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LAND TAX DELINQUENCY AND ABANDONMENT IN THE FOREST REGIONS OF WESTERN WASHINGTON AND OREGON

A general survey of forest land ownership in western Washington and Oregon and an intensive study of parts of eleven sample counties therein reveal a condition that should command broad serious attention.

Land tax delinquency and abandonment are extensive in the forest regions of western Washington and Oregon. The situation in western Washington is recent; that in western Oregon is long standing. Cut-over lands show greater long-time delinquency than timbered and agricultural lands. Timbered lands display heavy delinquency for taxes levied in the last few years.

A reasonable demand for accessible or good quality timber existed until 1928. Demand for undeveloped, poor quality or immature timber has been slight for many years, and here long-time tax delinquency and abandonment are excessive. Counties are coming into ownership of large amounts of second growth and low grade old growth. In the main, both timber and land thus acquired are held for early resale to private operators who, as a rule, purchase just enough for their immediate needs, strip the timber, remove the public revenue base, and let the wastes go back to the counties again. County deeds regulating or restricting use have not been discovered.

A small portion of lands cut over during the past twenty years has been absorbed by agriculture. The major portion is being held either for future forest crops or merely for a possible profitable turn. Demand for these lands is limited and many owners have stopped paying taxes. During the period of delinquency preceding foreclosure, management rests largely with the protective efforts of existing cooperative agencies. As the area of delinquent lands increases, the problem of maintaining protection intensifies.

Counties, through tax foreclosure, have acquired cut-over forest lands in large and small chunks--some sufficiently large to justify definite public management, some so small and remote from other forest lands as to warrant little attention, and the remainder (which constitutes the bulk) interspersed with private, state and federal lands where protection from fire by cooperating agencies is imperative if any form of management is to be provided. There is but one instance of present county intent to manage a large body for continuous forest purposes. A few counties are providing funds for protection of some of their lands, but many counties, because of general distress or for want of appreciation of the situation, have provided little or no funds, leaving the job of financing to other agencies. Present trends indicate a material increase in county acquisition of cut-over forest lands with lessening hope of returning them to private ownership for any purpose other than speculation, and speculative purchases appear to be on the wane.

The following table illustrates the acreage tax delinquency situation found in the areas studied. These figures are furnished in advance of completion of the study, and are preliminary, subject to revision.

Area in acres of tax delinquent acreage real estate as shown by 1931 acreage tax roll and still delinquent in 1932 and also area of county-owned acreage real estate in 1932

Oregon Counties	County and privately-owned land studied	Delinquent for taxes levied in 1929 & 30	Delinquent for taxes levied in 1928 & prior	Foreclosed for taxes and owned by county	Total acres involved in tax delinquency.
	(1)	(2)	(3)	(4)	(5)
Benton	322,287	62,035	20,822	5,493	88,350
Clatsop	512,629	275,445	57,468	34,067	366,980
Columbia	389,951	131,843	31,914	19,833	183,590
Douglas	1,472,771	330,663	177,815	34,129	542,607
Lincoln	451,946	109,541	55,384	48,911	213,836
Tillamook	551,632	143,334	29,703	73,624	246,661
Total	3,701,216	1,052,861	373,106	216,057	1,642,024

Washington Counties	County and privately-owned land studied	Delinquent for taxes levied in 1927 to 1930	Delinquent for taxes levied in 1926 & prior	Foreclosed for taxes and owned by county	Total acres involved in tax delinquency
	(1)	(2)	(3)	(4)	(5)
Grays Harbor	798,330	228,151	21,846	11,415	261,412
Lewis	942,560	148,542	12,867	436	161,845
Mason	389,017	73,798	7,393	9,575	90,766
Snohomish	357,982	101,401	14,578	19,085	135,064
Thurston	314,515	79,922	6,910	5,306	92,138
Total	2,802,404	631,814	63,594	45,817	741,225

Taxes are delinquent in both states if not paid on the due dates of the year immediately following the year of levy. In 1932, any one tax levy on real property delinquent for three years in Oregon or delinquent for five years in Washington subjected the property to tax foreclosure sale by the County in which it is situated.

Areas of lands that went delinquent for taxes levied in 1931 are not included. Column 1 represents the area of county and privately-owned lands studied within the county named. Municipal, state, and federal lands are not included. Column 2 includes lands that went delinquent for the first time in the years set forth and still delinquent when the study was made in 1932. Column 3 includes lands foreclosable by the respective counties if not paid in 1932 on or before the dates set forth by law. Column 4 includes lands that have been foreclosed and were still owned by the counties in 1932. Column 5 is the sum of columns 2, 3 and 4. The difference between column 5 and column 1 is the privately-owned acreage not delinquent for taxes levied in 1930 or prior years.

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LOW TEMPERATURES FATAL TO WESTERN PINE BEETLE

(Contributed by the Forest Insect Field Station - Bureau of Entomology)

It is evident that nature sooner or later must bring bark-beetle outbreaks under control or the impetus of an epidemic, such as has been sweeping the ponderosa pine area of eastern Oregon during the past few years, would soon wipe out this valuable forest species. A few times in the past it has been indicated that low temperature is one of nature's most valuable checks to bark-beetle multiplication. This was first brought out in 1924 when, after a period of extremely cold winter weather, A. J. Jaenicke found heavy mortality among broods of the western pine beetle on the Metolius area near Bend, Oregon. Again, during the past winter subzero weather in December brought about widespread killing of these pine bark beetles.

Although the occurrence of winter kill among hibernating broods was established beyond a doubt, little was known as to how cold the air temperature must be to produce fatal low temperatures in the bark where the broods are located. This is an important point, for if the relation of air temperature to bark temperature were known, it would then be possible to translate known air temperatures into probable brood mortality. In cases where a heavy kill of brood had occurred, expensive control operations could then be avoided.

In February an opportunity came to test this relationship during subzero weather on the Ochoco National Forest. A series of standard mercury thermometers was placed beneath the bark of six infested ponderosa pine trees of different bark thicknesses and subcortical temperatures were recorded hourly. The thermometers were placed beneath the bark on both north and south sides of the trees. Similar thermometers were suspended in the shade for records of air temperature. Likewise, recording maximum and minimum thermometers were placed in the bark on the north and south sides of six additional infested ponderosa pine trees and a maximum-minimum thermometer suspended from the north side of one of them. Two thermographs were installed, one at the Ochoco Ranger Station and one near the trees, a half mile from the station, and mercury thermometers were suspended near each of them.

After the thermometers were put in place, the air temperature started dropping over a 28-hour period until a low point of 26 degrees below zero was reached. Hourly readings were taken day and night for 66 hours on the mercury thermometers and daily readings were taken over the same period on the maximum and minimum thermometers.

The records obtained showed very definite relationships between air and bark temperatures. Subcortical temperatures in thin-bark trees responded within an hour to marked changes in air temperature, while in thick bark there was approximately a 2-hour lag. Bark did not cool as rapidly as air temperature, and the thicker the bark the slower it responded. At 26 degrees below zero, the lowest air temperature recorded, subcortical temperature in bark one half inch thick remained 8 degrees higher; bark an inch in thickness remained from 18 to 21 degrees warmer, and 2-inch bark stayed 29 degrees warmer and reached a low of only 3 degrees above zero.

Subsequent examinations of the broods which had been exposed to known temperatures are presented in the following table.

Mortality of western pine beetle larvae subjected to 26° F. below zero under field conditions

Bark Thickness	Bark Temperature	Larvae		Mortality
		Living	Dead	
Inches	Degrees F.	Number	Number	Per Cent
1/2	-17	26	69	72.4
3/4	-14	40	72	64.0
3/4	-11	24	30	55.5
1-1/8	- 5	71	68	48.9
1-3/4	0	170	86	33.5

Cold periods with temperatures as low as 26 degrees below zero, even for a very short time, result in fatal inner-bark temperatures for a high percentage of the overwintering broods of the western pine beetle. In bark only one half inch thick almost 75 per cent of the brood is killed; in bark three fourths inch thick from 55 to about 65 per cent of the brood dies; while in bark one and one eighth and one and three fourths inches thick the percentages of mortality are about 50 and 34, respectively. Since about 95 per cent of the bark of ponderosa pine trees has been found to be between one half and one and one half inches thick, it can be seen how low winter temperatures may sometimes bring this insect practically under control. It can also be seen why low winter temperatures do not entirely eliminate this pest from the forests. Some of them live in thick bark and with the lowest air temperatures occurring in the region are never exposed to temperatures sufficiently low to be fatal to them. It is this protection that enables the species to retain its foothold in the northernmost extent of its range.

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OREGON WHITE OAK

Oregon white oak (Quercus garryana) is one of the four most important hardwoods of the Pacific Northwest. But despite this, its use by the secondary wood-using industries decreased nearly 90 per cent between 1910 and 1928. The consumption in 1910 amounted to nearly two and one fourth million feet, while in 1928 it was about one quarter of a million feet. The wood is now used chiefly for handles, chairs, boats, and stirrups, though in the past considerable quantities have entered into the manufacture of furniture, cooperage, and fixtures.

The toughness of second growth or "grub" oak especially fits it for ax, hammer, and other small handles. Being durable and hard, it is used to some extent in boat construction and may be depended upon to give long service. Its hardness, strength, and flexibility makes it an excellent wood for stirrups. This species is one of the chief sources of fuelwood in the region. The 60,000 cords used annually place it second only to Douglas fir.

The decreased use of Oregon white oak in certain of the secondary wood-using industries is not surprising. The better stands of this species have been destroyed in the clearing of agricultural lands. Present stands are confined mostly to the less favorable sites, with the result that the timber is of poorer quality. Since second growth is unsuitable because of texture, and since the remaining virgin stand is so defective that clear cuttings of sufficient size and quality are not obtainable at a reasonable cost, manufacturers of such items as furniture, fixtures and chairs have turned to the eastern states for their oak supply.

With present stands of Oregon white oak limited largely to marginal and submarginal lands of little agricultural value, it is desirable that they be so managed as to maintain a permanent growth of this species. Efforts should be directed toward producing the maximum amount of handle stock and fuelwood, favoring only the best trees for lumber. Proper management requires absolute protection from fire and the cutting of the trees so as to encourage vigorous sprouting.

The above are the salient points of a recently completed report on the properties and uses of Oregon white oak on file at the Pacific Northwest Forest Experiment Station. A fuller digest of this report will appear shortly in "The Timberman" of Portland. More detailed information will be made available to any who may request it of the Experiment Station.

H. M. Johnson
Assistant Forester

THE STOCKING CLASSIFICATION OF LANDS LOGGED IN 1920 TO 1923 AS SHOWN BY THE FOREST SURVEY

Field work on the inventory phase of the forest survey of the Douglas fir region is practically completed and compilation of the data is progressing rapidly. Statistics of timber volumes by species and ownership classes and cover type areas by ownership classes will be available for most of the 38 counties in this region sometime this fall.

In addition to timber volumes and type areas, interesting items of collateral information are being collected. For example, one of the types recognized by the Survey, "recent cut overs" was defined as lands clean cut since January, 1920. In order to obtain a statistical expression of the restocking condition on that portion of these areas which has been cut the longest, it was decided to make a linear survey, using the stocked quadrat method, of the areas logged from 1920 to 1923 inclusive. Transects were spaced at two-mile intervals and at one-chain intervals on these lines a set of four 13.2-foot quadrats was examined and each square recorded as stocked or nonstocked upon finding or failing to find one well-established, coniferous seedling within the confines of the square.

In seven counties in northwestern Washington 137 miles of strip line have been run and 43,856 quadrats examined. In analyzing these data, four-chain units or 16 quadrats were used and each four-chain interval was classified as either well stocked (70-100 per cent stocked) if 12-16 squares were stocked, medium stocked (40-70 per cent stocked) if 7-11 squares were stocked, poorly stocked (10-40 per cent stocked) if 2-6 squares were stocked, or nonstocked (0-10 per cent stocked) if 0-1 of squares were stocked. Six of the counties examined--King, Mason, Skagit, Snohomish, Thurston, and Whatcom--are in the Puget Sound region and are grouped together. The other county, Grays Harbor, which contains much of this type of land and has a different geographical situation, is listed separately. The following table gives the results of the analysis:

Number of Four-chain Units by Classes of Stocking

	Good		Medium		Poor		Non	
Degree of Stocking	No. Units	Per cent	No. Units	Per cent	No. Units	Per cent	No. Units	Per cent
Puget Sound Counties	278	13.8	338	16.7	583	29.0	816	40.5
Grays Harbor	100	13.8	147	20.1	208	28.7	271	37.4
Total	378	13.8	485	17.7	791	28.9	1087	39.6

Results for individual counties of the Puget Sound group deviate somewhat from the average of the group, and it is probably partly coincidental that the Grays Harbor and Puget Sound results should agree so closely. These data do indicate very definitely that the lands clean cut in the past decade are in a condition far from satisfactory.

R. W. Cowlin
Associate Forest Economist

MOTOR TRUCK LOG HAULING

The volume of forest products hauled by motor trucks in Oregon and Washington is increasing. Over 800 trucks are now engaged in hauling logs, and hundreds of others in transporting fuelwood, pulpwood, lumber, poles and piling. A major part of the timber so handled is dependent upon motor transportation because it occurs in small bodies isolated from railroad and water hauls. The remainder is hauled either because trucking is cheaper than any other method or will permit an earlier realization of cash returns than would otherwise be possible.

About 375 million board feet of logs were transported by motor trucks in Oregon and Washington during 1931. They were hauled from landings in the woods to sawmills, log markets and railroads. Trucks are used mainly on small operations by loggers who own bodies of timber adjacent to public roads. Others work on large operations where they haul from the rougher ground and the leaner settings to the main-line railroad. Still others deliver logs to semiportable sawmills located near the timber, and haul the lumber to markets or seasoning yards.

Log hauling is not an easy service for trucks. Heavy loads, poorly surfaced roads, and steep grades contribute to difficult hauling conditions. It is often necessary to truck heavy loads over roads, parts of which are poorly surfaced or very steep. One operator near Bridal Veil, Oregon, for example, hauls logs down a mountain road having a difference in elevation in one and one half miles of over 1,100 feet. His trucks have air-controlled brakes cooled with running water and highly selective transmissions with nine speeds forward and three in reverse. Needless to say, steep grades are ordinarily avoided, but the instance referred to shows the conditions under which some trucks operate. Generally public roads are used for a part, at least, of the hauling distance. Additional roads are built by the logger if needed.

During the twenty years that motor trucks have been used in the Pacific Northwest, they have proved suitable to conditions unforeseen by their most optimistic advocators. Loggers have found that motor vehicles may contribute to lower logging costs through the elimination of spur railroads in large operations, and may make possible the economic harvesting of timber tracts too small or too isolated to be handled with other equipment, the salvage of fire-killed or insect-damaged timber, the utilization of timber by small mills located in or near the forest, and the continued operation of other mills. Motor truck equipment is not specially developed for the small operation as contrasted to the large, but is a means of transportation which, under the right conditions, is the most economical method of hauling timber.

During the past summer, information was obtained on the engineering, economic, and forestry aspects of motor truck use. This has since been assembled in a report which tells about the equipment, road building, truck operation, the cost of hauling, and the present and future place of motor equipment in forest utilization. Publication of the complete report will be made shortly in The Timberman.

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REFORESTATION BY BROADCAST SEEDING IN THE SPRUCE-HEMLOCK TYPE

Under proper ground conditions, reforestation by broadcast seeding with certain coniferous tree seed now appears to have decided possibilities, in spite of repeated failures in the past. For years some of the reforestation in foreign countries has been done by this method, but in America foresters have had very little success with it. Failures in this country are attributed by the author primarily to the use of large seeded species and to ground conditions unfavorable to germination and survival. If the seed were not consumed by birds and rodents, the seedlings were destroyed by drought or competition.

Not forgetful of previous failures, the Experiment Station in cooperation with the Olympic National Forest started four years ago a series of broadcast seeding tests in the humid fog-belt region, using small-seeded native species, such as western hemlock, western red cedar, and Sitka spruce. Sample plots, on an area slash burned in 1928 and seeded in January 1929 at the rate of 1.6 pounds per acre of the above three species, had an average stand of 2,800 seedlings per acre in June 1932. Other parts of the same burned area seeded a year later at the rate of 2.24 pounds of mixed seed per acre, now have 1900 seedlings per acre. Later seedings in 1931 and 1932 on the same area were not satisfactory because of ground conditions, since on nearby fresh burns, successful regeneration was obtained using similar seed and sowing at the same time and at the same rate per acre.

Red alder was added to the list of species tested in January 1932 because of its timber value and its proposed value for firebreaks in coniferous forests. A fresh burn on moist ground seeded at the rate of 1.3 pounds of seed per acre had 13,600 seedlings per acre in June 1932 and an adjoining gravel surfaced railroad grade had even more. It is too soon to be sure of the percentage of survival. Douglas fir seed was also tried, but no satisfactory results were obtained, substantiating the hypothesis that only the small-seeded species are adapted to practical broadcast seeding.

The results to date indicate that adequate restocking can be obtained in the fog belt by broadcast seeding at the rate of 1.5 to 2.5 pounds per acre under the following conditions:

1. The seeding must be done one or two years after the slash fire, when the ground vegetation furnishes a light protective shade and does not choke out the seedlings.

2. Small seeded species must be used (200,000 to 500,000 seed per pound) since these are not attractive to birds and rodents.

Where broadcast seeding is feasible, it is desirable, because it makes possible a flexible program and requires no nursery overhead. Advantage can be taken of heavy seed crops. Should a good crop occur this year, for instance, when the forestry program is receiving extra attention and much help is available, this method might be used, especially since there are insufficient seedlings on hand for extensive plantings. In normal times, sowing by airplane offers a possibility.

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Assistant Silviculturist

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MORE ABOUT THE GROWTH OF DOUGLAS FIR

Yield tables have a definite place in forest management for the prediction of growth, but they should be checked with actual yields so that predictions may become increasingly reliable. This is being done for the Douglas fir tables by taking measurements periodically on about forty permanent sample plots and comparing the trends of consecutive values with the trends of the yield tables. The results of a comparison were reported in the Journal of Forestry for April 1933; a few of the more striking results are summarized below.

The actual growth on the permanent plots more than substantiate the growth rates of the normal yield tables; in fact due to their relatively even spacing and slight degree of understocking, many of the permanent plots are producing wood at a faster rate than the yield tables show. The tables in other words tend in the long run to be somewhat conservative for good stands.

Understocked plots which are far below the normal condition grow at a relatively faster rate than fully stocked plots, with the result that a normal condition is approached, at first rapidly and then at a diminishing rate. Overstocked stands on the other hand grow slower than normally stocked forests, so that they tend to diminish in volume also approaching the normal condition of stocking. Briefly the permanent plots give factual proof that light stands become heavier and heavy stands become lighter. This ability to seek an equilibrium production is another evidence of the high capacity of Douglas fir for continuous forest production.

Due to intentional conservatism in the original computations and field work, the yield tables for Douglas fir do not give the optimum values. According to the check plots, the full or ideal stand seems to have a volume about 15 per cent above the yield table values, since understocked plots if left undisturbed will ultimately attain stand volumes which are 115 per cent of the yield table volumes for the same age and site.

Plots on Site Quality I land may produce currently 2,000 board feet (net) per acre per year, full scale; the trees increase in diameter at an average rate of one inch in about four years, although some trees will increase two inches in diameter in this time. Plots on Site Quality II land produce commonly 1000-1500 board feet (net) per acre per year, and the trees increase in diameter about one inch in five to six years on the average.

Under present conditions growth should be considered always in terms of net values. The volume lost by mortality can not be included in the total yield. Ordinarily the mortality is less than one per cent by volume in the stands studied, but in extreme cases it is sufficient to wipe out completely the entire periodic increment.

W. H. Meyer
Associate Silviculturist

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NOTE

After July 1, 1933 the office of the Pacific Northwest Forest Experiment Station will be in the New Federal Court House, S.W. 6th Avenue and S.W. Main Street, Portland, Oregon.