

THE FOREST FOR RECREATION

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VOLUME AND VALUE OF FOREST RECREATION

THE PRESENT VOLUME

The use of the forests for recreation probably dates to the time when some wandering savage, returning to his cave through the depths of the primeval forest, may have noticed a beam of sunlight shining on some darkened tree trunk and felt all at once without knowledge of the reason a moment of great, surging joy in the chaotic passage of his life.

Until very recently, the recreational enjoyment of the forest has been chiefly of this incidental nature. Today, however, forest recreation is no longer an unpremeditated matter. People do not, as a rule, live in the forest any more, and if they go there to enjoy themselves they are fully conscious of their purpose. Consequently they have come to realize that forest recreation has a definite value in their lives, that it is something for which they are willing to sacrifice time and money and so they desire to plan for the preservation of its possibility.

The word "recreation", as it is used in this report, means anything that is done directly for the pleasure or enrichment which it brings to life, in contrast with things that are done primarily to obtain the necessities of life. The diverse purposes of forest recreation and the many different forms which it assumes will be discussed later.

Table 1 shows in round numbers the best available statistics on the use of American forest lands for recreation during the year 1931. These figures are valuable not as giving a precise measure but for the general impression which they convey of the tremendous volume which recreational forest use has already attained in America.

TABLE 1.—Recreational visitors to forest land in the United States in 1931

Type of land	Number of visitors	Type of land	Number of visitors
National parks ¹	2 3,000,000	County and municipal parks ⁶	4 60,000,000
National monuments.....	2 400,000	Private lands.....	4 100,000,000
National forests.....	2 32,000,000		
Other Federal lands.....	4 1,500,000	Total.....	248,900,000
State parks and forests.....	2 50,000,000		

¹ Exclusive of the urban Hot Springs National Park.
² National Park Service figures.
³ United States Forest Service figures. About 24,000,000 of these recreationalists were transients who merely drove through the national forests.
⁴ Estimates based on known use of limited areas of this type of land.
⁵ National Conference on State Parks figures.
⁶ Exclusive of parks within urban limits.

There is, of course, a great deal of duplication in these records. Some people visited several different parks or forests; some people visited the same area on a number of occasions and were checked separately each time; perhaps some people made use of all seven types of land for recreation. No doubt there were individuals who were counted more than a score of times in the total figure. It is therefore impossible to state how many different persons made recreational use of the United States forests during the year.

It is reasonable, however, to estimate that each visitor spent on the average one full day in each park, forest, or private timberland for which he was recorded. Some remained only for a few hours, it is true, but many remained several days, and a few spent the entire summer on a single forest area. If the estimate of one day per visitor is correct, a total of approximately 250 million man-days were spent during 1931 in recreational enjoyment of the forest.

The national parks and the national forests have kept count of the number of their recreational visitors since 1916 in the one case, and since 1917 in the other. These records started just prior to the era when long-distance automobile travel became mechanically and financially possible for a large proportion of our population, when consequently old notions of distances were altered almost overnight, and when entirely new recreational habits were formed by millions of Americans. The astounding increase in the number of both park and forest visitors, as shown in table 2, reflects the fact that forest recreation has grown during the past 15 years from a relatively unimportant variety of diversion into one of the most universally adopted forms of recreation.

There is, of course, considerable duplication in the records presented in table 2. The standards of tabulating visitors have varied considerably, also. Nevertheless the resulting inaccuracy probably is not of serious moment in the face of an apparent 750 percent increase in national-park use and an apparent 920 percent increase in national-forest use during the brief period of 14 years. The multiplication of the recreational use of these Federal lands has been not only tremendous in volume but virtually unbroken.

TABLE 2.—Recreational use of national parks and national forests

Year	Number of visitors to—		Year	Number of visitors to—	
	National parks ¹	National forests ²		National parks ¹	National forests ²
1916.....	237,357		1924.....	1,258,178	11,304,366
1917.....	353,268	2,160,000	1925.....	1,495,372	15,279,730
1918.....	311,661	3,322,565	1926.....	1,670,955	17,112,024
1919.....	594,835	3,064,344	1927.....	2,173,120	18,523,888
1920.....	758,654	4,832,671	1928.....	2,323,089	23,008,997
1921.....	876,367	5,633,420	1929.....	2,496,080	31,758,231
1922.....	938,338	6,172,942	1930.....	2,607,499	31,904,515
1923.....	1,168,886	10,543,893	1931.....	2,999,451	32,228,613

¹ Exclusive of the urban Hot Springs National Park.
² The national-forest and national-park figures are not comparable because in recent years about three quarters of the national-forest visitors have been transients who merely drove through the forest area, while virtually all of the national-park visitors came for more protracted sojourns. The 1931 Forest Service figure which would be comparable to the Park Service record for the same year would be the 8,073,917 hotel and resort guests, summer-home guests, campers, and picnickers.

There is no reason to suppose that the general trends on Federal lands are different from those on other recreational territory. Consequently, it is fair to state that recreational use of forest lands is growing with tremendous acceleration.

THE FUTURE VOLUME

Is there reason to believe that this present growth in recreational use will continue? What factors are likely to inhibit and to stimulate future demand for forest recreation?

The most serious of the possible inhibiting factors seem to be commercial exploitation and fires, which threaten to deplete severely the beauty of many recreational areas. There can be no doubt that the greatest attraction of the forests is their natural beauty. If this is not adequately safeguarded, unquestionably millions who now delight above all else in the loveliness of the forest will forsake it for some other source of recreation.

Another of the possible inhibiting factors may readily be observed at any popular camp ground over a holiday. Here one sees swarms of tourists who not only destroy, by their mere numbers, the very isolation which was one reason for their journey to the forest, but also kill the ground vegetation around the camp site and tramp down the soil so compactly as even to kill many of the trees. This type of destruction has its remedy, like the destruction resulting from commercial exploitation, but unless the remedies are applied these factors will definitely tend to decrease the recreational use of the forests.

Factors which may be expected to stimulate recreational use of the forest are:

(1) *Increasing population.*—The predictions of reputable biometricians place the eventual saturated population of the United States between 145 million and 185 million. This represents an increase over present population of between 20 and 50 percent. It would in all likelihood result in a corresponding increase in the number of recreational seekers, even if no other factors were involved.

(2) *Shorter working hours.*—Whereas the average working week in 1929 ranged from 40 to well over 60 hours, with a mean for all in-

dustries somewhere around 50 to 55 hours, estimates for the not distant future place the average in some cases as low as 24 hours and in the majority of cases at least as low as 30 hours. This change would greatly increase the available leisure, and it seems reasonable to assume that a share of the additional leisure time would be devoted to forest recreation. If shorter working hours mean smaller income, however, the change may actually work against an increase in recreational use of the forest.

(3) *Probable rising standard of living.*—Most economists, whether they be capitalists or socialists, predict a great eventual improvement in the standard of living of the majority of American citizens. This means that millions of workers who cannot now afford to go to the forest will find it possible to make regular excursions to the woods. In many cases these excursions will probably be provided for at public expense. Already a number of cities perform such welfare work. It is not unreasonable to believe that sooner or later it may be considered just as much the function of public agencies to provide healthful recreation as to provide schooling.

(4) *Increasing ease of transportation.*—The advent of the automobile has decimated distances and made it possible for people living 500 miles from attractive forest areas to visit them as readily and cheaply as people a few years ago visited tracts but 50 miles away. With airplane and autogiro transportation rapidly being perfected and cheapened, there is every reason to believe that the forests will become still more accessible.

(5) *Increasing psychological necessity for escape to the primitive.*—As society becomes more and more mechanized it will be increasingly difficult for many people to stand the nervous strain, the high pressure, and the drabness of their lives. To escape these abominations, increasing numbers will seek the primitive for the finest features of life.

THE VALUE

An evaluation of forest recreation may be attempted upon either a monetary or a social basis.

In terms of dollars and cents, there are several ways of estimating the recreational worth of the forest. One is to determine the number of people who visit the forest annually, ascribe some average value to the pleasure which each one gets from it, and multiply. A second is to estimate the amount of money invested in forest recreation. A third is to figure the taxable wealth resulting from the recreational use of the forest. A fourth is to calculate the amount of money which recreationists spend in visiting the forests. The few figures available for each of these approaches will be presented as suggestive of the tremendous economic importance which forest recreation already assumes.

(1) It seems distinctly on the side of conservatism to estimate that each all-day visitor to the forest derives as much pleasure from it as he would derive from a 2-hour motion-picture show. On the basis of the best statistics available we have estimated that in the United States approximately 250 million man-days a year are devoted to forest recreation. If the admission price to a movie averages 25 cents, this gives the annual American forest recreation a value of

\$82,500,000. This is what people probably would pay for the privilege of using the forest if the price were asked. The incidental fact that people have to pay for admission to the movies and do not usually have to pay for admission to the forest does not mean that the outdoor recreation is any less valuable.

(2) No inclusive figures are available for the amount of money invested in forest recreation. The special Senate Committee on the Conservation of Wild-Life Resources¹ estimates that "the investments which the Federal and various State Governments have made for the purpose of preserving or increasing wild life comes to a total of \$507,134,935." The total amount of money so far spent in the purchase of State parks and forests used primarily for recreation amounts to nearly \$50,000,000. The annual expenditures by States for forest recreational developments, including chiefly the maintenance of parks and reservations, amounted in 1929 to \$4,612,711.

In New England alone, it is estimated, \$550,000,000 is invested in recreational property.² Of all New England's recreational appeals, the dominant ones are natural surroundings among which lakes and mountains rank first.³ Consequently a very considerable proportion of the \$550,000,000 recreational investment may be attributed to forest recreation.

In Wisconsin⁴ "it has been estimated that the investment in a resort area 40 miles square in the highland lake district is almost \$40,000,000."

In view of the \$40,000,000 estimated to have been expended on the area 40 miles square in Wisconsin, it is interesting to speculate what amounts may have been invested in such extensive, popular, and much-developed forest playgrounds as California, Colorado, or the Adirondacks.

(3) Private recreational investments in many regions bear an especially important relationship to the rural tax problem. It has been found, for instance, that recreational lands contain 37 percent of the tax base in Oneida County, Wis., and 63 percent of the tax base in Vilas County, Wis. In these counties "even on the acre basis, recreational land is usually assessed for more than farm land or merchantable timber."⁵

It is impossible even to estimate how much taxable wealth results from forest recreation in the entire United States. A material fraction of the billion dollars of taxes paid in 1931 on motor vehicles and gasoline must be prorated to forest recreation. In addition there are the taxes on forest hotels, resorts, residences, and services; on scenic railroads, trolley lines, and tramways; on camping clothing and other equipment; and on the manufacture and sale of arms and ammunition. The sum of all these taxes certainly involves a huge total.

Of course much of this tax bill would be collected even if there were no forest recreation. If people could not go to the forest, a good many of them would take their vacation tours somewhere else. Similarly, if the people who now have woodland summer homes were obliged to give them up, a goodly percentage would be content with

¹ Wild Life Conservation, Senate Report No. 1320, 71st Cong., 3d sess., 1931.

² New England Council News Letter, Nov. 19, 1931.

³ "New England's Recreational Appeals," Laurence W. Childester, 1930.

⁴ Forest Land Use in Wisconsin, committee on land use and forestry, Madison, Wis., 1932.

⁵ "Recreation as a Land Use," George S. Wehrwein and Kenneth H. Parsons, Agricultural Experiment Station, Madison, Wis., 1932.

seashore dwellings. But the substitutability noted in forest recreation applies equally to any other resource. The taxable wealth resulting from the commodity use of the forest also would be greatly reduced if all the possible commodity substitutions were effected.

(4) The American Automobile Association estimates that almost \$4,000,000,000 was spent in motor camping and vacation motor travel in the United States during the year 1929. It does not seem unreasonable to assume that one quarter of the vacation motor travel is through forested country, and this would mean that annual forest vacation motor expenditures amount to about \$1,000,000,000.

The Special Senate Committee on Conservation of Wild-life Resources⁶ calculates that in 1929 hunters and fishermen spent \$650,000,000 in addition to transportation expenses. It would be conservative to estimate that at least three quarters of this enormous sum was spent on forest hunting or fishing, which would mean that this form of forest recreation accounts for an annual outlay of approximately half a billion dollars.

No national figures are available for the amount of money spent each year on summer homes, hotel, and resort accommodations (other than those paid for by automobile tourists), hiking equipment, or the outfits required for wilderness journeys. These expenditures would unquestionably run half as high as those for hunting and fishing. Consequently the following would seem to be a reasonable, although admittedly a very rough, estimate of the amount of money spent on forest recreation during the peak recreation year of 1929:

Forest vacation motor travel.....	\$1, 000, 000, 000
Hunting and fishing.....	500, 000, 000
Summer homes, resorts, hiking, wilderness journeys.....	250, 000, 000
Total.....	1, 750, 000, 000

Although huge sums of money are involved on any basis of calculation, the most important values of forest recreation are not susceptible of measurement in monetary terms. They are concerned with such intangible considerations as inspiration, esthetic enjoyment, and a gain in understanding. It is no more valid to rate them in terms of dollars and cents than it would be to rate the worth of a telephone pole in terms of the inspiration it gives. The only common denominator for the recreational and commodity value of the forest is the human happiness which may be derived from each use. Unfortunately no quantitative measure of human happiness has ever been designed, and consequently it is impossible to describe accurately the contribution which forest recreation makes toward the welfare of mankind. About all one can do is to point out the purposes for which men seek the forest and let each reader make his own evaluation of their intrinsic importance.

PURPOSES

Perhaps the most frequent purpose of those seeking forest recreation is simply to have a good time in the outdoors. The majority of vacation motorists enjoy what features of the forest they can observe at a velocity of 40 miles an hour, but never really transfer their lives from the highway to the forest. The woods are only a pleasant back-

⁶ Wild Life Conservation, S.Rept. 1320, 71st Cong., 3d sess., 1931.

ground for a type of satisfaction which could be enjoyed with no essential diminution in any open-air environment. The urge to go somewhere and the desire for amusement and a change from everyday life are the vital concerns with this particular type of recreationist.

Millions of people go to the forest for the preservation, restoration, or stimulation of their health. The therapeutic value of forests has long been recognized in selecting sites for sanatoria. More recently it has come to be realized that healthy people may be immensely benefited by the pure air, the wholesome exercise, and the relaxation which are such important attributes of forest recreation.

There are many people whose primary concern in the forest is the pursuit of beauty. The joy which such people derive from a sunset across some forest lake, from the unfathomable immensity of the panorama off some wilderness summit, from the unmarred splendor of a virgin forest, is not essentially different from what another esthete might derive from the paintings of Rembrandt, from the sculpture of Rodin, from the music of Beethoven, from the drama of Shakespeare, or from the poetry of Keats. In spite of the analogy with these artistic forms of beauty, the forest has unique values which make it a most distinctive source of esthetic pleasure.

Closely allied with the pursuit of the beautiful is the desire for communion with nature. For many people there is a significance, as vital and as satisfying as that which any communicant ever derives from feeling his spirit one with God, in feeling themselves to be one with nature, in cutting all bonds of habit and drifting into the timeless continuity of the primeval.

The primeval environment often proves exceptionally inspiring and exceptionally favorable to contemplation. Many of our greatest American thinkers—men of the caliber of Thomas Jefferson, Henry Thoreau, Mark Twain, William James, and John Muir—have found the forest an effective stimulus to original thought. John C. Merriam has well remarked:⁷

The man or woman who goes to Grand Canyon or Yellowstone or Yosemite for a week's vacation is cut off, for the moment, from the business of making a living. Nearly all of the small cares that make up a good part of our ordinary living are also left behind. Under such conditions the mental and spiritual processes turn not only toward appreciation of nature but toward enjoyment of intellectual life. Frequently at such times consideration is given to the greatest of our problems. The most intimate and deepest spiritual experiences may develop and great decisions be made.

Some visitors to the forest are primarily interested in its scientific aspects. They want to study the forest, to learn the fundamental reasons for its development, to appreciate the causes of the functioning of its myriad component parts. To them the forest is a laboratory, unbounded by the conventional four walls, floor, and ceiling of the usual research center but fully as significant in the development of a knowledge of the laws of nature.

The tradition of the pioneers is inculcated into most American children even before they start their schooling. All through their formative years they read about the glorious adventures of the American frontiersmen, and often they relive in games and imagination the stirring pioneer days. Many of them grow up to long for some real adventure and become sick and tired of getting their thrills in

⁷ Educational Values of Recreation, Educational Record, October 1932.

such vicarious forms as the lurid movie, the cheap novel, or the travelogue. A depressingly large number of the more energetic of these malcontents try to appease their unfulfilled yearning in the pursuit of crime and racketeering. Others long for a declaration of war in the hope that in battle they may capture some of the rightful thrills of life. This same psychological urge lures some people to the forest, where in less antisocial ways than crime and fighting they add genuine dash of adventure to their lives.

Finally, there are those whose chief purpose in visiting the forests is simply an escape from civilization. These people want to rest from the endless chain of mechanization and artificiality which bounds their lives. In the forest they temporarily abandon a life to which they cannot become wholly reconciled and return to that nature in which hundreds of generations of their ancestors were reared.

It is patent that people who go to the forest with such different purposes will find their recreation in many different forms. Some of them will tour the forest, or temporarily reside in it, without having recourse to any means of transportation other than the mechanical. Others will resort principally to natural means of transportation in the course of hiking, riding, canoeing, hunting, fishing, or traveling the wilderness. Of course many of these must use mechanical modes of transportation to reach localities where they can make use of the natural modes.

The differentiation between forms of recreation employing mechanical transportation and those employing natural transportation is of fundamental significance. In the former case the recreationist considers nature a mere background to his enjoyment; in the latter he becomes for a while a part of nature. When a man travels in the forest by natural means all his capability and all his understanding are called into use, and an infinite number of subtleties which cannot possibly be discovered from the highway, the camp ground, or the house are clearly appreciated and become vitally significant to him. On the other hand millions of people who enjoy the forest in the luxury of mechanical transportation would not dream of undergoing for pleasure the hard work which delights the hiker or canoeist. The mechanical modes of transportation appeal to those who desire especially comfort, speed, and a superficial acquaintance with many areas. The natural modes are chosen by those who want adventure, freedom from the rush of life, and an intensive knowledge of small areas.

There is no object in trying to compare the different forms of forest recreation as to importance or value. Each form has at least tens of thousands of devotees who prefer it to any of the other forms. We cannot say that if fish and game resources become exhausted fishermen and hunters will be satisfied with hiking, or that if we cut up all our large wilderness areas those who in the past enjoyed wilderness travel will enjoy automobiling just as well. For large numbers of people such losses would represent an irreparable destruction of the richest aspects of life. A rational program for forest recreation in America must assure to the adherents of each of the different types of enjoyment an ample opportunity to indulge their desires.

TYPES OF RECREATIONAL FOREST AREAS

The varied purposes of those who seek recreation in the forest, and the different forms that the realization of these purposes assumes, necessitate recognition of several distinct types of recreational forest areas. Since each of these types has its special standards of size, beauty, and administration, and since therefore a separate recreational program must be developed for each, it is well to explain their character and function.

SUPERLATIVE AREAS

"Superlative areas" are localities with unique scenic value, so surpassing and stupendous in their beauty as to affect almost everyone who sees them. Examples of such superlative areas are the Grand Canyon, Crater Lake, the Canyon of the Yellowstone, the mountains of Glacier National Park or the Teton Range, the Valley of Yosemite, and the Big Trees. This category includes also natural features of exceptional scientific interest such as the geysers of the Yellowstone and the Carlsbad Caverns in New Mexico. If any of these areas should be destroyed or seriously injured there would be no substitutes.

Most American citizens are enthusiastically convinced of the importance of thoroughly safeguarding the inspiring beauty of these areas. Even those least appreciative of recreational values are generally willing to admit that we should reserve our relatively few superlative areas. Consequently it will not be necessary here to justify the retention of such tracts for recreational purposes. Already most of them have been set aside in national parks. A number are located in national forests, national monuments, and State parks, where their unique values are adequately safeguarded. A few remain in private ownership. The last mentioned should be acquired by public agencies.

No maximum or minimum size can be assigned to superlative areas. Each superlative feature is a law unto itself, demanding preservation of the entire area which it occupies and of a certain terrain from which it may be viewed.

PRIMEVAL AREAS

"Primeval areas" (sometimes called natural areas) are tracts of virgin timber in which human activities have never upset the normal processes of nature. They thus preserve the virginal growth conditions which have existed for an inestimable period.

Primeval areas have two different values. First, they are of great scientific significance. They are an absolute necessity for any future studies of the natural distribution of the flora and fauna of the world. Further, in trying to plan methods of cutting which will assure the perpetuation of the forest, it is of utmost importance to have various unmodified stands with which to compare the results of human modification. Innumerable laws of nature can never be thoroughly understood without some access to the conditions of the primeval. These scientific values are quite generally recognized, and both the Forest Service and the Park Service are making provisions for preserving them.

The importance of the primeval in the more subtle aspects of forest recreation is much less generally recognized. Yet observation of many recreationists gives convincing evidence that most of those who visit the forests for contemplation, inspiration, communion with nature, or enjoyment of the beautiful receive very much more pleasure from the beauty of primeval areas than from the beauty of areas modified by man. To argue that because lovers of the woods get some enjoyment from cut-over lands it is unnecessary to finance the retention of samples of the primeval would be as unconvincing as to argue that because lovers of music may get some enjoyment from the concerts of mediocre pianists it is unnecessary to finance a Paderewski or a Rachmaninoff.

It seems necessary not only to reserve samples of the primeval but to reserve a considerable number of such samples in every important forest type in the country. There are at least three important reasons for this: First, in order to avoid such overcrowding as would speedily destroy primeval conditions; second, to make the advantages of primeval areas readily accessible to people in as many different parts of each forest region as possible; and third, because there is still so much danger that any forest stand will be wiped out by fire or insects. Therefore, unless it is already too late, at least half a dozen primeval areas should be set aside in every forest type.

It is not reasonable to contend that if all the samples of primeval conditions in one forest type were destroyed other forest types would do as well. Each timber type has its own unique charms, its own unduplicated manifestation of beauty the destruction of which would distinctly lessen the potential esthetic enjoyment of nature. There are as great differences between the beauty of the redwood, the Engelmann spruce, the western white pine, the northeastern hardwood, the southern pine, and the cypress forests as there are between the paintings of De Vinci, Turner, Rembrandt, Sargent, Goya, and Diego de Riviera. If anyone proposed that public expenditures for the housing of art should be reduced by disposing of the works of Turner, Sargent, and De Riviera, because their paintings are less distinguished than those of the others the suggestion would be greeted with uproarious derision, because everyone knows that art cannot be relatively evaluated, and that it is of the utmost importance to preserve the finest example of each important type. Similarly no defensible rating can be made of the relative beauty of timber stands, and consequently each important type should be preserved in the museum of the forest.

In general, the same primeval area may be put to scientific and recreational use. On certain areas, however, recreational use will have to be entirely barred in order to permit undisturbed research. In any event, visitors to primeval areas will be subjected to certain restrictions. Except on spacious areas it will not be possible to permit camping, for any great amount of such activity tends to deteriorate the primeval with exceptional rapidity. Where there are large numbers of visitors it will be desirable to construct trails through the area to save underbrush and reproduction from trampling.

The minimum area necessary for the maintenance of primeval conditions varies with forest type, climate, and topography. In general the Forest Service believes that 1,000 acres is about the smallest area desirable, though in special cases where so much as 1,000 acres of

virgin forest cannot be found the largest available area will have to be sufficient. A tract of 1,000 acres, while well adapted for research, is too small for satisfactory recreation. The person with a yearning for the beauties of the primeval wants to do more than just stroll into a virgin stand of timber and squat. He desires to be able to walk around in it for a considerable period, losing himself entirely for a while in its timeless beauty, forgetting that there is such a thing as a machine-age world. This is extremely difficult to do in 1,000 or even 5,000 acres. While the figure varies considerably with timber type, a primeval area should contain not less than 5,000 acres, which is, after all, scarcely 8 square miles. Wherever possible, tracts of at least double that area should be set aside.

Table 3 shows the major timber types in the United States and the number of primeval areas of even 5,000 acres which have been set aside in each. It will be observed that little progress has been made in reserving primeval areas of even the minimum size. It is vitally important that any additional areas which are to be preserved should be set aside right away, for without early action the possibility of maintaining primeval areas in a number of important timber types will be lost, if, indeed, it has not been lost already.

TABLE 3.—Number of 5,000-acre primeval areas reserved in each major forest type

Forest type	Total	National park	National forest ¹	State
Spruce and fir.....	11	1	0	10
Jack, red and white pine.....	0	0	0	0
Northeastern hardwood.....	3	0	0	3
Chestnut, chestnut oak, and yellow poplar.....	1	1	0	0
Oak and pine.....	1	1	0	0
Oak and hickory.....	1	1	0	0
Cypress, tupelo, and red gum.....	0	0	0	0
Southeastern pine.....	0	0	0	0
Ponderosa pine.....	3	3	0	0
Sugar pine and mixed conifer.....	2	2	0	0
True fir.....	2	2	0	0
Redwood.....	2	0	0	2
Sitka spruce.....	0	0	0	0
Douglas fir.....	2	2	0	0
Lodgepole pine.....	7	7	0	0
Engelmann spruce.....	6	5	0	0
Subalpine.....	7	7	0	0
Western white pine.....	0	0	0	0
Larch and douglas fir.....	1	1	0	0
Aspen.....	1	1	0	0

¹ The Forest Service has established 16 smaller areas, between 150 acres and 4,230 acres, and averaging about 1,250 acres each.

This list of forest types excludes several distinctive minor types which are so limited in distribution that it would be impossible to attain the minimum standards of either number or size which were set for the major types. In each minor type at least one primeval area, as large as possible should be set aside. These minor types include the pitch pine, southern white cedar, mangrove, port orford cedar, jeffrey pine, monterey pine, and mountain hemlock types. Provision is already being made for the reservation of all existing stands of Bigtree.

WILDERNESS AREAS

"Wilderness areas" are regions which contain no permanent inhabitants, possess no means of mechanical conveyance, and are sufficiently spacious that a person may spend at least a week or two

of travel in them without crossing his own tracks. The dominant attributes of such areas are: first, that visitors to them have to depend exclusively on their own efforts for survival; and second, that they preserve as nearly as possible the essential features of the primitive environment. This means that all roads, settlements, and power transportation are barred. But trails and temporary shelters, features such as were common long before the advent of the white race, are entirely permissible.⁸

It will not be possible to preserve primeval forest conditions through the whole of any tract large enough to fulfill these requirements. Indeed there may be some wilderness areas, as for instance in Maine, where practically the entire tract will have been logged. The difference between primeval and wilderness areas is that the primeval area exhibits primitive conditions of growth whereas the wilderness area exhibits primitive methods of transportation. Of course wilderness areas may contain within their boundaries much that is primeval. Their chief function, however, is not to make possible contact with the virgin forest but rather to make it possible to retire completely from the modes of transportation and the living conditions of the twentieth century.

In 1930, the United States Forest Service adopted the policy of reserving portions of its territory from road or residential development. The Park Service had meanwhile enunciated the policy of preserving most of its territory in a state of roadlessness. Under these two administrative policies it will be possible to preserve an adequate number of wilderness areas in the West. In the East the situation is less favorable for except in New York and Minnesota the potential wilderness areas are almost exclusively controlled by States or private owners having no policy of preserving wilderness conditions.

Wilderness areas in general will have to be sections of high mountain country where commercial values are low, because practically all of the more accessible and productive lands have already been subjected to development. The great bulk of the remaining potential wilderness areas could not possibly be managed for timber production. Their inaccessibility and the low quality and slow growth of their timber would render futile any hope of either a financial profit or a sustained yield. The fact that most of the wilderness areas will of necessity be low-grade land will make the cost of maintaining them much less serious than their large acreage might lead one to expect. Further, a great part of such land will need to be reserved anyway, as protection forests for the control of stream flow and the prevention of erosion.

Cattle or sheep grazing is not incompatible with wilderness use. In occasional instances storage reservoirs may be permissible. On a number of wilderness areas, logging will be allowed, though in most of these tracts the timber will be so remote that cutting operations will not be feasible. For fire-protection purposes it will be necessary in most parts of the West to permit telephone lines and lookout cabins within wilderness areas and to permit airplane transportation of men and equipment. Otherwise, wilderness areas should be kept as much as possible in their pristine wildness.

⁸ The Problem of the Wilderness, Robert Marshall, the Scientific Monthly, February 1930.

As regards area, no absolute limits can be set. Americans who want wildernesses of the sort which existed in frontier days will need to retreat to the more remote expanses of northern Canada and Alaska. Some semblance of pioneer conditions might be obtained in tracts of more than a million acres, of which several still remain uninvaded by roads. For those wishing to spend one or two weeks in wilderness travel without retracing their routes, 200,000 acres (about 300 square miles) is the least area that would generally prove satisfactory. In this report that acreage has been adopted as the minimum size for a wilderness. In many cases smaller units have a great recreational value, but it is not the value of wilderness travel, and consequently such tracts will not be considered as wilderness areas.

There remain today in the United States only 9 areas of 1,000,000 acres or more, 18 areas of 500,000 acres or more, and 38 areas of 200,000 acres or more which could still be set aside as wilderness tracts without involving any serious sacrifice of commercial values, any great risk to adequate fire protection, or any major changes in existing highway plans. These tracts total about 26,950,000 acres. Approximately 8,425,000 acres in the East is almost entirely covered by forest. The 18,525,000 acres in the West includes at least 7 million acres of non-forested land. This leaves about 20 million acres of wilderness in a forested condition. As has been explained, almost no sacrifice of economic values would result from preserving these forest areas as wilderness. The only sacrifice involved would be in barring tourists. In view of the fact that 486 million acres of forest land in the country would remain subject to highway development, it would not seem unreasonable to bar mechanized development from 20 million acres.

The wilderness journey is still relatively unusual, both because for full enjoyment it requires considerable facility and training, and because it is expensive. Only a strong and experienced woodsman can pack on his back the necessary equipment for more than a week of wilderness travel. The great majority of wilderness travelers must buy or hire pack horses or boats, or employ back-packers. Unless they have had considerable experience in the woods they must also employ guides. Consequently, although a competent man can take a 2-week wilderness journey with one pack horse for \$30, most people would require a couple of horses and a guide at a cost of at least \$125, even if they do not have to buy special clothing and camp equipment. A month's trip with an elaborate outfit in especially inaccessible country may easily cost one man \$1,000.

In the future, however, as more and more people learn how to care for themselves in the woods, and above all as wilderness journeying becomes recognized as an important and exceptionally virile form of recreation, a decrease in cost of participation may be expected similar to that which has accompanied the development of other popular pastimes. Furthermore, the heightened standard of living which it is reasonable to predict for the future may be expected to make travel in the wilderness a possibility for tens of thousands who today yearn futilely for such adventure.

In consequence, a greatly increased amount of journeying in the wilderness may fairly be expected. It would seem reasonable, therefore, to establish as wilderness areas all tracts for which no definitely higher present utility exists. If in the future the use of these tracts does not justify their retention as wilderness areas, it will always be

possible to cut them up with additional roads. But once roads are built, it will be very difficult to restore the wilderness. In table 4 are listed the 38 established, partly established, or potential wilderness areas.

TABLE 4.—Forest wilderness areas, established and potential

Name of area	State	Acreage	Ownership	Present status
Central Idaho	Idaho	3,375,000	National forest	Part established.
Aroostook-Angash	Maine	2,825,000	Private	Potential.
South Absaroka	Wyoming	1,825,000	National forest, national park	Established.
Upper St. John	Maine	1,300,000	Private	Potential.
Superior	Minnesota	1,275,000	National forest, private	Established.
High Sierra	California	1,075,000	National forest, national park	Do.
South Fork	Montana	1,050,000	National forest	Part established.
Glacier-Bridger	Wyoming	1,050,000	National forest, Indian reservation	Do.
North Cascade	Washington	1,025,000	National forest	Potential.
North Absaroka	Wyoming	825,000	National forest, national park	Established.
Snoqualmie	Washington	800,000	National forest	Potential.
Sysindopsis	Maine	775,000	Private	Do.
Olympic	Washington	725,000	National forest	Part established.
Dead River	Maine	600,000	Private	Potential.
Nantes Mountains	Arizona	575,000	Indian reservation	Do.
Gila	New Mexico	575,000	National forest	Established.
North Glacier	Montana	550,000	National park	Do.
Moose River	New York	500,000	State, private	Do.
North Yosemite	California	475,000	National park, national forest	Do.
Aquarius Plateau	Utah	475,000	National forest	Potential.
Mount Marcy	New York	425,000	State, private	Established.
Pitchstone Plateau	Wyoming	450,000	National park	Do.
Okefenokee	Georgia	400,000	Private	Potential.
South Glacier	Montana	400,000	National park	Established.
South Yosemite	California	350,000	National park, national forest	Do.
Madison Plateau	Wyoming	350,000	National park	Do.
San Juan	Colorado	300,000	National forest	Do.
Oven Lake	New York	300,000	State, private	Do.
Goat Rocks	Washington	250,000	National forest, Indian reservation	Part established.
Baltorn Trinity Alps	California	250,000	National forest	Do.
High Uintas	Utah	250,000	do	Established.
Marble Mountain	California	250,000	do	Do.
Beartooth	Montana	225,000	do	Do.
Eagle Gap	Oregon	225,000	do	Do.
Grand Teton	Wyoming	225,000	National park, national forest	Part established.
Central Plateau	do	200,000	National park	Established.
Bighorn	do	200,000	National forest	Potential.
Mission	Montana	200,000	National forest, Indian Reservation	Part established.

ROADSIDE AREAS

The great majority of people who visit the forests for recreation do so by automobile. While most of these visitors do not penetrate into the forest, they are very much concerned with the part which they can see from the highway. If this were destroyed or seriously damaged, their enjoyment of touring would be immeasurably impaired, and indeed many of them would largely give up their vacation journeys. Consequently, it follows that for these people it is of great importance to preserve from serious scenic damage the timbered strips adjoining the more important roads. These strips will be referred to as "roadside areas." This classification will include also strips of timber left along lakes, rivers, and all other boat and canoe routes.

Obviously it would not be feasible to preserve scenic strips along all the 3,009,000 miles⁹ of highways in the United States. Many of the highways receive only occasional use, and the great majority are rarely visited by people in quest of recreation. However, it would seem that the 324,500 miles of State highways receive sufficient use to

⁹ Estimate given in Facts and Figures of the Automobile Industry, National Automobile Chamber of Commerce, 1932.

justify protection of roadside areas. Therefore, wherever State highways pass through forest lands, it is recommended that strips of land at either side of the roadway be preserved on which scenic values will not only be safeguarded where they already exist but also restored through planting, the elimination of billboards, the tearing down of ramshackle houses, and cutting to open attractive vistas.

About a quarter of the land area of the United States is covered with forest, but roads do not sample all this territory equally. They are much more apt to lead through fields and clearings. It would be liberal to estimate that one sixth the State highway mileage, or about 54,000 miles of such road, leads through forests. If there were added to this figure a nearly equal mileage of county and local roads having particular recreational value it would mean that a maximum of about 100,000 miles of roadside strips should be retained to give scenic protection to the highways.

The width desirable for these strips varies with the density of the forest, the topography, and the danger of windfall. Along roads that are used chiefly in summer, when forest visibility is much less than in winter, the strips can be narrower. In most cases the width of the strips on each side of the road should probably range from 125 to 250 feet, which would be sufficient to hide any impairment of the scenery behind them.

CAMP-SITE AREAS

For the benefit of the many automobilists and boat travelers who spend their nights in camp, it is important to provide "camp-site areas." These will not only make camping more comfortable and convenient for the travelers, but will also curtail the very serious damage to forests which results when the hordes of tourists who throng many popular highways camp chaotically through the surrounding woods.

The minimum area desirable for individual camp grounds is difficult to determine precisely. Probably one-quarter acre is about the least size to which a single tent site could be contracted and still retain reasonable isolation for the camping party which occupies it, though in many cases isolation is what the campers do not desire. However, too great crowding also tends to deteriorate the camp site. The number of tent sites on a camp ground may vary from one to upwards of a thousand.

In general it is desirable to locate camp-site areas some distance back from highways. This spares the camper the continual dust cloud raised by passing automobiles, and spares the tourist constant interruption in his enjoyment of the forest. To a certain extent the location of camp grounds will be determined by the occurrence of water, though wells and preferably piped water will make almost any area available for this use. In many populous parts of the country practically every possible camp ground should be developed. The laying out of camp-site areas calls for landscape architecture and recreational planning of high quality.

Camp-site areas may sometimes be necessary along much-frequented trails in order to avoid a haphazard camping which would seriously mar scenic beauty and wildness. The State of Maine has found public camp sites in the interior of the forest most desirable from a fire-prevention standpoint. In most cases, however, camp grounds

away from roadsides and main trails and boat lanes are undesirable because they give the recreationalist an unnecessary impression of the very regimentation and artificiality which he is seeking to avoid.

RESIDENCE AREAS

"Residence areas" provide space for private homes, hotels and resorts, group camps, sanatoria, and stores and services of one sort or another. They are in most cases privately owned, though the national forests in 1931 furnished summer-home sites for some 493,235 special-use permittees and their guests. The rent which the Government got from the summer-home sites in that year amounted to more than \$150,000. For the acreage involved this was the best paying activity which the Forest Service undertook. Many of the better-run private residence areas have been sources of great profit to their owners. There is here no conflict with commodity exploitation because the returns from recreation are so much greater than they could be from any other source.

About one-quarter acre is the minimum desirable area for a single forest residence. One acre would probably not be an unreasonable average, for both public and private land. Of course a few immense private estates run into thousands of acres, but only a small fraction of each of these tracts could fairly be considered a residence area. A store or service station generally necessitates a little less acreage than a private home, while a hotel or a group camp requires considerably more.

OUTING AREAS

While for many people the automobile tour in itself supplies every want, increasing numbers of people desire more intimate contact with the woods. Their first trip may be confined to the highway, but soon a curiosity as to what lies beyond the roadside fringe is aroused, and they return to find out. Once the joys of intimate contact with the forest are discovered, the idea of taking a vacation exclusively on the highway seems almost as preposterous as it would seem to have moving sidewalks established in picture galleries so that one might enjoy the paintings without stopping.

These people may be interested only in an afternoon's walk or an all-day hike or at most in an overnight trip. They do not require the large expanse of a wilderness and may not have ready access to any superlative or primeval areas. Consequently, yet another type of recreational area is needed. This type of area will be referred to as an "outing area."

For this use any tract of forest on which one can get away from the sounds of the highway and which has not been severely injured scenically will be acceptable. The outing areas will thus be intermediate between primeval areas and commercially operated timber tracts. In most cases it will be perfectly possible to combine sustained-yield forestry with the recreational use of outing areas. While even the best silviculture generally injures the æsthetic value of a forest for many years, there are high recreational values on most well-managed timber areas at least during the second half of the rotation. Obviously, recreational use and timber operation can never be combined unless there is assurance of sustained yield. In view of the almost uniform failure of private owners to practice sustained-

yield forestry, it is virtually imperative that where there is combined timber and recreational use the area must be in the hands of the public.

Throughout the East a good part of the forest hiking will have to be done in outing areas. In the West outing areas are often important adjuncts to popular residence areas. An example is the Desolation Valley in California, a tract of 41,000 acres near the much-visited Lake Tahoe. This basin has neither remarkable beauty nor remarkable timber, yet the Forest Service has set it aside exclusively for recreational use. It is much too small for any real wilderness journey, but is splendidly adapted for a day's walk or an overnight trip.

The character of outing areas will depend on what forest is available. In certain devastated sections of the East the most beautiful stands of timber remaining are such as might not even be considered for recreation in most regions. On the plains the only forest will generally be plantations which, although in their particular locality they may seem of surprising beauty, in other parts of the country would appear exceptionally unattractive.

Outing areas will have special value as buffers for superlative and primeval areas. Superlative areas tend to attract large numbers of people. If these crowds are permitted to camp in the midst of the most stupendous scenery, they seriously distract the onlooker, for a throng of tourists does not seem to blend with surpassing natural beauty. Yet hotels, camp grounds, and various services are needed for the crowds which visit these superlative areas. Hence arises the desirability of attractive buffers adjacent to the unique phenomena which draw the tourists. Here the large number of visitors can reside comfortably and amid pleasant surroundings, and yet not mar by their presence the value of the beauty which they came to enjoy.

The need of outing areas as adjuncts to many of the primeval areas is quite different. Primeval areas will generally be small, simply because in most forest types no large tracts of virgin timber are available. Any development of trails within these small primeval areas should link with forests outside, so that the pedestrian or horseback rider may not be confined in his enjoyment to the relatively brief time it takes to travel through the primeval forest. Such outside trails should lead through forest areas characterized by a considerable degree of beauty. Often this will necessitate the exclusion of all logging from the buffer forest.

The size of outing areas will vary from a few acres up to the lower size limits of wilderness areas. In general such areas will be distinguished by their accessibility, and this will tend to curtail the possibility of large dimensions.

THE PROBLEMS OF FOREST RECREATION

USE WITHOUT DESTRUCTION

Anybody who visits the popular outing centers near the large American cities on public holidays cannot fail to be impressed by the immense number of people in search of forest recreation. Almost every possible open spot along the highways will be filled with picnickers and campers cooking their meals, pitching tents, playing games, swinging from trees, and noisily giving vent to pent-up child-like impulses which are rigidly curbed under city regimentation. At

night time it sometimes seems almost as if every tree and every bush sheltered a sleeping figure. Such heavy use does more than kill the possibility of enjoying one of the chief recreational values of the forest, its privacy and quiet. It threatens to destroy the forest itself.

This damage to the forest comes from several sources. Small trees are cut down for fuel and tent poles. Reproduction and underbrush which gets in the way is removed. Trees and the lesser vegetation are killed by abrasion. Gas and oil leaking from cars onto the forest floor seriously injures all forms of plant life. Finally, the mere constant tramping on the forest floor kills the moisture-absorbing, nitrogen-providing ground cover, and packs down the soil so firmly that proper aeration for the roots of the trees becomes impossible. Many much-frequented camp grounds originally laid out in beautiful groves have become virtually deserts, with the few remaining trees all sickly, with the undergrowth and reproduction virtually extinct, and with the surface of the camp ground merely bare soil which in wet weather becomes a slimy mud and in dry weather gives off a constant cloud of dust.

The remedy for such intolerable conditions is fourfold. It is first of all essential to set aside a sufficient quantity of camping ground in the vicinity of large centers of population that no camp site will be overused. How many camp sites will be needed for each community is a subject for individual study, involving a consideration of the population, its present and probable future recreational habits, the quantity of other types of recreational land accessible for use, and finally the susceptibility to damage of each type of forest available for camp sites.

A second important remedy is to educate the public in the proper use of camp sites. There is an immense difference between the damage caused by careful, considerate campers and that caused by campers who appreciate nothing except their own immediate pleasure. Lack of regard for social values is in most cases not willful but simply thoughtless. Much of the misuse and destruction of public camp sites could be eliminated by educating people in a consciousness of the necessity for care with fire, prevention of needless damage to trees and other vegetation, cleanliness in garbage disposal, and reasonable consideration of the peace of neighboring campers.

There is need also for careful planning of camp sites so that cars may be parked, tents pitched, camp fires built, and meals eaten at definite places instead of all over the camp ground.¹⁰ In this way the quantity of vegetation destroyed by camping can be greatly reduced and much more efficient use can be made of the available space. Enough well planned camp sites are already in use to indicate clearly how much better the forest values are protected on such areas.

Finally, it is desirable to have definite regulation of all camp grounds. In the case of large, much-frequented camp-site areas this will necessitate a resident administrative officer; in the case of smaller, less popular areas, an occasional visit by an inspector. The administrator will see that necessary regulations are enforced, he will help to educate the camp-ground users as to the desirability of good camping manners, he will assist them where they require help, he will build fireplaces, garbage receptacles, driveways, he may in some cases even

¹⁰ A Camp Ground Policy, E. P. Melnecke, 1932.

procure fuel for campers, and he will clean up any mess they may leave behind and repair any damage that can be repaired.

The problem of use without destruction is in many respects even more critical in the case of primeval areas. The only reason it is not in all respects more critical is that fewer people visit primeval areas, unless the areas are along main routes of travel, as in the case of the California redwood groves.¹¹ Primeval areas are the result of a very delicate balance of natural conditions. As soon as they become overrun by hordes of people the original conditions are upset and the natural balance of the forest destroyed. To prevent this it will generally be necessary to prohibit camping, most destructive of the recreational uses of the forest, in all primeval areas except a few of the most extensive. Where camping is permitted it will have to be confined to specially prepared camp grounds. Trails will have to be constructed through the areas so that the great bulk of people, instead of tramping promiscuously over everything, will limit their wanderings to the pathways.

PRESERVATION FROM NATURAL ENEMIES

Areas of forest land that are devoted to recreation require just as serious protective measures as do commodity areas. Fires, insects, and fungi may in fact be even more destructive to recreational than commercial values. Dead trees often have a salvage value as commodities, but there is no way of salvaging the destroyed beauty of a ruined forest.

In spite of the best protective efforts, however, there is one natural enemy against which the primeval forest can not in the long run be protected. This enemy is senility. Sentimental conservationists talk glibly about setting aside virgin timber tracts to be preserved in all their natural glory forever. Nevertheless relatively few forest trees live beyond 400 years. What is a beautiful virgin forest today may in 40 years be a very ragged stand in which most of the old trees are dying and in which the understory will require a century or more to attain the size and beauty of the former forest. There is good evidence that in the past great areas of overmature timber were wiped out by widespread insect epidemics, often followed by fire.

Just recently the disastrous mountain pine beetle epidemic among the lodgepole and ponderosa pine stands of the northern Rocky Mountains has destroyed the overmature timber on millions of acres, in spite of strenuous efforts to control it. Such natural devastation is bound to occur among trees that have passed their normal life span. Expensive protective measures may delay it, but they can never make trees immortal. The primeval forest, though it is a self-perpetuating unit, is bound to go through cycles of deterioration and upbuilding.

Since deterioration is inevitable, and many years or even several centuries may elapse before the beauty of the primeval is restored, sustained-yield principles must be applied to primeval areas as well as to lands which are being logged. It is necessary, in other words, to maintain in a primitive state a complete rotation of age classes, so that when the overmature forest decays a mature stand will be growing up to take its place and a stand of reproduction will be advancing toward maturity.

¹¹ A report upon the Effect of Excessive Tourist Travel on the California Redwood Park, E. P. Melnecke, 1928.

To illustrate this principle specifically, let us suppose that it is desired to set up a primeval rotation in the western white pine type. This type does not reach its finest development before 200 years. By 300 years the white pine elements of the stand begin to disintegrate rapidly. Thus the 200-year-old primeval stands which we set aside today at their most beautiful stage of development will be considerably less splendid in 2032. Consequently it is desirable to reserve mature stands of about 100 years which today lack much of the beauty of the older forests but in a century will have surpassed them in aesthetic value. Similarly it is desirable to set aside stands of present reproduction which will grow into the primeval forests of the twenty-second century.

In actual practice the first necessity is to preserve the virgin areas of the present. This action cannot be postponed. If many of the present overmature forests are not set aside as primeval areas within the next few years, they probably never will be set aside. The acquiring of the mature and immature age classes can safely wait in most cases, but sooner or later it will be desirable, in all except a few uniformly uneven-aged types, to make provision for preserving the important stages in the life cycle of the forest.

ADMINISTRATION

It will be well to consider briefly the different agencies which control forest land, to mention the theory under which their administration functions, and to point out which types of recreational land each ownership is adapted to handle.

NATIONAL PARKS

National parks are supposed to be confined to areas which remain essentially in their primitive condition, which are sufficiently inspirational to attract visitors from the entire country, and which are the finest samples in the United States of the particular types of natural phenomena which they exemplify. All commercial exploitation is barred. They are maintained as outdoor museums of the superlative and primeval. They are intended to serve chiefly as sources of inspiration, education, and aesthetic enjoyment, rather than as playgrounds, health resorts, or week-end camping sites. They include most of the superlative areas, are peculiarly well adapted for maintaining primeval areas, and owing to a recently formulated policy of keeping roads out of most of their territory they include splendid possibilities for wilderness areas.

NATIONAL MONUMENTS

The national-monument system of the United States is administered by the Departments of the Interior, Agriculture, and War. The number of monuments administered by each of these agencies is respectively 38, 16, and 24. The Agriculture Department monuments are included in national forests. The War Department monuments embrace barely 1 square mile altogether. National monuments administered by the Interior Department are of five classes: (1) Remains of prehistoric civilization, (2) historic relics, (3) geologic examples, (4) botanic reservations, and (5) wild-animal reservations. It is in the

fourth class that forest recreational lands may well be administered. The Muir Woods near San Francisco and the Glacier Bay National Monument in Alaska are splendid forests preserved in national monuments from commercial exploitation. The national-monument system of the Interior Department is capable of taking over further primeval areas which it may be desirable to purchase, though on the whole the administration of such areas would seem to be more the function of the Forest Service.

NATIONAL FORESTS

The national forests are managed on the principle of providing "the greatest good to the greatest number in the long run." Under this policy the Forest Service recognizes that some lands are so valuable for recreation that no commercial exploitation should be permitted on them. Other lands are much more valuable for the timber, forage, and water power which they can produce, and on these lands recreation receives no consideration. On still a third sort of area some of the recreational values are safeguarded at the same time that the development of commodities is permitted.

In national-forest recreational development the stress is laid not on preserving the primeval but in providing healthy outdoor recreation. Camping, the development of health resorts, and general frolicking are encouraged. As a result national forests, in addition to providing some superlative areas and primeval areas, provide wilderness areas, camp grounds, residence areas, and outing areas for millions of people.

OTHER FEDERAL LANDS

Certain forest lands which could be used for recreation are found on the public domain, naval reservations, military national forests, and lighthouse reservations. The last three classes of lands embrace less than 60,000 acres. They can well continue under their present administration, with any recreational use they receive ranking distinctly secondary to their major purpose. Public-domain lands that are chiefly valuable for recreation should be turned over to the national parks, national monuments, national forests, or State parks, according to which type of management is best adapted to administering them. Provision has been made in the Recreation Act of June 14, 1926, for turning over to the States or minor political units public-domain lands of recreational value which seem better adapted to local than to Federal administration.

STATE PARKS OR FORESTS

State parks and State forests which may be devoted to recreation are supposed primarily to meet the recreational needs of the citizens of the State in which they lie. They should generally be distributed as evenly as possible throughout the State so that all the citizens may have a reasonable opportunity of enjoying their benefits. "They should be sufficiently distinctive and notable to interest people from comparatively distant parts of the State to visit and use them, not merely good enough to attract people from the region in which they are situated and merely because of the absence of more interesting areas within easy reach."¹²

¹² Olmsted, California State Park Survey, California State Park Commission, 1929.

In most cases State parks will be under less stable control and more subject to political influences than Federal reservations. They will not, therefore, be so well adapted for the permanent retention of primeval areas, although the Adirondacks and California belie this generalization. They will usually be much smaller than Federal parks and forests, and consequently will seldom contain possible wilderness areas, although the Adirondacks again make a notable exception. Their chief value will be in supplying roadside, camp ground, residence, and outing areas for citizens of the States in which they lie.

COUNTY AND MUNICIPAL PARKS

In general the parks controlled by the minor civil divisions are meant for the ordinary outings of the local citizens. They will lack the sensational features which attract people from distant parts, but will make up for their constricted appeal by the intensive use to which they are put by those who live near them. They will be even more important than State forests for camp site, residence, and outing areas. Each municipality and county will have the responsibility of planning for the forest recreation of its own citizens, and the amount of land which each will have to supply will be in inverse ratio to the amount of Federal and State land in the vicinity.

PRIVATE LANDS

Private holdings are usually adapted only to those types of recreational land capable of yielding a profit. These are in general residence and camp-site areas. In competition with free or very cheap public camp grounds it is doubtful that many private camp grounds could pay, and certainly the various governments would not be justified in giving up this social service to their citizens simply to permit private operators to make a profit in this field. There are several privately owned wilderness areas in Maine and one in Georgia, but their preservation under this form of control is very perilous. One experiment is being broached in Maine for developing an outing area on private lands, the proceeds to come from toll roads, summer home sites, and concessionaires. The few large private estates and game reserves which still remain in the United States might also be classified as outing areas.

SUMMARY

In summary, the types of recreational area for which each of the principal forms of forest administration is especially adapted are:

National parks: Superlative, primeval, wilderness.

National monuments: Primeval.

National forests: Superlative, primeval, wilderness, roadside, camp site, residence, outing.

State parks and forests: Roadside, camp site, residence, outing.

County and municipal parks: Camp site, residence, outing.

Private: Camp site, residence.

FORESTRY AND RECREATION

Without the practice of forestry on the lands devoted to timber production, the best values of forest recreation would be doomed. For no matter how solemnly we may set aside in perpetuity lands on

which timber may be neither "sold, removed, nor destroyed", the fact remains that if the need for timber becomes sufficiently acute the protected lands will be opened for exploitation. Men in general have always attended to their physical needs ahead of their aesthetic and recreational ones. Consequently, if our physical forest needs cannot be met on the areas devoted to commodity production, it is almost certain that the aesthetic and inspirational forest values will be sacrificed. But if the commodity forests are managed on a sustained-yield basis there will be no need to call on the recreational forests for wood products, and people may still continue to enjoy the adventure, the beauty, the inspiration, and the opportunity of communion with nature which the forest alone can supply.

AREA TO BE SET ASIDE FOR RECREATION

It will be impossible to make any precise calculations as to the area necessary to meet the country's forest recreational needs until some survey, much more thorough than anything yet attempted, has been made. However, the following estimates may have some validity as rough approximations.

SUPERLATIVE AREAS

It is generally agreed that all forest areas of superlative scenic value should be set aside exclusively for recreational use. The total of such areas in the United States probably does not amount to more than 3 million acres, of which over 2½ million acres have already been reserved for exclusive recreational use.

PRIMEVAL AREAS

An average of 150,000 acres of overmature forest would seem like a conservative estimate of the acreage to be set aside as primeval area in each of the 20 major forest types. The departures from this average in individual types will be wide, for much will depend on the availability of satisfactory stands. In addition to the 3 million acres of overmature forest which it is important to reserve immediately, it will eventually be desirable in all except a few uniformly uneven-aged types to set aside an equal area in both the mature and immature forest in order to have that succession of age classes which alone will insure the perpetuation of primeval areas. Furthermore, about 500,000 acres in minor forest types should be reserved, making primeval areas total about 9½ million acres.

WILDERNESS AREAS

Of the 20 million acres of forested land included in wilderness areas that have already been established or might be established, about 5 million acres in Maine are in private ownership. This land has practically all been cut over, and will no doubt continue to be handled for both commodity and recreational use. About 4 million acres of national forest wilderness will also be subjected to logging according to present plans. Approximately 1 million acres of the forested wilderness total is also superlative area. With these deductions

there remains a total of 10 million acres of forest land which will probably be reserved primarily for wilderness recreational use. Some grazing will occur on much of this area.

ROADSIDE AREAS

It was estimated that a maximum of 100,000 miles of road leading through the forest should be protected by scenic strips on either side of the right of way. The width of these strips would range from 125 to 250 feet, with an average of perhaps 175 feet. Two strips 175 feet wide and 100,000 miles long would involve an area of approximately 4 million acres.

CAMP-SITE AREAS

It may reasonably be estimated that not more than one tenth of the American population is likely to go camping in the forest at one time, or in other words a maximum of 16½ million people out of an estimated stabilized population of 165 million. If the average area required by each camping party is about one third acre, and if, as the American Automobile Association has calculated, touring parties include an average of 3½ people each, each camper would require about one tenth of an acre. This would make the total camp-site area, in round numbers, 1½ million acres.

RESIDENCE AREAS

The acreage required for residence areas is even harder to estimate than for other recreational land. There were in 1930 about 30 million families in the United States. If the stabilized population of the country is one third greater than the present population, it may be expected that the number of families will increase by at least that ratio, making the stabilized figure not less than 40 million. It does not seem unreasonable to expect that one tenth of these families, or in other words, 4 million, will have forest residences. If the average area for each residence were 1 acre, the total area would amount to 4 million acres. In addition it seems reasonable to calculate at least 100,000 group camps, hotels, and resorts, with an average of 20 acres of forest for each, making an additional 2 million acres. Thus the total area required for residential use might be calculated very roughly as around 6 million acres.

OUTING AREAS

By far the larger share of those who make use of the forest for recreation do not demand the unusual qualities which characterize superlative, primeval, and wilderness acres. Their demands are satisfied by any land which retains a considerable growth of timber and has not been recently scarred by logging. Consequently, a goodly fraction of the forest recreationists can obtain the values they seek on any well-managed forest lands which have had sufficient time to recuperate from the effects of logging.

Theoretically, if the population of the United States were equally distributed, there would be no necessity for special outing areas. People might take their ordinary forest outings on lands which are being properly managed for the production of commodities. However, in the vicinity of certain centers of population the value of forest land for recreation may be so great that there will be no social justi-

fication for turning any of it over to commercial exploitation even for a few decades. Lumber is much cheaper to transport than people, and so it seems that wise land-use planning will favor exclusive recreational use of some at least of the land near areas where the population is particularly dense, leaving the more sparsely settled regions as the principal sources of commodities.

The total acreage of such outing areas as are needed for exclusive recreational use would only be a small fraction of the acreage of the well-managed forest land which might provide both recreation and commodity production. Nevertheless, it would probably amount to a good many million acres in the entire country. It seems conservative to estimate 10 or 12 million acres as the minimum territory which would meet the requirements for exclusive recreational outing areas. If, however, sustained yield forestry should not be practiced on the commercial forest areas, and recreational values on cut-over lands should be as seriously depleted in the future as they generally have been in the past, the 10 or 12 million acres would only meet an insignificant fraction of the total outing area requirements.

SUMMARY

These estimates, though admittedly crude, indicate that approximately 45,000,000 acres will be required primarily for recreational use. These acres will probably be distributed among the different types of recreational land about as follows:

	Millions of acres
Superlative areas.....	3
Primeval areas.....	9½
Wilderness areas.....	10
Roadside areas.....	4
Camp-site areas.....	1½
Residence areas.....	6
Outing areas.....	11
Total.....	45

It is well to point out that 45 million acres is only 9 percent of the total of 506 million acres of commercial timberland in the United States. Already 11 million acres have been withdrawn from timber use in national, State, and local parks. Of the remaining 34 million acres, at least 13 million acres are so remote and of such low productivity that it will undoubtedly be many years before they can possibly be considered for commercial exploitation.

The withdrawal of 45 million acres of land for recreational use would involve a very distinct economic benefit. It would concentrate the growing of timber for commodity use on a smaller acreage than is at present available, would consequently increase the value of commercial forest land, and would thus indirectly aid in making the commercial operation of timber lands more profitable.