to 1933 were concentrated in four or five well defined areas.” (USDA

Forest Service, 1944:8) From the map in figure 6 it is fairly easy to pick out where these areas of concentration were located. While one may conclude from this map that the burn area was virtually untouched by logging, in fact the Forest Service reported that “between 1915 and 1933 46,000 acres had been cut over” (USDA Forest Service, 1944:8). This represents about 10% of the area that would be burned in the 1933 fire.

Figure 6
Railroads circa 1933



Fire History

In considering the extent to which this area was truly virgin forest it is useful to review the history of fire occurrence prior to 1933. The 1944 Forest Service Report on the Burn states it succinctly: “Prior to 1933 its history was typical of most of the Coast Range Country. There had been several large fires and logging was progressing from several directions” (USDA Forest Service, 1944:7). Figure 7 is a map prepared by the Oregon Department of Forestry which shows the history of fire in Northwest Oregon.

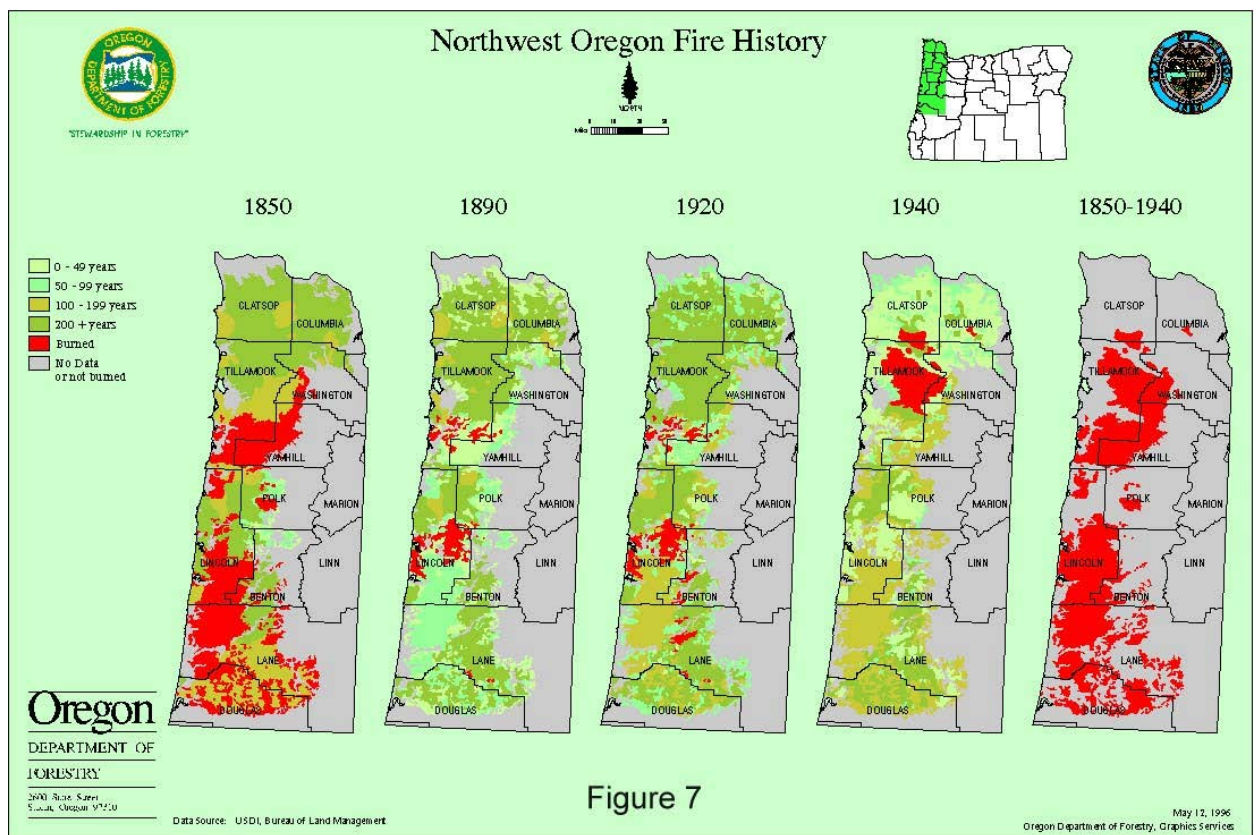
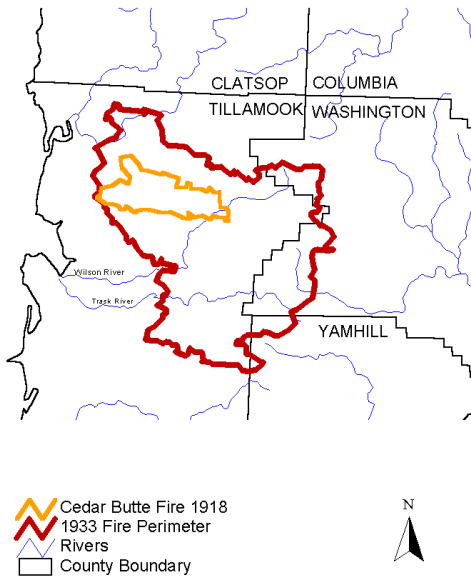


Figure 7

It can be seen that between 1850 and 1940 much of the coast range was burned but that the Tillamook fire stands out as the first major fire to affect Northern Tillamook County since European settlement. Over a million and a half acres were burned between 1848 and 1853 by the Nestuca, Siletz and Yaquina fires(Wells, 1999). However, a review of historical evidence indicates that there were fires in the area which are not showing up

Figure 8
Cedar Butte Fire 1918



Cedar Butte Fire 1918
 1933 Fire Perimeter
 Rivers
 County Boundary

on the map. It is known that in 1845 a clearing fire in Marion County escaped and burned across the Coast Range, in 1878 hunters started a fire that burned south and west out of Clatsop County and into Tillamook County. A human caused fire in 1902 burned a portion of the Wilson River watershed in Tillamook and Washington County. In 1918 the Cedar Butte fire burned about 40,000 acres all within the perimeter of the future Tillamook Burn (Figure 8 shows the extent and location of the 1918 Cedar Butte Fire with respect

to the 1933 Tillamook Fire). In 1931 a 40 square mile area of trees near the Tillamook-Washington county line was destroyed, and in October of 1932 near the origin point of the Tillamook fire about 200 acres was burned. (Bunting, 1997. Morris, 1935). Thus it can be seen that fire was no stranger to this area prior to 1933.

Most of the fires mentioned above were human caused. Figure 9 shows a map of Lightning occurrence in Oregon

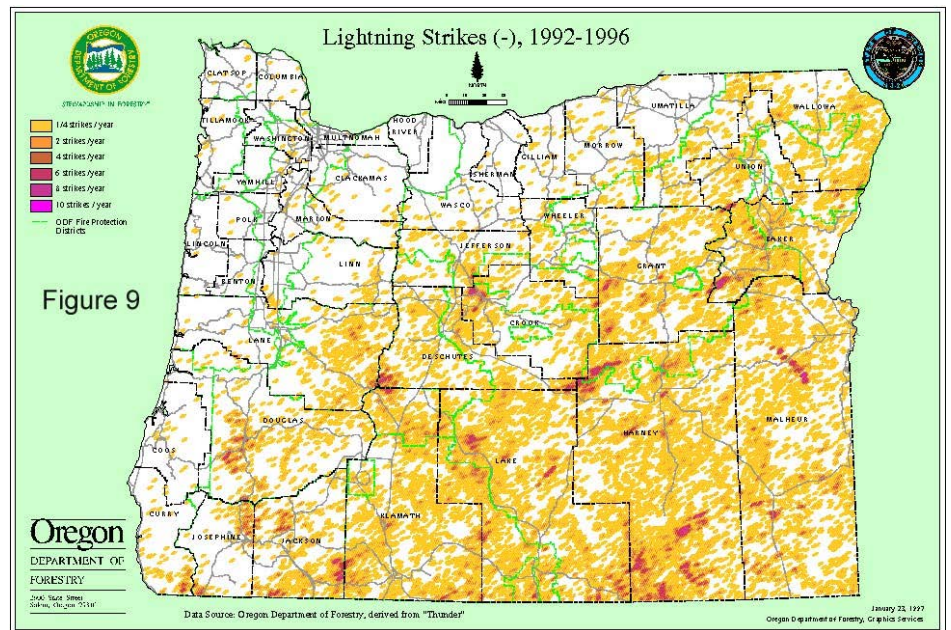


Figure 9

from 1992 to 1996. Although this a very short period of record from a climatological standpoint, it does give us some sense of the relative frequency of lightning in Northwest Oregon compared with other parts of the states. The conclusion that can be drawn from this map is that while lightning is not unheard of in northwest Oregon, it is relatively infrequent. It can also be concluded that given the right combination of fuel conditions and weather, lightning caused fires can be expected in Northwest Oregon, though they will be less frequent than in other parts of the state.

Whether the area of the Tillamook Burn could accurately be referred to as a virgin forest prior to 1933 is clearly open to debate. Although there were certainly large stands of old growth forest which had not yet been reached by loggers, the U.S. Forest Service reported that prior to the Tillamook Fire, 43% of the merchantable timber in this area had been removed by logging, destroyed by fire or killed by disease(USDA Forest Service, 1944).

The Human Caused Disaster

An important component of Tillamook Legend is that the responsibility for the destruction of this forest rests squarely on the shoulders of human beings. Gail Wells has described the frontier worldview, which frames the telling of the Tillamook story. “One important theme of that worldview...is the domination and mastery of nature by human beings”(Wells, 1999:45). Wells later explains that “Human culpability is an important theme of the Tillamook legend, because it reinforces the idea of human domination of nature”(Wells, 1999:60).

It has been commonly agreed that the 1933 Tillamook Fire originated from a spark caused by the friction of one log being dragged over another during a logging operation (Morris, 1936). But consideration of the fire history presented above begs the question: “What was different in 1933 that caused this fire to spread over 360 square miles?” The evidence presented below will show that while the spark that started the 1933 fire was human caused, the conditions which caused it to become a disaster of legendary proportions can be attributed to nature alone.

The 1933 Fire

The Tillamook fire started just before 1pm on August 14. The weather had been dry with no significant rain since June 9. Relative humidity, while not dangerously low had fallen steadily during the previous week and ranged between 20 and 30 percent at nearby weather observation sites. Temperatures were estimated between 90 and 97 degrees. Winds were North to Northeast at 18 to 23 mph (Morris, 1935).

Table 1

Date	Max Temp	Min R.H.	Wind Direction	Wind Speed	
Aug 14	90-97	20-30%	NNE	18-23mph	
Aug 15	100-105	15-25%	E shift to W	15-20mph	
Aug 16	70-75	35-45%	E-SE	5-10mph	
Aug 17	unknown	40-50%	West	5-10mph	
Aug 18	unknown	45-55%	West	5-10mph	
Aug 19	unknown	45-55%	West	5-10mph	
Aug 20	unknown	40-50%	North	10-15mph	
Aug 21	unknown	25-35%	East	15-25mph	
Aug 22	unknown	20-30%	East	20-25mph	
Aug 23	unknown	20-30%	East	10-15mph	
Aug 24	unknown	25-35%	E-NE	10-15mph	
Aug 25	unknown	20-25%	East	25-35mph	
Aug 26	unknown	Rising to >60%	E shift to W	20-28mph decreasing	

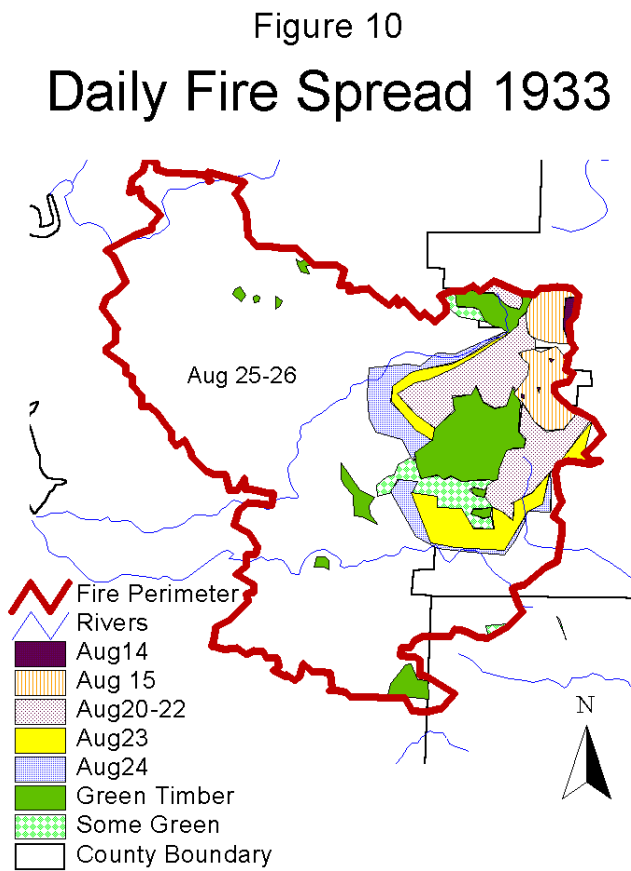
Table 1 summarizes the weather conditions for the period of active burning from August 14th through August 26th. Temperature and humidity conditions are taken from the U.S. Forest Service report of the details of the 1933 fire (Morris, 1935) and are based on hygrothermograph records from nearby fire weather stations. Wind speed and direction

are ridge level winds from Mt. Hebo and Baker Point, the nearest observation points to the fire (Dague, 1934). Winds can be expected to have been somewhat lower at valley locations.

Humidity and wind are the most critical factors in influencing fire behavior.

Figure 10 shows a map of the advance of the Tillamook fire by day. It can be seen that although the fire burned out of control during the first day

it remained fairly small. There has been some controversy over whether there was a second fire that started on August 14th but the evidence seems to support the idea that the second fire was a result of spotting from the first (Morris, 1935).



On August 15, the second day of the fire, temperatures rose to 102°F at Portland and 105 at Forest Grove. A new record for the month of August was set for Portland that day (Dague, 1934. Morris,1935). Humidity fell accordingly and winds, although somewhat less than on the previous day, remained strong. As can be seen in Figure 10 the Fire spread rapidly to the south and east on August 15. The weather changed on August 16, becoming cooler and more humid with relatively light westerly winds. The fire showed no appreciable growth through the 19th during this weather pattern. On August 20th the humidity began to drop as winds increased and shifted to easterly. The fire again spread to the south and east on subsequent days. Note that by August 24th the shaded area represents a relatively small portion of the total fire area.

On the evening of August 24th winds began to increase from the east. Relative humidity, which normally rises during the night, fell instead. On August 25 winds blew steadily out of the east at 25 to 35 mph at the ridge level. The fire blew up spreading 5 to 10 miles to the south and west during the day. Over 75% of the final fire area burned in the 36 hour period between midnight August 24th and noon on August 26th(Morris, 1935). Figure 11 shows a hand tinted photograph taken from an airplane flying over the Tillamook plain looking east on August 25th.

On August 26th winds shifted back to the west and cool moist conditions prevailed. The fire stayed within the perimeter established during the blow up until August 28th when a good wetting rain all but extinguished the fire (Morris, 1935).



Figure 11 Tillimook Fire, August 25, 1933 *Courtesy of National Archives*

Morris (1935) considered the relative fire danger due to weather over a five-year period from 1929 to 1933. He found that overall fire weather conditions were worse in 1929 and 1932 based on extended periods of low humidity and strong winds. Some critical fire weather occurred in July of 1931 but overall this year was less dangerous than 1933. The safest year of the five was 1930.

Thus it may be concluded that this was no more a strictly natural disaster than it was a human caused disaster. It was the combination of high winds on an already going fire which had gotten out of control on the hottest day that had been recorded since weather records had been kept in Northwest Oregon. Under cooler, moister conditions the fire may never have started in the first place or may have been stopped at a few acres. Had the terrain been less rugged, or access routes more readily available it might have been controlled during the favorable weather period between August 16th and 20th. Had high

pressure not developed over the Rocky Mountains to set up a strong easterly wind gradient as low pressure moved in from the Pacific the fire might have been stopped at 40,000 acres instead of spreading to 240,000. Without a doubt it was the wind event of August 25th, 1933 that turned this fire into a disaster that would become legend to generations of Oregonians.

Subsequent Fires, Salvage and Restoration

The Tillamook Legend does not end in 1933. It is beyond the scope of this paper to go into detail about all the events that have transpired in this area since the first fire. However, the story would be incomplete without some mention of the more significant events that have shaped this landscape and contributed to the Tillamook Burn legend.

Subsequent Fires

Left to her own devices, without further trauma, nature would eventually have healed the wounds of the Tillamook fire without human intervention. A Forest Service Report on reproduction two years after the fire found that only those areas burned in the 1918 Cedar Butte fire and reburned by the Tillamook fire were showing signs of damage so severe that revegetation was impaired. “We concluded that in all the country we saw there was not a square mile that did not have some living timber”(USDA Forest Service, 1936:24). That living timber provided the seed necessary to for the forest to be reborn.

The authors of the 1936 report also comment on the danger of future fires. “The great number of snags, coupled with the large amount of unburned material on the ground

and the inflammability of the present ground cover, combine to make the fire hazard conditions on the Tillamook Burn very severe” (USDA Forest Service, 1936:12).

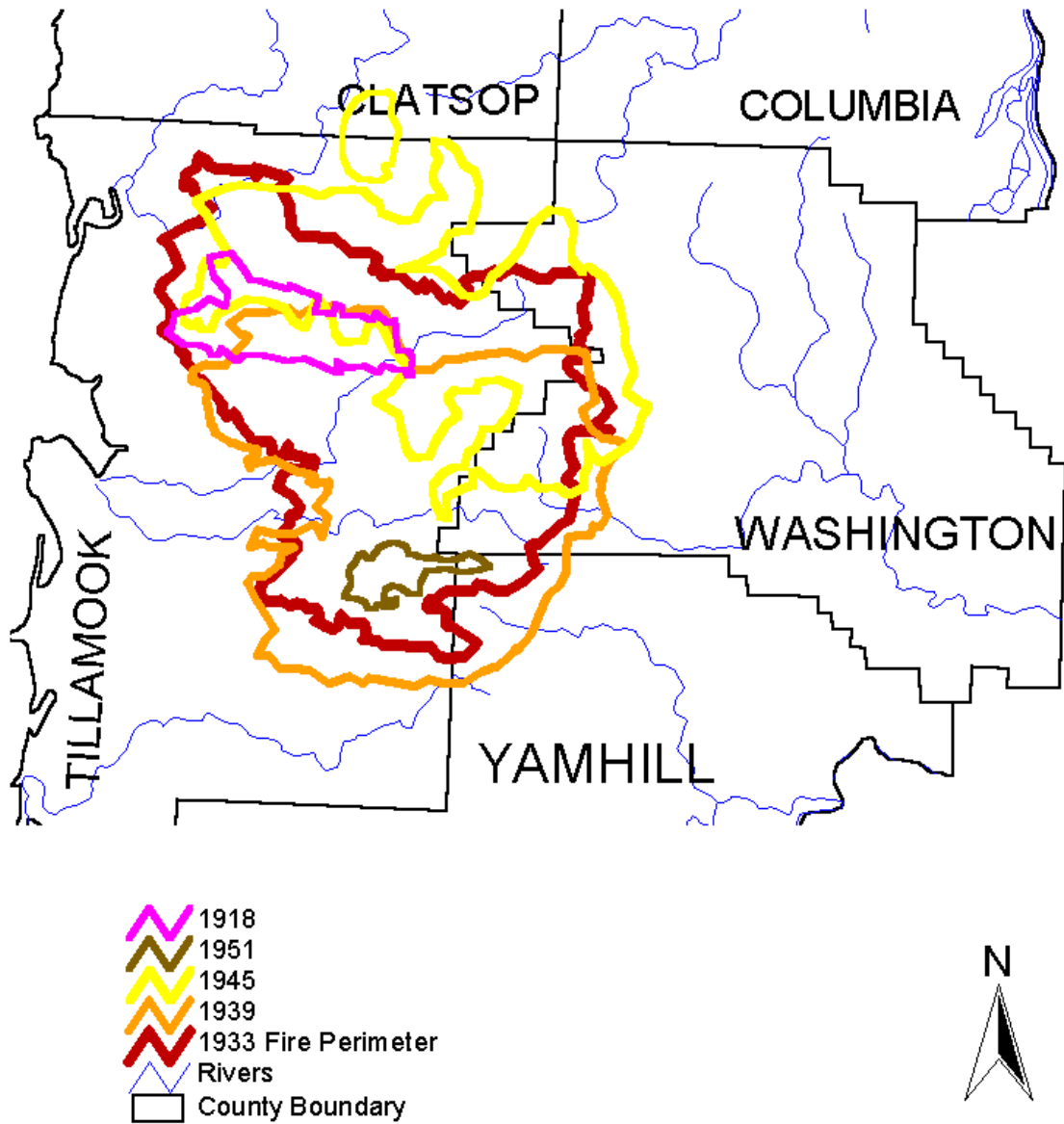
Indeed, disaster would strike only six years after the 1933 fire. “The damage, serious as it was, was increased by the Saddle Mountain fire of 1939. This fire reburned a large part of the Tillamook Burn. It killed reproduction that had started since 1933 and destroyed most of the seed trees that had escaped the previous fire” (USDA Forest Service, 1944:8).

Figure 12 shows the relationship of subsequent fires to the 1933 Tillamook fire. The perimeter of the 1918 Cedar Butte fire is also included for reference. A third fire in 1945 would seal the fate of the Tillamook Burn. Natural regeneration had become all but impossible due to the large size of the area left with no living trees to provide seed for new growth. The six-year cycle led some to conclude the Burn was jinxed. A fourth fire occurred in 1951 but by this time fire prevention measures allowed for quick suppression, or so the legend goes.

Salvage Logging

Salvage Logging is one aspect of the Tillamook Burn that is often overlooked in the telling of the legend. That over 10 billion board feet of timber was killed by the 1933 fire is legend. That an estimated 7.5 billion board feet was removed by salvage logging between 1934 and 1971(Wells, 1999) is less well known.

Figure 12
Tillamook Burn - Subsequent Fires



Several large companies joined forces to rebuild the railroads and begin salvage operations within months of the fire. It was believed that the dead timber would deteriorate rapidly and be subject to pest infestations. At first only the largest trees were removed but with the coming of World War II increasing prices made it profitable to go back and cut lower grade logs that had been left behind in the first cutting. Figure 13 shows a logging



Figure 13 Salvage Logging on the Tillamook Burn *Courtesy of Library of Congress*

truck loaded with salvaged logs in 1941. Note the size of the available trees even after eight years of salvage and a second burning. Salvage logging continued to increase after World War II. “The number of outfits, big and small, working The Burn rose from fewer than fifty before and during the war to more than two hundred by 1950” (Kemp, 1967).

After the War railroads were replaced by roads and logging trucks. Impacts on the landscape were significant. “One ecological study of the Tillamook Burn concluded that

the heavy salvage logging in the Tillamook country did more damage to soils and streams than the fires ever did” (Wells, 1999).

Restoration

Even before the 1945 fire the Tillamook Burn had been characterized as a problem area. “The two outstanding characteristics of the Burn are the excessive fire hazard and lack of satisfactory growing stock or sources of seed from which to build up new growing stock”(USDA Forest Service, 1944:21). The Forest Service went on to recommend that measures to rehabilitate the burn should be taken, “the corner stones of which are intensive protection, hazard reduction, intensive salvage and reforestation”(USDA Forest Service, 1944:21). The Forest Service, however, declined to take on the project (Wells, 1999).

In 1948 the state legislature submitted a proposal to the voters for a constitutional amendment to float a statewide bond issue to finance the reforestation. Legend would have us believe that the people of the state of Oregon were 100% behind the restoration effort. But of 420,000 votes cast the amendment was passed by only 1,875 votes, and it did not pass in Tillamook county which stood to gain the most (Wells, 1999).

Planting began in 1949 (Oregon Department of Forestry, 1983). Legend tells that school children helped replant the burn. Indeed over a 20 year period an estimated 25,000 school children were bussed to the Burn to plant trees. In all they planted less than one percent of the 72 million seedlings that were planted on 108,000 acres of the Burn (Wells, 1999. Oregon Department of Forestry, 1983).

A network of roads to “fireproof” the forest were also constructed. Corridors up to three miles wide were cleared of snags to ensure firebreaks. Salvage logging continued

during the reforestation and sometimes hampered the effort. By 1953 nearly 70% of the Burn was state owned but private owners often held onto the timber rights while turning the land over to public ownership (Kallander, 1953).

Much of the Burn was too rugged and inaccessible for hand planting. A program of aerial seeding was developed and over 116,000 acres were seeded by helicopter and airplane (Oregon Department of Forestry, 1983). In order to reduce the risk of seed being eaten by small mammals the areas to be seeded were first spread with poison. Excessive brush was also a concern in some areas and herbicides were sprayed to make room for the new forest. The last seeding was not completed until 1970.(Kallander, 1953.Oregon Department of Forestry, 1983). On July 18, 1973 the new Tillamook State Forest was dedicated by Governor Tom McCall.

Conclusion

Figures 14 and 15 show some of the changes in vegetation that have occurred along the Nehalem River during the past century. The Tillamook State Forest has undergone significant changes in the 200 years or so that European Americans have frequented the area...much of it in the last 100 years. This paper has only scratched the surface in examining these changes and in shedding light on events that have become legend in the state of Oregon. Much work could still be done in studying the impacts of humans on this landscape. How have the rivers been impacted by years of sediment being washed off the denuded landscape? Has the use of herbicides and pesticides in the seeding operations had a lasting effect on the present day ecosystems? What can aerial photographs tell us about the changes in this landscape? How has land ownership changed over time and are these changes reflected in the recovery of the land? When did this area become a haven for dirt bikes and where do they fit in the evolution of the landscape? The questions are endless. The Tillamook Burn is indeed a living laboratory.