SURVEY OF FOREST FIRE INSURANCE

by

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Approved:

[Signature]
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Dedicated to my wife for her helpful criticisms and ever available assistance close at hand at all times until the manuscript was completed.

The author
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Typical Look Out Station to Aid in Forest Fire Control
SURVEY OF FOREST FIRE INSURANCE

Purpose:

The only purpose of this thesis is to present in a light form a few ideas gathered by persons who have looked into, and some who have studied the field of forest fire insurance. It will not be a complete picture, but it will convey the weaknesses and show in the same paragraph how to give strength to an otherwise weak plan. With this purpose in mind the author hopes that his viewpoints will coincide with the viewpoints of the experts in the forest fire insurance field.

Introduction:

Forest fire insurance is still a problem in its infancy. Many persons debate this question in the field of forestry, but a satisfactory system is still in waiting in this country. I wish to present in this thesis a few ideas, past and future, in this field, and maybe with the cooperation of a few interested persons forest fire insurance can at some time become a reality.

The problem may not seem to be of much importance on the surface, but it is not too erroneous to say that perhaps it would be one of the strongest factors in getting sustained yield management on private holdings more rapidly than they are now moving. (11) There have been many statements made that one of the greatest obstacles in the path of the practice of forestry by private owners is the
presence of the time element. The great risk of investing capital for such a long period as it takes for a timber crop to grow is a factor which defeats private forestry ownership before it gains a foothold. It would be a very strong inducement to private owners to invest in a sustained yield policy when their greatest risk has been lifted from their shoulders. (5) The owners are not the only persons that are benefited because the entire country is involved. When you speak of forestry you are speaking of a national and not merely a private holding. Many attempts have been made with either complete failure or only partial success in most of the enterprises. (14) According to Webster, anything that is insurable has the ability to carry insurance for loss or damage, and I do not believe that any person would repudiate that timber stands do not have both of these types of injuries.

Many insurance companies would gladly insure a stand of timber, but due to inadequate data and information they set the rate so high that the risk is, as usual, placed upon the shoulders of the owner with the result that there is no benefit for either side. This is probably the last vast problem standing between a solid, useful fire insurance program from being carried out. The major objective, therefore, is to point out many of the solutions that can be used to gain a fair and strong insurance base for the protection of forest timber stands and lands especially in the case of the private owner.
History:

(2) In the records of past attempts, the first insurance program to be recorded was issued in France and Germany in the year 1880 by a Stock Insurance Company. Failure was due to the same factors which caused failures in many attempts after this date—the rates were too high and not a large enough volume of business to sustain the venture was present. (9) The Norwegian Mutual F. F. I. Company of Norway and the Sanpo Mutual Insurance Company of Finland are two successful insurance companies in Europe today.

In the United States the development of forest fire insurance has lagged considerably. In the first place, policies were not offered to the timbermen but had to be requested. The Phoenix Insurance Company of London, England, was the first venture in this country, and they chose the wooded slopes of Oregon and Washington as their field of business. This was in the year 1916 and lasted only two years.

The Timberland Mutual Fire Insurance Company was the first exclusive forest fire insurance company to deal with forest lands entirely, but it was finally replaced by the Globe and Rutgers Fire Insurance Company of New York. (1) The final attempt made on the Pacific Coast was made by the Logging Insurance and Underwriters Association and at a later date it was dissolved into another company which later disintegrated forever.

Principle of Fire Insurance:

The fundamental principle of insurance is indemnity. (12) The action of both parties is based on a profiteering scheme, and the insurance company wants to be certain that it does not have to take any undue risk; while a private owner is interested in placing the burden of the load of responsibility on the shoulders of another.

The insurance policy is a contract insuring the person instead of the goods thereby accomplishing one purpose. The policy is not merely an insurance contract to give a private owner the right to be rid of any fire protection, but instead it makes the protective force much stronger in paying losses if and when they occur. It is nothing more than to absorb the residual hazard that is left when protection has done all it can do economically. (12) With this type of proof to work on, it can be readily seen that the burden goes to the shoulders of the insurance company, but does not lessen the hazard of having the timber burn. With this true purpose in mind, it should never be misunderstood that the protective force is to be lessened and thereby endangering our timber supply to fire with insurance covering the losses.
Types of Insurance Carriers:

Federal and state forest activities have never been directed into the field of insurance, and therefore it leaves four main types of organizations to carry on the business as a private enterprise. The types include Stock companies, Mutual companies, Reciprocals, and Lloyds Association. (12) The main differences between these companies are those organized for a profit and those organized without a profit motive. Stock companies comprise the first group and the mutual the latter. (12) The four different types are explained as follows:

1. Stock companies--These companies are organized with a profit motive and hence are required to have a cash form of capital in order to protect policy holders. Dividends are declared from the surplus, and the whole business set up is carried on as a corporation and their business is conducted in a like manner.

2. Mutual companies--The primitive companies were purely mutual organizations. With this class of company that does not operate with a profit motive, all of the policy holders are equitable holders in the surplus of the company. Carrying no deposits for contingencies, they have many times failed because of their inability to withstand heavy losses. They have classified mutual companies into many different categories such as farm, city, village, and class mutuals. Many strong insurance
companies of today, however, are mutual companies and have always met their obligations promptly.

3. Reciprocals--This is based upon the whole set up of a mutual company, and an attorney is the presiding business manager and receives 25 to 40% of the gross premiums on which to manage the company. The policy holders are both insured and act as insurers as is the case in a mutual company. Losses the company becomes responsible for are taken care of by the sum remaining from the attorney's managing allowance.

4. Lloyds Association--The most outstanding example of this type is the Lloyds of London with headquarters in England. This company is based on a group of individual underwriters who become responsible personally for their policy holders. As you can readily see, this organization is composed of individual writers instead of a company as a controlling unit. The value of the policy depends wholly upon the worth of the underwriters who subscribes or writes the policy. Lloyds of London has made this form of insurance company famous by the slogan, "We insure anything".

As stated by H. B. Shepard, (12) "If the test is in the volume of business done, then the stock companies have much the best of the argument because they handle far and away the greater proportion of fire insurance business done in North America". There should be no doubt in the statement that a company should be of considerable strength to carry insurance on a forest stand. A pool of companies would probably be of the greatest strength, but the selfishness
of business would probably defeat the purpose in the end.
There has never been a strong demand for public protected policy and participation. Neither the state or the federal government has ever given a thought to entering private ventures in this field. Such a demand would in all respects never be met on any other condition therefore a suitable organization could not be found. It has always been governmental policy to keep their fingers out of private competition. (4) Brown makes a recommendation in a statement to the effect that such an organization as the National Lumber Manufacturing Association would be in a position to take over forest insurance.

(10) The history of insurance companies points to a very helpful point which may become a turning point in forest fire insurance: They have always been quick to respond to new demands for new forms of insurance protection when they are assured the demand is adequate in every respect. This would be an outlet so that governmental interference would not have to be asked for.

As H. B. Shepard states, (12) "Careful selection of risks, frequent inspections covering a fairly large percentage of the liability, attention to the character of the assured and to proper appraisal and valuation, a good distribution of liability supplemented by intelligent re-insurance, and evidence of a sympathetic attitude toward the owners, coupled with strictly honest dealings, will be the primary requirements of successful operation."

Data Needed for a Successful Business in Forest Insurance:

The greatest number of ventures in forest insurance have failed through the medium of not having any data on which to base their judgment; therefore exceptionally high
rates were asked and this fact bound and limited the business to a very small sphere. As the old proverb teaches us, "Profit from the mistakes of others", we as foresters and insurance companies which are interested should take heed of this warning and gather all the available data possible to determine the policies which will underly the business as a whole.

(10) In a report of the Committee on Forest Fire Insurance of the Commercial Forestry Conference, the following factors were found to be of primary importance and should be thoroughly investigated:

1. Data should be compiled through such sources as the Federal Forest Service, the state forestry department, associations of lumber and pulp and paper manufacturers, timber land owners, and forestry experts to show the average annual losses by fire over the longest periods obtainable, by area, by volume, by species, and by value, all compared with the total values.

2. The common species of timber should be studied as to their susceptibility to fire at various ages, and also as to possible salvage value.

3. The relative risk of timber land adjoining railroads, towns, highways, cuttings, sawmills, etc., should be determined.
4. The causes of fire such as sparks, lightning, campers, clearing of land, etc., should be tabulated by per cent tables.

5. The numerical frequency of fires together with the average extent of fire should be determined sectionally.

6. The immunity afforded by various forms of protection, such as patrols, mountain lookouts, telephones, adequate first-aid appliances, tools, and cooperation of outside assistance, etc., should be determined.

7. An investigation should be made to determine the amount spent per acre per year for fire protection and the values covered in various sections of the country.

8. The relative risk of old growth, second cuttings and plantations should be investigated.

9. The slash risk along railroads right-of-way, highways, boundaries, etc., and the length of time to decay should be studied.

10. The effect of prevailing winds on the fire risk should be studied.

11. The average number of days a year when humidity is below the danger point should be studied in relation to forest cover and other hazards.

12. The average cost of field inspections should be determined as accurately as possible.
13. The investigation should cover the entire country as it would most likely be more accurate.

All of these ideas would take a very extensive survey, and I think points out the importance of the necessity for a very accurate accumulation of data gathered. Naturally every part of forestry will submit to some part in the make-up of the business, but there is some data which is more important than others, and this is what I am going to attempt to emphasize in this report.

Volume of Business:

An important and an essential part of all insurance business is the volume of business over a wide range and diversified type of country. (6) The terms of a forest fire insurance contract will almost inevitably have to include a complete holding; as there must be as much good as bad in the terms of fire hazard in order to get a balance between the two; so the risk will not be to great. Since their business is in assuming a great risk and to protect theirselves and their policy holders, it is readily understandable that they must have a policy over a wide range of areas. This will necessitate a survey of all timber owners to see and get their view points on whether or not they are favorable to a forest insurance policy. If they can be assured of a wide range of business this aids toward the establishment of a great deal of confidence in the business. This is where a great mistake can be made and must be avoided in order that there is
still a great many things to be considered and it would be hazardous to venture into business without further data.

**Determining Rates to be Charged:**

This field will contain many, many different types of data and probably will be the one to watch very closely, because the rates a business sets for its policy will determine whether favorable owners and corporations will take out and continue with an insurance policy. This one word "rate" has probably been the strongest factor in the defeat of the business ventures in the past. Many different ideas have been brought forward and many of them might prove out satisfactorily and it has proved to be one of the most important of all the points.

(13) It has been discovered by an experienced writer that all insurance rates should fit into three categories.

1. Adequacy: They must be high enough to cover all losses, legitimate expenses, and profit, but no higher.

2. Fairness: Risks should be so grouped and classified that each class is normally self sustaining.

3. Consistency: Risks of equal hazard should be charged the same premiums.

(8) The owner of timber lands of medium or below medium risk, as a rule, is not interested in forest insurance, but prefers to invest in approved and modern
fire protection equipment and carry his own fire risk. This is the type of owner you want to get interested and thus lower the risk, and in so doing, widen the field in which your policies are sold. (1) In Massachusetts they found that timber land that was of good stock was in a low risk area, and that of poor stock in a high risk area. It follows, therefore, that the owner of a poor timber crop is not going to invest a great deal in its protection, while a good timber crop in a low risk area will not cost a great deal to protect. This another obstacle that will have to be hurdled in getting the confidence of the owners of the timber lands or the future patrons of the forest fire insurance business.

Remembering the weed tree of today may be the timber crop of tomorrow, all things must be considered and this presented to the public with good solid facts and not with lacquered viewpoints. As long as you can prove to the public that you are not trying to force something off on to them, but are really presenting a service that will benefit them, the job becomes an easy one.

Risk of Area:

It is a natural conclusion that all areas should be rated according to the hazard they present and the value they represent before a fair insurance rate can be determined. Fire is the worst enemy in the destruction of forests. There is always a problem in the insurance business in forests which has no direct connection with the
with the rating of hazard or the rating of the amount to
be charged; nevertheless it is important enough to
consider.

As we all know, our vast timber lands are almost
continuous, and thus one fire can spread over a great
many acres and in all probability at sometime would cover
areas held by many policy holders. The Tillamook
fire is a good example of what a risk a company
would take in insuring adjacent timber holdings. (13) This
proves that distribution must be effective both internally
and externally, regardless of other considerations. It
is plain that in unbroken stretches of forest, this is a
very important consideration.

Many standards have been set up by the national and
state government, but these are available to all, so I
will hold this report to the finding of others. (1) J. S.
Glidden lists three principle divisions in measurement of
fire hazard. They are as follows:

1. Loss costs due to relative hazard of the
   property based on structure, occupancy, exposure,
   and protection.

2. Variation in ratio of loss between definite
geographical regions or zone for same period of time.

3. Variation in the ratio of loss for any
definite period of time in any given geographical
region or zone. This type of a division fits forest
fire insurance in that it creates zones and other divisions of measurement, but I personally disagree with it on the basis that it is not complete enough for the large field which it is attempting to cover. Another measuring stick which was based on data already tested and approved, and one which was more adaptable to the intended purpose, seems to me, would be more suitable for the undertaking.

(10) Measurement of Building Hazard

Changed to Forestry

<table>
<thead>
<tr>
<th>Building</th>
<th>Forest</th>
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<tbody>
<tr>
<td>1. Element of Risk</td>
<td>Soil conditions and the composition of the forest on which combustibility very largely depends.</td>
</tr>
<tr>
<td>(Structure)</td>
<td></td>
</tr>
<tr>
<td>(Occupancy)</td>
<td>Use of forest, i.e., grows commercial timber, demonstrates purpose, recreation, etc.</td>
</tr>
<tr>
<td>(Exposure) -- External source</td>
<td>Forest subject to both external and internal exposure such as railroads, smokers, campers, and other sources of ignition.</td>
</tr>
<tr>
<td>(Protection) -- Public and private</td>
<td>The forest is the same in both cases.</td>
</tr>
<tr>
<td>2. Element of Place</td>
<td>Variation in fire loss would depend largely on climatic conditions and adequacy of protection system.</td>
</tr>
<tr>
<td>3. Element of Time</td>
<td>Variation in fire loss would depend on variation in hazardous conditions.</td>
</tr>
</tbody>
</table>
Naturally there is a great amount of extra material available in statistical magazines or logging operations magazines that concerns directly the data which goes to make up these risks. After all risk tables have been formed; then a table must be formed to show how to determine the charge for policy and this charge will be shown in the final rate base.

Protection on Area:

(8) As has already been stated, the insurance policy is not a gamble but is merely an added protection, and thus does not exclude an owner from becoming lax on the standard protection of his holding. I do not think personally that many owners would slack up on their personal protection of the holding for the mere reason that they hold an insurance policy. I base this statement on the fact that the timber itself is much more valuable to them than money the loss would bring.

(13) Other things being equal, fire damage will vary inversely with the effectiveness of the protective organization. (14) It will probably come to pass that most private organizations will organize under a fire protection organization. I realize that the state laws control the handling of fires and protection, but I am referring to efficient organizations whose prime purpose will be just protective measures. This allows a concentration of protection and will be needed only at
a certain time of the year. These stipulations will be set up by the individual companies handling the insurance policy.

Final Rate Base:

The gathering of all this data is primarily for the purpose of arriving at a fair rate to assess policy holders. (1) According to C. C. Averill there are three distinctive phases of making up insurance rates. They are as follows:

1. Loss cost...... 55%
2. Expense........ 40%
3. Profit.......... 5%
With the preceding data in mind, we will take 100 as the base on which all average property is based. It is from this base or point from which most property will fluctuate up or down and is called the average base. Considering this fact, the same individual came to the conclusion below:

<table>
<thead>
<tr>
<th>Class of Risk</th>
<th>Grade in Range</th>
<th>Rate Range</th>
<th>Averages for Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>up to 40</td>
<td>up to $.15</td>
<td>$.15</td>
</tr>
<tr>
<td>Mild</td>
<td>40 to 80</td>
<td>.15 to .20</td>
<td>.18</td>
</tr>
<tr>
<td>Average</td>
<td>80 to 120</td>
<td>.20 to .30</td>
<td>.25</td>
</tr>
<tr>
<td>High</td>
<td>120 to 200</td>
<td>.30 to .75</td>
<td>.55</td>
</tr>
<tr>
<td>Serious</td>
<td>200 to 300</td>
<td>.75 to 2.00</td>
<td>1.40</td>
</tr>
</tbody>
</table>

The grade on this chart is determined from Figure II, thus gaining the knowledge wanted for the premium on the policy. It is based on twenty-five cents per one dollar value.
On the X axis is the grade in points based on one hundred as an average, and on the Y axis is the rate in dollars. This curve was obtained from gathering of data on many plots by C. C. Averill and L. M. Frost.

Figure II.

It is very difficult to find a correct rate base, but if a fairly interesting rate is set up, experience and time will give knowledge that can be received in no other way.
Valuation:

(7) There are two main classes of forest property: Merchantable and unmerchantable timber, and may be carried to a third class, artificial plantations. The natural basis for dividing the forest is to get a much more close correlation to the forest itself in order to develop a fair valuation of its property. In order to fit the rates to all stands, each forest tract which is to be insured should be evaluated by an expert in this field. This should be done as accurately as possible. There have been many charts formed for help in determining the value of forest land, but most of these do not fit all areas, therefore an experts work would be much more accurate.

(1) A chart for plantations was formed by Averill and Frost which gives the per acre value to replace plantations of a certain age. (Figure III.) The reason for placing this chart in the report is because of the fact that in order to get a sustained yield policy in working order on the different private tracts of timber, many plantations that are denuded will have to be planted. This type of insurance rating will then give them more assurance and will interest private owners in risking their capital in that type of investment.

After any destruction of the property there is a second valuation survey carried on to determine the amount lost and the amount that can be considered as the salvage
Figure III.

Replacement Value Curves for Plantations

(4% interest @ 12 1/2% A carrying charges)
value. There are many types of formulas that can be used to determine the value of timber before and after loss, but with so many variations in formulas, it will not be necessary to state them since each insurance company will use their own method.

(1) Averill and Frost outline three different methods of determining the value of property. They are as follows:

1. Cost value--Customarily used in the valuation of natural or artificially grown stands not yet old enough so that the value of the final cut can be predicted with any degree of certainty.

2. Expectation Value--Also used on young and middle-aged stands.

3. Sale value--Used on forests ripe for cutting.

Adjustment of Losses:

This portion of the policy will be the part of greatest interest to the prospective investor. (12) This is natural because human qualities always seem to lean toward protection of money, and investors being human, want to see what they are getting before they invest.

Many people would like to see a rapid rate of adjustment take place. However, this is out of the question in forest fire insurance. Many companies have quickened their adjustments purely for the purpose of increasing their writings in a competitive field. However, this is impossible in the field of forest fire insurance because
there is generally a considerable lapse of time after the
fire before a valuation of the loss can be made. This
wait probably will not be imperative in a young stand.
Naturally it can be assumed that in a young stand, as shown
by the preceding chart, prediction of loss could be
ascertained much more readily because you do not have the
years of growth to deal with.

The first question to be considered is to determine
location and extent of the fire on the area which is
insured. This should be correlated accurately with all
survey points so as to know the exact location of the burn.
If salvage is at all possible, it should be taken care of
as soon as possible in order to eliminate further loss.
At this point pressure will have to be applied to enforce
regulations which should be written in the policy in order
to protect the company.

After all areas have been mapped and salvage value
has been ascertained in dollars and cents, the proper
unit of dollars must be applied to the loss which the
company is to bear.

With this data presented for making adjustments, it
brings to mind a problem which all companies should heed.
This constitutes the fact that all policies should be
worded in such a manner that it is clear both to the holder
and to the company. All stipulations of rates, protection
afforded, and adjustments to be made should be made clear
Protect the Forest Above With
Insurance and Harvest as Below
to the holder. The policy should be made in iron clad form so that it will hold in a court of law, and at the same time it should be earmarked with clarity so that there will be no need for a lawsuit or an expensive court trial. This type of publicity would be advertising for the forest insurance company which is the type of advertising which is not wanted at this stage of its development.

Conclusion:

The writer does not attempt to say that this is a complete picture of forest fire insurance. On the other hand it consists of the essential features of an insurance plan and is but a small penetration into the field. This is explained in a very satisfactory manner by Averill and Frost in their article, "Some factors Underlying Forest Fire Insurance in Massachusetts".

(1) "In the United States increased intensiveness of forest management has as the ultimate objective a sustained fire protection and more stable economic conditions. If, when that time arrives, there is an adequate knowledge of the correlation between fire hazards and fire loss, the insurance business should be and will eventually become a necessary adjunct of forestry because it will eliminate a large part of the financial risk involved in growing commercial timber. A forest property with an insurable value has also a loan value. Insurance will be an incentive to keep forest lands covered with growing timber. If a fire destroys a stand of timber, the owner who has insurance will be in a better position to reforest and will not allow his land to be idle and unproductive. Insurance should act as an added stimulus to better fire protection because improved protection will mean low premium rates."

(15) Japan finds itself confronted with problems
Which are urgently calling for improvement and consideration immediately. Since we are yet in the but in regard to forest fire insurance, we may be able to profit from such problems. The problems are as follows:

1. To organize perpetual forest fire insurance companies on the one hand, and to establish a state forest fire insurance on the other hand, the latter to undertake re-insurance for those companies.

2. To compile available data of fire statistics for the purposes of insurance

3. To construct a schedule of rational rates as regards premiums.

4. To investigate the hazards affecting fire risks in order to arrive at a precise risk survey.

Many persons have brought forth ideas of how to put insurance on a sound basis and how to get it into a workable form so that it can be used extensively at the present time. It would be almost an impossibility to list all of those factors that have been brought up in this thesis, but an example can be shown so as to give some correlation of what type of ideas have been presented.

(3) Brewster has brought forth a plan for combined insurance and fire protection. His plan in form was to assess each acre in the state for fire protection. Even blank areas such as humous are valuable and should be protected from fire. Heavy penalty and low returns
were in effect for this type of land. In his plan it seemed to be his greatest worry that most lands would be willfully burned and thus upset any insurance policy. I think any reader can see the weak points in such an idea.

It is not the author's policy to say whether a certain insurance policy is good or bad, but no plan can be fairly judged until it has been tried in actual practice and has proved whether it is successful or not.

With this in mind, forest fire insurance is a pioneer field for insurance companies which should offer positions to trained foresters and thus receive the benefits of their knowledge and training. If this paper arouses any small bit of interest in the field--it has done its job--and the only job expected of it.

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