FOREST FIRE PROTECTION UNDER THE WEEKS LAW IN COOPERATION WITH STATES.

BY

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FOREST FIRE PREVENTION AND CONTROL.

The forest-fire season of 1912 marked the second year's operation of section 2 of the Weeks law. This section authorizes the Secretary of Agriculture to cooperate with States in protecting from fire the forested watersheds of navigable streams.

The importance of protection from forest fires is shown by the efforts being made to bring it about. The Forest Service is charged with the protection of 163 National Forests, aggregating nearly 200,000,000 acres. Eighteen States have effective forest-fire laws, enforced by efficient organizations under a State forester or a chief fire warden; seven others have made a start in this direction. Private owners in the Northeast and the Northwest have organized protective associations, each member of which is assessed for expenses according to the acreage of his holdings. Individual owners over the entire country are more and more realizing that not only is it practicable to protect their timber, but profitable also, because of its constantly increasing value. The joint efforts of all these agencies are reducing the fire risk and making the task of each easier.

It has been estimated that an average of 10,000,000 acres is burned over annually in the United States, with a money loss of about $25,000,000. The loss in some States is enormous. In Wisconsin, during the three years prior to 1911, the losses were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Acres burned</th>
<th>Value of merchantable standing timber destroyed</th>
<th>Total loss of all forest products, including merchantable standing timber, young trees, and pulpwood, bark, logs, and similar products.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1908</td>
<td>1,200,000</td>
<td>$9,007,000</td>
<td>$13,194,000</td>
</tr>
<tr>
<td>1909</td>
<td>160,000</td>
<td>22,000</td>
<td>28,000</td>
</tr>
<tr>
<td>1910</td>
<td>892,000</td>
<td>997,000</td>
<td>1,044,000</td>
</tr>
</tbody>
</table>

Minnesota had in 1910 a loss estimated by the forest commissioner at more than 1,000,000 acres burned and nearly $2,000,000 damage; Oregon lost in the same year, according to the State forester, nearly 2,000,000,000 feet of timber, with a value of about $2,500,000.
FOREST FIRE PROTECTION.

Forest fires generally have been regarded with indifference or as unavoidable. Too often life is lost and valuable property destroyed before the public is aroused to the danger.

In the coniferous forests of the North the destruction of merchantable timber over vast areas is frequent. In the pine or hardwood forests of the South the chief damage is the repeated killing of young growth, especially on cut-over lands. Such damage, unlike the destruction of the northern forests, is not as strikingly apparent, but the loss is, nevertheless, a severe one, because the young growth has a very great future value, and upon it depends the permanency of the lumber industry in the region.

Fire destroys also the soil covering; this causes rapid run-off on steep slopes, and erosion results. The soil thus washed out is the chief source of sediment in the channels of navigable streams. Forest fires, therefore, cause irregularity of streamflow and loss of navigability. This calls for active assistance from the Federal Government. Section 2 of the Weeks law is designed to authorize this assistance.

THE WEEKS LAW, SECTION 2.

The purpose of section 2 of the Weeks law is to protect navigable streams, through promoting forest protection by the States and by private owners. The appropriation for this purpose is $200,000, which is available until expended. The law requires that (1) the protection must be confined to the forested watersheds of navigable streams; (2) the State must have provided by law for a system of forest fire protection; and (3) the Federal expenditure in any State must not exceed in any Federal fiscal year the amount appropriated by the State for the same purpose.

ADMINISTRATION OF THE LAW.

The law is administered by the Forest Service under an agreement between the Secretary of Agriculture and the State.

In the administration of this act the Forest Service places a broad interpretation on what constitutes a navigable stream, with the exception that streams used only for floating logs, canoes, or rowboats will not be considered navigable. As a general basis for decisions on the question of navigability the reports of the Chief of Engineers, United States Army, are used.

No State will receive more than $10,000 in any one year. Nor should it be assumed that the Federal Government will duplicate within the limit any appropriation made by a State for fire protection. It is proposed to disperse the Federal fund as widely as possible, and throughout three years, in order that the educational value of the work may be fully realized. A fund of about $20,000 has been reserved to increase allotments to States where an emergency due to unusual drought may occur. The expenditures in 1917 were about $50,000. The allotments for 1918 will be about $90,000.

FOREST FIRE PROTECTION.

In making the allotments consideration is given especially to the possibility of active assistance from private owners; to the amount of appropriation from each State; to the importance of the watersheds to be protected with respect to stream-flow and navigation; to the relative area of the watersheds; to the kind and value of the forests; and to the relative fire risk. The States assisted must at least have initiated efficient fire protective organizations.

They must secure the cooperation of private owners in various activities, such as the hire of patrolmen, purchase of fire-fighting equipment, and the construction of lookout stations and telephone lines. The Forest Service takes the ground that before a region shall receive Federal aid the private owners must make a reasonable effort themselves. This requirement is most satisfactorily met by protective associations of timberland owners such as those in Maine, New Hampshire, Washington, and Oregon.

The aim is to assist each State as far as possible, helping especially the ones which have difficulty in providing efficient protection. The State which can make only a small appropriation may receive an amount equal to the sum which it appropriates; while the State whose appropriation is relatively large and which can of itself provide safe protection may receive a relatively small allotment.

Other things being equal, the more important watershed, or the larger area, or the more valuable forest, receives the larger allotment for protection, full weight being given in each case to the relative fire hazard.

TERMS OF THE COOPERATIVE AGREEMENT.

The standard form of cooperative agreement is given in full in an appendix to this publication. A specific agreement is made with each State with such variations in detail as local conditions require.

The State supplies the Forest Service with a comprehensive fire plan, which includes maps showing the areas to be protected, the headquarters and approximate routes of patrolmen, and all features necessary to a clear understanding of the State's plan of fire control. The appendix contains a map which forms part of the fire plan for northern New Hampshire.

Except for a nominal salary to the State forester, the expenditures made by the Federal Government are exclusively for the salaries of Federal patrolmen, including men assigned to lookouts, to railroad patrol, and to similar duties. The distinction between the Federal and the State patrolmen is advisable in order to simplify both the fiscal operation of the agreement and the inspection of the use of the funds. During wet periods, when patrol is unnecessary, the men are employed on other protective work, such as trail clearing, road making, and telephone construction. The State's expenditures that are to offset those of the Federal Government may properly include, however, any expenditures for protect-
FOorest Fire Protection.

Federal funds are rarely expended over an entire watershed, but only on those portions which have most protective value, or which are most liable to fire damage. The watersheds which received cooperative protection were the following:

Maine
New Hampshire
Vermont
Massachusetts
Connecticut
New York
New Jersey
New York
Minnesota
Washington
Oregon

Three hundred and eight Federal patrolmen were employed, of whom about 200 were on continuous pay from the date of appointment to the end of the season. They received from $1 to $3 a day. When not directly under the State forester, or wardens, they were assigned to districts, or rangers who supervised and inspected their work. The patrolmen are usually given specific written instructions as to routes of travel and other duties.

Each had a district to guard varying in area from about 25,000 to 100,000 acres. Without necessarily attempting to cover the whole district he made his rounds of the dangerous places on the most valuable areas at the most advantageous times. These routes varied from 10 to 40 miles a day, depending on the most feasible method of travel, usually by foot, horseback, or bicycle. Along the railroad lines, except where oil-burning locomotives were used, there was a special and constant patrol, in some places on foot and in others on railroad velocipede or speeders.

The patrolman carries a map of his district and adjoining districts showing the major topographic features and the approximate location of the Federal and State patrol routes, patrolman's and fire wardens' headquarters, telephone lines, lookout stations, roads, trails, and tool-supply boxes, or any features which might aid him in an emergency. He also must carry some fire-fighting tool, such as a shovel or a collapsible canvas pail.

The most important duties of the patrolman are putting out small fires, warning persons against setting or leaving fires, and recording their names when advisable. In the larger fires he has authority under the State law to call out help.

In addition to regular patrol duty and fire fighting, his work includes watching for fires from lookout stations, burning slash, and constructing protective improvements.

WORK DONE IN 1912.

The States which received Federal aid under the Weeks law in 1912 and the amounts expended by the Government are shown in the following summary:

<table>
<thead>
<tr>
<th>State</th>
<th>Allotments</th>
<th>Expenditures</th>
<th>Unexpended balance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in 1912</td>
<td>in 1912</td>
<td>in 1912</td>
</tr>
<tr>
<td></td>
<td>$10,000</td>
<td>$8,314.50</td>
<td>$11,546.50</td>
</tr>
<tr>
<td></td>
<td>8,000</td>
<td>7,725.90</td>
<td>11,949.40</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>1,977.15</td>
<td>3,654.15</td>
</tr>
<tr>
<td></td>
<td>2,500</td>
<td>2,459.00</td>
<td>11,685.00</td>
</tr>
<tr>
<td></td>
<td>1,500</td>
<td>1,228.35</td>
<td>1,929.35</td>
</tr>
<tr>
<td></td>
<td>6,000</td>
<td>4,000.00</td>
<td>1,929.35</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>1,977.33</td>
<td>2,977.33</td>
</tr>
<tr>
<td></td>
<td>2,000</td>
<td>2,094.00</td>
<td>3,984.00</td>
</tr>
<tr>
<td></td>
<td>5,000</td>
<td>4,153.00</td>
<td>6,123.00</td>
</tr>
<tr>
<td></td>
<td>10,000</td>
<td>10,000.00</td>
<td>10,000.00</td>
</tr>
<tr>
<td></td>
<td>10,000</td>
<td>2,818.75</td>
<td>7,181.25</td>
</tr>
<tr>
<td></td>
<td>10,000</td>
<td>7,150.85</td>
<td>2,849.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>67,000</td>
<td>50,662.93</td>
<td>13,397.07</td>
</tr>
</tbody>
</table>

1 Negotiations were started with Kentucky, Montana, and Idaho, but no agreements were executed.
2 Federal expenditures in each State were at least equalized and in most cases considerably exceeded by State expenditures.
In most of the mountainous regions, especially in the Northeast, the lookout station is a highly developed feature of the State's fire protective system. It furnishes the primary control of the fire situation, while the patrol conducted in the valleys beneath forms the secondary control. The station is generally permanent, and consists of a lookout cabin or tower on top of a mountain, possibly with living quarters farther down where water can be had. The station is connected by telephone with the country below and with other lookouts, and equipped with field glasses, a map of practicable size, plane table, and alidade. Usually the lookout man lives on the mountain, and during clear days is continuously on duty. In rain or snow or thick weather, when watching is necessary or feasible, he is busy inspecting or repairing the telephone line or keeping clear the trail by which the line can be traveled quickly and damage to it located promptly. The lookout man is supplied with a list of the names and telephone calls of fire wardens, deputy wardens, patrolmen, watchmen, timberland owners, lumbermen, and all persons who may render help in the territory covered by the lookout; and he notifies the proper persons when he discovers a fire. From the mountain top he is generally able promptly to discover fires which might otherwise burn for hours and, perhaps, gather tremendous headway before they would have been detected from the lower valleys.

The practical value of the lookout station has been thoroughly tested; it is one of the best assets of a timbered country. Wherever possible the Federal Government prefers that its funds be expended for the salaries of lookout watchmen.

When there was no need for patrolling, the men were employed in the construction of protective improvements. In some States a great deal of work of this kind was accomplished in 1911 and 1912. An example of what may be done was furnished by Wisconsin.

There was practically no danger from forest fires on the cooperative area in Wisconsin after the middle of the usual fire season in either year. It would have been unwise to dismiss the patrolmen, since there was no telling when dry weather might come, and it would have been difficult to get hold of the same men again or others quite as competent. The improvement work, therefore, was pushed ahead rapidly to make the area more traversable and thus easier to protect. Nearly half of the area is State land included in the State forest reserve. The plan was to divide the more valuable portions, and those of greatest fire risk, into blocks of about 40 acres by constructing roads and fire lines so that the patrol force would have a reasonably good chance of holding a fire within the block in which it started. The roads are about 3 miles apart, and from them fire lines extend to such natural fire barriers as lakes, rivers, and wet swamps. For the most part, the roads were built by removing the ties from old logging railroad grades and then leveling the grades with plow and drag. This network of old grades throughout a large portion of the cooperative area made road construction comparatively inexpensive. Where the roads will become main thoroughfares care was taken to build them for permanent use. Less expensive fire lines and trails seemed sufficient where fire protection was the only reason for their construction. There were constructed during 1911 and 1912 by the State and Federal patrolmen, with temporary help, over 100 miles of road and 115 miles of fire line.

A complete telephone system was planned and 6 miles of line were constructed, which connect a headquarters camp with the distant and important lookout towers, ranger cabins, and summer resorts. This system will be still further extended during the summer of 1913.

Other important protective measures were the "brushing out" of trails; the cutting of old stubs, chiefly birch, for a distance of 6 rods on each side of 69 miles of roads and fire lines; the burning of dangerous slashings on 1,500 acres; and the construction of 5 bridges, 4 ranger cabins, and 4 lookout towers.

The cost of this work in Wisconsin was a little over $26,000.

RESULTS ACCOMPLISHED.

There were many practical results of cooperation under the Weeks law. Hundreds of fires left by campers, fishermen, and hunters, or set by careless smokers and by locomotives, were discovered by the patrolmen and promptly extinguished. Great progress was made in permanent improvements that will simplify future fire control and prevention. But in addition to these tangible results, which have been apparent from the start, the educational value of the work although not yet fully realized has been far reaching. Except in a few States, the last two years were the first when any systematic State patrol of the forests was conducted. It marked the general extension of the State organization cooperating with the Federal Government in getting work among the people; in educating them, through the actual work done, of the need and value of fire protection; and in encouraging their cooperation.

The most effective work of the patrolmen was in warning persons not in the woods of the danger of setting fires, and informing them of the fire laws. The patrolmen were generally instructed to record the names and addresses of fishermen, hunters, and campers whenever possible and to send them to the district chief. In New Hampshire, in 1911, 4,200 warnings of this sort were given; more than half the names were recorded, and forwarded to the office of the State forestry commission. Before the fire season of 1912 a copy of the fire laws was sent to each of these persons.

Sportsmen, loggers, and others who travel the woods are taking greater care for the use of fire; quicker notification of fire are given to the proper State officer, while before they at best were desultory. Many private owners who were skeptical at the start later saw the practical value of the work and began cooperating in it and contributing toward it.

The increased interest of the public was shown by the widespread demand for information on fire protection received by the various State foresters and by the Federal Forest Service.
The first direct result of the Weeks law in encouraging State legislation was the passage by the Connecticut Assembly of the following act:

CHAPTER 292.

AN ACT CONCERNING PREVENTION OF FOREST FIRES.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. The State forest fire warden may take such action as he may deem necessary to provide for the prevention and control of forest fires, and is hereby authorized to enter into an agreement with the Secretary of Agriculture of the United States, under authority of the act of Congress of March 3, 1911, for the protection of the forested watersheds of navigable streams in this State. Said State forest fire warden may appoint patrolmen, who, for not more than twenty-five cents per hour for time actually employed, and may establish and equip fire lookout stations and furnish necessary equipment for such patrolmen.

Section 2. Any patrolman appointed for such purpose by said State forest fire warden may arrest, without warrant, any person taking in the act of violating any of the laws of this State for the protection of forest and timber lands.

Section 3. The disbursements of the State forest fire warden in carrying out the purposes of this act shall be paid by the State from the appropriation for fire wardens.

Section 4. This act shall take effect from its passage.

Approved, September 29, 1911.

The first question that naturally occurs to one looking for measurable results in saving property is, how far the expenditures succeeded in preventing fire losses. Maine and New Hampshire furnish striking examples of comparative losses in 1908 and 1911, two of the most dangerous fire years on record in these States. The comparison is based only on the watersheds where cooperative forest protection between the Federal Government and the State and timberland owners was established last year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Season of drought</th>
<th>Maine</th>
<th>New Hampshire</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Acres</td>
<td>Damage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>burned</td>
<td></td>
</tr>
<tr>
<td>1908</td>
<td>Apr. 17 to June 6</td>
<td>179,800</td>
<td>870,429</td>
</tr>
<tr>
<td>1911</td>
<td>Apr. 16 to June 1, June 30 to July 17</td>
<td>91,471</td>
<td>154,284</td>
</tr>
</tbody>
</table>

While the danger season of 1911 was longer and generally considered to be the more severe, the area burned over and the amount of damage were considerably less than in 1908, and the decrease without doubt can be attributed in great measure to the reduction of the protection afforded in 1911, as compared with the almost complete lack of it, except by a few private owners, in 1908.

EXTENDING COOPERATIVE PROTECTION.

The Federal Government desires to extend this cooperative protection to other States. To secure its benefits they must enact a forest-fire law and must appropriate funds for administering it.
APPENDIX.

FORM OF AGREEMENT.

The form of agreement between the Secretary of Agriculture and the State for the protection from fire of the forested watersheds of navigable streams is as follows:

UNITED STATES DEPARTMENT OF AGRICULTURE.

Agreement for protection from fire of the forested watersheds of navigable streams under section 2, act of March 1, 1911 (36 Stat., 691).

This agreement, made by and between the Secretary of Agriculture of the United States, under authority of section 2 of the act of Congress approved March 1, 1911 (36 Stat., 691), and the State of __________ by and through its State Forestry Commission, witnesses,

That whereas the said State has requested the cooperation of the said Secretary in the protection from fire of the forested watersheds of navigable streams; and whereas the said State has provided by law for a system of forest-fire protection:

1. To establish and maintain a cooperative fire-protective system covering any or all private or State forest lands within the State of __________ and situated upon the watersheds of navigable rivers; and for the purpose of Federal and State patroon or to take such other protective measures as may be deemed advisable, under the conditions hereinafter provided.

2. The State commission shall furnish maps showing the watersheds and areas which are proposed to be protected under this agreement. The cooperation shall be limited to such watersheds and areas in so far as they shall be approved by the Secretary. The said commission shall indicate the periods during which protection from forest fires is proposed under this agreement; the number of patroons, with their stations, which will be employed by the State; the character and extent of other protective measures which it is proposed to put into effect at the expense of the State; and the localities in which it is desired to place Federal patroons furnished by the Forest Service.

3. The State forester of __________, acting as an employee of the State commission, shall be appointed collaborator in the Forest Service of the United States Department of Agriculture at a salary of $__ per month. The cooperation shall have direct charge of the force of Federal patroons employed under this agreement. The State forester shall select the Federal patroon in the discretion of the collaborator, subject to approval by the Secretary, and instruct them as to their duties, supervise their work, and certify to their services on pay rolls of the Forest Service.

4. Federal patroons so selected shall be appointed as temporary laborers in the Forest Service at a per diem rate not exceeding __________ dollars ($_________); provided that they shall be employed exclusively in the protection of areas on the watersheds of navigable rivers which shall have been approved by the said Secretary.

5. This agreement contemplates the employment under ordinary conditions of fire hazard of not to exceed __________ Federal patroon, or in case of emergency of not to exceed __________ Federal patroon, in the discretion of the collaborator, provided that in case of serious emergency the latter number may be increased with the approval of the Forest

6. The State commission shall secure for the Federal patroon furnished under this agreement, by appointment as deputy State fire warden or otherwise, without additional compensation, such police powers for the prevention and control of forest fires as may be granted under the laws of the State of __________; and shall equip such Federal patroon with such fire-fighting tools or devices as will enable him to operate effectively. The State shall authorize him to employ such expenditures as are prescribed in the State fire laws and regulations. This agreement contemplates an expenditure of State funds of at least __________ dollars ($_________); and in the event of such expenditure exceeding said amount the Federal expenditure will be decreased proportionately.

7. Payment for the services of Federal patroon employed under this agreement shall be made at the end of each calendar or fractional month on vouchers certified by the State forester as collaborator, and approved by the Forest Service, Washington, D. C., provided that no patroon will be employed except during the regular season from forest fires on the watersheds and areas approved by the Secretary under this agreement.

8. The said Secretary and his authorized representative shall have full authority to inspect the protective areas and the force herein authorized, and, at his option, by giving the State commission written notice, may withdraw his approval of such area or portion thereof, or terminate the employment of any Federal patroon or patroon or of the State forester as collaborator in the Forest Service.

9. The State forester shall be responsible for seeing that each patroon keeps a vigilant lookout for forest fires in or threatening his district, and that he makes every possible effort to extinguish such fires as occur whether they are on lands belonging to the State, the Federal Government, or a private owner. The State forester's patrol in the forest is unnecessary the patroons may be used on other fire-protection work. The State forester or his representative shall from time to time make suggestions for the cooperation of the cooperative fire-protection work. This agreement as may be necessary to promote the effectiveness of said work.

10. The State forester shall, with respect to all private forest land, afford protection against fire under this agreement, use every proper means to bring about the active cooperation of the owner in such protection, including aid from him in the form of hire of one or more patroons, construction of permanent improvements, and the like.

11. The commission and the Forest Service of the United States Department of Agriculture shall have equal rights to publish the results of the cooperation under this agreement: Provided, That any results intended for publication shall be given a notice of availability of funds appropriated by Congress by the act of March 1, 1911, for the purposes hereunder, in such manner as may be made hereof by mutual agreement of the parties; and it is expressly understood that this agreement or any modifications thereof may be terminated by either party upon thirty (30) days' notice to the other.

12. In witness whereof the said commission has hereunto caused its seal to be affixed by its proper officers, on the day of __________, __________, and the said Secretary has hereunto set his hand and affixed his official seal on the date below written.

President, State Forestry Commission.

Secretary of Agriculture.

Signed and sealed by the Secretary of Agriculture this day of __________, __________.
FOREST FIRE PROTECTION.

FIRE-PLAN MAP.

The accompanying map of the northern district of New Hampshire, including a portion of the cooperative watersheds, is an example of the kind which should accompany a fire-protection plan. The map shows, in addition to the headquarters of members of the fire force, the routes of patrolsmen and the location of lookout stations, telephone lines, and tool-supply boxes.

This district has an area of approximately 1,000,000 acres. It is supervised by a district chief, under whom are patrolmen, lookout watchmen, and fire wardens. In this district in 1912 the expenditures for fire protection were as follows:

State................................................................. $4,850
New Hampshire Timberland Owners Association.............. 3,270
Federal Government................................................. 2,580

Total........................................................................ 10,700

At $12,700 for the protection of 1,000,000 acres, the rate is about 1½ cents per acre.

Fire-plan map of the northern district of New Hampshire.