Forestry on Private Timberlands

UNITED STATES DEPARTMENT OF AGRICULTURE
MISCELLANEOUS PUBLICATION No. 381

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Forestry on Private Timberlands

A Pictorial Record of What Some Private Timberland Owners in the United States Are Doing to Keep Their Forest Lands Productive

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PREPARED IN THE
DIVISION OF PRIVATE FORESTRY
FOREST SERVICE

COVER PHOTOGRAPH.—An illustration of selective cutting in a 50-year-old shortleaf-loblolly pine old-field stand. The Crossett Lumber Co. of Arkansas cut approximately 6,000 board feet of sawlogs and 8 cords of pulpwood per acre from this tract, reserving 7,000 board feet per acre of high-quality timber for added growth. F–350900

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1.—Partial cutting on the property of Mrs. Nora McMann, near Stratford, N. H., in which 6 to 8 cords of pulpwood, including large, mature fir and poor-quality spruce, were removed and approximately 20 cords of the best growing stock left per acre. Cutting varied from single trees to groups of trees. Growth of the remaining trees will be increased very materially. (Courtesy of the New Hampshire Extension Service.)

2.—Strip cutting for pulpwood in an even-age stand of spruce and fir on the Frank Dodge property near Whitefield, N. H. Approximately 10 percent of the stand by volume was removed. Such areas have to be limited in size to prevent wind throw. (Courtesy of the New Hampshire Extension Service.)

3.—Plantation of white spruce on lands of the St. Regis Paper Co. in Coos County, N. H. Planted in 1930 with 2-year transplants, the survival of thrifty, vigorous trees in July 1937 was 98.8 percent.

4.—Loblolly pine on land of the Hummel-Ross Fibre Co. in Dinwiddie County, Va., planted in the spring of 1929.

INTRODUCTION

FORESTRY is becoming recognized in this country as a specialized business just as farming is or any similar enterprise. It calls for the use of land for continuous production of crops of economically valuable species of trees, with attention to both volume and quality.

Forests in many cases can be so managed that they will yield regular income or profit. To do so, it is essential that the productive capacity of the forest be maintained at the highest practicable level. The enterprise involves growing more wood and better wood that will bring higher prices. If the timber stands are run down, they must be built up in order to increase the forest capital so that greater future returns are possible.

Forests, by and large, under proper management can be made to yield financial returns comparable with those from other properties requiring long-term investments. Always there has been a demand for forest products. Never has there been an oversupply

5.—White pine planted on the Eli Whitney Forest, New Haven, Conn., in 1913. A thinning was made in 1929 in which 4 cords per acre, mainly of small, intermediate, and suppressed trees plus a few that were large and poorly formed, were removed. The second cut removed 1,800 board feet per acre. The whole operation made a stumpage return of $3 a thousand feet. Costs were high, however, because of the small size of material handled and the difficulties of making a partial cutting in dense stands. (Courtesy of Yale University.)

6.—Norway spruce plantation on the Eli Whitney Forest, New Haven, Conn. Planted in 1913 with 3-year transplants on deep, loamy soil, formerly cultivated, the trees have made excellent growth. The calipered tree in the center is 8.6 inches in diameter and about 50 feet tall. In 1930 the volume was estimated at 1,060 board feet per acre. Selected trees have been pruned to insure one clear log. No thinnings, except removal of a few Christmas trees per acre, have been made. (Courtesy of Yale University.)

7.—Thinning and improvement cutting in an even-age hardwood stand, Eli Whitney Forest, New Haven, Conn. The photographs illustrate the appearance of a 45- to 50-year-old stand: A, Before; and B, After a thinning and improvement cutting to favor the white ash. In some portions of the area nearly 17 cords per acre were removed, but in the white ash group in the center foreground cutting was much lighter.

of high-grade material. Moreover, there is no indication that there will be an overproduction of high-quality timber.

The pictures in this publication show what some private timberland owners in various parts of the United States are doing to keep their lands productive and are representative of that 20 percent of the privately owned forest area which the Forest Service has reported as being under some form of management. They indicate what the owners of the other 80 percent can do under similar circumstances. The cutting methods illustrated vary, but they are all designed to build up or maintain productive capacity of the forests while merchantable products are periodically removed. That is good forest practice, the important thing being to maintain a sufficient number of trees of proper size suitably spaced to utilize the possibilities of the land in producing wood. The trees are referred to as "growing stock." Growing stock is like invested capital in that it yields an increment. The increment in the case of capital appears as interest or dividends. In the case of forest growing stock, it appears as wood which can be converted to cash when the trees reach salable size.

8.—Finch, Pruyn & Co. cuttings in the Boreas Mountain section, Essex County, N. Y.: A, Typical cut-over softwood flat. It contained 12.73 cords and up per acre of pulpwood (peeled basis) 5 inches in diameter at breast height comprised of 55 percent red spruce and 45 percent balsam fir. After lumbering, there remained 2.65 cords of sound pulpwood and 1,200 trees per acre of reproduction and advance growth in sizes ranging from 1 foot high to and including trees 4 inches in diameter at breast height. B, Girdling a large inferior soft maple to release the young softwood growth in its vicinity.

9.—Selective cutting of loblolly pine on land of the Chesapeake Corporation in King and Queen County, Va. Approximately 8½ cords of pulpwood per acre was cut. Growth of the remaining trees will be greatly increased.

10.—Release cutting by the Chesapeake Corporation in a large pole stand of loblolly pine in Gloucester County, Va. About 30 percent of the stand was removed to relieve a stagnant crown condition.

11.—Loblolly pine plantation in King William County, Va. The trees were set in the spring of 1934 on lands of the Chesapeake Corporation.

12.—Loblolly pine seed trees left to reseed the area after pulpwood cuttings on private lands in King William County, Va.

13.—A, Jack pine plantation established with 2-year-old seedlings on lands of the Nekoosa-Edwards Paper Co., of Port Edwards, Wis., photographed in October 1929; B, Same plantation after 12 growing seasons. Some pruning has been done, partly to facilitate the removal of trees of undesirable species, by company employees, who cut them for fuel wood.

14.—Selective cutting in northern hardwood–hemlock sawtimber stands of the Goodman Lumber Co., Goodman, Wis.: A, Area after selective cutting. Only mature and badly defective trees were removed. A cutting of 51 percent of the volume brought 71 percent of the present merchantable value, leaving the tract in condition for continuous production. B, Light selective cutting in advanced second growth. Only the largest "pay" trees, comprising about 50 percent of the volume, were removed. Insofar as practicable, logging was confined to old-growth stands producing little or no net growth. C, Selectively cut spruce-cedar swamp. Approximately 50 percent of the merchantable volume was removed.

15.—Selectively cut hardwood stand on lands of the Patten Timber Co., Amasa, Mich. This company has been practicing selective cutting for about 10 years. About 30 percent of the volume in the smaller-sized trees was left in the residual stand for future growth. F-300818

16.—The Ford Motor Co. has been selectively logging its forests of more than 200,000 acres in the Upper Peninsula of Michigan since the fall of 1936. The timber stands are principally mixed hardwoods and hemlock, running about 9,000 board feet per acre. About 30 percent of the merchantable volume is being left after the first cut. The residual stand puts on a net growth of about 160 board feet per acre a year. A, A virgin hardwood timber stand; B, Stand after selective cutting.

17.—Economic clear cutting in northern hardwoods by the Conner Lumber & Land Co., Laona, Wis. Only such trees were removed as could be handled at a profit and care was taken to preserve and protect the young growth and trees that were left. F-324836

18.—Light selection cut in stand of virgin sugar maple on the Upper Peninsula of Michigan. The original volume on the tract was 6,350 board feet per acre, of which 35 percent was cut. Note the fine reproduction 3 years after cutting. F-243076

19.—Selective cutting in a 48-year-old jack pine pulpwood stand owned by the Minnesota & Ontario Paper Co., Itasca County, Minn. The stand contained 365 trees 5 inches in diameter at breast height and over per acre, average 7.4 inches. The average volume was 25 cords of pulpwood in 8-foot sticks to a minimum top diameter of 4 inches inside the bark: A, Stand before cutting. B, After cutting 40 percent of the merchantable volume. A good growing stock has been left and repeated crops of pulpwood may be harvested at frequent intervals.

(A) F-367773 (B) F-367774

20.—Strip cutting in a mature, even-age, pure black spruce stand in Minnesota. In order to reduce the fire hazard, assure adequate restocking by seeding from the side, and to prevent excessive wind damage, often in such stands it is most practical to clear-cut in narrow strips. F-309393

16 A

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19 A

16 B

19 B

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21.—In eastern Louisiana the Gaylord Container Corporation of Bogalusa (successors to the Great Southern Lumber Co.) have more than 30,000 acres of land planted to pine: A, Portion of a 4,300-acre slash pine plantation established in the winter of 1924–25 and photographed in October 1925 when the trees were 10 months old; B, October 1932, plantation 7 years old; C, December 1935, plantation 11 years old, prior to thinning operations; D, February 1936, after thinning to remove undesirable, crooked, suppressed, and other surplus trees. Pulpwood was cut to a 3-inch minimum top diameter, or about 4 to 5 cords per acre. Fuel wood was cut down to a 1-inch top diameter.

22.—The 203,000-acre Suwanee Forest of the Superior Pine Products Corporation at Fargo, Ga., has been under sustained-yield management for years. Four forest rangers and a fire crew of from 8 to 10 men are kept constantly available for fire fighting. A radio system, with trucks and towers equipped with short-wave sets, enables the fire dispatcher to get in immediate touch with suppression crews. Some 5,000 miles of fire lines have been plowed and, with 100 miles of road, break up the area for fire-control purposes. Fire control on the Suwanee Forest allows natural reproduction to become established. Photograph A was taken in 1933; B, in 1939, identical location. Only those areas which fail to reforest naturally are hand-planted.

23.—On Dan Howell's property, near Lake City, Fla., fire lines are plowed and maintained with tractor plows. Approximately 16,000 miles of plowed fire lines existed on the 3,135,000 acres of private forest land under protection in Florida in 1937. The equipment shown in the picture will build 16 to 17 miles of 8-foot firebreak with a 6-foot ditch in an 8-hour day.

24.—Mature slash and longleaf pine timber in the naval stores region of the South is often turpentined 3 to 6 years prior to cutting. The worked-out trees are then cut for pulpwood, poles, piling, or sawlogs. F-186822

25.—Three miles west of Runnelstown, Perry County, Miss., this old field loblolly pine owned by a farmer was cut selectively by a contractor for the Masonite Corporation. Cutting conservatively has left the stand so that another cut can be made in 10 years. F-353336


22 A


22 B


23


24


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26.—24-year-old longleaf pine on an old clear-cut area in the southern Coastal Plain. Fire has been kept out.

F-256498

27.—Logged selectively 30 years ago, this stand of longleaf pine is ready for another cut of high-grade timber.

28.—A 70-year-old stand of second-growth longleaf pine in the southern Coastal Plain after selective logging. The original timber was cut about 1888, when trees 20 inches and larger were taken. The second cut, in 1909, included trees down to 14 inches in diameter and removed the remainder of the virgin timber. The tract was logged for the third time in 1938, on a selective basis. This cutting removed 4,500 board feet of timber per acre, leaving 6,000 board feet per acre. The trees removed were turpentined for 3 years prior to cutting.

29.—The T. R. Miller Mill Co., Brewton, Ala., owns many thousand acres of thrifty second-growth longleaf pine in southwest Alabama and northwest Florida. Protection from fire, begun in 1924, has resulted in well-stocked stands: A, A 30-year-old stand of longleaf pine with from 400 to 500 trees per acre, ranging from 4 inches to 12 inches, d. b. h. The stand is ready for its first cutting, and the trees to be reserved have been marked with white paint. In the first cutting one-third to one-half of the stand will be removed. B, Posts and small poles are produced in the first cutting operation. Posts measuring 2½ inches at the top and 6½ feet long are the smallest size merchantable. Close utilization is thus practiced. C, After the first cutting for posts and poles. The residual stand contains from 200 to 250 trees per acre in sizes 4 to 11 inches, d. b. h. An equal number was cut, and successive cuttings will be made at 3- to 5-year intervals. D, In this stand, thinned in 1932 and each succeeding year until 1937, on each acre 100 trees measuring 8 to 14 inches in diameter were left. The growth rate has been 3 inches in diameter in 10 years. A sawlog cutting will be made 15 years hence, on a selective basis. In the foreground is a burned protective strip.


29 A


29 B


29 C


29 D

30.—In 1899 the Crossett Lumber Co. erected a sawmill at Crossett, Ark. Now there are eight separate wood-using establishments at Crossett drawing their raw material from 440,000 acres of the company timberlands. During the last 14 years the forest operations have been on a sustained-yield basis. The present annual cut of 35,000,000 board feet is less than half of the estimated annual growth. The forest growing stock is being built up so that a larger annual cut may be sustained in the future. Crossett, with a population of 3,500, is almost solely dependent upon its forest industries for employment: A, The Crossett Co. has found that the quality of second-growth timber can be built up through selective cutting. On this tract, logged 2 years before the picture was taken, young growth has already become established in the small openings. B, Second-growth, shortleaf-loblolly pine stand, 4 months after 2,500 board feet of logs and 7 cords of wood per acre were removed in selective logging in 1937.

(A) F-353404 (B) F-350895

31.—Second-growth yellow poplar stand following acid-wood operations completed in 1920–24 on lands of the Champion Paper & Fibre Co. near Willets, N. C. The 4,200 acres in the operation yielded an average of 25 standard cords per acre.

32.—In 1925 the Southern Railway decided to operate, as a perpetual forest to demonstrate that it would pay to grow pine trees, 11,043 acres at Pregnall, S. C., originally acquired to supply wood for construction and for wood-burning locomotives. The forestry program includes protection from fire and the gradual replacement of longleaf pine with slash pine. Up to September 1, 1937, more than 81,000 trees had been cut for lumber and poles, and 3,880 cords of pulpwood had been sold without materially reducing the growing stock. Intermediate thinnings are being made to improve naturally restocked and hand-planted stands. Prior to harvest cutting, the longleaf and slash pines are worked for naval stores.

33.—Lands in Pender County, N. C., owned by the West Virginia Pulp & Paper Co. of Charleston, are protected from fire. Lookout towers and fire lines aid in preventing and suppressing fires and so help young growth to become established. Some 800 acres on which natural restocking was inadequate have been planted. F-230977

34.—Cutting by the Allison Lumber Co., of Bellamy, Ala., started in 1901. In 1928 a diameter cutting limit of 14 to 16 inches was adopted, followed in 1935 by a strict application of selective cutting with the marking of each individual tree to be cut. Under the present method a residual stand, with at least a third of the original volume, is left. Particular care is taken in logging to prevent damage to reproduction and advanced young growth. The company employs 350 men in connection with its timber operation, many of whom have been with the company for years. About 1,000 persons are directly dependent upon this operation and timber and log purchases by the company afford income to numerous others. The growing stock is being built up on the 100,000 acres owned by the company so that the operation may be self-sustaining: A, Trees are carefully selected and marked for cutting with a paint gun. This stand of shortleaf pine has just been partly cut over, leaving about 5,000 board feet per acre in high-quality timber. Another cut will be made in about 10 years or after young growth becomes established. B, Before and after cutting. The original old-growth shortleaf pine stand on the left of the road, was estimated to contain 10,000 to 12,000 board feet per acre. On the right is the same type of stand after 60 percent of the volume had been removed.

35.—These young loblolly pines on lands of the Long Bell Lumber Co., near Sheridan, Ark., are 6 years from seed sown on an old burn. Through fire control and by cutting the residual timber selectively the growing stock has been built up. F-247299

36.—The Ozan Lumber Co., of Prescott, Ark., has 69,000 acres of company lands under good forest management and in addition 6,000 to 8,000 acres of farmer-owned woodlands under verbal contract to be cut selectively. A forester directs the forestry operations and is keeping records on permanent sample plots to determine growth rates: A, On the Mathis sample plot, cut in December 1937, when the stand was 49 years old, 48 trees producing 4,907 board feet were harvested, and 7,784 board feet in 167 trees was left per acre in addition to 2.1 cords of wood in trees under 8 inches in diameter. B, Prior to 1898 this land owned by the Ozan Co. was cultivated. In 1938, 1,131 board feet per acre was taken from the tract in a selective cutting, leaving 3,597 board feet per acre.

37.—The Malvern Lumber Co., Malvern, Ark., established in 1880, has been in the timber business continuously for 59 years. Power skidders have never been used in the logging operations, and this, combined with adequate fire control, accounts for the fact that many of the company tracts are now being logged selectively for the fourth and fifth time. The stand shown was cut selectively in 1927. In 1937, 8 trees per acre were cut for poles, and 68 trees (11.2 cords) were cut for pulpwood; 80 pines (9.1 cords) and 60 hardwoods (4.7 cords) were left per acre.

38.—Lands of the Hudson & Dugger Co., of Memphis, Tenn., in Hempstead County, Ark. Unconsciously for the last 20 years the operator has selectively cut on a sustained-yield basis 4,200 acres of oak by reserving this acreage for special orders.

39.—Pulpwood cutting on a selective basis in Avery County, N. C., on the lands of the Cranberry Furnace Co. From this stand of yellow poplar a cut of 30 cords per acre was made, leaving 30 cords in straight, thrifty trees for sawlog production.

40.—Selective cutting in 36-year-old loblolly pine timber on the D. R. Williams plantation near Camden, S. C. From this tract 1,600 board feet of logs, 17 cords of pulpwood, and 1½ cords of fuel wood per acre were cut. Left standing were 1,600 board feet of saw timber and 6 cords of other wood per acre. F-356761

41.—Near Fayetteville, N. C., E. C. Johnson thinned this 30-year-old stand of longleaf and loblolly pine. He cut 9 cords of wood per acre, leaving 410 trees per acre with a volume of 25.7 cords. The average annual growth is estimated at 1.16 cords per acre per year.

42.—In 1922, when this 30-year-old stand, owned by the Urania Lumber Co., Urania, La., was 15 years old, it was thinned. It now contains 230 trees per acre, with an estimated volume of 25 cords. The thinning in 1922 took out about an equal amount and left only the thriftiest trees.

43.—On the old Sterling Lumber Co. tract near Bastrop, La., the present owners and operators, the Southern Kraft Corporation, have carried on a partial cutting for saw timber. The 88 pines harvested per acre yielded an average of 13.8 cords; 120 pines with a volume of 20.8 cords and 48 oaks containing 3½ cords per acre were left.

44.—A woodland manager for the Southern Kraft Corporation points with pride to this fine 50-year-old residual stand of shortleaf pine in Calhoun County, Ark. In cutting, 16 cords per acre were taken out, and 20 cords, representing the straightest and thriftiest trees, were left. In about 10 years the remaining stand will again be cut selectively.

45.—On the Dyal tract near Darien, Ga., this 30-year-old stand of longleaf pine was marked by foresters of the Union Bag & Paper Co., of Savannah. Only thrifty trees were marked; 7½ cords per acre were removed. A fine stand of well-spaced thrifty trees was left. A, Before cutting; B, After cutting. (A) F-351082 (B) F-351086


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45 A


45 B

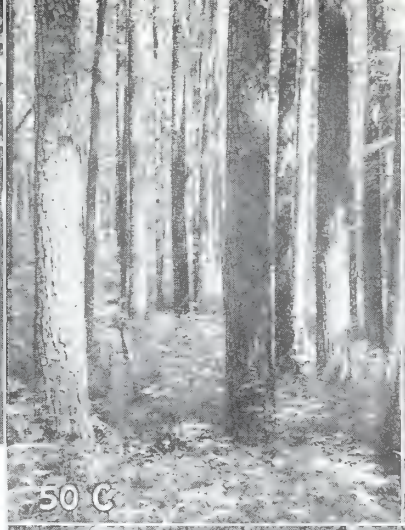
46.—James Fowler, of Soperton, Treutlen County, Ga., has planted 4,000 acres to slash pine on his 14,000-acre "million pines" property. The first planting was made in 1926, and as an experiment 1,000 trees planted at that time are now being turpentined. He is reducing his cotton acreage by eliminating nonprofitable areas and planting them to pines. The picture shows a 4-year-old slash pine plantation established with wild stock in February 1926. F-230226

47.—Sixty-four years ago, in 1875, this was an old field. It is now owned and operated by the Ozark-Badger Lumber Co., of Wilmar, Ark. It is a portion of a stand cut in 1930 and again in 1936. The last cut removed three trees per acre, with an average volume of 383 board feet per tree. The cut since 1928 has had a stumpage value of $43 per acre; the stand still contains high-quality timber.

48.—A, This tract of old-growth pine has been logged for the third time by the Ozark-Badger Lumber Co., of Wilmar, Ark. An average of 4,000 board feet per acre has been removed in three cuttings. B, This 59-year-old stand of old field pine has been cut for the third time since 1928. The cuttings removed 8,000 board feet per acre.

49.—Selective logging has been carried on by the Union Sawmill Co., of Huttig, Ark., over a period of 20 to 30 years. On portions of their shortleaf pine holdings eight separate cuts have been made over a period of 35 years. About 30 percent of the stand is removed at each cut, leaving a thrifty stand of well-formed rapidly growing trees for future cuts. As a result of this cutting policy, combined with adequate fire control, the stands have been built up, and the growing stock has increased in amount and quality. A careful selection of trees to be cut is made by trained timber markers, and the loggers cut only such trees as have been marked: A, Shortleaf and loblolly timber holdings, logged first in 1927 when 7,000 board feet per acre was removed. In 1933 an improvement cutting took out 6 cords of pulpwood per acre, and the stand contained 10,000 board feet per acre when the picture was taken. Note the tall, clear trunks. B, Seventy-five years ago this was an old field. Since 1904 seven successive cuttings have been made on the area. Since 1920, it has been logged selectively four times. It is estimated that in the stand there is now more than 5,000 board feet per acre, and the regeneration has filled in openings.

(A) F-353408 (B) F-353413



50.—The W. T. Smith Lumber Co., of Chapman, Ala., is operating on a sustained-yield basis and is cutting its shortleaf, loblolly, and longleaf pine selectively: A, In this stand 4,000 board feet per acre was cut in January 1937, a year before the picture was taken; B, A cut of 3,500 board feet per acre was made in this second-growth loblolly pine stand; C, Portion of the mature loblolly pine timber on the Thorpe tract, a stand which will run 30,000 board feet per acre.

51.—On its Satilla forest, in Camden County, Ga., the Georgia Forest Products Co. operates 30,000 acres of longleaf, slash, and loblolly pine. Headquarters on the forest is near Woodbine. A fine system of roads and fire lines makes all portions of the area readily accessible for fire control as well as for naval stores, logging, and other operations. Operated on a multiple-use, as well as on a sustained-yield basis, the forest yields piles and poles, gum for naval stores, railroad ties, posts, and saw timber. Pulpwood is cut from tops and from small, suppressed, defective trees taken out in thinning operations. The third year's chipping is under way in this 30- to 35-year-old slash pine stand. In 6 years the stand will be cut selectively for poles, ties, and pulpwood. F-339121

52.—Conservative cutting has long been practiced on lands of the Vredenburgh Sawmill Co., Vredenburgh, Ala. This stand of mixed loblolly and shortleaf pine was cut to an 18-inch-diameter limit in 1936. Stumps were cut low to facilitate logging with mules and eight-wheeled wagons to spur landings. The property has been protected from fire for the last 10 years.

53.—Lands of the Scotch Lumber Co. in Clark County, Ala., which were first logged in 1905. The residual stands were protected from fire. The area was logged again in 1937, from 5 to 10 trees 16 to 20 inches in diameter per acre being removed (2,000 to 4,000 board feet) on a selective basis. The present stand runs 2,000 to 5,000 board feet per acre.

54.—H. M. Wilson, of Jacksonville, Fla., owns many thousand acres in Clinch and Lanier Counties, Ga., on which, as a result of fire control, there are stands of second-growth slash pine.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55.—The owner of this timber, Alex Sessoms, of Cogdell, Ga., has thinned several thousand acres of second-growth slash pine in southeast Georgia. This 15-year-old natural stand of slash pine was thinned in 1934 with no resulting product, then thinned again in 1938, at which time 50 to 75 trees per acre were cut for pulpwood, leaving from 175 to 200 trees per acre averaging 8 inches in diameter (6 to 11 inches). The tract has been protected from fire since 1922.

56.—Selective cutting on the Metcalf property, Georgetown County, S. C., total acreage 24,000. This picture shows a stand of 60-year-old loblolly after thinning. The cut per acre included 8.08 standard cords of pulpwood and 5,630 board feet of saw timber. The stand left per acre is estimated at 12.6 standard cords of pulpwood and 6,460 board feet of saw timber.

57.—Stands on lands of the H. Weston Lumber Co., of Bay St. Louis, Miss., are being cut over selectively. This tract has been operated for pulpwood and a fine residual stand is left.

58.—Protection from fire for 10 years has resulted in the establishment of this fine young growth on lands of the Southern Pine Lumber Co., Diboll, Tex. (Courtesy of the Texas Forest Service.)

59.—On the H. A. Budde tract near Conroe, Tex., pulpwood was cut on a selective basis. Poor-quality trees were taken out, and those with straight, clear boles were favored. The cut averaged 9 cords per acre; 16 cords per acre was left. (Courtesy of the Texas Forest Service.)

60.—Planted scotch pine belonging to the Champion Paper & Fibre Co., Canton, N. C.

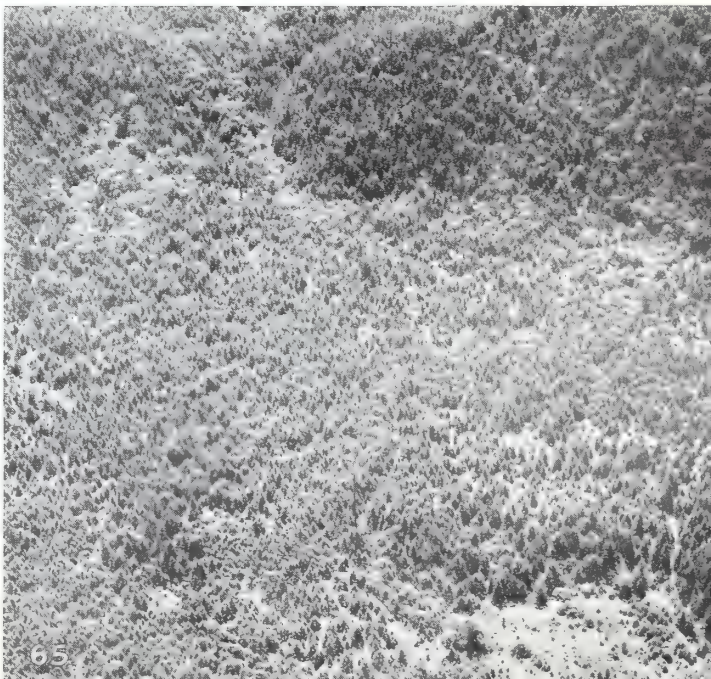
61.—W. O. Whittle, of Knoxville, Tenn., planted these white pines in 1928 on a worn-out cultivated mountainside field in the Great Smoky Mountains near Gatlinburg, Tenn. By 1936, when the photograph was taken, the fastest-growing trees had reached a height of 15 feet, and a real forest cover had become established. (Courtesy of Tennessee Valley Authority.)

62.—Logging operation on lands of the Westfork Logging Co., Mineral, Wash. The cable sky line (bare strip) goes to the railroad track in the lower part of the picture. The area to the left of the sky line was logged with high-lead donkeys. Tractors were used to swing the logs from the cold-deck piles over to the sky-line road, down which the logs were swung to the landing.

63.—Selective logging in Douglas fir-hemlock type in 1936 by the Westfork Logging Co., Mineral, Wash. This picture shows the stumps of Douglas fir trees that were cut and removed, and the residual stand. This type of cutting resulted in a greater gross and net profit than if the stand had been clear-cut.

64.—In the Douglas fir region of Washington, the Westfork Logging Co. is doing selective logging. The lighter-colored portion of the timber to the left of track and center spar tree was logged by using tractors. Approximately 30 percent of the stand was removed. An area of clear cutting shows in the background.

65.—An old cut-over area in Washington now well-stocked with new growth. The area is owned by the St. Paul & Tacoma Lumber Co. and is under organized fire protection.



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67 A

67 B

67 C

68 A

68 B

69 A

69 B

66.—Clear cutting in Douglas fir with seed-tree groups left uncut to seed the intervening areas.

67.—Logging practices of the Simpson Logging Co. on the Olympic Peninsula in Washington are shown: A, Satsop River operations. This area was logged by clear-cutting methods approximately 35 years ago. It is now fully stocked with natural reproduction up to 30 years old, mainly Douglas fir. B, Selective logging of a 300-year-old Douglas fir decadent stand. All hemlock has been left. C, Camp 3 operations showing staggered settings in background, seed trees and groups of young growth in middleground. Age of timber 250 years.

68.—The Weyerhaeuser Timber Co., Longview, Wash. A, In the background of the picture is a 40-acre permanent seed area. Across the railroad grade to the right are four additional seed areas of from 2 to 5 acres. In the center of the large cut-over area is a setting of mature timber which has stood 2 years since the surrounding area was logged. This is now being logged with crawler tractors. About 25 percent of the trees will be left to provide a permanent seed supply for the area around it. B, Fine stand of 15-year-old Douglas fir resulting from natural reforestation.

69.—A, The Crown Zellerbach Corporation selectively logged this land in the Clatskamie area, Washington, with tractors about 1933. All large Douglas fir and Sitka spruce was removed, leaving all western red cedar, western hemlock, and small Douglas fir. The cut totaled 25,000 to 30,000 board feet per acre, averaging approximately 35 to 40 percent of the total net volume. B, Tract in the Siltcoos Lake area, Oregon, selectively logged with tractors about 1933. Approximately 30,000 board feet, or 35 percent, was removed.

70.—Residual stand on pine lands cut over by the California Diamond Match Co. in 1938.

71.—Operation in Lassen County, Calif., by the Fruit Growers Supply Co. Logged over in 1929.

72.—Selective redwood logging with tractors on the Van Duzen River, Humboldt County, Calif., by the Hammond Redwood Co. A cut of about 100,000 board feet per acre was made, leaving about 60,000 board feet per acre.

73.—Selective logging in the redwoods, Mendocino County, Calif., by the Mendocino Lumber Co. A cut of about 40,000 board feet was made, leaving about 15,000 to 20,000 board feet per acre.

74.—An area in Idaho, stand 100 to 120 years old, selectively logged in 1936. Logging slash has been disposed of 100 percent. An average stand of 25,441 board feet per acre was left on the ground. Photographed in 1938.

75.—A railroad selective logging operation, Idaho. Note the residual stand in the background.

76.—In the pine operations of the Weyerhaeuser Timber Co. at Klamath Falls, Oreg., a careful inventory of the forest resources has been made to determine the lumber-grade expectancy. On the basis of this information, the logging is so planned as to remove the timber of highest present value and greatest susceptibility to pine beetle loss, and yet leave enough growing stock so that a return cut will be possible within a reasonable length of time. In logging the area pictured, an average of 14,000 board feet per acre was removed, leaving a reserve stand averaging 6,000 board feet per acre in trees 14 inches in diameter and over, plus a substantial understory of smaller growing stock.

77.—A, Stand of virgin timber in eastern Oregon which averages approximately 14,000 board feet per acre, owned by the Ochoco Timber Co. B, Same area after logging in 1938, approximately 11,000 board feet per acre having been cut and 3,000 board feet per acre left for a second cutting. The cut included approximately 10 merchantable trees per acre, and the stand left averages 7 merchantable trees per acre.

78.—Dense reproduction on lands logged over by the New Mexico Lumber & Timber Co. The largest trees are blackjack pines of 14 to 18 inches diameter at breast height. Approximately 7,000 board feet per acre was cut, and approximately 3,500 feet per acre gross volume was left.

79.—View taken along an 8-mile stretch of the Dallas–California highway south from Lava Butte. It shows reproduction on operations of the Shevlin Hixon Lumber Co. in eastern Oregon 12 to 15 years after cutting. Some areas show very little reproduction. Fires have been kept out. The size of the trees left varies according to the stand existing at the time of cutting. Some areas which were logged with tractors show a much heavier stand of trees up to 10 or 12 inches in diameter.

Forest Owners Are Finding That Good Practices Pay

PRODUCING timber as a crop, as illustrated in this publication, is a comparatively recent development in this country. Forty years ago this was not being done by anyone either as a public or private undertaking. About 1900 the practice of forestry was begun nationally with the establishment of national forests; at the same time the States became more active in setting up State forests. This had little or no influence, however, on private-forest practices at that time. Private owners continued to cut their timber with no thought of renewal.

Within the last 20 years a change in attitude toward forests and in the practice of treating timber as a crop has come about. During the last decade particularly the traditional attitudes have changed, rapidly in some regions and more slowly in others. Better forest-management practices have been most widely adopted by private landowners where conditions have offered the greatest promise of success.

Among the most important factors influencing the adoption of forestry and the degree of forest management practiced by private owners are:

(1) Conditions affecting the establishment of forest stands and their rate of growth, such as climatic and soil factors.

(2) Risk of loss by fire, storm, insects, and diseases.

(3) Carrying charges, including taxes.

(4) Markets and transportation facilities for forest products.

(5) Condition and amount of growing stock, species, and sizes of timber.

Forest land in the United States is owned by many individuals, companies, and corporations and for many different purposes. Sometimes it is just owned without purpose. On the basis of these purposes, private forest owners may be divided roughly into two general groups:

1. Owners whose main source of income is timber products. The owner may have an industrial plant, including sawmill, pulp mill, turpentine still, etc., for processing the raw product into a finished or semifinished commercial product. A forest owner is not necessarily, however, a processor of forest products. In fact quite commonly he is not. The owner may, on the other hand, sell his timber as a raw product to the processor as sawlogs, pulpwood, poles, piling, crude gum, or what not. He may sell it on the stump, leaving the cutting and transportation to the buyer. There are many variations in practice, depending on the desires of the owner and the operating customs, conditions, and limitations in the community.

2. Owners whose timber products are a collateral or subsidiary source of income. The farmer who owns timberlands is a member of this group. His income is derived mainly from farm crops including livestock, but many farms contain woodland which usually consists of land unsuitable for cultivated crops or pasture. Such land should, of course, be used to increase the general farm income. Many different classes of people other than farmers who derive their incomes mainly from other sources also own forest land. All are to some degree interested in obtaining income from such land. Unfortunately many do not manage their holdings for sustained income. Forest owners who are not dependent on the income from such land for immediate needs are in a particularly favorable position to build up the productive capacity of the forest and thus provide for a larger sustained future income.

The figures in the table on the following page show the condition of privately owned timberlands in the United States. In all regions among both groups are to be found owners who are following good management practices to some extent. Most of the pioneers who undertook forestry measures when the uncertainties were greater than they are today, are already reaping the reward of their foresight. Rarely is an owner found who regrets his investment of time and money in permanent forest production. Most such owners regret that they did not start sooner at least to protect and preserve their young immature timber.

Estimated Condition of Privately Owned Commercial Forest Lands in Continental United States in 1938

Item	*Acres*	*Percent*
Under intensive and extensive management (sustained yield)[1]	22,795,000	6.7
Under extensive management[2] (not sustained yield)	47,212,000	13.8
Total under management	70,007,000	20.5
Additional lands in at least partially productive condition[3]	212,726,000	62.4
Lands not in productive condition	58,176,000	17.1
Total privately owned commercial forest lands	340,909,000	100.0

[1] The term, as used in this table, means that the land is being so managed as to at least maintain production in sufficient quantity for commercial operation.

[2] Extensive management includes a satisfactory degree of fire protection and such cutting practices as are necessary to keep the land productive although production cannot be maintained at its current rate.

[3] Includes lands bearing stands either now or potentially valuable without special effort on the part of the owner other than fire protection.

Of the nearly 213 million acres indicated as at least partially productive, probably about two-thirds has fire protection, but is not under management. As yet there is no assurance that it will be placed under management and it should be noted that only 20.5 percent is under any form of management—varying from very good to mediocre.

Special recognition is due the owners of this 20 percent, who have largely during the past decade or two changed from a practice of forest liquidation to forest management and who in spite of many serious handicaps have pioneered in timber growing. But there is still a long way to go. There are 107 million acres of commercial forest lands needing but still without fire protection. Fifty-eight million acres (37 in nonfarm ownership) are poorly stocked or not stocked at all.

On millions of acres now bearing cordwood or second-growth stands the forests must be rehabilitated—the growing stock built up and the composition improved. And in the last analysis sustained-yield is the critical test of good forest management. It alone assures continuity of output, continuity of employment, and stable support for dependent communities and for forest regions. The problem confronting us as a nation is that of completing the change (already begun) from a philosophy and practice of liquidation to that of sustained production under management. The forest land owners and operators have the ability and resourcefulness to play a large part in this, and if the examples shown in this bulletin expedite this change they will have served their purpose.