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Farm Woodlot Management in Montana

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Farm Woodlot Management In Montana

by
William R. Pierce

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Farm Woodlot Management In Montana

by

WILLIAM R. PIERCE



MONTANA FOREST AND CONSERVATION

EXPERIMENT STATION

SCHOOL OF FORESTRY

UNIVERSITY OF MONTANA

Missoula



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Introduction

The purpose of this pamphlet is to interest the owners of small forests in developing their timber holdings as a source of potential income and to recommend some appropriate forestry practices toward that end.

Montana has 22,330,000 acres of forest. Of these, 15,727,000 acres are both capable of commercial timber production and available for that use. Most of the commercial forest lands are in the mountainous regions of the state. Federal, state, and municipal governments own or administer 10,870,000 acres of the total, and 4,857,000 acres are in private hands. Almost half (2,360,000 acres) of the private commercial timber holdings are on farms and ranches.

The commercial forests of Montana are extremely important to the economy of the state. In 1962, the U. S. Department of Commerce reported that Montana lumber and wood products industries employed 7,350 persons at an annual payroll of \$35,000,000. With nationwide population growth and industrial expansion, the need for forest products is expected to increase. Some of this future demand can be met by the owners of farms and ranches if they manage their private woodlots for an economic return.

Although private woodlots may not represent a very large part of the total commercial forest land of Montana, they are more important to the welfare of the state than the size of their aggregate acreage indicates. Farm forests contain much of our more productive and accessible timber and can therefore be managed with a minimum expenditure of both time and money. Given the proper combination of economic and natural circumstances, the owner can benefit both himself and the state by managing his timber holdings for a continuing yield rather than either disposing of them or ignoring them.

Why Manage Your Timber?

For many farm-forest owners, the timbered portion of the ranch is not now a source of revenue. Everything salable has been sold, or there has been no market for forest products. The latter condition, where it exists, is not expected to continue indefinitely, as new markets are developing every day for smaller products. Forest lands that have been cut and left without regard to a future timber crop will reproduce and grow timber, but management can greatly increase production and shorten the period of time required for the trees to mature.

The farm-forest owner's first question should be: How can I use my forest land to return the most income to the farm? In making a decision objectively, he should not think of the farm forest in terms of what it is now producing in the way of timber or what it did produce from natural growth in the past. He must think, rather, of what it can produce in the future under proper management. This same approach should be taken for all possible uses of forest land, including recreation development and wildlife production. Land should be used for growing timber when this use indicates the best return to the owner over a continuing period of years. With many owners, the decision as to whether to grow timber or to put farm woodlots to some other use does not arise. Existing timber conditions on the farm may make conversion to other uses prohibitively expensive.

Consider the following points in favor of raising timber:

1. When forest land is properly managed and stocked, the yield in timber products can amount to at least 200 to 500 board feet a year from each acre, the amount increasing as you move westward to the more productive forested areas of the state. The value per unit of product varies from community to community, depending on local industries, and from year to year, depending on national wholesale lumber-price fluctuations.

2. As an additional product, timber from farm forests provides a diversity of income for your farm.

3. A timber crop doesn't have to be cut at an exact period or date as do other crops—the owner can wait for favorable markets or for off-seasons when there is more time for this type of work. The waiting period will result in a higher volume and value that will more than offset such increased carrying costs as taxes and fire-protection assessments.

4. Logging can often be accomplished with equipment already available on the farm.

5. Timberland can still be used for cattle forage if grazing is not too heavy.

Don't let the long period involved in growing sawtimber-size trees discourage you. The trees that nature grew may be several hundred years old, but by thinning, pruning, and culling it is possible to produce the same size tree in a much shorter time and obtain a greater yield per acre. All trees in a forest do not reach marketable size at the same time, so there is a yearly or periodic harvest if desired. In addition, our markets are changing, with the demand for smaller timber increasing. When natural commercial forests are gone, the wood-using industries will have to depend entirely upon the timber we grow, and the rotations, or ages, of the oldest trees when they are cut are going to be less than 90 years.

Diversification of the markets for wood products has gone a long way toward relieving the disadvantages of the time element. At 30 years you can begin to cut stud-size logs, and small saw-logs can be cut ten years later. Christmas trees can offer a good return within ten years of planting. Expanding pulp markets are also improving the sales picture for immature timber. If you need advice in deciding whether or not to manage your timber, it is a good idea to consult the local Soil Conservation Service or the nearest State Forester's representative.

Timber Management Practices

Once the decision to manage a woodlot for timber production has been made, a series of essential practices will put your management plan into operation. Before outlining these practices, it is important to emphasize that the key to tree growth is spacing; if the trees have room to grow, the land will produce. If there are too many trees per acre, the resulting timber will take many extra years to reach salable size. If there are not enough trees, brush takes over the growth potential of the site. With this fundamental principle in mind, you are ready to begin management of your woodlot.

Rehabilitation

Starting with the timber stand that now exists, whether it be uncut or one from which all salable material has been removed,

go over the trees and take a good look at them. You are interested in those that have good form and are not too old, for these are the trees with a healthy growth potential. Trees that are crooked or forked, have cankers or rot, or have sustained porcupine damage, are not worth bothering with and should be removed. A tree must have a good full crown to produce growth; spindly trees with very small tops should be removed (see section on thinning for spacing requirements), as should trees with dead or broken tops. Wide crowns on very short trees are also undesirable and will also be discussed in the section on thinning. Mistletoe retards growth and reduces seed crops; get rid of any trees carrying this parasite. Examples of desirable and undesirable trees are illustrated on pages 9 through 12.

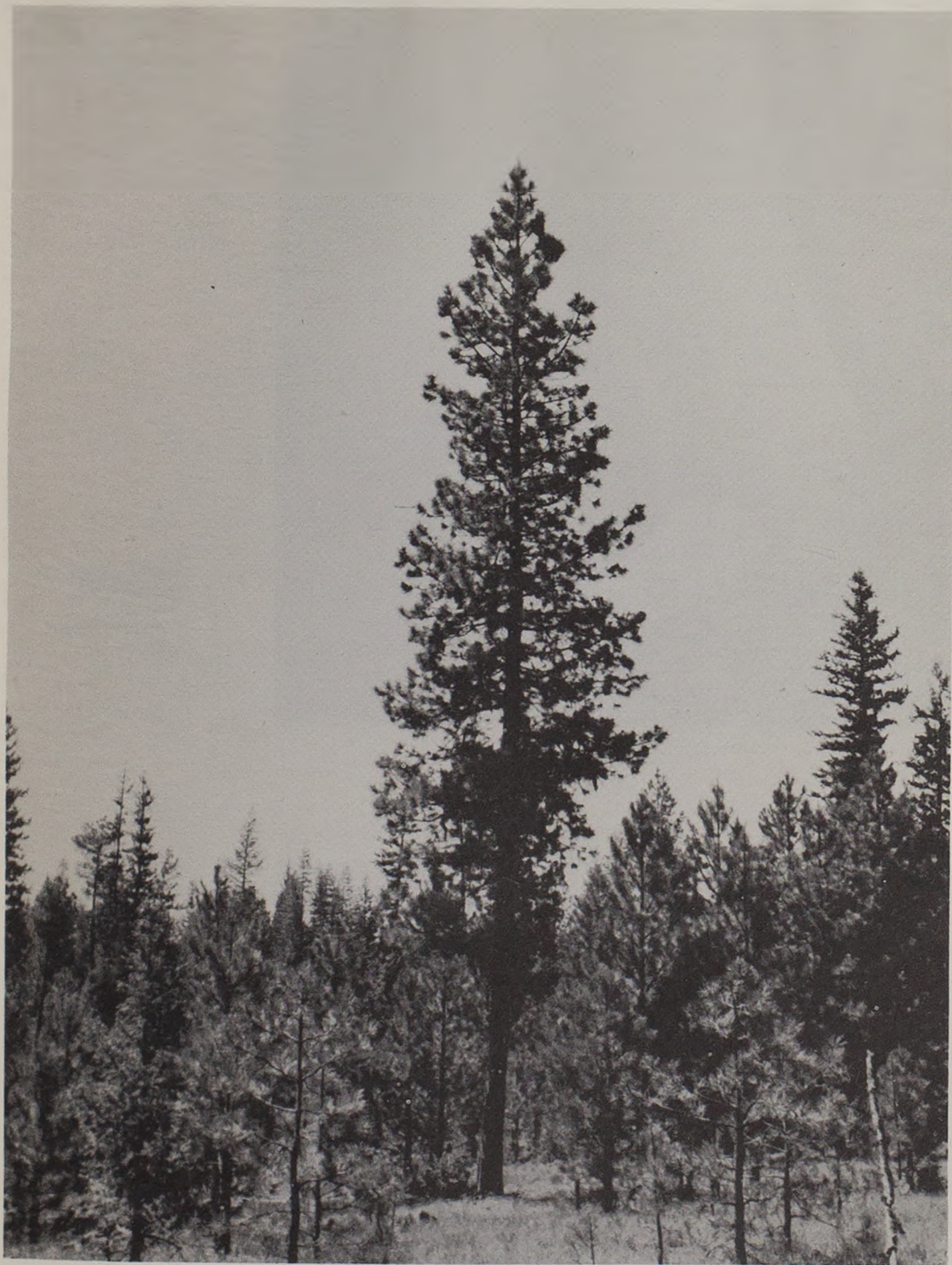
In some stands, such as stagnated lodgepole or larch, it may not be feasible to leave any trees for future growth. In this case, the entire stand will have to be destroyed and the cleared land planted to a new crop of either trees or annuals. Usually, however, after taking out the diseased or otherwise undesirable specimens indicated above, you will have a stand of straight, healthy trees with good, sharp-pointed crowns. These are the growing stock.

In all probability, the trees that have been removed cannot be sold. Nevertheless, look them over and cut out any piece that will make a log. Whatever cannot be used for firewood, fence posts, or corral poles should be piled and burned. The smaller branches can be cut off and scattered or burned. It is better for the soil if they are not burned, particularly if the area is also being grazed and if there are few enough small branches so that leaving them does not create a fire hazard. Heavy accumulations of slash have to be burned to comply with state laws and to keep down insect populations. (See section on slash disposal.)

If there are spaces in the forest where the remaining trees are over 20 feet apart, these openings should be planted with young trees or seed. (See section on reproduction.) If there is brush, this should be removed first. The cheapest method of brush removal is with selective sprays, the same as those used by the county to clear road right-of-ways. Information on spray mixtures and methods of application can be obtained from your county agent. Grass turf should be removed from a three-foot-square area at each planting or seeding spot as illustrated on page 14. Young trees cannot compete with a heavy cover, and any planting will be a failure without adequate site preparation.

Thinnings

When the stand is stocked and growing, all that is necessary is to protect it from overgrazing and fire and wait for the trees to reach cutting size. As the trees grow older and larger they



*The desirable tree:
a ponderosa pine with a straight, slowly tapering
stem, a long, narrow crown, a pointed top, and
heavy dark-green needles.*

*Undesirable trees
that should be re-
moved during re-
habilitation of
stand:*



*Left: crooked
stem.*

*Center: dead
top.*



*Porcupine
damage.*

*Small and
mis-shapen
crown.*



Forked stem.





*Short, wide
crown.*



Mistletoe.

increase not only in diameter and height but also in the size of their crowns. When the crowns of adjacent trees begin to touch, it is time for a thinning.

In planted areas with controlled spacing, the first thinnings can be postponed until most of the trees removed will provide a salable product. In some stands resulting from natural seeding, thinning must be started much earlier. Larch and lodgepole pine are species which nearly always need early thinnings. Always cut the trees close enough to the ground, not over 12 inches, so that the stumps will not hinder your future activities.

Thinning gives more soil moisture, nutrients, and direct sunlight to the trees that are left. In effect, the growth of the removed trees is transferred to the trees that remain. By thinning you will obtain larger trees at an earlier age than could ever result from an unmanaged stand of timber.

It is not practical to release the remaining trees on all four sides. This would open the stand too much and waste space. For pines and larch, crowns may be left touching on one side. For fir and spruce, touching crowns on two sides are desirable. (See illustrations, page 15.) Wherever possible, the trees that are removed should be those with the poorest form, those putting on the slowest growth, or trees of the less desirable species. See the species description on page 19 to determine which should be favored for a given location.

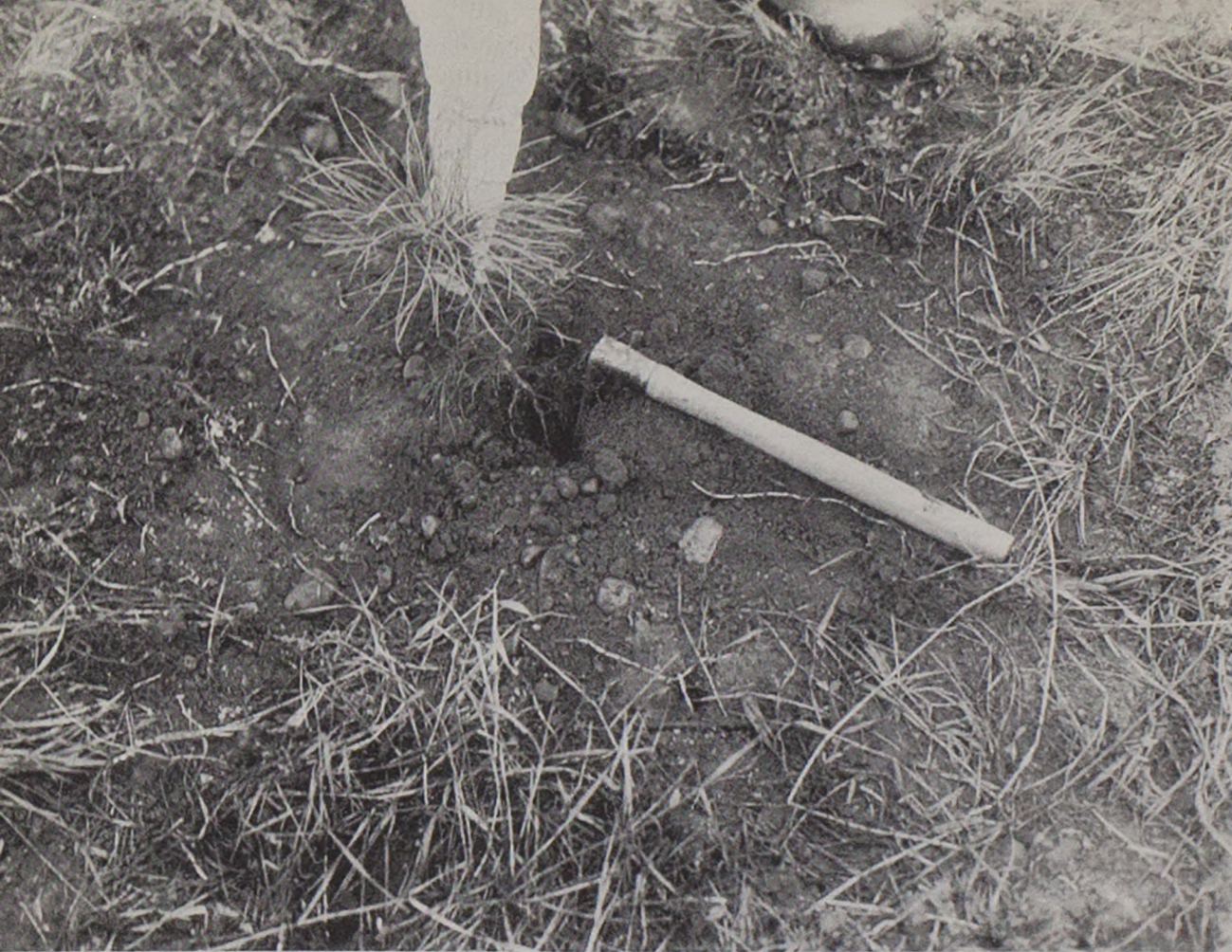
In selecting the trees to cut or leave, remember that the larger and fuller the crown, the better the growth rate of the tree. We want larger crowns, however, to be the result of length, not width. Wide crowns on short trees form larger knots in the logs. Short trees produce less wood per unit of land and logs of lower quality, hence a lower value. Short, wide-crowned trees should be removed in thinnings and in the early improvement cuttings.

Thinnings will cause openings in the forest canopy, but unless the remaining trees are over 20 feet apart, do not attempt to fill these openings by planting. The remaining trees will close in the space.

Thinnings should continue until all of the remaining trees are at least 16 inches in diameter. In the extreme western part of Montana, they should be 20 inches in diameter. Faster growth due to more abundant moisture in this area will produce larger trees in the same time period required for smaller ones in dryer parts of the state.

Pruning

The first logs from trees 16 inches or over in diameter can be increased in value if the trees have been pruned. Pruning is the



Planting a two-year-old pine seedling on forest land covered with grass.

removal of the limbs on the first 16-foot log. It results in knot-free lumber in the outer portion of the log.

Pruning should be applied only to those trees which you expect to carry to the harvest cut. They should number not over 100 per acre. It is a waste of time to prune trees that will be removed in thinnings. Trees should be pruned while they are young and still under six inches in diameter, and all limbs should be cut off flush with the bark surface, taking care not to cut into the bark. The limbs should be removed for a distance of 17 feet above the ground, but at least one third of the total height of the tree should be left with crown. This crown-retention limit can prevent the pruning of the entire first log the first time pruning is attempted. A second pruning can be used to complete the job after the trees have grown taller. A 12- or 14-foot pole saw should be used for this work in preference to an axe.

Harvest Cut

When all the trees on an area of an acre or more have reached or exceeded the minimum desirable size, they are ready for a harvest cut. A clear-cut is recommended—that is, all of the trees on the area should be removed. If the entire forest is about the same age and reaches harvest size at one time, it may not be wise to cut over all the acres at once. The clear-cut areas can be kept

*Choosing trees
for thinning:*

*Right: Cut a and b. These
trees are less desirable than
c and have no growth poten-
tial due to crowding.*



a

b

c

a



*Left: Cut a and b
to release c.*

b

c

small and the harvest spread out over a long period of time, cutting an equal area each year, or whenever the market is good. This is the advantage of a forest crop: trees can be held for many years and will increase in value and size. If the entire forest were cut in one year it would be a long time before there would be another tree large enough to sell.

In clear-cutting, everything should be removed that can be sold or used. The remaining debris will have to be disposed of by burning or scattering.

Reproduction

Clear-cut areas, if over one acre in size, should be kept in strips rather than squares if natural reproduction is desired. The width of these strips should not be over 200 feet. The surrounding timber will be a source of seed. On a larger clear-cut area, if natural reproduction is desired, you should leave at least five of the best trees on each acre for seed. They should be well spaced over the area. These seed trees can be removed later after reproduction is established.

Remember, however, that our timber, with the exception of lodgepole pine, provides a good seed crop only once every seven years. If you have just missed a crop, it will be to your advantage to plant or seed instead of waiting for natural reproduction. Planting or seeding is also recommended because in this way both the species and the spacing of the new growth can be controlled. Another advantage of planting or seeding over natural reproduction is that in the latter case brush may reoccupy the area before the seed crop is established.

Whether in the rehabilitation process or after a harvest cut, the following rules should be observed in planting or seeding:

Planting should be done early in the spring on a six-by-six- or eight-by-eight-foot spacing. Although you are aiming ultimately for an approximate 15-foot spacing for mature trees, closer spacing of the young trees allows for losses that always occur, reduces the brush cover on the ground, and results in less side branching in the trees as they get older. If Douglas-fir is planted, it is possible to use an even closer spacing of three-by-three feet and remove some of the trees as soon as they reach Christmas-tree size.

Seeding should be done in the late fall or early spring according to the same spacing as above. Use a planting tool to insert the seed about one inch into the soil. This part of the forest should be treated with poison grain one week before seeding to reduce the rodent population.

In both planting and seeding, if a heavy grass turf is present over a large area and has not been broken up by the logging and

brush disposal, furrows should be opened with a single-bottom plow at the desired spacing and the trees or seed planted in the bottom of the furrow. On hillsides, these furrows should contour.

In areas that have been planted or seeded, it will be necessary to restrict or eliminate all grazing until the trees are large enough to be safe from trampling. Overgrazing at any time can injure your trees and soil.

Slash Disposal

The slash from thinning should be disposed of by hand piling, either after or during the logging operation. Slash left by the harvest cut can be piled by hand or with a tractor and blade. A brush blade is better than a dozer because less dirt is included in the piles. The piled debris can be burned in the fall after the end of the fire season. Don't start with the first rain but wait until well into October. With hand piling, tar paper can be laid over the center of the piles and held in place with more slash. This permits easy burning much later into the fall.

Slash disposal is advocated for site preparation for the new crop of trees if natural seeding is desired, as well as for reduction of fire hazard. On open south slopes with severe summer soil temperatures, limbs can be cut from the felled trees and allowed to remain to provide some degree of shade for the young trees.

Slash from lodgepole pine contains a large supply of seed. If all of it were released, there would be severe overstocking and the landowner would have to thin long before any timber was of salable size, even Christmas trees. If lodgepole slash is piled and burned, the excess seed is usually eliminated; an adequate amount for normal regeneration remains in the ground.

The disposal of slash and logging debris is required by the state under the hazard reduction and management law. When timber is cut a hazard is either created or not depending upon the volume cut, species, topography, and other factors. The law requires all persons cutting and thereby creating a hazard to take appropriate action for its reduction. Meeting the legal requirements does not, in most cases, constitute adequate slash treatment for management purposes. The treatment advocated in the paragraph above will more than comply with the law. (See Appendix II for legal details of hazard reduction.)

Fire Protection

Fire is one of the greatest enemies of the forest and is no respecter of age or condition. State laws require all classified forest lands west of the Continental Divide to be assessed yearly for the purpose of fire protection. This money goes to the U. S.

Forest Service where private lands are within national forest boundaries, and the Service offers the same protection to these lands as it does to the public lands under its care.

Private and state-owned forest lands outside national forest boundaries are protected by fire protection associations or by the State Forester. In either case, the protection offered does not relieve the landowner from taking all precautions to prevent and suppress fires. A cache of fire tools is required by law during logging operations and should be available in or adjacent to the forest throughout the fire season.

In Conclusion

Trees are a crop, as much so as one raised on cultivated land, and like any crop they require some care and attention. Trees differ from other crops, however, in that they take longer to mature and do not have to be harvested at a specific time. Don't expect overnight results from the improvement work; give the land a chance, and if the work has been done well the improved farm forest will become an asset to the property. At the same time it will help to support important industry for the community.

The guidelines presented here should enable a farmer or rancher to make improvements on his timbered lands and to be a better judge of their worth. There is no substitute for experience, however, and the farm-forest owner should take advantage of the forest-management advice and services available in many localities from the State Forester, the U. S. Forest Service, and the Soil Conservation Service. Harvest cuts of timber should be made no faster than the land is producing, and only a skilled forester can make such a determination.

Appendix I

Timber Species in Montana

There are seven species with which you should be familiar. They are listed in order of their value as sawtimber. If a more detailed description, including illustrations, is desired, the publication "Know Your Trees" can be obtained from your county agent.

1. Western white pine, *Pinus monticola*

This tree is very important because its wood is soft, light in weight, and easily worked. It is a tall, very straight tree that grows in pure or mixed stands along the western edge of the state. This is a sun-loving tree that cannot stand crowding. It is seriously affected by white pine blister rust, but this disease can now be controlled. All stands in western Montana are also badly depleted by pole blight, a disease caused by an unknown agent for which there is no known cure. Not recommended for planting.

Needles: 2" to 4" long, in clusters of five, flexible, bluish-green.

Cones: 5" to 10" long, green before opening and light brown when ripe, scales thin; found principally at the tops of the trees.

Bark: Thin, smooth, and light gray on young trees; in dark gray, square, or rectangular plates on older trees.

2. Ponderosa pine, *Pinus ponderosa* (bull pine, yellow pine)

This species—the state tree of Montana—is a sun-loving tree that grows best on our drier, well-drained sites. It yields a high-quality wood for both the sawtimber and stud-log markets. It has limited use as a Christmas tree. Recommended for planting.

Needles: 3" to 6" long, in clusters of three (occasionally two), rich olive-green.

Cones: 3" to 6" long, shaped like a top; bright green, becoming reddish-brown as cones get older; armed with small spines.

Bark: Dark brown on young trees; yellow-brown to cinnamon-red and broken into large, flat plates on older trees.

3. Engelmann spruce, *Picea engelmannii*

This tree is found on our moist, poorly-drained lands and at higher elevations. It grows well in the shade and can stand a great deal of competition. However, like any other tree, it attains its best growth when not crowded. It is a premium pulp species and commands a good price in the saw-log market. It has limited use as a Christmas tree. Recommended for planting.

Needles: 1" to 1½" long, single, sharp-pointed, bluish-green to silvery-white.

Cones: 1½" to 2½" long, oblong, with soft, papery scales.

Bark: Thin, very loose and scaly, cinnamon-red to purple-brown.

4. Lodgepole pine, *Pinus contorta* (jack pine)

This tree is a sun-loving species and grows on well-drained sites at all elevations. It grows fast and often forms dense, stagnated stands. Each tree retains its cones and seeds for many years. Heat causes long-dormant seed to be released, and this leads to very dense reproduction following fires. Lodgepole pine is good for poles, posts, and for stud logs. It is a good pulp species, but has limited use as a Christmas tree. The common name is derived from the early use made of it by the Indians and pioneer white settlers of the Northwest. On present markets it has a lower value than the other pines because of its lesser height and smaller diameter. Not recommended for planting.

Needles: 1" to 3" long, two in each bundle, dark olive-green.

Cones: 1" to 1½" long, appear lopsided, armed with sharp spines; cones remain on the tree and unopened for many years.

Bark: About 2/5" thick, orange-brown to gray, somewhat flaky.

5. Western larch, *Larix occidentalis* (tamarack)

You may find this tree and the species following mixed in all stands, but they achieve their best growth on the better-drained soils of north and east slopes. Larch has the best natural pruning of any of our species, forming long clear stems at an early age. Products can be sold as sawtimber or stud logs. It is the most valuable of our western species for poles, with the exception of cedar. This is a sun-loving tree and should be thinned early to attain good growth. Recommended for planting. (Planting stock is not available at present but should be in the future.)

Needles: 1" to 1¾" long, in clusters of 14 to 30, triangular, sharp-pointed, but soft to touch; pale green, turning deep yellow before falling in the early autumn.

Cones: 1" to 1½" long, oblong, purple-red to red-brown, with numerous thin, stiff scales.

Bark: Thin, dark, and scaly on young trees; up to 6" thick, broken into plates, and yellow-brown to cinnamon-red on older trees.

6. Douglas-fir, *Pseudotsuga menziesii* (red fir)

This tree has about the same value as larch for saw logs or stud logs. It is the primary species sold in Montana for Christmas trees.

It can stand considerable shade and can be planted on any but the poorly drained soils. It does best on north and east exposures. Recommended for planting.

Needles: $\frac{3}{4}$ " to $1\frac{1}{4}$ " long, single, flat, slightly grooved above and marked below with two light bands. Needles become narrow at base where they are attached to the branchlets; sharper at the end than the other firs, but not so pointed as spruce.

Cones: 2" to 3" long, $\frac{3}{4}$ " to 1" in diameter, oblong, can be identified by the three-pointed wings, or bracts, that stick out beyond the cone scales.

Bark: Smooth, light gray-brown, with resin blisters on young trees; thick, deeply grooved, cork-like, gray to gray-brown on old trees.

7. Grand fir, *Abies grandis* (white fir, balsam fir)

This species provides a very good pulp wood and has a good market as a Christmas tree. It grows on the moister sites and can stand a great deal of shading. Recommended, but not available for planting in the foreseeable future.

Needles: $1\frac{1}{4}$ " long, flattened, lustrous, dark yellow-green above, silvery-white below.

Cones: 3" long, cylindrical, erect; bracts shed on the tree.

Bark: Thin, pale gray, and resinous on the younger trees, very much like Douglas-fir; reddish-brown, plated or deeply furrowed on the older trees.

Appendix II

Hazard Reduction Laws in Montana

A Hazard Reduction Agreement must be signed with the State by whoever cuts timber for sale. The responsibility for the determination of whether or not a hazard has been created rests upon the operator at the time the Agreement is signed. State slash inspectors will give the operator as much assistance as possible. Under normal conditions, any commercial cutting will constitute the creation of a hazard. In the event the operator decides that no hazard has been created, he must indicate this in the Hazard Reduction Agreement.

When the timber-owner allows the timber to be cut or cuts it himself, thus creating a hazard, the following procedures will be followed:

1. The owner must sign a Hazard Reduction Agreement with the State Forester. This can be done at a U. S. Forest Service Ranger's office or at any office of the State Forester.

2. If the total volume removed is below the minimum of 30,000 board feet established by the Board of Forestry, the operator has no choice (the operator is the party that cuts the timber, whether he is the owner or a logger). He must furnish a bond to the State Forester covering the amount cut, but not to exceed one dollar (\$1.00) per thousand board feet, and satisfactorily reduce the hazard himself. The full amount of the bond will be refunded upon satisfactory completion of the hazard reduction job. State inspection will be made to determine satisfactory completion.

3. If the volume removed is above the minimum, the operator must decide whether to dispose of the hazard himself or elect to have the State Forester dispose of the hazard.

a. If the operator elects to dispose of the hazard himself, he may either furnish a bond for the entire volume cut, not to exceed one dollar (\$1.00) per thousand board feet, or may have the purchaser withhold that amount as logs are delivered, to be turned over to the State Forester. The bond or money withheld by the purchaser will be refunded upon satisfactory completion of the hazard reduction job, with appropriate inspection charges deducted.

b. If the operator elects to have the State Forester dispose of the hazard, he may have the purchaser withhold the money, not to exceed one dollar (\$1.00) per thousand or its equivalent, if other forest products are cut. This money will be turned over to the State Forester and will be used to dispose of, protect, or treat the hazard.

It is recommended that the farm-forest owner dispose of his own slash or make the arrangements for disposal of his slash by a third party and request refund of the bond.

