FOREST-LAND OWNERSHIP RESPONSIBILITIES, COSTS, AND RETURNS

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OWNERSHIP RESPONSIBILITIES, COSTS, AND RETURNS

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RESPONSIBILITIES OF FOREST LAND OWNERSHIP

Forests, whether in public or private ownership, are a basic resource. Their treatment involves long-time national interests, and ownership must be considered to imply a responsible stewardship. No State or nation can prosper for long if it continues to deplete its forest and agricultural land resources. No matter how rich it may be in man power or mechanical ingenuity, a country which fails to maintain or to increase its output of the organic products from land must inevitably decline in prosperity or become more and more dependent on other countries for such prime necessities as food, clothing, and shelter. Continued productivity of the land. therefore, is essential to the general welfare.

Generally speaking, the land, as a source of wealth, must last as long as mankind remains on earth. A so-called owner, whether he be an individual, a corporation, or a public body, is only a temporary tenant. His ownership is on an altogether different basis from the ownership of commodities, which can practically always be replaced at will. His use or misuse of the land affects a wide circle of society, in many ways. It may also profoundly affect the welfare of posterity. Future generations have the same right as our own to receive their land heritage with its productive capacity unimpaired.

Land ownership, then, must be considered as a trust for the benefit of both the living and those who come after them. An owner may be entitled to make the fullest use of all the varied products of his land, but society may properly expect that its own interests in land productivity should not be reduced or destroyed. This is as true of forest land—which has very little prospect of being used productively for any other purpose than forestry—as it is of land producing annual

crops. The ownership of forest land carries with it an obligation to use the land productively, if society needs the products. If there is no immediate need for them, an owner is under an obligaton at least not to abuse the forest, but to leave it capable of yielding its products and services as soon as a need for them arises.

To use forest land wisely it must be developed. To hold it without developing it is to derive less than the full measure of service which it is capable of yielding. Development requires the expenditure of labor and money. Within reasonable limits, increases in expenditures for forestry can be expected to more than pay for themselves in increased returns. As in Europe in normal times, the largest net returns will be derived from those forests which are the most intensively managed.

Expenditures for the development of local transportation systems, if prudently made, will be more than repaid through the increased value of the timber and other resources thus opened up, as well as in the reduction of fire losses and costs of fighting fire. Silvicultural measures, such as the removal of diseased, misshapen, or otherwise inferior trees, thinning of crowded stands, and measures for reducing or preventing the ravages of insects or disease, will result in more valuable crops of timber. Planting up of denuded spaces in the forest, or replacement of inferior kinds of trees with better ones, will increase the yields in quantity as well as in quality and value. Expenditures for the development and administration of forage resources of the forest will not only be returned through increased receipts from grazing but they will help to prevent damage to the vegetative cover that might result in erosion and undesirable acceleration of stream flow. Investments in the development of game and recreation resources, if they do not bring in a direct cash return, will more than pay for themselves in increased public enjoyment of the forests. When the economic liabilities and social losses in unproductive lands are considered on the one hand, as against present and potential returns from well-managed forests on the other, the essential costs for proper management appear as a relatively low investment.

Forest-land management entails capital and current expenditures for some or all of the following:

1. Resource management of timber, forage, water, recreational values, and wild life.
2. Improvement of property through capital investments and current outlay.
3. Protection against fire, insects, tree diseases, trespass by man and animals, and poisonous weeds.

The attempt to arrive at prevailing and future costs of managing and protecting forest land discloses insufficient data on other than Federal forests. Detailed costs are available for the national forests covering a 20-year period, but only fragmentary data for forests in State and private ownership. For this reason the national-forest costs have been analyzed in detail. These costs may reasonably be assumed to represent costs on other large forest holdings where similar protection and management are to be applied. Also, existing national forests and proposed extensions constitute a large public enterprise warranting special analysis of present and proposed expenditures and appropriations.

The present costs given for national forests represent the costs of current forest practice sufficient to keep these lands productive and prepared for increasingly intensive management; the proposed costs approximate a higher standard of forestry practice than this, such as would produce something like a full timber crop.

NATIONAL-FOREST COSTS

The Federal Government in its management of the national forests recognizes the obligation of stewardship for these forest areas. Congress specifically establishes this responsibility in the act of 1897 which states:

> To improve and protect the forest—for the purpose of maintaining favorable conditions of water flows and to furnish a continuous supply of timber for the use and necessities of citizens of the United States.

Secretary Wilson announced the same principle in his policy letter to the Chief Forester of February 1, 1905, which states:

> In the administration of the forest reserves [called national forests since 1907], all land is to be devoted to its most productive use for the permanent good of the whole people. You will see to it that water, wood, and forage of the reserves are conserved and wisely used. * * *

In the following discussion the costs for managing and developing the national forests are considered on the broad principles laid down by Congress and Secretary Wilson for Federal responsibility in its assumption of responsible stewardship of these lands.

National ownership and management of forest lands must generally provide for multiple use wherein all the renewable resources are developed, improved, and utilized simultaneously. This form of management requires expenditures for all the major factors of cost enumerated above. Private ownership, on the other hand, more often has only a single purpose in the management of a forest property and needs to provide funds for the development and utilization of only one resource.

The national forests embrace about 161 million acres of land in 31 of the States and the Territory of Alaska. For the purposes of the present discussion the small area in Puerto Rico is omitted. These forests contain a variety of forest and related resources in different stages of development and of marketable value. They require treatment different in both character and intensity. The proper development of these resources significantly affects broad national interests, although tied in with local and regional needs. Because of these broad national aspects, all the national forests together may properly be considered as a single enterprise for the purpose of calculating both the costs and benefits of management, although a great spread in cost may exist between different units.

The simplest way in analyzing the items of cost and in making broad comparisons between present and proposed expenditures is to reduce all costs to a unit basis, the acre. This method has therefore been followed. In table 1 are shown, by major activities, the present and probable future per-acre costs for managing and developing the 161 million acres of national forests.

TABLE 1.—*Average costs per acre of the protection and management of the national forests, including Alaska*

Activity	Present cost	Estimated future cost
Protection:		
Current administration and capital investment:	*Cents*	*Cents*
Fire [1]	3.374	4.218
Insects	.070	.125
Disease	.172	.193
Timber management:		
Current administration	.720	.856
Capital investment:		
Stand betterment	.084	.954
Planting	.019	.131
Grazing:		
Current administration	.705	.742
Capital investment	.200	.443
Recreation:		
Uses, administration	.178	.184
Wild life, administration	.090	.185
Capital investment	.077	.174
Lands: Administration	.401	.441
Improvements: Capital investment	.865	1.872
Undistributed overhead	.124	.124
Total	7.079	10.642

[1] These fire costs differ from those given in the section, Protection against fire, since the latter are spread over only the 95 million acres of national forests requiring special provision and expenditure for protection, whereas in this table the total costs are spread over the entire national-forest property. Fire costs per acre on only the 95 million acres protected are 5.72 cents for present expenditures and 6.853 cents for proposed.

Programs of different time intervals have been set up for completion of essential capital investments and increases in current expenditures, depending on the resource, the necessity for completing the jobs to prevent losses, trends in prospective resource requirements, and the magnitude of the task. For example, planting work must be planned a long time ahead; the job is big; therefore expenditures have been figured on a 20-year program. Immediate capital investments to hasten better practice where important values are jeopardized are set up in a short 5-year program, whereas large scale improvements have been set up in 10-year programs. The calculations were made as follows:

The usual accounting procedure of segregating current expenditures from capital investment charges was followed. The current costs represent the usual annual recurring expenditures for protection, resource management, and maintenance of existing improvements. They include such items as salaries, wages, and expenses of personnel and labor employed in protection, resource management, and maintenance of improvements, roads, and trails. The total annual current expenditure for any activity divided by 161 million acres, gives the per-acre cost for current administration of that activity for the national forests.

A different procedure was followed in calculating the annual cost per acre for capital investments. The total current expenditure for any capital investment does not represent the annual carrying charge. To arrive at the correct figure, it was first necessary to sum up the total money spent for each capital investment under each activity. The next step was to depreciate or write off the sum expended, converting this figure to a total annual carrying charge. Interest was not included. This total divided by 161 million acres, gives the annual per acre carrying cost for capital investments. The depreciation and write-off periods used were based on the best

data available as to the probable life of improvements or the time at which a given cultural job will no longer be repeated on a given area. For example, the construction costs of roads and trails were depreciated in 40 years, giving a 2.5 percent annual carrying charge. In this instance, the rate of depreciation is rather high, because with another charge already included for maintenance, roads may be expected to give service longer than 40 years. Buildings, depending on kind, were depreciated in 15 to 20 years, which gave an annual carrying charge of 6.7 and 5 percent.

Stand betterment, planting, and other cultural operations were written off in a 100-year period, representing the average long rotation likely to be used on the national forests, or at the rate of 1 percent per year. Since in Federal finances an amortization or sinking fund is not usually employed, the write-off and depreciation method was substituted, to ascertain the actual costs of a given activity.

The present and proposed average cost per acre for the existing national-forest system merely represents the average for 161 million acres. Costs for a single national forest unit may vary considerably from this figure, depending on the number of activities administered and the intensity of present management and development. For example, nearly 83 million acres of the 161 million acres in the national forests are grazed by livestock, and if the grazing costs are charged directly to this acreage and not to the entire property, the present per-acre grazing cost is 1.76 cents instead of 0.90 cents. Similarly the total acreage on which timber sales are now made or likely to be carried on during the next 40 years is about 50 million acres or only 31 per cent of the gross area. Present timber-sales cost on the total area is 0.823 cent per acre, but, if based on the 50 million acres, would be 2.650 cents.

The wide spread that may appear between costs for different national forests is illustrated in table 2, where costs for actual acreage covered are given for four typical units representing different combinations of resources. Present costs vary from 6.6 cents per acre in a unit with a predominant grazing resource to 19.3 cents per acre, where heavy utilization is being made of many resources.

TABLE 2.—*Average costs per acre of resource management and fire protection on representative national forests*

Character of use	Activity	Present cost	Estimated future cost
		Cents	*Cents*
Varied multiple use	Resource management	9.653	15.955
	Fire	9.660	10.774
		19.313	26.729
Timber predominating, no grazing business	Resource management	6.033	14.642
	Fire	6.490	7.290
		12.523	21.932
Grazing predominating, no timber business	Resource management	4.953	8.099
	Fire	1.660	1.600
		6.613	9.699
Predominate watershed and recreation, no timber and no grazing business.	Resource management	4.830	6.195
	Fire	7.160	9.483
		11.990	15.678

The timbered forests, where active business is now carried on, have generally the highest cost, both in fire control and resource management, and correspondingly yield the greater revenue. The lower costs are found on the units where grazing is the major resource, and both resource management and fire control require minimum expenditures.

The per-acre costs cited above are based upon the total national-forest area of the United States (Puerto Rico excluded). If the Alaskan forests be excluded, as their alienation from many of the economic and environmental conditions that affects costs in the national forests of the States might warrant, the per-acre costs will be somewhat higher, as shown in table 3. These higher costs are somewhat more appropriate for estimating costs that may be involved in future additions to national forests in the States and for State forests.

TABLE 3.—*Summary of present and proposed expenditures per acre for national forests in 31 States only*

Activity	Present cost	Estimated future cost	Activity	Present cost	Estimated future cost
	Cents	*Cents*		*Cents*	*Cents*
Protection	4.159	5.215	Improvements	0.989	2.153
Timber management	.914	2.205	Undistributed overhead	.143	.143
Grazing	1.034	1.349			
Recreation	.408	.564	Total	8.106	12.221
Lands	.459	.592			

ELEMENTS OF COST AND REASONS FOR NEEDED INCREASE

In the management of forest lands as with any other property, a balance must be struck between expenditures and returns. Frequently inadequate expenditures will fail to show any returns while a very slight increase in costs may turn an unprofitable venture into a good paying investment. The maximum returns from forest lands require definite plans for sufficient current expenditures and outlays for capital investment to insure future income. In the administration of the national forests, returns and public benefits are of two kinds—those directly salable and producing revenues and others, as for example watershed protection, which add to the general public welfare but for which no service charges are made. Expenditures on the national forests have been progressively increased in the past few years. Further increases are urgently needed if the property is to be built up to its potential possibilities in returns and public benefits.

The increases in expenditures suggested for the national forests are discussed in some detail, to indicate why such expenditures are warranted in a national enterprise of this character. This discussion, however, may also be helpful in appraising costs that other owners of forest land may have to make to secure maximum returns from forest-land management. The elements of cost for each major activity are therefore briefly summarized.

PROTECTION AGAINST FIRE

The need for increasing the average per-acre expenditure for protection against fire is fully discussed in the section "Protection Against Fire." Briefly, adequate fire control is the first essential step in

forestry and, like all other objectives in any positive form of management, will not be reached without providing additional finances. While the fire problem has been successfully met on many national forests which require but little additional expenditures, there still remain 30 million acres in the national forests where the situation is critical and intensified protection effort is of paramount importance. These areas represent the most accessible timber-growing sites, the most valuable watersheds, and the most intensively used recreational forests. On the present scale of protection these areas will retrograde, but adequate funds can reverse the process.

PROTECTION AGAINST INSECTS

Protection against forest insects, as pointed out in other sections of this report, must be provided not only for the normal year but also for the years when attack becomes abnormally high. The proposed expenditure for insect control is raised from 0.07 to 0.125 cent per acre and is largely to be devoted to handling bark-beetle attacks in the most valuable pine stands. A proposed $200,000 annual expenditure doubles the present allotment for this work and will be merely sufficient to hold in check the building up of epidemic attacks in the commercial timber belts of ponderosa, sugar, white, and southern pines, and lodgepole pine on the national forests. Further increases will be needed if the less valuable stands of lodgepole pine are to be protected or if endemic losses in any valuable species are to be entirely curbed. Unusual epidemics are not predictable, but when they do occur, control work must be handled with dispatch. No provision is made in these calculations for the control of abnormally high epidemics of bark beetles or for serious attacks by new insect pests or for insects whose work is only occasionally very destructive. Protection against insects is set up as current annual charge.

PROTECTION AGAINST TREE DISEASES

Few tree fungous diseases are specifically treated in the national forests at present but these are partially controlled as a result of other activities. Disease induced by indigenous fungi generally spreads in a forest stand after a fire and can be partially checked as fires are successfully excluded by adequate protection. Cutting under silvicultural methods and consequent stand betterment remove diseased trees and thus reduce sources of further infection. These costs are included under fire protection and timber management, but do not appear in protection against disease. As sound silvicultural treatment proceeds, each rotation should as a general rule find stands in healthier condition and a checking of disease may be possible. For example, in some of the western virgin stands the first cutting shows averages of 10 to 25 percent cull, while in the second cut the cull will be reduced to only 5 percent.

It is otherwise, however, with exotic fungi. These once transplanted in a new environment, on a new host, may almost completely exterminate a species. And this, in fact, is happening with the chestnut in the East. In the West, the white-pine blister rust, a virulent and destructive disease of the five-needle pines, is reducing the valuable white and sugar pine in both quantity and quality and may eliminate

them as a species of commercial importance. Fortunately the blister rust, because of its double host, offers an opportunity to protect the pines through the removal of one host (Ribes). In the light of European experience with intensive forestry, systematic forest management brings on its own disease problems, more or less different from those of our virgin or culled forests, but which will nevertheless require measures of control. These are not provided for in the calculation.

The proposed increase raises the present per-acre expenditure from 0.172 to 0.193 cents (table 1), devoted mainly to the control of the blister rust. A total sum of $2,000,000 a year for 5 years will safeguard the white and sugar pine from extermination but on 3 million acres only. It will leave exposed about 10 million acres on which 5-needle pines make up a small portion of the total stand, and which can be replaced by other species now found in mixture.

The proposed cost has been calculated as follows: The total $10,000,000 needed for eradication is considered as a capital investment to salvage and perpetuate the white and sugar pine on selected and important commercial areas. This sum has been charged off for an entire rotation or at the rate of 1 percent per year, giving an annual carrying charge of $100,000. In addition 7 cents per acre per year will have to be spent on the 3 million acres treated to prevent reinvasion of ribes, which will cost $210,000 per year. Therefore, $310,000 is the annual carrying charge.

TIMBER MANAGEMENT

It is estimated that timber sales will be made on about 50 million acres in the national forests of the United States and this area will require definite silvicultural management for timber production during the next half century, the remaining area for the present needing only to be given adequate protection against fire. Timber management requires a group of technicians to prepare management plans, determine sale policies, administer sales, and carry out silvicultural work and stand betterment. Provision must be made for current jobs as well as for development and preparation for future sales.

The proposed expenditures for current business in timber management are estimated at 0.856 cents per acre, an increase of 0.136 cents over present cost (table 1). This is to take care of the administration of sales of timber, which will progressively increase in amount during the next 20 years. This increase in expenditure need not be made in one step, but annually, as anticipated increased business actually materializes. It is expected to involve finally an increase of $215,000 annually.

Stand betterment is being effected at present largely in the course of regular timber sales. Since the national forests were established, timber sales have been made on about 1,874,000 acres of land on which area betterment and improvement of the stand was possible. In the next 40 years it is estimated that about 8,500,000 acres of national-forest land will probably be cut over, which also will require silvicultural treatment in connection with sales. On national-forest timber sales we start with virgin forests or culled stands which are not producing up to their capacity and the silvicultural task is to increase volume or quality growth in the next rotation. The cost of doing this

work is now allowed for in fixing the sale price of the stumpage; no Federal cash expenditures are involved and no appropriations are needed. To show actual costs, these additional expenditures have been included in the calculations and charged off at 1 percent per year, or as a capital investment in the land on a 100-year rotation. Since the cutting on national forests will be materially larger in the future, the cost for stand betterment in the course of selling and cutting stumpage has been likewise increased; but this will not involve any cash outlay, as it will be taken out of the sale price of stumpage.

Many stands not in current timber sales need work that can profitably be done and should be provided for. Thinnings of crowded stands, girdling and removal of weed trees, elimination of hazards and many other cultural improvements have all an important place in forestry. Frequently such cultural operations will pay for themselves currently. In many places, particularly in the eastern forests, outlays for such work, even where no immediate returns are possible, will pay big dividends in increased growth and quality increment of the stand. Practically no expenditures are now incurred for such activity. Recent preliminary estimates of the national forests show that about 2 million acres can immediately be given cultured treatment at an estimated cost of about $4,000,000. Detailed surveys will undoubtedly reveal large additional acreages on which similar cultural operations can profitably be made. This investment, amortized and spread over the entire 161 million acres, would amount to about 0.248 cents per acre, and is considered as a capital investment. In the East such treatment has been already initiated profitably by a number of private timberland owners.

A mere start has been made in planting on the national forests. To bring unproductive lands into use and to provide additional needed growth on sustained-yield units, 2,100,000 acres should be planted during the next 10 or 20 years. The work will cost about $10 per acre on the average, and will involve a total expenditure of about $21,000,000. The cost for this work is charged off at the rate of 1 percent a year, and is considered as capital investment in the land itself. Annual appropriations in the past few years have averaged about $210,000, but to meet present needs five times this schedule is a minimum requirement. The proposed cost per acre will be about 0.131 cents as against 0.019 cents at present, which represents the amortized cost of planting work to date (table 1). This estimate applies solely to existing national forests. Planting costs on possible extensions of national forests is included in a later discussion.

GRAZING

Forage is an important and salable resource on 83 million of the 161 million acres in the national forests. When well regulated and managed, the grazing of domestic livestock makes feasible the harvesting of an annual crop which would otherwise go to waste; it frequently reduces the fire danger by cropping inflammable fuel, and thus lowers the cost of fire control. When properly controlled it adds a fair annual income to a forest property without jeopardizing other values in timber, watersheds, or recreation. This comparatively cheap forage maintains an important industry, adds value to dependent farms and grazing lands outside of the national forests,

and is the basis of the production of low-priced beef, mutton, and wool. Present current administration costs are 0.705 cent per acre, spread over the entire national-forest system. An increase of $50,000 is needed annually, making the proposed rate 0.742 cent per acre. This annual increase is particularly needed for additional personnel to perfect and put into operation better range management plans so as to insure progressive improvement of the resource, solve vexing problems existing on many national-forest units, and secure proper utilization consistent with the safeguarding of other resources. In addition, there is urgent need for capital investment for range improvements, so that present range resources in themselves can be permanently safeguarded against abuse and that new areas may be developed for extending the grazing business. Capital investment charges in such range improvements will have to be advanced from 0.2 cent to 0.443 cent per acre. Proposed annual expenditures will provide for the following essentials on the basis of a 10-year program:

1. Range improvements—development of water and fences: $150,000 for capital investments and approximately $30,000 for maintenance.
2. Poisonous plant eradication—initial and follow-up work covering 100,000 acres on badly infested valuable range: $50,000 the first year, up to $500,000 in the tenth year.
3. Rodent control on 5 million acres, where permanent damage will ensue unless action is soon taken—initial and follow-up work: $50,000 in the first year, up to $68,000 in the tenth year.
4. Revegetation of 810,000 acres of depleted ranges, which will require $2,500,000 expenditure in a 20-year program.

RECREATION

In other sections of this report the importance of recreation and the necessity for providing increased facilities have been discussed. In every forest region recreation is becoming a pressing problem, and there is every indication that it will as time passes be greatly aggravated and accentuated. Present per-acre costs are 0.178 cent for general administration, 0.090 cent for wild-life management, and 0.077 cent for capital investment for essential improvements (table 1). The proposed expenditures are but slightly increased, involving costs, respectively, of 0.184, 0.185, and 0.174 cent per acre. In contrast to other activities, recreational use occurs on practically every national forest. The total increases needed for an indefinite period are: For administration, $100,000 annually; for wild-life management, $153,000 annually. For capital investment, a total of $2,250,000 is needed, available at the rate of $450,000 annually for a 5-year period. Estimates for wild-life management presupposes that forest officers will continue to act as agents of the State; but under complete Forest Service management, including intensive control of hunting, the costs would average from 1 to 2 cents more per acre.

LANDS

This activity involves the tasks that go with the acquisition of lands, surveying boundaries, and the management of all commercial

special uses. Proposed per-acre costs are 0.04 cent higher than present costs, involving an increase of $64,000 in the annual appropriations for this activity for an indeterminate period. These costs do not provide for additional work under any enlarged program of acquisition. If any plan for extensive purchase of lands for national forests is undertaken, additional appropriations will be needed for the current item considered above.

IMPROVEMENTS

This item includes expenditures for general miscellaneous improvements, development roads, trails, and such parts of forest highway appropriations as are chargeable directly to the development of the national forests. Roads, trails, buildings, telephone lines, pastures, and other physical improvements are the tools for adequate administration, sound development, and proper utilization of the numerous forest resources. Good transportation systems on a national forest will give opportunity for closer administration, for increasing sales of mature timber, for better cultural treatment, and for the better disposal of unused forage and other products or services. Expenditures for stream improvement either to control erosion or to facilitate transportation of forest products are not included.

In the proposed increase over present expenditures for improvements of 1.017 cents per acre, miscellaneous improvements are depreciated at 10 to 20 years and roads and trails at 40 years. Appropriations in the past for the development of roads, trails, miscellaneous improvements, and forest highways have varied considerably in amount, because of special unemployment relief funds made available for these purposes. The program recommended for this work will insure the completion of the essential transportation, communication, and physical improvement systems as far as can now be foreseen. The new annual appropriations recommended are:

Development roads (to continue for 10 years)	$1, 500, 000
Trails (to continue for 10 years)	40, 000
Miscellaneous improvements (to continue for 5 years)	300, 000
Forest highways (to continue for 10 years)	3, 300, 000

Only part of the forest highway expenditures contribute directly to forest development, a part is for community service in the States where the national forests are located.

SUMMARY OF NEEDED INCREASES FOR PRESENT AREAS

A summary of additional needs over and above present appropriations to cover an immediate program for the existing national forests is given below. These appropriations are annual and continuing unless otherwise shown.

Protection:	
Fire—roads and trails (for 10 years)[1]	$3, 700, 000
Improvements (for 5 years)	780, 0000
Man power (progressively from $80,000 in 1933 to $625,000 and to continue at that rate annually)	625, 000
Insects	100, 000
Disease (5-year program)[2]	1, 700, 000

[1] Fire roads and trails. The amount is the new annual total recommended.

[2] The amount needed annually is $2,000,000 from which has been deducted an average expenditure of $300,000.

Timber management:	
Current general administration	$215,000
Stand betterment	1,000,000
Planting (20-year program)[3]	840,000
Grazing management:	
Current general administration	50,000
Capital investments (10-year program):	
Range improvements [4]	180,000
Poisonous plant eradication (progressively from $50,000 to $500,000)	500,000
Rodent control (progressively from $50,000 to $68,000)	68,000
Artificial reseeding of depleted ranges (20-year program)	125,000
Recreation:	
Current general administration	100,000
Capital investment (5-year program)	450,000
Wild life—current administration	153,000
Lands: Current general administration	64,000
Improvements:	
Development roads (10-year program)[5]	1,500,000
Trails (10 year program)[5]	40,000
Miscellaneous improvements (5-year program)	300,000
Forest highways	3,300,000

SEGREGATION OF CAPITAL-INVESTMENT AND CURRENT-CHARGE INCREASES

Forestry, from its very nature as a long-time enterprise, requires heavy initial expenditures in capital investments to put the property into shape for producing continuous and sustained incomes. In timber production, for example, a proper distribution of growing stock must be attained so that continuous cropping can be assured, which can contribute amply towards all current expenditures.

Both the western national forests, which in the main are the remnants left after the best timber both in quality and accessibility had been privately acquired, and the eastern national forests, which are largely made up of culled-over forests, poorly stocked cut-over areas, and only partially productive lands, are producing only a small fraction of their potential capacity in income and in other public benefits. The greater portion of expenditures up to the present time has therefore been devoted to capital investments, for improvements and better protection of these forests. These appropriations, both for capital investment and current administrative needs, have been progressively increased, but they still fall considerably short of what must be spent to bring the property to something approaching its full potential capacity for returns.

In considering costs, it is important, particularly in the initial stages when a forest property is being converted from a poor income producer to a sustained-yield producer, to distinguish between capital investments and current administrative charges. Ordinarily current administration and protection charges will be covered by income even on a poor forest; but expenditures for capital investments must be recognized and accepted as an investment to insure future returns and income.

For the purpose of illustrating and analyzing these two distinct classes of costs, the national-forest appropriations for the fiscal year 1933 have been segregated between capital investments and current charges.

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[3] The amount needed annual is $1,050,000 from which $210,000 now appropriated has been deducted.
[4] This excludes outlay now made in the form of contributed time by forest officers.
[5] Development roads and trails. The amount here given is the new annual total recommended.

Only the items that apply directly to national forests have been included; items that cover other functional services of the Forest Service, as for example State aid, extension, and general research, have been omitted. The costs broadly segregated are:

Capital investments	$12,036,689
Current charges	7,384,275
Total	19,420,964

This capital investment charge includes an item of $5,905,000 appropriated for forest highways, part of which only is of immediate and direct value to national-forest administration. Forest-highway appropriations are made under special acts of Congress to provide for public travel between communities and towns within or adjacent to the national forests and tying in with transcontinental highway systems. The appropriation in 1933 provides about 4.5 cents per acre for current administration and protection. An analysis of the summary of additional needs on page 1313 in comparison with appropriations for the fiscal year 1933 may illustrate further the differences between current charges and capital investment.

The average annual increases in current charges up to the end of the tenth year as the proposed program is put into effect will consist of the following:

Protection	$725,000
Timber management	215,000
Grazing management	50,000
Recreation management	253,000
Lands management	64,000
Total	1,307,000

This total, added to the present appropriations of $7,384,275, would give an average annual expenditure for current work of $8,691,275.

To get a better comparison of capital investment as included in the fiscal year 1933 appropriation and the proposed amounts, the forest highway appropriation is excluded, since unlike the other items, it has another special service feature and is not solely a direct expenditure for protection and improvements on the national forests. The fiscal year 1933 appropriations show a capital investment expenditure minus the forest highway item of $6,131,689. The increases needed, exclusive of that for forest highways, is estimated at $4,953,000 for the tenth year, making a proposed total capital investment during that year of $11,084,689. This sum of course will progressively and steadily decrease as each step in the program is completed. After the tenth year the total amount needed for capital investment, excluding forest highways, will be $4,465,000.

Briefly summarized a comparison of present and proposed appropriations are as follows:

	Fiscal year 1933	Proposed average annual appropriations
Current charges	$7,384,275	$8,691,275
Capital investment (minus forest highways)	6,131,689	11,084,689
Forest highways	5,905,000	[1] 3,300,000
	19,420,964	23,075,964

[1] Estimated share of total forest highway appropriation chargeable directly to national forests.

The apparently large increase in capital investment is, in the light of the information given in other sections of the report, well justified, if the national forests are to be brought up to their full productive capacity for future returns and public benefits.

COSTS OF MANAGEMENT AND PROTECTION ON NEW NATIONAL-FOREST UNITS

A program of acquisition has been set up in the section, The Probable Future Distribution of Forest Land Ownership, which provides for the addition of 134.2 million acres to the present national-forest system. Acquisition costs of the land itself are treated elsewhere. Here it is intended only to consider, in brief summary, the costs for management and protection of the new units, excluding outlays for land purchase.

On the basis of present knowledge, it is reasonable to assume that the per-acre cost for management and protection on the new units, after the purchase program is entirely completed, will be approximately identical with the figures recommended for existing national forests. But these costs will not be approached until a 20-year period has passed, when all of the basic investments are completed and protection effort is confined solely to Federal lands. Immediate costs and those for the next 5 years depend on many factors, including the rapidity of acquisition and the concentration of purchase areas. The acquisition program proposes an annual addition to the national forest of 5,355,000 acres in the East and 1,355,000 acres in the West. In the West these additions in the main are already within or reasonably adjacent to existing national forests. This fact has a material bearing on the amount of money which must be immediately expended for protection and administration of new units. Capital investments especially for protection on existing national forests, contribute considerable value to the intermingled and adjacent private lands, which are to be acquired, and hence, in part such investments will not have to be duplicated. The per-acre costs as well as per-acre appropriations for management and protection on proposed western additions will, therefore, immediately more nearly approach those on present established forests.

In the East on the other hand a more difficult problem is presented. Present national forests totaling more than 7 million acres and spread over 19 States form but a fraction of the final national-forest system proposed. Many of the units, particularly those acquired in the first 5 years, will be in new territory, distant from existing forests. The proposed annual purchase of 5,355,000 acres in the East cannot logically be concentrated in a few units. If the total area set up in the acquisition program is to be completed within a 20-year period, even if sizeable purchases can be made, these will have to be spread over many States according to need for meeting whatever exceedingly critical situations of national import may exist. In the first 5 years or so of acquisition the result will undoubtedly be skeletonized national forests, in which Federal ownership will be scattered through and intermingled with a large percentage of privately owned land, later to be acquired. Later acquisition will round out the property and will permit concentration of effort. Until this is done, particularly in eastern purchase units, appropriations must provide for capital investments and fire protection for areas that approximate the final

size of the unit rather than for the fraction acquired. This means that if 5 million acres are purchased in one year, protection must be given to an area nearly twice its size, first to safeguard the acquired land from encroaching fires, and then to prevent deterioration of values on land subsequently to be purchased. Likewise capital investments in improvements cannot be confined solely to the lands purchased, but must of necessity go through intermingled and adjacent forest property.

There are other reasons for advancing expenditures for capital investments with great rapidity on new purchase units. Time is an essential factor in the national-forest program. Every acre immediately placed in productive condition, whether for timber growth to build up the national growing stock or for improvement of watershed, will the more promptly return income and public benefits. Delay, on the contrary, does not merely mean a deferred program. In the process of delaying protection and proper management, the forest property which is to come under public management is likely to depreciate and deteriorate from neglect and abuse and the ultimate costs to the public will be correspondingly higher. It is therefore important to provide adequately for expenditures required in capital investments and at least extend protection to the areas surrounding the land already purchased and ultimately to be acquired. Table 4 gives approximately the area which is recommended for acquisition and the appropriations needed for capital investments and current administration for the first 5 years of the acquisition program.

The following method was used in the calculations involved in table 4:

For the East: Capital investments needed are approximately $2 per acre, or for the entire area to be acquired $214,200,000. As explained before, the rate of construction must be planned in excess of the area purchased in any given year. It has been assumed that in the first year 1 percent of the total needed in capital investment will be made, 3 per cent of the total in the second year, 4 percent in the third year, 6 percent in the fourth year, 8 percent the fifth and sixth years, and thereafter at the rate of 10 percent per year until the capital investment needed for the entire plant is completed. Direct current expenditures for protection are estimated at 5 cents an acre, but protection must be applied to about twice the area actually purchased in any one year until the entire acquisition program is completed. Current administration, outside of protection, is estimated at approximately 5.6 cents per acre for the areas actually purchased, with, of course, no allowance for privately owned adjacent areas.

For the West: Capital investment per acre, as has been seen, will not be as large as in the East, amounting to about $1 per acre, or a total of $27,100,000 for the entire acquisition program. In the West it is suggested that appropriations for capital investments be made at the rate of 5 percent of the total the first year, increasing 5 percent each year including the fifth year, 10 percent the sixth and seventh years, and 5 percent the eighth year. Protection in the West need only be applied to the areas actually purchased. The current cost of protection and administration, which need be applied only to the area purchased each year, is estimated at 10 cents per acre.

TABLE 4.—*Cost for first 5 years of maintaining acquisition program, capital investment (exclusive of land), and current expense* [1]

Region and item	First year	Second year	Third year	Fourth year	Fifth year
Eastern purchases:					
Capital investment	[2] $2,142,000	$6,426,000	$8,568,000	$12,852,000	$17,136,000
Current expenses:					
Protection	535,500	1,071,000	1,606,500	2,142,000	2,677,500
Administration	299,880	599,760	899,640	1,199,520	1,499,400
Total	2,977,380	8,096,760	11,074,140	16,193,520	21,312,900
Western purchases:					
Capital investment	1,355,000	2,710,000	4,065,000	5,420,000	6,775,000
Current expenses:					
Protection	67,750	135,500	203,250	271,000	338,750
Administration	67,750	135,500	203,250	271,000	338,750
Total	1,490,500	2,981,000	4,471,500	5,962,000	7,452,500
Total annual expenditures	4,467,880	11,077,760	15,545,640	22,155,520	28,765,400

[1] 5 percent of total area acquired each year. Eastern program, 107,000,000 acres; capital investment, $2 an acre; protection (double acquired area), 5 cents an acre; administration, 5.6 cents per acre acquired. Western program, 27,000,000 acres; capital investment, $1 an acre; protection, 5 cents an acre (land adjacent to national-forest land); administration, 5 cents per acre acquired.

[2] Capital investment includes planting costs.

STATE FOREST COSTS

As more of the States enter into the venture of acquiring forest lands with the purpose in mind of permanent management, they will undoubtedly assume the full obligation of responsible stewardship and the costs that go with it. Otherwise, no particular reason exists for the creation of a State forest system.

No detailed data are available for analysis of present costs of State forests. Their management and development will undoubtedly follow closely those worked out in national-forest experience, where provision is made for the protection, development, and utilization of all the resources as local exigencies dictate. Multiple-purpose management will feature the State forest as it has the national forest, with here and there one resource singled out as dominant—particularly watersheds and recreation. In the case of watershed forests, all other uses may be considered of secondary importance and sometimes restricted or excluded entirely. Where recreational demands are high, some of the State forests (as has already occurred) may be set aside for exclusive use as State parks. But in the main, if multiple-purpose management is skillfully carried out, all of the resources in State forests can be equally utilized or enjoyed.

The public benefits involved in stream-flow regulation or erosion control may not produce direct revenues, but they will promote the economic welfare, and are one of the chief reasons for the creation of State and national forests. Costs for the development and management of public forests, whether in State or national ownership, will probably be about the same, and the costs estimated for the national forests can be applied safely to the State forests. It was estimated in the first part of this section that State forests may reach a total area of approximately 100 million acres—and States must be prepared, if management is to be applied, to spend about 12 cents per acre for protection and administration and to make a total capital investment

of $2 per acre. Costs of acquisition will vary and will involve an average expenditure of about $2.75 per acre for all lands to be acquired, including those obtained through tax delinquency.

COSTS OF PRIVATE FOREST MANAGEMENT

Only meager data are available for estimating the costs of handling forest lands held at present in private ownership. Forests in farm woodlands are held incidentally in conjunction with farm land under crops and, excepting for taxes, ordinarily carry no financial burdens. On many farm woods, however, a reasonable expenditure per acre should bring a greater and more continuous return, making the woodland a source of sustaining reveune to the farmer and possibly converting an otherwise unprofitable farm into a profitable venture.

Conscious effort in the direction of a continuous and sustained cropping of timber is made today on only a mere fraction of the total forest land held in private ownership. The great bulk of the privately owned virgin and even second-growth forest, as reported in other sections of this inquiry, is being rapidly exploited under pressure for immediate liquidation. Only in a few favored sections is there sufficient interest among private owners to invest in forest lands as a long-term enterprise. To practice forestry, whether by private or public endeavor, requires immediate and continuous investments if future continuous returns are to be insured. Rapid exploitation or liquidation is incompatible with the long-term rotations demanded in forest management and with the nonrevenue-producing periods which must pass while depreciated areas are converted to productive forests.

The costs that the private owner must consider in any intensive system of forestry are as follows: Taxes, carrying charges, protection (fire, insects, disease), silvicultural practice, stand betterment, planting. In contrast to the public owner, he need make no investment for nonrevenue-producing public benefits such as recreation, although in some parts of the East, where hunting privileges can be leased, costs for game management may be justified.

The possibilities for private ownership and management of forest lands are discussed in other sections of this report. The costs for private forestry must be determined for each property under one individual ownership and general or average figures can be indicative only. Where the convertible cash values on a forest have been largely removed and a long period must expire before current incomes become available, private ownership may not be attracted, even by the prospect of large profits, if too long deferred. On the other hand, where a property produces a steady current income, private enterprise may be attracted to make the necessary investments in silvicultural treatment, fire protection, and capital investments, because the current income can be made to carry expenditures. Some of the more recent logging and milling studies show that what appears at first hand as added expenditures for silvicultural treatment of a forest may be in reality a blessing in disguise. Case after case has been investigated where such treatment not only gives higher current returns but offers the best opportunity for fully and adequately depreciating heavy capital investments.

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Illustrative costs for forestry under private ownership are given in table 5. These figures are based on present costs on national forests and other available data but cannot be safely applied to any one individual operation, although they may represent fair averages for very large properties.

TABLE 5.—*Representative costs for intensive private forestry, in cents per acre per year* [1]

Type	Taxes	Other charges	Protection		Timber management			Total
			Fire	Insects and disease	Cutting	Stand betterment	Planting	
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Spruce-fir hardwood	25	2	2.5	0.2	4.5	13	2.5	49.7
Eastern white pine	60	2	5	10	15	17	4	113
Western white pine	40	2	12	11	12	1	3	81
Ponderosa pine (California)	40	2	8.5	2	10	1	2	65.5
Longleaf [2]	20	2	7	----	3	4	1	37
Central hardwoods	25	2	6	----	3	3	2	41
Douglas fir (Pacific coast)	50	2	8	----	3	1	1	65

[1] These are generalized costs for forest properties, in which at least half of the stand is assumed in either virgin forests or in merchantable stands. Silvicultural cutting charges, stand betterment, and planting charged off at 1 percent per year—as a capital investment.

[2] Typical second-growth turpentine forest in the South.

THE POSSIBLE RETURNS FROM MANAGED FOREST LANDS

SOURCES OF RETURNS FROM FOREST PROPERTIES

Timber, whether in the virgin forest, or grown as a crop tended by man, has always been considered the principal source of revenue to an owner of forest property. Such secondary crops as turpentine, forage, game, and recreational values, have, however, under favorable conditions, produced greater incomes than the timber crop itself. Indeed in many places the timber has been maintained solely to perpetuate and increase these auxiliary forest values.

Under ideal conditions, and through multiple-use management, all the resources of the forest are husbanded and developed for use and for revenue. Even where the major returns in income must come from the timber crop, the sale of other products often furnishes sufficient funds to pay a great share of the current operating expense. Therefore good forest management must give consideration to all uses as possible sources of revenue and as lightening the burden of carrying a long-time timber crop. In the United States many of these tangible values of forest lands, regardless of ownership, have not been exploited. In some instances, markets have not been sufficiently developed to provide sources of revenue, in other cases unrestricted free public use has been permitted by custom and tradition.

There is, however, another important group of forest values which to date are not marketable and yet which contribute benefits to special groups and the general public. Among these, watershed protection, as it affects water supplies and water power, is the most important. Recreational use of the forest, likewise, is for large parts of the country a nonrevenue-producing resource. If the forest is in public ownership, the general taxpayer pays for these nonrevenue-producing

values; and if it is in private ownership, the owner is the public benefactor. The possibility of realizing returns from these less tangible forest values will be considered later on.

Forest properties held especially for timber, either as virgin forest, second growth, or artificially grown stands, have so far in the United States appeared unattractive as sustained revenue producers. One important factor which has contributed to this is the manner in which the markets for timber products have been supplied, mainly from overrapid exploitation of virgin stands rather than from continuous production of organized forest properties. The resulting competitive marketing of the forest capital from the more accessible areas has not only prevented conservative cutting on much of the lands in private ownership, but on public forests has prevented the relatively inaccessible timber from coming into production and has thus deferred financial returns from it.

If a sustained-yield policy of cutting should now be adopted on virtually all private lands, the nation's timber requirements are sufficient to absorb the products from all of the forests which still contain a sufficient growing stock to yield a current cut of timber. If there is delay in the adoption of sustained yield operations by private owners on accessible areas, general application of sustained yield on less accessible private and on public forests will necessarily be delayed until liquidation has been completed on operations which are able to monopolize present markets.

For this reason no very definite estimate can be made of the time when sustained annual yield can be extended on all privately owned forests and all public forests. Probably such action will not be delayed more than 20 to 40 years. Even then the normal annual returns from sustained yield management will come only from those properties endowed with sufficient growing stock. The national forests in the West with large areas of virgin stumpage and young stands resulting from a quarter century of protection should be in full production within 40 years. The existing national forests of the East and those to be acquired in the future will entail a long process of building up the growing stock. State forests will generally lack sufficient growing stock and take still longer to come into production.

Direct experience in continuous-yield forestry in the United States is limited, but data for forecasting rates of forest growth and stumpage values of leading species are reasonably satisfactory for most regions. In table 6 the estimated gross timber returns per acre under intensive and extensive timber management on public forests are obtained by applying stumpage prices based on 1928–1930 experience to the annual rates of timber production. The production rates, which include a budget cut based on growth, are those presented in the section of this report entitled, "Present and Potential Timber Resources." The stumpage rates used are based on numerous regional logging and milling studies as reported on table 4 of the section of this report entitled, "Status and Opportunities of Private Forestry." The assembled data in table 6 show the possible financial returns per acre from intensive and extensive timber culture on public forests.

Since the returns shown in table 6 are based on conservative growth rates and on stumpage prices already attained, the average results are likely to be conservative as applied to operations which will come into full production some years in the future. They also apply immediately to some of the more favorable situations.

TABLE 6.—*Possible gross income from forestry on public forests by regions*

Region and minimum diameter limit of timber	From intensive forestry					From extensive forestry				
	Growth rate per acre	Net sale value saw-timber stumpage [1]	Saw-timber returns	Salvage and culling returns [2]	Total returns per acre	Growth rate per acre	Net sale value saw-timber stumpage [1]	Saw-timber returns	Salvage and culling returns [2]	Total returns per acre
	Ft.b.m.					*Ft.b.m.*				
N. E.—12 inches	307	$6.75	$2.07	$0.50	$2.57	166	$4.50	$0.75		$0.75
M. A.—14 inches	275	6.75	1.86	.50	2.36	185	4.50	.83		.83
Lake—16 inches	268	6.91	1.85	.50	2.35	179	4.60	.82		.82
Central—18 inches	217	6.75	1.46	.50	1.96	140	4.50	.63		.63
South—18 inches	365	7.02	2.56	.50	3.06	257	4.68	1.20		1.20
P. Coast—34 inches	559	4.16	2.33	.50	2.83	213	2.78	.59		.59
N. R. M.—22 inches	348	6.97	2.43	.25	2.68	175	4.64	.81		.81
S. R. M.—22 inches	126	6.97	.88	.13	1.01	79	4.64	.37		.37

[1] Taken from species figures (mostly 1928–29 values) given in section, "Status and Opportunities of Private Forestry" (table 4), with a deduction of 25 percent under intensive management to allow for profits in logging and milling. In determining the possible realization values, interest and risks on the investment were not included in the costs. In the case of New England, Middle Atlantic, and South Rocky Mountain regions the absence of local logging and milling studies necessitated setting up figures based on results under similar conditions elsewhere. The timber under extensive management is more remote and costs more to get out than that under intensive management. The sale value is therefore computed at only 50 percent of the realization values in logging and milling studies on more accessible areas. This allowance also covers profits to private operators. Returns usually will come from saw timber alone.

[2] A usual attribute of intensive forestry is utilization of intermediate returns from thinnings and returns from salvage of timber killed by insects, fire, etc., together with tops of trees cut for saw timber. These items are estimated at one half cord per acre with 50 percent stumpage, except in the South Rocky Mountain region where they are estimated at one eighth cord per acre, and in the North Rocky Mountain region at one fourth cord per acre.

The program of timber growing set up by this report is only sufficient to provide for permanent national timber requirements. The enlarged national forests will provide only about 35 percent and the State forests 15 percent of these requirements. There is great doubt whether the 50 percent left to private forest management will be realized. Under these conditions it is a reasonable assumption that within the period of 20 to 40 years, forests still having growing stock coming into production, may have a ready market for all higher grade forest products and that the estimated returns will be realized. Gross incomes from extensive and intensive timber management are likely to be reasonably comparable whether under private or public management, except that the private lands, being generally the more accessible and of higher quality, will give somewhat higher returns when equally well managed. Furthermore, since public stumpage is sold to private operators, the returns average less than the private operator can obtain through careful cutting operations carried on by himself. Returns other than from timber may vary more with ownership, and are discussed under each type of ownership.

In dealing with privately owned lands where harvesting and manufacture of raw material is normally done by the owners it can be assumed that they receive full realization value. The returns per acre from intensive and extensive private forestry as estimated in table 7 are based on full realization values without deduction for operating profits allowed in national forest stumpage prices.

TABLE 7.—*Estimated gross returns per thousand feet board measure per acre on private forests under intensive and extensive forestry*

Region	From intensive forestry					From extensive forestry				
	Growth rate per acre	Stumpage realization value [1]	Sawtimber returns	Salvage and culling returns [2]	Total returns per acre	Growth rate per acre	Stumpage realization value [1]	Sawtimber returns	Salvage and culling returns [2]	Total returns per acre
	Ft.b.m.					*Ft.b.m.*				
New England	307	$9.00	$2.76	$0.50	$3.26	166	$9.00	$1.49	----	$1.49
Middle Atlantic	275	9.00	2.48	.50	2.98	185	9.00	1.67	----	1.67
Lake	268	9.21	2.47	.50	2.97	179	9.21	1.65	----	1.65
Central	217	9.00	1.95	.50	2.45	140	9.00	1.26	----	1.26
South	265	9.36	3.42	.50	3.92	257	9.36	2.41	----	2.41
Pacific Coast	559	5.55	3.10	.50	3.60	213	5.55	1.18	----	1.18
North Rocky Mountain	348	9.29	3.23	.25	3.48	175	9.29	1.63	----	1.63
South Rocky Mountain	126	9.29	1.17	.13	1.30	79	9.29	.73	----	.73

[1] From section "Status and Opportunities of Private Forestry" (table 4).
[2] See table 5, note 2. Under extensive forestry only saw timber returns are included.

RETURNS FROM FEDERAL FORESTS

The gross returns attainable from timber stumpage from Federal forests include the estimated annual returns (reasonably forecast) within a period of 20 to 40 years on forests having growing stock, and within 50 to 80 years on those where the growing stock has to be built up. The variation in economic conditions and the rate at which the various improved practices outlined in this report are put into effect cannot be forecast very far ahead, and thus a precise estimate of how long it will be before full returns are attained cannot be closely made. The major portion of the Federal forest area is subject to multiple use in which many resources are revenue producers, through sale or use. The estimated returns from each type of use are given below under their respective headings.

TIMBER RETURNS

The program of Federal acquisition contemplates adding approximately 134 million acres to the 140 million now in the national forests, excluding Alaska. These 274 million acres will of necessity include enormous areas on which private ownership has destroyed or reduced the growing stock. It will include also lands which experience has shown are economically unadapted to private ownership. These are the major reasons for allocating only about 20 million acres to intensive and 90 million acres to extensive (or "crude") timber management under Federal ownership. When the intensive area has been placed in full utilized production through an adequate growing stock, the gross returns from timber sales may be about $50,000,000 annually. In like manner the 90 million acres under extensive timber management might eventually produce a gross return of some $80,000,000 annually.

Less complete data indicate that an additional 10 million acres under extensive forestry in the Alaska forest might yield a gross return of $4,000,000 annually. This brings the estimated eventual total timber returns under the expanded national-forest system in the continental United States and Alaska to a possible $134,000,000. The speed with

which this program is carried out, as well as unpredictable economic conditions and other variable factors, will determine the rate at which such returns can be realized both in time and amount.

RETURNS FROM GRAZING

The forage resource is now more completely used than any other revenue-producing resource on the national forests. Unlike the timber, which for the most part is sold to the highest bidder, the grazing has been so far administered to stabilize the grazing industry, giving preference to the small farmer and grazier. This policy has been justified in numerous localities to preserve the value of small ranch properties dependent for summer forage on the forest ranges. Under the present system and scale of charges the average return for the 5-year period 1925 to 1929, inclusive, was $1,626,388, exclusive of Alaska. The acquisition program when carried out will add materially to these returns. Careful appraisal of ranges on existing national forests indicates that the actual normal commercial value of the forage is far in excess of the present rates charged. The future returns from grazing will be contingent on the economic position which the industry dependent on the national forests may eventually attain and the public policies which may be developed regarding disposal and charges for grazing use. It seems logical to expect an increase in demand for use of these resources as the population increases. Grazing with a fair charge for privileges may yield as much as $4,000,000 annually in the course of time.

SPECIAL USES

These include all present revenues from occupancy of forest lands other than timber and grazing use. The average revenues from 1925 to 1929 were $370,000. These revenues may be expected to show a gradual increase. It is reasonable to assume that within 20 to 40 years they may grow to six times the present income or approximately $2,000,000.

OTHER SOURCES OF REVENUES, NOW USED WITHOUT CHARGES

RECREATIONAL USES

The recreation program proposes a withdrawal of some accessible timber areas from commercial use, and a considerable acreage classed as poor and inaccessible commercial timber forests, and their reservation primarily for recreational use. In addition, a large acreage of noncommercial timberland and nonforested land would be made especially available for recreation, including wild-life conservation. All these areas will require outlay for protection against fire, insects, and disease. The administration and protection of such areas costs considerable sums. To this must be added costs for maintaining and increasing the fish and game supply, development and care of camping sites, and the construction of roads and trails. It has been the policy to make no charge for these services in the past. It is not unreasonable to suppose that eventually consideration must be given to the possibility of offsetting the cost of providing the special facilities required by the recreationist through reasonable charges.

As shown in the section, "The Forest for Recreation" (table 1), the number of visitors to national forests has steadily increased and

has reached a figure of 32 million, of whom 24 million are transients. Considering the increased area needed for recreation and which must be provided by further extension of national forests, it is safe to estimate that within 20 years the total number of those using the national forests to hunt, fish, or camp will exceed 5 million annually. The possibility of a license fee of $2.00 for adults hunting, fishing, or camping on national forests would provide an annual revenue of $10,000,000. This sum would provide for the necessary skilled administration demanded by increasing public use. Such a fee is not exorbitant, and may well be considered as a possible source of revenue. There are, however, many obstacles, both in public attitude and in difficulties of administration, which may prevent this principle from being applied in the near future.

WATERSHED RESOURCES

As shown in the section of this report entitled, "Watershed and Related Forest Influences", watersheds maintained with a suitable cover of forest and other vegetative growth render special services to irrigation, domestic water supply, power, and navigation projects. The evidence clearly indicates that large expenditures will be required to improve and thereafter maintain watersheds of immediate benefit to these projects. Under the "benefit theory" for the purpose of providing necessary funds for this work, the possibilities of a tax or fee might be considered. For example, a tax of $1.00 per horsepower of water-power development would eventually provide on the basis of 10 million horsepower of development a return of $10,000,000 per annum. Public policy must of course determine whether such a plan for financing is feasible and in best public interest.

SUMMARY OF POSSIBLE GROSS REVENUE

The revenues from national forests under a program of full development may be summarized as follows:

Revenues at present charged for:	
From 20 million acres intensive timber management	$50, 000, 000
From 90 million acres extensive timber management	80, 000, 000
From extensive management Alaskan forests	4, 000, 000
From grazing management	4, 000, 000
From special uses	2, 000, 000
Total	140, 000, 000
Resources now not subject to charge:	
From recreational uses	10, 000, 000
From water-power revenues	10, 000, 000
Total	20, 000, 000
All possible returns	160, 000, 000

Possibly as much as a forest rotation will be required to build up forest revenues to full possibilities. There are, of course, many justifications that can be advanced for the public's undertaking the development and management of forest lands, the social and economic aspects being paramount. To assume that the expenditures made on public forests will be self-liquidating in the sense that for every dollar spent a dollar's worth of goods will be sold to amortize investments may be neither sound economics nor sound social policy. It is

important that expenditures made give returns either in direct income or direct public benefits commensurate with the investment. But this does not in any measure preclude the possibilities of creating sustained incomes from public forests sufficient to cover costs. Public policy now recognizes that timber, forage, and similar direct products or uses should be paid for by the immediate beneficiary. We have not yet established the principle that other services such as water, recreation, etc., which are products of the forest, be likewise paid for in large part by the direct user. This latter source of income is suggested merely as a possible plan of financing the public forest enterprise.

It must be again reiterated that the estimated revenues are based, if the full program is consummated, on forests built up with growing stock capable of a sustained-yield income. The possibilities are that income for current expenses may be reached as early as within 15 to 30 years, but incomes to retire capital investments must in the nature of the enterprise be deferred almost to the end of a tree rotation.

CONTRIBUTION TO THE STATES

Under the existing practice 25 percent of the direct gross revenues from the national forests are returned through the State treasurers to the counties in which the forests are situated. The net return to the Federal Government would therefore be 75 percent of the above gross income.

RETURNS FROM STATE AND LOCAL FORESTS

The section, "Probable Future Distribution of Forest Land Ownership", shows the prospective regional distribution of State and local forests. Out of about 100 million acres in State and local public ownership, the probable portions of the areas which are expected to be under timber management are about 10 million acres under intensive and 35 million acres under extensive management. The acreage costs of State forestry were estimated earlier in this section to be comparable to those for Federal forestry, and it can be likewise assumed that returns will be similar. The aggregate intensive forestry return is estimated on this basis at about $24,000,000; the extensive at $30,000,000; making a total of possibly $54,000,000 from timber production if and when this program is carried out. Owing to the expectation that much State acquisition will arise through tax delinquency of lands which have previously been stripped of their timber, it is to be expected that a long period, often a tree generation, will elapse before productivity can be fully restored. Eventually, however, these areas can be counted on to yield large revenues as well as to perform the important functions of supporting local industry.

On State properties, opportunity to lease grazing rights is the same as on Federal lands, but in those regions where range livestock raising is an important industry, few State forests exist or are expected to be created, and consequently not much return can be expected from this source. States may, however, control important sites for water power, irrigation, and domestic water supplies. In such cases the decision will be whether to obtain a revenue from such development or to grant free public use. No doubt, use of State-owned sites for such purposes can be made a source of revenue. Recreational use of

forest properties will be under full State control. Since the States usually control fish and game, whether on private or public lands, they are in a position to collect substantial revenues from fishing and hunting licenses. It would be reasonable to collect a higher license fee where the State controls not only the fish and game but the lands as well on which fishing and hunting is pursued.

Procurement of revenues from all forest uses is most effectively accomplished in States where conservation activities are coordinated. The variety of State policies and practices regarding such uses precludes any accurate forecast of the probable revenues therefrom. It is reasonable, however, to look forward to constantly increasing returns not only from timber but other values existing on forest lands. If a general policy is followed of collecting from beneficiaries of these services, it is conceivable the revenues may grow to as much as $10,000,000 from the anticipated 100 million acres in State ownership. Since the areas are already reasonably suitable for game, fish, and other recreational uses, this revenue is available much earlier than the returns from the timber crop.

RETURNS FROM PRIVATE FORESTRY

The section of this report entitled, "Present and Potential Timber Resources" (table 22) contains an estimate of the areas necessary for operation on a continuous-yield basis in order to provide an adequate national supply of timber. Deduction of the sum of the foregoing Federally and State managed areas from these totals leaves to private operation approximately 40 million acres for intensive and 150 million acres for extensive timber management. This share of the prospective national timber production and the corresponding area allotted to private operation involves a vast expansion of private forestry effort over what is now taking place. Unless expansion takes place the requisite national supplies will fall short as soon as the present liquidation of the private merchantable growing stock approaches completion. Since the present growing stock is far under the quantity necessary to yield full production, a long period of building up growing stock, particularly in the eastern regions, must intervene before full production can be attained.

The respective areas under intensive and extensive forestry in each region multiplied by the gross returns (table 7) shows the estimated gross returns from stumpage production. On this basis the total returns might be as much as $140,000,000 from intensive and $300,000,000 from extensive timber management, a total of $440,000,000. This is a return from growing timber and does not include returns from logging, manufacturing, and other ramifications of the wood-using industries.

The close attention which private owners are able to give to their holdings may result in many returns from uses other than timber. Grazing use in some areas yields a considerable revenue. Since the private forest lands include farm woodlands, the value of grazing per head of stock here reaches the highest level. Undoubtedly the timber returns from the forest are often curtailed by the grazing use, but under proper restrictions it constitutes a legitimate source of revenue. Recreational use of private forests is increasing and where the forests can be protected from trespass, it is beginning to yield actual

revenues. If public forests are sufficiently extended to provide adequate public hunting and fishing facilities, it will be possible to relieve private owners of the burden and cost of protection against trespass, fire, and other losses. Under these conditions it should become increasingly profitable for forest owners to build up the game supply and obtain revenues from this source.

Watershed values are generally not of a nature to yield private returns except as private owners may own power sites or in some States riparian rights. These sites and rights constitute on the whole a resource distinct from the forest, as in the case of mineral rights. These and mineral rights on some areas constitute the chief reason for ownership of large forest areas but these revenues have not been considered here.

Revenues from naval stores and minor forest products are large in some localities. There is no very definite basis for estimating all these returns but everything considered it is probable that they amount to $50,000,000 per annum on all the private forests of the United States.

SUMMARY OF COSTS AND RETURNS

The scope of the program outlined in this report is so extensive that no one agency is called upon to carry the entire responsibility. Federal, State, and private agencies must be relied upon to go far beyond their present activities in their respective field. It is urgent that within the next 20 to 40 years the plan, with such modifications as experience proves necessary, should be brought to complete realization. It must be realized, however, that depleted areas cannot be brought back to full production in that time. A period of 50 to 80 years of protection and care will be necessary to restore full production.

From the foregoing conservative estimates of returns from forests handled under methods which will insure high rates of productivity, it may be concluded that the forests of the United States, maintained at a level of productivity sufficient to meet fully the national requirements both for timber and other services should produce a gross return of about $700,000,000. This is in terms of stumpage values, with a partial allowance for recreational, watershed, and other more or less intangible values. It includes no allowance for the great spread of industry dependent on logging, manufacturing, transporting, selling, and utilizing forest products. After the costs are deducted from the gross returns, there remains a net of $400,000,000 to $500,000,000 as an earning on the investment in all forest properties, public and private. This is sufficient to restore and sustain a capitalized value in the neighborhood of $10,000,000,000 for the forest resource. This resource being susceptible to continuous renewal and in fact to continuous upbuilding, is thus visualized as a permanent part of the national assets, supporting as long as the Nation lives its quota of business activity, employment, and the manifold services which no other resource can replace in full.