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GIFFORD PINCHOT, Forester.

(IN COOPERATION WITH THE STATE OF CALIFORNIA.)

THE CONTROL OF FOREST FIRES AT McCLOUD, CALIFORNIA.

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[Cir. 79.]

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FIG. 1.—Protection plan for experimental area.

[Cir. 79.]

THE CONTROL OF FOREST FIRES AT MCCLLOUD, CAL.

INTRODUCTION.

Almost invariably the first step toward a wise use of the forest is its protection from fire. This is particularly true of the forests of the Sierras in California. Here the fire danger is unusually great, and fires have been so prevalent that they have come to be regarded almost as a necessary evil.

The Forest Service in 1904 made a thorough study of forest conditions and their relation to fire on the tract of the McCloud River Lumber Company, in Siskiyou County. The object of the study was primarily to devise a practical scheme of fire protection, particularly for the logged lands, on which fire is most prevalent. Its results, upon which the plan outlined in this report was based, show: (1) That by proper care and the execution of certain measures it is possible to decrease, or even to eliminate, the danger from forest fires; (2) that such protective measures may be carried out at a reasonable cost; and (3) that the results in most cases will fully justify the necessary expenditures. After the preparation of the plan, its execution was undertaken by the Service in cooperation with the company.

DESCRIPTION OF THE TRACT.

The lands of the McCloud River Lumber Company are situated in Siskiyou County, Cal., near the town of McCloud. The tract is on a level plateau at the base of Mount Shasta, at an elevation of about 3,000 feet. Its area is approximately 300,000 acres. The rainfall during the period between the last of September and the middle of May amounts to about 40 inches. On the other hand, practically no rain falls during the summer months, and these constitute the season of fire danger. The tract has been logged for the past seven years, and about 43,000 acres have been cut over.

THE FOREST.

There are two distinct classes of forest on the tract whose occurrence is determined by moisture and the composition of the soil. The following description, though true in large part of the entire tract, applies more specifically to that portion of it later referred to as the experimental area.

THE PINE TYPE.

On the drier lands, or where gravel occurs, the original forest is pure yellow pine with a very slight admixture of white fir, red fir, or sugar pine. The oldest pine is of excellent quality, but grows in rather open

stand, a result of ancient Indian fires. Within the last sixty years, however, fires have done little damage in the virgin timber, although prevalent on the cut-over lands since lumbering began. A heavy seeding about fifty-five years ago brought a large number of trees into the forest, which are at present from 12 to 18 inches in diameter. Besides the young trees scattered among the old ones, several openings were seeded up to dense stands, which at present average about 16 inches in diameter. Another series of heavy seedings began from ten to fifteen years ago, and resulted in a large number of dense thickets in the openings of the old-forest. Some of these are of considerable size, one covering more than a section. Except in the thickets the ground cover is chaparral, mainly buck brush (*Ceanothus cordulatus*), with a considerable mixture of manzanita (*Arctostaphylos glauca*). It is not dense enough, however, to prevent the pine seedlings from coming through it, and they have rapidly overtopped it in height. Logging has left practically all the timber which has come in during the last sixty years, together with some of the smaller stuff of the old stand. Remarkably little damage was done in felling, and practically all the young growth was left intact. The ground, however, was left covered with débris. On areas where fire has not occurred since logging, the pole timber is in excellent condition, and the seedlings are well above the chaparral.

THE FIR TYPE.

This type of forest occurs upon the moister and deeper soils. It is composed of white and red fir, cedar, a small percentage of sugar pine, and a slight amount of yellow pine. The trees are of large size, particularly the red fir and yellow pine, and the forest is very dense. Fires have not been prevalent for many years in this type, and there is a dense undergrowth of white fir. Logging removes all the sugar pine and the best red and white fir and cedar, leaving all the undesirable large trees and the poles of all species under 18 inches. In so dense a forest, timber felling naturally has caused some damage, but as a whole the trees left are not badly injured, and are now doing well in the increased light which they receive.

Logging débris is very heavy in this type, but the greater part has miraculously escaped destruction by fire.

FIRE.

From the preceding description of the forest, the danger of fire should be fully apparent. The time of greatest danger is, of course, the dry season, when every bit of débris and brush becomes like so much tinder. The danger is further emphasized by the presence of the inflammable chaparral areas and the vast quantities of slash on

the logged lands. Fire on these areas is of the hottest character, and once started is extremely difficult and often almost impossible to check. Not only is the forest threatened, but also the camps, railroad, and mills of the company, and even the town of McCloud itself. That the frequency and danger of fires is not exaggerated is shown by the fact that in 1903 the company expended \$3,000 in fighting fire, and in 1904 \$2,500.

CAUSES.

The causes of fire are manifold. Where the danger is as great as at McCloud the most trivial carelessness is often sufficient to start a serious conflagration. Unextinguished camp fires and sparks from donkey engines or logging locomotives of the company are the commonest sources from which fires start.

EFFECT ON THE FOREST.

The effect of fire on virgin timber is not always at once apparent. The mature trees, particularly yellow pine, are well adapted to resisting the effect of an ordinary ground fire, and apparently its chief effect upon the forest is the destruction of brush and litter. In reality, however, the trees are often seriously injured, particularly where fires follow one another at short intervals. Growth is checked and the trees are weakened; and insect attacks and fungous diseases follow. In addition the trees are gradually eaten through at the base, and eventually die or are blown over. Openings thus made in the forest are effectually prevented by subsequent fires from coming up to young growth, while the chaparral, which sprouts from the roots and is not permanently eliminated, even though completely burned back, takes possession of the ground. On the cut-over lands the effect of fire is even worse. Here, because of the greater accumulation of débris, the fire is hotter, and the trees left after lumbering are more likely to be killed. If this goes on long enough, the entire area becomes a chaparral field, and in the absence of seed trees, little chance is left of a return of the forest.

REASONS FOR PROTECTION.

To be effective, fire protection entails the expenditure of money, and to warrant this the returns should be commensurate with the cost. For the purpose of demonstrating this, about 15,000 acres in townships 39 and 40 north, range 2 west, were set aside as an experimental area. Most of the area had been cut over, and for this reason it was chosen, since not only is cut-over land most likely to be burned, but on it the returns from protection are least apparent.

The area was carefully cruised, and the stand of timber left after logging ascertained. Growth figures were then taken to show the

size and amount of timber to be expected from these trees forty years hence. The thickets of young growth were also considered, and their probable future yield determined.

Table 1 shows the classification of lands on the experimental area. It will be seen that 467 acres are classed as "Pole stand" and 1,724 acres as "Pine thicket." The pole stand consists of trees from 40 to 60 years old that have come up in openings in the forest made by old fires. The pine thicket is a dense stand of young pine from 15 to 25 years old, much of which has come in on old burns or cuttings.

TABLE 1.—*Land classification of experimental area.*

Section.	Yellow pine.		Red fir.		Chaparral.	Pole stand.	Pine thicket.	Burn.		Field, swamp, etc.	Total.
	Virgin.	Cut-over.	Virgin.	Cut-over.				Red fir.	Yellow pine.		
T. 40 N., R. 2 W.	<i>Acres.</i> 24	<i>Acres.</i> 2,320	<i>Acres.</i> 64	<i>Acres.</i> 3,397	<i>Acres.</i> 921	<i>Acres.</i> 93	<i>Acres.</i> 996	<i>Acres.</i> 206	<i>Acres.</i> 637	<i>Acres.</i> 311	<i>Acres.</i> 8,969
T. 39 N., R. 2 W.	36	3,484	-----	686	280	374	723	-----	16	156	5,760
Total.....	60	5,804	64	4,083	1,201	467	1,724	206	653	467	14,729

On the 5,804 acres of cut-over pine land there is a fair representation of trees left after logging because of their small size. These trees are to form the basis of the future cut on such land, and will also serve to seed up the open areas in their neighborhood. Most of the trees are sound and thrifty, and due allowance was made for those which showed defects serious enough to cause death before a second cut.

FUTURE YIELD.

The estimate of the future yield on the experimental area was made from growth figures obtained from trees now on the ground. The growth during the next forty years only was calculated, since by the end of that period the company will probably have cut all of its virgin timber and will be ready to log its land a second time.

Table 2 shows the probable future yield on the 5,804 acres of cut-over pine land and its probable value at the time of cutting. The price of stumpage at the end of forty years can only be guessed at, but it is safe to assume that it will be much greater than at present. For this reason, in estimating the returns, stumpage values of from \$3 to \$6 per thousand feet were given.

The present yield on the fir type, cutting to a diameter of 12 inches breast-high, would be 34,000,000 feet. No figures were obtained from which the future yield on this type could be estimated, but it is safe to say that it will be much greater than at present.

The yield of the pine thicket in forty years will be about 20,250 feet per acre, or a total of 34,911,000 feet, which would give a total yield of pine for the experimental area of 75,835,000 board feet.

TABLE 2.—*Estimated value of yellow pine at end of forty years.*

Area.	Yield.	Stumpage.	
		Price per acre.	Value.
<i>Acres.</i>	<i>Board feet.</i>		
5,804	40,924,000	\$3. 00	\$122,772
		4. 00	163,696
		5. 00	204,620
		6. 00	245,544

From Table 2 it is apparent that although the stand of pine on the 5,804 acres will not be heavy, it will be sufficient to warrant cutting, and will have at the lowest stumpage figure a sufficient value to justify its protection. It is only necessary, then, to devise an adequate system, the cost of which shall be commensurate with the future returns from the protected area.

Before going further, however, it should be stated that in many respects the experimental area is not typical of cut-over lands at present. The increased market prices for California pine lumber have made it possible within the past few years to utilize much smaller trees than was the case when the area in question was cut. There is a considerable stand of trees on the greater part of this cut-over pine land, often an average of 10 trees over 12 inches in diameter per acre. If the area were now being logged, these trees would be merchantable, and leaving them would mean an actual investment of money, which though small in amount, would accumulate in forty years, at compound interest, to a considerable sum. Without the presence of these trees, on the other hand, there would be no basis for a second crop forty years hence, and very little provision for seeding up the area with young growth. In this specific instance, of course, the trees as they stand do not represent an actual investment, since the scattered nature of the stand renders them at present unmerchantable, nor were they merchantable at the time of logging, since the prices for smaller timber at that time precluded the possibility of logging them. This point will again be referred to when the subject of returns is considered, but it should always be kept in mind.

PROTECTION PLAN.

The following plan of protection for the experimental area was submitted to the McCloud River Lumber Company:

FIRE LINES.

In a region where fires are likely to occur and, when once started, are hard to check, some means must be found to confine fires to the smallest possible area, and to serve as a basis for fighting them. For this purpose it is recommended that fire lines be constructed. It is

doubtful whether in a country such as this, fire lines will of themselves stop fires, but they will make it possible to hold a fire within fixed limits, and, in addition, they can readily be used to back-fire from. The lines should be from 200 to 300 feet in width, and on them everything inflammable should be burned, and, if necessary, tops and limbs should be piled. Old stubs should be felled and the ground cleared as far as possible. The lines may best be located along old tramroads or logging spurs. The best time for constructing such lines is in the fall or early spring, when the danger from burning is least. Areas of greatest danger should have the greatest number of lines. Twenty miles of fire lines should suffice for an ordinary township, and their construction should cost from \$12 to \$15 per mile.

PATROL.

The chief point in fire protection is to discover and extinguish fires as soon as started, since very few fires are hard to handle in their first stage. For this purpose a patrol should be established.

One patrolman should cover an area of at least 40,000 acres daily. If his route is carefully laid out, and the topography of the tract, as at McCloud, makes possible a view of the entire area from all points, the area covered by one man might be much larger. If practicable, the patrol route should follow the higher elevations, from which the whole tract may be viewed. The length of the route should not be more than the patrolman can cover thoroughly once every day during the danger season. In this instance it should encircle the experimental area.

The duties of the patrolman should be to detect and extinguish immediately all fires starting in his territory, and whenever the fires are beyond the control of one man, to immediately summon help and direct the fire-fighting. The patrolman should also exercise a general supervision in protecting the tract, by cautioning campers, hunters, and others against fires, and by watching carefully all places of especial danger, such as the neighborhood of logging operations and the camping sites of hunters and others.

The cost of the patrolman should not exceed \$75 per month, including the keep of his horse. This would mean \$300 or \$400 per year, according to the length of the danger season.

TOOL STATIONS.

In order that tools may quickly be obtainable in case of fire, tool houses should be placed at places readily accessible, preferably along the patrol route. Two such stations on the area covered by this plan should be ample. The stations may be simply chests furnished with rakes, shovels, axes, and the like.

TELEPHONE LINES.

In order to summon help readily and to get men to the scene of any fire at short notice, a telephone line connecting with headquarters should be erected. Telephone boxes should be located along the patrol route, at the logging camps, and at other frequented spots. A line along the logging tramroad already exists, and the expense of slightly extending this should be small.

ADDITIONAL MEASURES OF PROTECTION.

To call the attention of campers, hunters, and the like to the fire danger, warning notices should be posted in frequented places on the tract. Every effort should be made by the patrolman and the officers of the company to enlist the interest of the local inhabitants, on and about the tract, in the prevention of fires. Public sentiment is often one of the strongest factors in any protective effort.

If the accumulation of débris on cut-over lands were disposed of, the danger from fire would be greatly reduced, and any fires that started could be far more easily controlled. The cost of piling and burning slash may, however, prove prohibitive, and it is only by experiments that its feasibility can be determined.

COST OF PROTECTION.

The following estimate of the cost of protection for the first year is believed to be conservative. In actual practice many of the expenses can probably be reduced.

Fire lines—20 miles per township, at \$15	\$300. 00
Patrol—one patrolman, at \$75 per month for four months.....	300. 00
Three tool stations with tools, at \$15 each	45. 00
Cost per township.....	645. 00
Cost per acre.....	.03

In the above estimate no account is taken of telephone lines, since their cost will vary greatly. One patrolman is charged to a township, but in actual practice should cover nearly two, and this should, in some measure, balance the cost of the telephone.

THE PLAN IN EXECUTION.

The fire-protection plan just outlined was put in operation by the Forest Service in cooperation with the McCloud River Lumber Company in the summer of 1905. Some of the fire lines shown on the accompanying map, however, were constructed the previous season. The general execution of the plan was in the hands of an agent of the Forest Service.

CONSTRUCTION OF FIRE LINES.

The fire lines at McCloud were constructed in the fall of 1904 and in the spring of 1905, when the slash was not too wet to burn readily

and yet the forest was not too dry for safety. In accordance with the plan, they followed the wagon roads, tramroads, and spurs, though it was not found necessary to construct lines along all of these. Where the slash was heaviest and the danger from fire greatest, the compartments or segregated areas were made smaller than where the danger was less. The lines varied in width from 200 to 400 feet for the same reasons. The fire line along the railroad track now in use was made 400 feet wide, since here the danger from sparks is great. Where the slash and chaparral were not abundant, lines 200 feet in width were sufficient. To clear the lines, the men were divided into small crews of 6 or 12, under the supervision of a responsible man. Each crew was divided into two groups, one on each side of the road or spur. One or two men from each group preceded the rest to gather the tops and débris together in piles. The rest of the crew followed, setting fire to the piles of brush and débris, firing back from the outer edges of the fire line toward the center, and taking precaution not to let the fire spread beyond the boundaries of the fire line.

Piling the débris is not, as a rule, necessary, since the slash on the logged lands is usually bunched. This is due to the logging method in use. The level country permits the use of logging wheels, and, to give space for operating these, the slash has to be removed from around the felled trees. This results in throwing the slash together sufficiently for burning.

Fifteen miles of fire line were burned in 1905 in the above manner, at an average cost of \$15 per mile. These 15 miles afford protection to about 15,000 acres of cut-over land, at a cost of 1½ cents per acre.

THE PATROL.

A patrol route was laid out at the beginning of the season of 1905. This route was 25 miles in length and practically encircled the experimental area. It passed through those parts of the tract where fire danger is greatest, in places following the fire lines, but usually skirting the higher elevations.

A mounted patrolman covered the route daily for the four months of greatest fire danger, from June to September, inclusive. It was found that he could in this way look after 70,000 acres. He was given authority to employ and organize crews for fire fighting, and had, in short, direct control of the fire protection. The cost of the patrol, including maintenance of a horse, was \$75 per month—\$300 for the season. This made the cost per acre but one-half cent.

TOOL STATIONS.

Three tool stations were located on the tract. Two of these were on the patrol route, in places where fire was most likely to occur, and where they would be quickly accessible in an emergency; the third

was located at the slaughterhouse about $1\frac{1}{2}$ miles from McCloud. These tool stations were boxes or chests provided with locks, and large enough to contain the 6 long-handled shovels, 2 axes, and 2 iron rakes with which each was provided. Their cost, including tools, was \$10 apiece.

TELEPHONE LINES.

A telephone line provided with frequent call boxes follows the railroad which crosses the tract, and a private line connects McCloud with the slaughterhouse. It was necessary, therefore, to construct a line only 3 miles in length to the tool station in the northern part of the protection area. Old poles near at hand were used in the construction, so that the cost was but \$15 per mile. Had entirely new equipment been necessary, the cost would probably have been in the neighborhood of \$50 per mile.

TOTAL COST OF PROTECTION.

The actual total cost of protection for the first year was as follows:

Burning 15 miles of fire line, at \$15	\$225
Patrolman for 4 months, at \$75 per month	300
Three tool stations and tools, at \$10	30
Constructing 3 miles of telephone line, at \$15 per mile	45
Total	600

Based upon the 15,000 experimental acres the cost would be 4 cents per acre. The area actually protected, however, was much larger. The patrol covered about 70,000 acres and thus cost less than one-half cent per acre. The telephone lines and tool stations were for the protection of the same area, which would raise the cost to a trifle over one-half cent per acre. The fire lines covered approximately 15,000 acres, at a cost of $1\frac{1}{2}$ cents per acre, which makes the total cost of protection for the first year 2 cents per acre. This includes the initial cost for fire lines, tool stations, etc., which will not be chargeable in future years.

ADDITIONAL MEASURES.

Besides the actual protection of the tract, experiments in slash burning were carried on, with the object of determining the practicability of disposing of the slash in this manner. In slash burning the greatest drawback, on account of its expense, is piling. At McCloud this was not necessary, since the method of logging, as already mentioned, leaves the slash in piles, which can be burned without much additional work and without injury to the remaining trees or to young growth. To make this doubly sure, however, all logging crews were instructed to use special care in felling and swamping. With this done the slash was burned without additional piling. Burning took place after the first fall rain, when there was little danger of fire spreading.

Three crews, one from each camp, with 15 men in a crew, and each

crew in charge of the camp foreman, were detailed to the work. Each crew burned the slash on the land logged from its camp during the season. The brush was fired toward the wind and just as it was found, unless lodged against standing trees, in which case it was first thrown back. Very little piling of this sort, however, was necessary. The cost of the slash burning was $1\frac{1}{2}$ cents per thousand feet of timber cut on the area, or about 23 cents per acre.

To further assist in the removal of the débris left after logging, the wood choppers cutting wood for camps, town, or railroad, were put to cutting the larger tops and limbs into firewood.

These experiments in disposing of the slash proved very effective in thoroughly clearing up the land, and the low cost of $1\frac{1}{2}$ cents per thousand feet logged proved the measures entirely practicable. Slash was burned on 5,804 acres of cut-over pine land.

FINANCIAL CONSIDERATIONS.

The probable gross receipts at the end of forty years have been discussed and it remains only to show the probable net returns.

COST OF PROTECTION.

Table 3 shows the amount invested in protection at the end of the forty years, compounding the items of expense at 3, 4, and 5 per cent interest. The cost of protection is divided into annual and initial expenses. The cost of the patrol and telephone and tool stations is charged entirely to the experimental area, although in reality it covered a much greater territory.

TABLE 3.—*Estimated total cost of protection.*

Items	Initial expense.	Annual expense.	Total investment in 40 years, compound interest at—		
			3 per cent.	4 per cent.	5 per cent.
Telephone and tool stations.....	\$75. 00				
Burning slash, 5,804 acres, at 23 cents per acre.	1,334. 92				
Fire lines.....	225. 00				
Taxes on 14,720 acres (assessed value \$1 per acre, tax rate \$0.0165).....		\$242. 88			
Patrol for season.....		300. 00			
Initial expense.....			\$5,333	\$7,849	\$11,510
Annual expense.....			40,934	51,887	65,580
Total.....	1,634. 92	542. 88	46,267	59,436	77,090

NET RETURNS.

Table 4 shows the net returns from the experimental area. In the total value of the yield only the yield on the 5,804 acres of pine land is considered. The large yield from the fir type and the thicket is consequently ignored, and the estimate is thus made doubly conservative. It will be seen that, even at the interest rate of 5 per cent and at a valuation of only \$3 per acre for stumpage, the net receipts from the experimental area will be over \$45,000.

As previously stated, however, in the general application of this plan, particularly to lands which are to be cut in the future, the amount invested in the trees left standing to form the basis for the future crop must not be overlooked. This investment will of necessity cut down the final "net returns." For example, in cutting over an acre of pine land it might be necessary to leave 2,000 feet of merchantable timber to provide the basis for the future crop. This 2,000 feet at present stumpage prices would mean an investment of \$4 per acre. Compounded for forty years this might amount to such a sum that, beyond the money invested and the accumulated interest at 5 per cent, the company would receive nothing at the time of cutting.

TABLE 4.—*Probable net returns from experimental area at end of forty years—Cost of protection deducted, and yield estimated at 40,924,000 board feet.*

Stumpage.		Net returns, interest on investment compounded at—		
Price per acre.	Total value.	3 per cent.	4 per cent.	5 per cent.
\$3.....	\$122,772	\$76,505	\$63,336	\$45,682
\$4.....	163,696	117,429	104,260	86,606
\$5.....	204,620	158,353	145,184	127,530
\$6.....	245,544	199,277	186,108	168,454

Table 4 shows, then, greater profits than can ordinarily be expected from raising successive crops of timber. It is firmly believed that, even considering the permanent investment of capital in merchantable timber on the ground, conservative lumbering and fire protection will show a fair rate of interest on the investment, but that, barring exceptionally rapid advances in stumpage values, this rate of interest will be comparatively small.

There is, however, another argument in favor of protection, namely, a continuance of the supply for the mill. Thus, if leaving trees and protecting the land will show a fair rate of interest on the money invested, it is an entirely practical plan from a business standpoint.

SUCCESS OF FIRE PROTECTION.

The fire record for 1905 at McCloud is the best argument for the protection of timber land from fire and of the success of the plan in general. A few fires started, but none of these were on the small experimental area. The few fires which did start were speedily discovered by the patrolman and extinguished by him without assistance. In addition to this, slash burning was carried on successfully, a fact which will somewhat alter the aspect of the protection scheme.

EXTENSION OF THE PLAN.

In view of the success of the plan, the McCloud River Lumber Company extended it over all its holdings during the season of 1906.

Three additional patrolmen were employed, fire lines were burned, tool stations erected, and telephone lines constructed.

In the future, slash will be burned after logging. This removal of débris makes fire lines less necessary, and their number and width can be greatly reduced. Twelve miles per township on logged lands should be sufficient in any case, and on most areas much less would suffice. It is not advisable, however, to eliminate entirely the use of fire lines, since they will be of great value in stopping the spread of a dangerous fire, and even under the system of protection the possibility of such a fire occurring can not be overlooked.

A few additional measures for protection might be instituted, such as posting notices, etc., but the protective plan as carried out at McCloud is complete in itself. As experience is gained in the practical execution of the work, the cost of protection can doubtless be reduced. Patrolmen will become more efficient, patrol routes more advantageously laid out, and slash burning will reduce the number of fire lines. If adjoining timber owners also take up the scheme of protection, the danger from fire from outside will be largely reduced and the plan will become the more effective.

CONCLUSION.

Though fire protection as practiced at McCloud has met with success, the plan in its present form might not apply equally well to other tracts. The McCloud tract offers many features that favor both conservative lumbering and fire protection. The company's holdings are extensive and fairly well consolidated, and it will take a considerable time to cut over the present virgin stand. More important than this is the topographical character of the tract, which renders logging both easy and cheap. This, perhaps more than any other one thing, justifies the leaving of trees for a future cut, since the comparatively level nature of the country will make it possible to return again and log profitably even where the stand per acre is relatively small. This is not true of many Sierra tracts, where rough country makes logging exceedingly difficult and expensive. This does not mean, however, that fire protection on such lands is impracticable, but simply that each tract offers local conditions of its own which must largely determine the character of the plan.

Finally, though the first and most essential step in any system of forestry is protection from fire, conservative cutting of the forest is equally necessary. The McCloud Lumber Company has already shown its appreciation of this fact by modifying its logging operations. At present virgin timber is being cut to a diameter limit of 30 inches breasthigh, which leaves an excellent basis for a future cut.

Approved:

JAMES WILSON,

Secretary of Agriculture,

WASHINGTON, D. C., *February 16, 1907.*

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<i>MAY 18 1965</i>		
<i>VAN WAGEN...</i>		
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