Factors Affecting the Application of Forest Fire Insurance in Oregon

by

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- Justin Du Cray
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FACTORS AFFECTING THE APPLICATION OF
FOREST FIRE INSURANCE IN OREGON

CHAPTER I

INTRODUCTION

The forest industry in Oregon has come to a crossroad - one road leads to a permanent sustained yield forest industry, and the other road leads to the historical cut-out and get-out policy which has characterized American lumbering from the Atlantic Seaboard to the Pacific Coast. The longer over-production continues on private lands, the more difficult it will be to convert to sustained yield. For this reason it is important that sustained yield management be introduced as rapidly as possible on private lands before the timber that might sustain permanent operations is removed.

A permanent forest enterprise is beset by more unfavorable obstacles than the average business. Undoubtedly the two greatest obstacles to forestry are the lack of adequate credit facilities and the constant danger of fire.

In every field of endeavor, insurance is the keystone of industrial credit, and no business these days is run independently of credit. It is necessary that capital
be extended to timberland owners if they are to carry their properties and raise timber upon them. Immediately the question arises, if insurance is so important to industrial credit, why haven't we had insurance against fire for forest properties?

In the past, there have been four principal reasons for not having forest fire insurance. The reasons were: the lack of essential actuarial data for the construction of an insurance rating table, the problem of value estimation and damage appraisal, the unwillingness of any of the large insurance companies to underwrite forest insurance, and perhaps the most important reason of all is the psychological handicap in the belief that neither standing timber nor a young forest is an insurable risk.

The purpose of this thesis is to present the practical possibilities of fire insurance for forest properties in Oregon, and to attempt to establish the fact that forest properties are definitely an insurable risk.

Obviously to completely cover the forest fire insurance problem would require a lengthy discourse, and this discourse would needlessly cover several previously published articles that adequately explain various portions of the problem. Rather than stress previously written works, the scope of this thesis has been limited to a few important factors which have prevented the development
of forest insurance in Oregon. The two most important factors being the reputed lack of actuarial data, and the unwillingness of any major company to underwrite forest insurance.
CHAPTER II

HISTORY AND NEED OF FOREST FIRE INSURANCE

Insurance in Foreign Nations

The first attempts to underwrite forest fire insurance occurred in France and Germany about 1880. These early attempts were not very successful because the volume of business was too small, and the premium rates were too high. Nevertheless, stock companies are still writing forest insurance in France and Germany.

After considerable study and investigation, the Norwegian Mutual Forest Fire Company was organized in November, 1911. This is a mutual insurance company where any owner, regardless of size, can become a member. Being a mutual concern, it follows that there are no stockholders. All surplus is added to a reserve fund in order that the yearly premiums can be kept as low as possible. The growth of insurance has exceeded expectations, and by 1922, seventy per cent (5,200,000 acres) of the private lands of Norway had been insured.

In 1914, Finland followed Norway's successful venture into the forest fire insurance field by organizing a mutual insurance company. A second company, also a
mutual type, was organized in 1916, and since that time several other companies have developed. Prior to World War II, the forest insurance companies in Finland had shown considerable development, and they had conducted the most successful scientific studies on insurance.

Sweden's first successful forest insurance was written in 1919. Sweden now has four or five companies which will insure everything from young plantations to shipments of lumber.

In addition to the Scandinavian countries, other nations have met with varying degrees of success in their insurance ventures. In Denmark, the Danish Plantation Society has been insuring the property of its members since 1902. However, only plantations are insured and its liability is limited to the cost of replanting the area. In 1931, there were four companies in Japan insuring forest properties, but due to extreme caution in the selection of risks, very few policies have been written. It is also possible to insure forests in Switzerland, Belgium, and Holland.

Insurance in The United States

Forest insurance in the United States has lagged behind Europe. Prior to 1916, policies were only written on request of the forest owner for protection of small lots
of valuable timber for a few years, or to aid in the floating of a bond issue. The first active effort to underwrite forest insurance in the United States was undertaken by the Phoenix Assurance Company of London, England. On April 8, 1916, the Pacific Coast department of this company announced that it would write insurance on mature timber in Washington and Oregon west of the Cascades. The venture proved unprofitable, and it was discontinued in 1918. In 1917, a group of public-spirited citizens founded the Timberlands Mutual Fire Insurance Company of Portsmouth, New Hampshire. The company did a very conservative business, insuring all kinds of timber, but avoiding unfavorable hazards. After establishing the fact that timberland insurance was feasible, the founders of the company, not being interested in the financial aspects of insurance, transferred the business to the Globe and Rutgers Fire Insurance Company of New York, which still writes a small amount of insurance.

The only other known companies underwriting forest insurance are the Home Insurance Company of New York and its allied companies, the Franklin Insurance Company of Philadelphia, and the City of New York Insurance Company. These companies limit their operations to the forests of the northeast and only underwrite merchantable timber and plantations.
The Need for Forest Insurance

America is just entering an era wherein it will be necessary and economically advantageous to grow timber. The climate and soil conditions in Oregon are exceptionally well suited to the growing of timber crops, and many forest owners are interested in the commercial possibilities of permanent forest production. However, the great risk of investing capital for such a long period as is required to grow a crop of timber with the ever-constant fear of fire, is a deterrent to permanent timber growing. Forest fire insurance can eliminate this fear. Insurance eliminates an element of uncertainty and replaces it with a known annual expense. In addition to the protection of the capital investment, insurance will encourage the adoption of better protective measures because of the influence of such measures upon insurance rates. Another advantage, which forest insurance will provide, is the extension of credit and loans to permanently organized forest properties. Thus insurance not only protects an investment, but it also makes it possible to obtain capital for such an investment.

Insurance would bring many other benefits. For example, the increased safety of the investment would increase the flow of capital toward the field of forestry; this in turn would lower the prevailing high rates of interest and thereby eventually lower the costs of production. This
lowered cost of production would result in a larger production of wood products with higher profits for the majority of forest producers.
CHAPTER III

ACTURIAL DATA

Sources of Data

The one outstanding excuse for not underwriting forest insurance has been the lack of accurate statistics of fire losses. While this statement was undoubtedly true twenty years ago, and possibly even correct ten years ago, it is no longer correct for Oregon and the Douglas Fir Region. At this point, it might be well to mention the outstanding bulletin, "Forest Fire Insurance In the Pacific Coast States," written by Shepard (11) for the United States Forest Service and published in February, 1937. This study was conducted over four consecutive years, 1930 to 1934, and during that time it had the active co-operation of the State Foresters of Oregon, Washington and California, The Board of Fire Underwriters of The Pacific, The National Board of Fire Underwriters, The Weather Bureau, The United States Forest Service, and numerous other organizations and individuals. Shepard based his study upon the individual fire reports furnished by the local fire wardens during the ten-year period, 1921-1930 inclusive, as summarized in the annual reports of the State Foresters, and in part from the fire records
of the Forest Service. Of course, these reports did not furnish all the information needed. Therefore, Shepard and his co-workers went out into the field and collected original data. This scientific investigation of the factors affecting the underwriting of forest fire insurance furnished enough accurate statistics and actuarial data to form a reliable base for a rating schedule. In fact, the outcome of this inquiry was a recommendation in favor of forest fire insurance as a feasible and profitable undertaking where proper precautions are observed.

Although the State of Oregon's Forestry Department has been collecting data on forest fires since its inception in 1907, these early records did not contain all the necessary information for the computation of a rating schedule. However, since Shepard's investigation and spurred on by the Tillamook conflagrations, there has been a change in the procedure and kinds of data collected by the State Forestry Department. Of course, this change did not occur on any specific date, but it is reasonable to state that the records compiled since 1936, and in particular since 1940, are accurate, and that they contain sufficient data to initiate insurance.

Other sources of actuarial data are the two studies of adequate fire control on private forest lands by Mathews (9, 10) conducted in Snohomish County, Washington,
and Clackamas and Marion Counties in Oregon. The reports analyzed the fire control situation, and they also collected information concerning differences in terrain, type of forest growth, conditions of human settlement, fire occurrence and burning rates, risk and hazard factors, and fire weather data. In short, these two studies alone compiled enough data for an experimental insurance base.

There are other organizations, notably the United States Forest Service, Lumbermen Associations, and the Tree Farm Association which are quietly collecting important data on the occurrence and spread of fire. There is no doubt that we now have enough actuarial data to form a basis for underwriting insurance. In all fairness, it must be stated that the above mentioned data would be merely a starting point for insurance, and in no manner could it compare with the data that would be available after a decade of insurance underwriting. Nevertheless, the fact still remains that sufficient data is available for use as a base for underwriting forest fire insurance at the present time.

**Amount of Fire Loss**

Without question, the first information that an underwriter would want to know is the probability of loss or damage to any given amount of property. The amount of loss or loss cost, is dependent upon the so-called burning ratio.
If, out of a total value of $500,000, forest damage to the value of $1,000 is lost, the burning ratio is 0.2 per cent, and the loss cost is twenty cents per one thousand dollars of value.

If any region where forest fire statistics have been kept, it is possible to measure both the normal and conflagration hazards in terms of the burning ratio which can be expressed as follows:

\[
\text{Burning Ratio} = \frac{\text{Average Area Burned Per Annum} \times 100}{\text{Total Forest Area}} \text{ in Per cent}
\]

From statistics that were published by the State For- ester, the burning ratio in Oregon for the years 1935 to 1946 inclusive is as follows:

\[
\frac{(84,750) \times (100)}{12,436,000} = 0.69 \text{ per cent}
\]

For comparison, the burning ratio for the years 1941 to 1946 inclusive is:

\[
\frac{(47,000) \times (100)}{12,436,000} = 0.38 \text{ per cent}
\]

Knowledge of these burning ratios is the beginning of the development of an insurance rate schedule, and such knowledge is available in Oregon.

However, from the insurance viewpoint, the underwriter would actually want to know the loss ratio, and although the amount of damages is dependent upon the amount of area burned, there are several factors which tend to make this relationship more or less indirect.
A study of table II will illustrate this point more clearly. For example, the average damage for the years 1940 to 1945 inclusive is approximately $5.30 per acre burned, while the damage in 1944 is $13.40 per acre. Even more important than this variation, specific acres and stands would fluctuate from no loss to four or five hundred dollars damage per acre. This is an important factor, and it is admitted that except for Shepard's pioneering survey, little actual data is available on which to base an accurate loss ratio.

However, we do have sufficient data to establish a temporary insurance rate based upon the total forested area and the average annual damage. From the information in table II, the loss rate would be computed as follows:

\[
\frac{\$274,540 \text{ (annual damage)}}{12,436,000 \text{ A}} = \$0.022 \text{ per acre}
\]

If the average annual fire damage for the years 1940 to 1945 inclusive were prorated over the entire acreage under the jurisdiction of the State Forester, the annual damage would amount to only 2.2 cents per acre. This is certainly a small enough loss to warrant further investigation into the possibilities of forest insurance.

**Hazard Factors**

After the determination of the loss ratio, the under-
writer would require specific knowledge concerning hazard factors, their nature and influences, and the range between the lowest and highest hazards in relation to specific property units.

These hazards can be divided into two classes, namely, the contributive forest fire hazards and the causative fire hazards, or perhaps a better terminology would be simply, hazards and risks. The contributive hazards are the factors which affect the spread of fire once the fire has occurred. Consequently, the causative hazards, henceforth called risks, are all the agencies which result in the transmission of fire to forest fuels.

Contributive hazards can be classified as either climatic or physical. Scientific investigation has revealed the existence of a number of physical hazards of major importance which can be measured. It must be recognized that some factors must be ignored because their measurement involves undue complication and cost that would outweigh the advantages derived.

Shepard (11) lists the essential factors of physical hazard as follows:

1. The average size of the trees composing the insured stand.

2. The density of the stand.

3. The composition of the stand by species of trees.
4. The occurrence of unburned logging slash; of fern, brush, grass or desert areas; and of lands recently cut over.

5. The occurrence of snags.

6. The character of the topography.

Detailed field studies have uncovered very valuable information concerning the physical hazards. For example, tree size has an important effect on the amount of fire damage. It was found that immature growth, particularly in the smaller sizes, seldom escapes very serious damage if subjected to any kind of fire, since in these smaller trees, with their lower branches near the ground, the fire is almost certain to reach and travel along through the crowns. Even if this does not occur, the burning of the undergrowth usually scorches through the relatively thin bark of the young trees and destroys the cambium layer. On the other hand, merchantable timber has a high degree of fire resistance, and unless a fire crowns, the majority of merchantable Douglas Firs will ordinarily escape being killed, and the net damage will be relatively low. The term merchantable timber has many interpretations, therefore, for insurance purposes, timber was grouped into the following five major classes:

Class A -- Stands of trees mostly over 40 inches d.b.h.
Class B -- Stands of trees mostly 20 to 40 inches d.b.h.
Class C -- Stands of trees mostly 6 to 20 inches d.b.h.
Class D -- Stands mostly over 25' high, up to 6" d.b.h.

Class E -- Stands mostly less than 25 feet high.

The above classification lists two classes that are composed mainly of timber of merchantable size, and three of second growth and reproduction. All the evidence, shows a distinct difference between them in hazard, and indicates that their classification is admirably suited to the needs of forest rating and underwriting.

Stand density is an outstanding variable in hazard rating. The effect of density is not only more pronounced in some classes than in others, but the order of variation actually reverses itself. For example, a very dense stand of class E has a high hazard rating, while a dense stand of class B has a low hazard rating.

The intensity with which a fire will burn, its resistance to control, and the speed of its spread are all affected by the slope of the ground. Steepness is an adverse hazard for which an appropriate charge must be made in a rating schedule. For practical purposes, three slope classes have been recognized - level, which includes slopes up to 10 per cent; moderate, including slopes between 10 and 40 per cent; and steep, which includes all slopes over 40 per cent.

It is quite obvious that the different degrees of hazard that can be produced by varying the physical factors
are practically unlimited. However, in fire control planning these different degrees of hazard are satisfactorily evaluated, and the knowledge obtained in fire control experience would be a satisfactory basis for the construction of a rating schedule.

The spread of fire is influenced by weather conditions, therefore, weather constitutes another contributive hazard. If climate is uniform locally, no attention need be paid to its hazard factor. However, it becomes an important consideration when its local variations are sufficiently large to affect practical hazard rating.

When the influence of climate on fire hazard is under consideration, the essential factors are those that occur during the so-called fire season. Obviously, this is the drier and warmer portion of the year, which in Oregon normally occurs in the seven-month period between April first and November first.

Climate is a component effect, and as such it cannot be measured in absolute terms. Scientific analysis is limited to measurable factors of which we have accurate data in Oregon on the four following climatic elements - precipitation, drought, days of low relative humidity, and degree of low relative humidity.

The National Board of Fire Underwriters, in co-operation with the Weather Bureau, has made a chart of the whole country, on which are expressed various grades of climatic
hazard factors for the purpose of determining the proper climatic grades of cities and towns. Although many of the factors used are of no interest in forest work, the fundamental principles were used as a basis for computing a forest fire climatic chart.

The data for this chart was collected by the United States Weather Bureau, and it was evaluated by Shepherd (11) with the help and guidance of the Weather Bureau into a forest fire climatic chart.

This chart arbitrarily divides the Douglas Fir Region into five zones. For the purpose of hazard rating, zone I was taken as the standard with each of the other four zones having a hazard rating 50 per cent higher than the preceding zone.

Risk Agencies

The chance of damage by fire on a given forest area depends upon the probability of fire starting on or near the area. Whether or not fires will start depends upon the presence or absence of causative agencies during the period in which fires can start. Consequently, an agency assumes importance as a risk factor according to the number of fires which it starts.

When the number of fires caused by a specific agency is known, as well as the area in which it occurs, the increase in the risk resulting from it can be computed by
the following formula developed by Shepard (ll):

\[
\text{Percentage Increase of Risk} = \frac{100 \cdot r \cdot N_z}{z \cdot N_r}
\]

Where --

- \( r \) equals the area of the whole region under consideration,
- \( z \) equals the area of the zone of influence of the specific risk,
- \( N_r \) equals the number of basic fires in the region,
- \( N_z \) equals the number of fires resulting from the specific risk.

For illustration, let us assume that a forest area is 60,000 acres in extent, 30,000 of which are subject to fires from logging operations within the area. Records attribute eight fires per year to basic causes, and the records also attribute logging with an average of four fires a year. Placing these figures into the formula, we have:

\[
\text{Increase in Risk} = \frac{100 \cdot 60,000 \cdot 4}{30,000 \cdot 8} = 100 \text{ per cent}
\]

In this example, fire would be approximately twice as likely to occur in the logging zone as in the portion of the region subject only to fires from basic causes. Accordingly, the acreage in the logging zone must pay

\[\text{1No correlation can be established between location and the occurrence of fires from incendiarism and miscellaneous and unknown causes, and these causes have accordingly been taken as basic.}\]
additional premium charges in proportion to the increase in risk.

An important risk factor is the distance from the point of origin of a fire to a road. When the records from the man-caused fires in Marion and Clackamas counties were analyzed by Mathews (9), they revealed that fifty per cent of the fires started within one hundred feet of a road, and that ninety-five per cent started within one-quarter of a mile of a road. These figures follow the pattern of similar studies in other areas.
CHAPTER IV

PRACTICAL CONSIDERATIONS IN THE APPLICATION
OF FOREST INSURANCE

Fire Protection

Desirable as it may be, complete elimination of forest fires is not possible. Occupancy and use of the forest implies legitimate need for fire, and some of these fires are bound to escape through carelessness or negligence.

Prior to 1910, very little protection was given to forests in any part of the country. Since that time, as a result of public interest and demand, there has been rapid development of organized protection.

Oregon is an outstanding example of the recent development in fire prevention and control. Since the Tillamook catastrophe in 1933, the people of the State of Oregon have progressively supported and demanded better protection.

The decrease in the amount of forest area burned annually is the result of many factors. Undoubtedly, an important one is the growth of the Oregon State Forestry Department. In the past decade, and particularly in the past five years, the State Forestry Department personnel has increased in number and efficiency. The whole technique of handling the forest fire problem in Oregon has
been thoroughly revised and improved.

Other things being equal, fire damage will vary inversely with the effectiveness of the protective organization. Effective protection is a positive factor in keeping the loss ratio at a low figure, and therefore, there must be some method devised to grade the effectiveness of forest protection organizations. Fortunately, the Clarke-McNary Administration had encountered the same problem in its distribution of federal funds for fire control work on private lands. The following grading schedule is the result of the Administration's (11) pioneering work:
1. General strength of association, financial and administrative
   a. Per cent of area on tax roll
   b. Probable support from parent organization
   c. Independent financial resources

2. Plant
   a. Detection
   b. Communication
   c. Transportation
   d. Fire-fighting equipment

3. Manpower - Permanent force
   Number of acres per man
   Organized sawmill, woods, trail crews available
   Good local help available
   Members of force graded individually
   Physical fitness, one-half
   General fitness, one-half
   Intelligence
   Experience
   Warden graded according to general fitness for job
   Warden's grading is weighted to equal one-third of total

4. Performance
   Fast, strong start
   Prosecution
   Mopping up
   Records satisfactory

5. Law enforcement
The grading schedule here presented meets the requirements for introductory underwriting. As actual insurance experience is gained, it can be modified and improved.

Insurance would have a direct influence on forest protection. It is inevitable that this should be so, for the insurer is the one who will lose if protection slackens. It is a recognized function of insurance activity to develop and maintain effective protection.

Forest Valuation

Although the valuation of timber presents a troublesome problem, apparently the difficulty of valuation, as a basis for both insurance and for settlement of damage, has been unduly emphasized.

At present, there are three main classes of forest property - merchantable timber, immature second growth and artificial plantations. Each of these classes involves a different method of forest valuation.

In the valuation of mature timber, there is no doubt that sale or market value is the prevailing method. In addition, the indemnity payment must include compensation for the reduced value of capital improvements.

Immature timber presents a different situation. Perhaps the most practicable basis for appraisal is the cost value. Cost value may be computed by adding to the purchase
price, if any, the annual and periodic payments for taxes, protection, administration, and other maintenance costs, with an allowance for reasonable compound interest accumulation. Ordinarily no purchase price would be involved. Much of the second growth and reproduction privately owned is the result of natural restocking. Consequently, it could be expected that the accumulated expenses with interest would comprise the basis of value in most cases.

Artificial plantations present a relatively easy problem in appraisal. Once again cost value is used, but it must represent the cost of replanting the area at the time the fire occurred, plus additional indemnity for the amount of money spent for maintenance and protection.

Adjustment of Losses

A most important consideration in adjusting fire losses is to have the method and techniques of damage appraisal agreed upon at the time the insurance policy is written. In addition, it is advisable to have the area type-mapped, with the approximate values estimated in each different site class.

Adjustment consists in reaching an agreement with the insured party as to the amount of the claim for which the underwriter is liable under the contract. To settle any unforeseen disagreements, a third party should be designated as an arbitrator.
The first step in the actual adjustment is to determine the character and extent of the physical loss. An experienced timber cruiser can ordinarily make this determination.

It is essential to know the quantity and quality of the timber prior to the fire, and the quantity and quality remaining after the fire. The damage being the difference between its value prior to the fire and the salvage value remaining, with all future earnings discounted to present value.

There is no need here to go into the details of timber cruising. Cruising procedure has been standardized, and it offers a minor difficulty in the insurance problem.

**Insurance Rating**

It is beyond the scope of this thesis to propose a complete rating schedule. Nevertheless, it is appropriate to consider a suggested technique which is adaptable to forest rating.

The purpose of any rating schedule is to express in a practical manner the variations of relative hazard due to the specific factors that affect some properties without affecting others. The total degree of hazard varies according to the number and intensity of hazard factors having effect.
The Oregon State Forestry Department has compiled statistics which show the total hazard of this region. However, the problem is to break down these average figures to express variations of relative hazard, and here a degree of speculation and rationalization becomes unavoidable. It is quite apparent that such variations exist. For example, an area exposed to unburned slash incurs a greater hazard than one which is free from such an exposure.

For insurance rating purposes, a separate burning ratio must be computed for each hazard imparting variation. After each hazard factor and risk agency is properly evaluated, a theoretical ideal standard risk is computed. This theoretical ideal risk is used as a base, and additional hazard charges are added to a specific forest property according to the degree of variation from the ideal risk.

**Forest Insurance Carriers**

A great handicap to forest insurance is the lack of interest shown by any of the large private insurance companies in underwriting forest properties. This unwillingness of private enterprise to consider forest insurance possibilities forces some type of public insurance organization into this vital field.

Government insurance has many practical advantages. For example, a successful forest insurance organization
must cover a very large area, in order that the risks may be distributed over a wide range of forest and climatic conditions. Only in this manner will it be possible to avoid the danger of bankruptcy because of a great conflagration. If insurance is to be effective, the insurance carrier must be able and willing to accept and cover all the insurance demanded. No private insurance company could do this at the start. If it is to attract the larger volume of business that is necessary, it is essential that operating expense be kept at a minimum. Obviously, the government could operate initially at a lower figure than a private company, and if necessary, the public could assist in carrying the administrative cost of insurance. The Federal Government is vitally interested in protecting forests from fire. No better method of improving fire control standards is possible than through insurance, for an effective fire protection organization would lower the cost of insurance on any specific forest property.

The advantages for government insurance far outweigh the disadvantages. Commercial companies are unwilling to underwrite insurance, therefore, a government organization is justified in entering the forest fire insurance field.
CHAPTER V

CONCLUSION

It has just become economically advantageous to grow timber, consequently many forest owners and investors are interested in the possibilities for permanent timber production, but they are deterred by the great fire risk. Forest fire insurance eliminates this risk and replaces it with a known annual expense. Furthermore, insurance will provide for the extension of credits and loans to permanently organized forest properties. Thus insurance will aid in the establishment of sustained yield management.

In the past, forest fire insurance underwriting has been hampered by the lack of actuarial data necessary to construct a rating table. This situation no longer exists. The Federal Forest Service alone, in its four year research study, has compiled ample data for insurance underwriting. In addition, the Oregon State Forestry Department has extensive statistics on the fire hazard in Oregon. This data is both accurate and up-to-date.

Methods of rating forest-fire danger have been developed by the Forest Service, and these methods have proved their worth in the past five years. Hazard rating has taken most of the guess out of fire-danger forecasting,
and it has developed into a sound base for insurance risk rating.

Insurance will result in better fire control and lower fire losses. On its own behalf, insurance will introduce a systematic, technical, and vigorous effort to maintain effective protection.

Even with two Tillamook conflagrations during the past twelve years, the burning ratio has been low enough for insurance purposes. The annual fire loss of two and two-tenths cents per acre certainly warrants looking into insurance possibilities. We are ready for forest fire insurance now - all we need is a determination to succeed.
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**TABLE I**

**NUMBER OF FIRES AND AREA BURNED**

IN OREGON - 1935-1946, INCLUSIVE

Lands coming under the jurisdiction of the Oregon State Forester-private, state, and county - 12,436,000 Acres.
# TABLE II

EXPENDITURES OF OREGON STATE FORESTRY DEPARTMENT - 1940 -1945 INCLUSIVE

<table>
<thead>
<tr>
<th>Year</th>
<th>Fire Fighting Cost</th>
<th>Cost Exclusive of Fire Fighting</th>
<th>Area Burned</th>
<th>Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>$137,101.56</td>
<td>$837,141.73</td>
<td>26,058 A</td>
<td>$147,791</td>
</tr>
<tr>
<td>1941</td>
<td>127,670.82</td>
<td>1,316,580.00</td>
<td>9,443 A</td>
<td>55,974</td>
</tr>
<tr>
<td>1942</td>
<td>53,106.40</td>
<td>1,486,951.56</td>
<td>7,163 A</td>
<td>52,809</td>
</tr>
<tr>
<td>1943</td>
<td>101,210.01</td>
<td>1,339,546.34</td>
<td>38,889 A</td>
<td>117,572</td>
</tr>
<tr>
<td>1944</td>
<td>88,822.00</td>
<td>1,809,815.71</td>
<td>17,804 A</td>
<td>243,065</td>
</tr>
<tr>
<td>1945</td>
<td>647,657.83</td>
<td>2,193,884.32</td>
<td>211,822 A</td>
<td>1,029,999</td>
</tr>
</tbody>
</table>

This information was obtained from the Office of the Oregon State Forester.

At the present time there are 12,436,000 acres under state and private protection.

As to the amount of money spent by the state on protection, 84% of the total budget in the column "Cost Exclusive of Fire Fighting" goes directly to protection.
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