# FOREST

## –Goals and Decisionmaking in the Forest Service

RICHARD M. ALSTON


USDA FOREST SERVICE RESEARCH PAPER INT-128 / INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION / OGDEN, UTAH 84401

# ABSTRACT

The Forest Service is faced with a need for specification of the goals that guide National Forest management. Without clear goals, management action cannot be properly judged as to adequacy of performance. The needed specification cannot readily be found in Forest Service publications or management statements. This apparent absence of goals stems in part from a lack of focus on the role of goals in decisionmaking, and from the wording of the legislation.

Contrary to widely held belief, this study finds that the legislation, though often broadly stated, does provide the necessary guidelines to develop a fairly clear mandate to guide Forest Service activities. When viewed as an integrated and evolving set of laws, the legislation establishes the goal: Maximize the sum of the weighted values of the National Forest resources. Subject to specified constraints, this means that all the resources of the forest are to be managed in a manner that maximizes their aggregated value, as opposed to maximizing the value of any one resource in isolation. The weights to be applied are not specified. A descriptive decisionmaking model that can guide the agency toward greater fulfillment of its management objectives is presented.

Establishment of priorities without clear reference to the overriding goal has led to agency practice that is subject to criticism. Recent agency actions, however, show indications of awareness of the proper direction to be followed. In the areas of budgetmaking and public involvement, serious problems must be solved. Strengthening the ability to demonstrate the consequences of alternative actions will be an essential step toward solutions and will help to establish goal-oriented decisionmaking.

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Richard M. Alston is Assistant Professor of Economics at Weber State College, Ogden, Utah. He earned the B.A. degree in Economics from the University of Utah in 1966, and the M.A. and Ph.D. degrees in Economics at Cornell University in 1968 and 1970. A Woodrow Wilson Fellow (1966-1967), he held a National Defense Education Act Title IV Fellowship (1967-1969), and the Presidential Scholarship in Economics (University of Utah, 1965-1966). Dr. Alston is a biographee in *Who's Who in the West*, the *International Scholars Directory*, and *Outstanding Educators of America*. The subject of his doctoral dissertation was "Commercial Irrigation Enterprise: The Fear of Water Monopoly and the Genesis of Market Distortion."

## NOTE

This Research Paper reports the results of research done by Dr. Alston. The research on which this report is based was funded under a cooperative agreement with Weber State College.

This research was undertaken to gain insights into Forest Service policy problems. The conclusions reached are those of Dr. Alston. They represent the results of his exploration, analysis, and interpretation.

The field of policy consideration is controversial and professional researchers have varying approaches. The Intermountain Forest and Range Experiment Station believes that Alston's work ably presents a significant point of view.

Of necessity, reference has been made in this study to many sources not easily available to the public. Any questions on these items may be addressed to the author.

# PREFACE

A large organization under pressure is much like a person. Often personal crises trigger a much-needed self-evaluation. A traumatic experience may alter future direction significantly. Frequently an outsider — a minister, an acquaintance, or even a stranger — can provide insight and perspective on the problem not available from those immediately concerned.

The Forest Service has experienced just such a crisis in recent years. Prompted by public criticism, the agency has taken a hard look at where it has been and has attempted to determine the proper direction for the future. Agency personnel have investigated problem areas, such as those in Montana and Wyoming. For the agency, as for the individual, however, often it is helpful to get an outside view, from the perspective of someone not closely connected with the agency or its activities, and unaffected by preconceived ideas about Forest Service goals.

Because the study of economics is concerned with many aspects of choice and decisionmaking, the Intermountain Station turned to this field for assistance. Economists have only recently concerned themselves with the actual process of goal formulation. Many economists have returned to the original foundations of their field and have come to emphasize what is called "political economics," showing greater concern for the interrelationships between the sociopolitical environment and the actual goal formulation process. Not only can the economist serve in technical situations of choice among alternatives, but he can play an important role in gleaning out of seemingly imprecise and vague directions a decisionmaking framework that will enhance the probability of achieving such goals.

The study shows the economic orientation of the author, but was written primarily with the professional land manager and the interested public in mind. It is hoped that the conclusions reached will be useful in future planning.

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As an "outsider" with respect to forestry, I could not have completed this study without the expert advice and the general guidance of many people. I sincerely appreciate the assistance of Con Schallau and Alan Green of Intermountain Forest and Range Experiment Station, Ogden, Utah, and Dean A. Gardner, Office of the General Counsel, Ogden.

Forest Supervisors Orville L. Daniels (Bitterroot National Forest, Hamilton, Montana) and Jackson D. Large (Lolo National Forest, Missoula, Montana) shared their insight in personal discussions. Sincere thanks go to those who reviewed earlier versions of the study, including Henry J. Vaux (University of California, Berkeley); Carl Reidel (New England Natural Resources Center); William D. Hurst, Regional Forester (Southwestern Region, Albuquerque, New Mexico); P. M. Rees, Regional Planner (Intermountain Region, Ogden, Utah); Dennis Schweitzer (Pacific Northwest Forest and Range Experiment Station), and Ervin Schuster (Weber State College). Thanks are also due to the organizers of meetings held in Butte, Montana; Wemme, Oregon; Ogden and Park City, Utah; at which the FOREST model was presented. Many changes resulted from the question and answer sessions.

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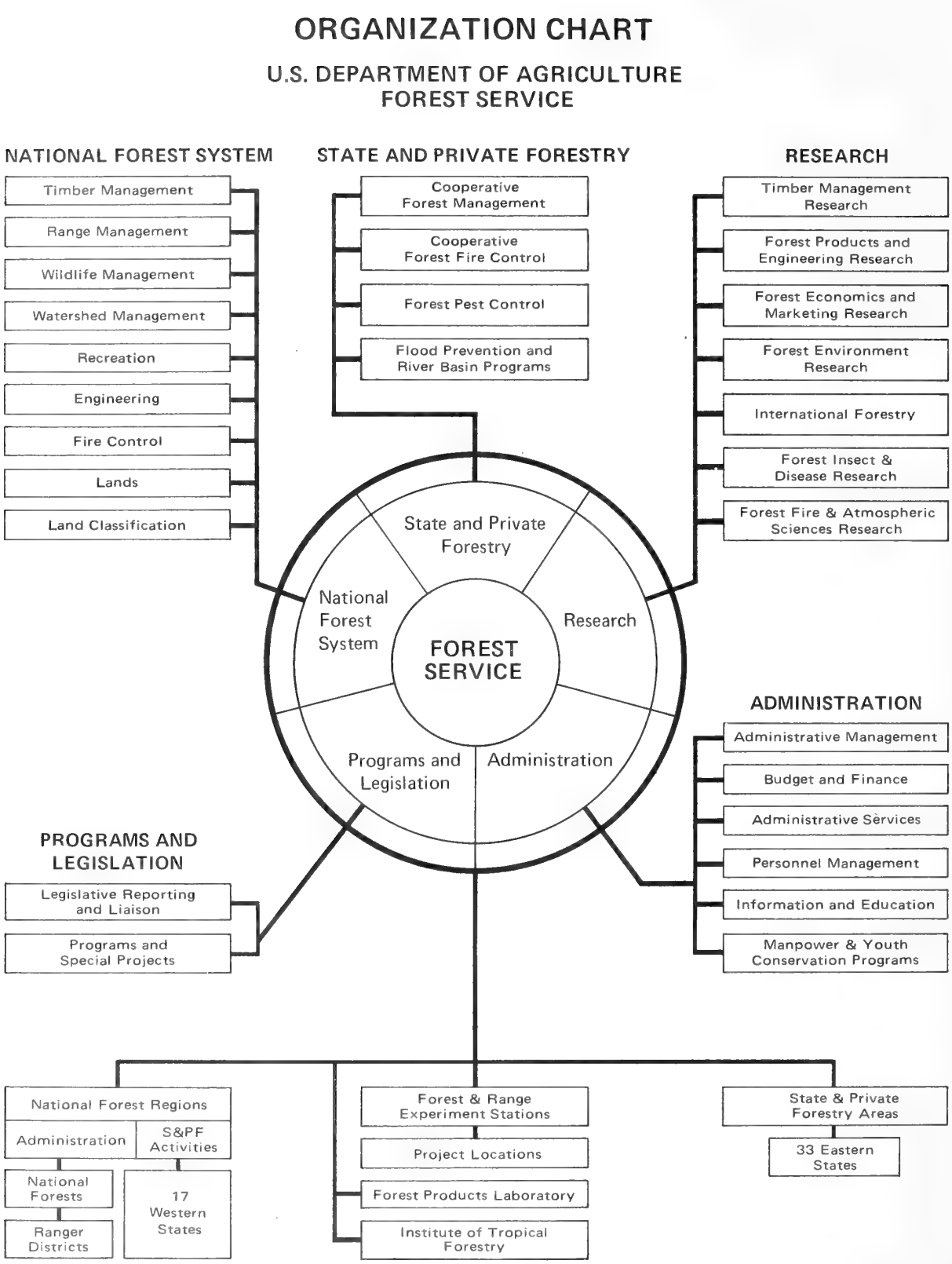


*Figure 1. — The organization of the Forest Service, shown in this chart, encompasses varied activities.*

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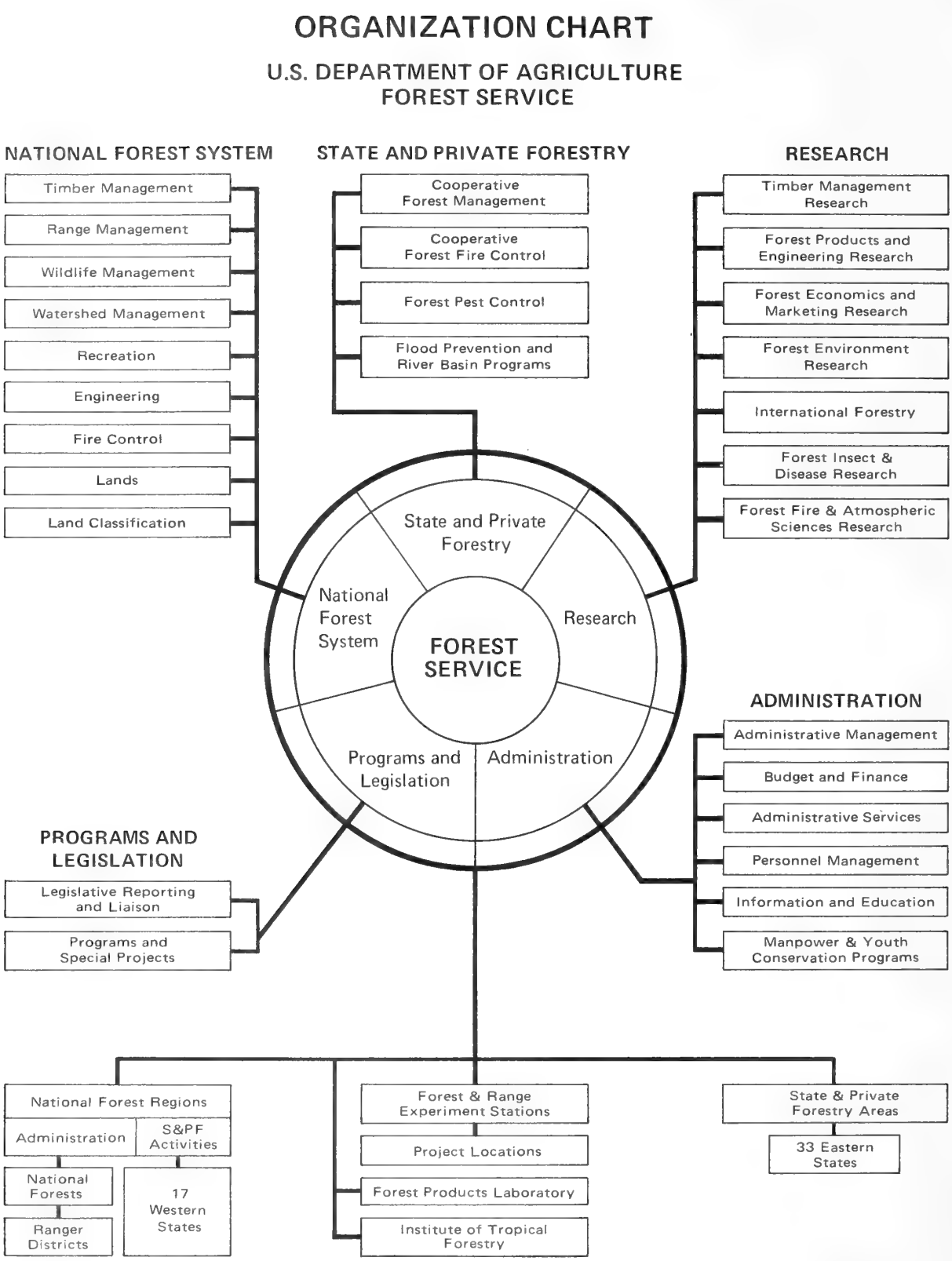


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# INTRODUCTION

This study deals with the place of goals in decisionmaking in the particular context of the Forest Service. It is not meant to be a polemical tract, although it hopes to chart a new course. It explores and perhaps illuminates an already existing but not clearly recognized path to improved management and decisionmaking.

The Forest Service, like most organizations, arose in response to a specific problem — how to manage the nation's vast timber resources to meet the needs of the American people. This study attempts to take an in-depth look at how the organization which emerged to handle that problem can define and evaluate its mandate so as to attain its objectives.

### The Management Job: The Forest Service View

Forest Service responsibility lies in three distinct areas: (1) Administration of National Forests and certain other Federal lands; (2) State and private forestry cooperation; and (3) research (fig. 1). It is "charged with responsibility for the technical phases . . . of forestry activities" within the Department of Agriculture. The Forest Service line-staff organization as described in the official *Forest Service Manual*[1] is designed to enable the most effective fulfillment of those assigned responsibilities:

> The organization is designed to provide a clear-cut, two-way channel for the transmission of policy and instruction from the top to the bottom and for the flow of recommendations and accountability from the bottom to the top. Because the Chief of the Forest Service is responsible for all its work he must have the means of assigning work and authority to subordinate officers and units with assurance that the work will be accomplished in accordance with his policies and other requirements. In short, the organization is essentially an extension of the physical and mental facilities of the Chief. The diversity and geographical diffusion of Forest Service work require a clear, well-understood, well-coordinated, and efficient organization.

The statement suggests a tightly knit organization that would prevent any major departures from well-recognized and nationally held objectives. The existence of such an organization is open to question, however. The remainder of this paper may shed some light on this matter.

### The Critics' View

Anyone interested in forest management is well aware of the criticism that has recently been leveled at the Forest Service. As Sterling (1970, p. 24) puts it, "The United States Forest Service catches hell from everyone these days. Every action it takes, or doesn't take, starts a public argument of some sort. And no matter what the result, the agency always seems to lose." At the heart of part of the current controversy is the clearcutting issue (see Burk 1970). But the roots of the problem are much deeper than any particular silvicultural practice. Even if clearcutting were to cease there is little reason to think that the controversy would be over (fig. 2). As the *Wall Street Journal* (p. 24, June 4, 1971) reports, the Forest Service is coming under increasing attack as it smarts under the critics' claims that it has allowed damage to the public timberlands. The *Journal* contends that "the government's green-clad foresters have changed from white hats to black hats . . . The unaccustomed role of black hat has prompted some painful self-analysis by the proud and somewhat stiff-necked forester corps."

[1] Sec. 1202, Amendment 119, 1964.

*Figure 2. — Clearcutting in some areas has aroused controversy. In this lodgepole pine stand on the Lewis and Clark National Forest, clearcutting in the foreground area was followed by dozer piling and scarification. The stands of young trees on most of the older units have been thinned.*

### A Search for Goals

There appears to be a general consensus among critics that the agency has no overriding goals and objectives, and in the absence of such goals is subject to pressure by sundry vested interest groups. The indictment, as far as it goes, may or may not be correct. In either case such criticisms simply don't go deep enough to provide solutions to the perceived problems. The emphasis should not be on fixing blame; rather, efforts should be focused on getting at the root of the problem and moving on with the job that must be done. Furthermore, the conclusions of the critics may be the result of three different possibilities.

First, they may be looking in the wrong place for the organization's goal. Whereas most critics attempt to spell out a land management or production goal, the agency may simply be seeking an internal goal of survival by striking a balance among competing forces. But as Sterling (1970, p. 24) argues, echoing many other equally vocal critics,

> . . . tragically, nothing could be further from the truth. There's been no "balance" at all. The complaints on both sides, in fact, are completely justified and the final compromises reflect, rather than harmony, an appalling lack of leadership. The truth is that the Forest Service has no policy. It charts no national course. It simply blows where the political storms blow it, riding the middle of the wind, heading for no port, bent only on somehow keeping afloat.

When divergent interests are strongly held by different groups, even compromise may not yield a satisfactory solution. An attempt to steer a middle course between vested interest groups, a practice referred to as "satisficing," may prove disastrous.

Second, the apparent lack of goals may be just that — apparent. There is no reason to say that actions taken or not taken by the Forest Service are irrational or pursue no specific objective simply because they do not yield the results or follow the precepts of any given

group or person. The Forest Service may indeed be pursuing rational and well-coordinated land management policies, but if this is so, then the real problem is a communications gap (some would say a gaping canyon) between the foresters and the general public. There may simply be an enormous public relations problem.

Both of these explanations of the absence of identifiable goals in Forest Service practice may contain more than a grain of truth. We cannot determine their validity, however, until we have explored a third possible explanation — the subject of this study. It is that the Forest Service may have failed in the past to fully recognize its goals and the function of goals in the decisionmaking process. R. S. Whaley, a serious student of forest management problems, may be correct in asserting that

> Our current orientation to solving multiple use problems seems to have the proverbial "cart before the horse." We are concentrating on the quantification of values without a clearcut definition of how derived values will be used. A more logical approach involves three steps, the order of which is critical. **Step one must be a realistic and explicit statement of goals for the development and use of the public resources in question** . . . With an explicit statement of resource management goals, the second step is to develop a valuation system which produces a set of indices related to the measurement of benefits . . . The third step is, of course, the application of the allocation model and its associated value system to multiple use decisionmaking (Whaley 1970, p. 564-565; emphasis added).

The Forest Service may appear to have no goals because it has not adequately clarified them. The goal of "good forest land management" is in the mind of virtually every forester in the agency, but has never been articulated fully enough to be useful in the decisionmaking process. Without a clearly stated goal, neither the agency nor its critics can firmly establish that the land is or is not being managed so as to best meet the needs of the American people. This study hopes to (1) develop a decision model embodying the goal specified to the Forest Service by legislative mandate; (2) identify some incongruities and weaknesses in the decisionmaking process as it is now carried out within the agency; and (3) indicate present and possible future approaches to eliminating these incongruities.

# GOALS IN THE DECISIONMAKING PROCESS

A goal is some special set of conditions, a state of being, an end, or an object to be achieved sometime in the future or maintained over a given period of time. Goals are a prerequisite for decisions and serve decisionmakers as targets, inspirations, performance standards, and guides to selecting data and personnel. Very often goals appear to be traditional, but they are the result of and evolve from change (Vaux 1968).

Choice, or decisionmaking, aims at fulfilling goals. Rational choice invariably requires selecting from alternative allocations of scarce resources those that maximize the attainment of a predetermined goal (or minimize the cost or pain associated with some specified level of its attainment). These scarce resources may be as concrete as the dollars spent to build a recreation campground, or as intangible as the quality of the view seen from a 747 jet flying over a western forest.

Although decisionmaking may involve a revision of goals, the process of rational choice is the same, whatever the goal. Thus, Baumol (1967, p. 46, 47) states,

> People's objectives are whatever they are. Irrationality surely must be defined to consist in decision patterns that make it more difficult to attain one's own ends, and not in choosing ends that for some reason are considered to be wrong. Unless we are prepared to determine other people's values, or unless they pursue incompatible goals, we must class behavior as rational if it efficiently pursues whatever goals happen to have been chosen.

Goal setting is a continual and continuing process. Some long established goals may have remained unchanged for years. But more often than not, even these will be altered and adapted through interpretation and application. These changes come about through the steps a decisionmaker takes in arriving at the optimum or correct choice among alternatives:

- First, the problem must be clearly identified and all of the issues properly defined. Unless a problem is understood, it cannot be solved.
- Second, the objectives or goals that are to be served must be identified specifically. Often, these are extremely vague. Goals may be single or multiple, simple or complex.
- Third, once the problem and the goals to be served are clearly identified, alternative courses of action must be set forth and analyzed. Rarely is there only one way to deal with a given problem. The probable consequences of each of a number of possible alternatives must be estimated.
- Fourth, the alternatives must be appraised and the decision made. The choice of any one alternative or combination of alternatives rests on the evaluation of probable consequences. This step may, and perhaps should, include a reevaluation of the goals themselves.

This study is primarily concerned with the second step in the process of decisionmaking — identification of the goal; and with the development of a decision model based on that goal.

## Considerations in Goal Setting

In the process of defining goals, certain basic principles must be kept in mind. A few of these are particularly relevant here.

**Availability of information.** — Different goals require different types of information or specific data. Whether or not a particular goal can be achieved is in large measure determined by the availability of the requisite information. As Vaux (1968, p. 800-801) states, "However well conceived it may be on other grounds, a goal which invokes needs for information which are difficult or impossible to fulfill may be completely ineffective in its influence on decisionmaking."

**Complexity.** — Goals are seldom either single or simple. The interrelations of various objectives, none of which can be ignored, complicate the choice among alternatives. If a government, agency, entrepreneur, or decisionmaker in any area has only one goal, its optimizing behavior — the most effective course toward the goal — is clearly evident. A rising demand for wood for housing, for example, could be met by simply increasing the harvest of timber from private and public forested lands, if no other consequences were important. But obviously the public interest demands consideration of other goals than housing. The potential of the forest to provide for recreation, habitat for fish and wildlife, water supply, and other needs cannot be destroyed in satisfying the need for wood. There are conflicts between objectives, and these must be specified before the decisionmaking process can go on.

**Consistency.** — To be useful, a goal must be applicable at all levels of an organization. Policies determined at higher staff levels are sometimes viewed as constraints by lower-level staff members. Unless there is a common understanding, this view that "one man's goal is another man's constraint" can easily lead to conflicts within the management structure. The activities, policies, and goals of subunits of an organization must be totally related to the goals of higher level management. Otherwise a process of suboptimization sets in that prevents achievement of the ultimate objective. The goal-oriented decision model presented later in this paper can be viewed as a high-level management goal. It should not be construed as an idealistic one that does not apply to the lower-level organization. At lower levels, subgoals must be defined that are consistent with the overriding goal, if optimal decisionmaking is to be achieved.

## Goal Ranking

As indicated above, the optimizing behavior to achieve multiple or complex goals cannot be easily specified from the goals themselves. Conceivably, for example, the Forest Service might operate with the following two goals: to maximize profit and to maximize revenue from sales of timber on the public lands.[2] It should be obvious (and is verified by economic theory) that the action that would maximize profit would not necessarily be optimal, because it is highly unlikely that maximum profit and maximum sales revenue can be achieved simultaneously. In fact, without additional information, no action taken by the Forest Service could be deemed optimal given those two goals. It is only when the goals are ranked or weighted so as to indicate the priorities, the dominant and subordinate goals, or the acceptable trade-offs between goals, that optimality will become manifest.

### Value and Weight

It is important that a clear distinction be made between the term "value" on the one hand, and "weight" on the other. Value is a quantitative estimate of a quality of usefulness, importance, desirability; in economics it is a measure of the degree to which a certain action or thing satisfies human wants. Value is often defined as the power of a commodity to command other commodities in exchange for itself. Value is a quantitative measure that allows comparison between different things. Weights allow the consideration of benefits that cannot be measured in strictly quantitative terms. It is possible that two policies that yield equal values in monetary terms will not be viewed by the decisionmaker as equivalent in terms of the benefits to be obtained. In essence, weights may be viewed as the expression of the premium placed on the outcome

[2] Note that these examples are in no way to be taken as goals the agency "ought" to pursue. This study is concerned with the goals set forth in legislation, not with those suggested by individuals or groups.

of a policy that provides nonmonetary benefits. An example will clarify the distinction.[3]

Let us assume that the United States desires to achieve a growing level of personal income and general economic prosperity throughout the nation. It also desires to improve the lot of the lowest quintile (20%) in the income distribution (i.e., persons with poverty-level incomes). Alternative fiscal policies may be presented, all of which would result in an increase in personal income, but in different magnitudes and distributed differently in a relative sense. The first alternative might achieve an increase in personal income of $1 billion in such a way that it is spread evenly throughout the nation. The second alternative might be able to achieve a total increase in personal income of only $0.8 billion, but would increase income to the lowest quintile by $0.5 billion, with $0.3 billion going to the remaining 80 percent of the distribution. The third alternative promises to increase per capita income by $1.01 billion, but would result in only $0.1 billion going to the lowest quintile. The required decision is which policy alternative to pursue.

The values of personal income that are attainable do not in themselves indicate the proper avenue to take. If no special "weight" were attached to the goal of redistribution to the lowest quintile in the income distribution (situation A), then the third policy, which yields the greatest total increase, would appear appropriate. If, on the other hand, a positive weight or priority were placed on the redistribution (situation B or C), either the first or the second policy would be preferable, even though both would yield lower total increases than the third alternative. The determining factor will be the degree of importance attached to the goal of income redistribution relative to the goal of increasing total personal income. The following discussion shows how decisions will be affected by placing alternative weights on the achievable values of the three fiscal policies.

[3] The example in the text is a simplification of the concept. For a more precise but readily understandable treatment see Major (1969). See also Marglin (1962).

| Goals | Policy 1 | Policy 2 | Policy 3 |
|---|---|---|---|
| Increase in personal income in the lowest quintile ($PI_p$) | $ 200,000,000 | $500,000,000 | $ 100,000,000 |
| Increase in personal income, total ($PI_t$) | $1,000,000,000 | $800,000,000 | $1,010,000,000 |

Various alternative weights or priorities may be placed on the two components of the goal, but whatever the weights, the decision rule is

**Maximize the weighted aggregate increase in personal income.**

This can be expressed quantitatively as

$$\text{Maximize } (PI_t + aPI_p)$$

where a is the premium placed on $PI_p$.

In situation A, with no distinction with respect to income distribution, no special weight or premium is given to income gained in the lowest quintile of income distribution. The optimizing behavior is

$$\text{Maximize } (PI_t + 0\ PI_p)$$

Policy 1 yields
$1,000,000,000 + $ 0 = $1,000,000,000
Policy 2 yields
$ 800,000,000 + $ 0 = $ 800,000,000
Policy 3 yields
$1,010,000,000 + $ 0 = $1,010,000,000

By choosing policy 3 we maximize the weighted value of increase in personal income.

In situation B, a special premium or weight of 1.0 is given to income gained in the lowest quintile of the income distribution. In effect, any income going to the poorest segment of

the society is counted as being twice as important as income going to other segments of the distribution. (Its impact already shows up once in the total figures.)

The optimizing behavior is

Maximize ($PI_t + 1.0\ PI_p$)

Policy 1 yields \$1,000,000,000
+ \$200,000,000 = \$1,200,000,000
➧ Policy 2 yields \$ 800,000,000
+ \$500,000,000 = \$1,300,000,000
Policy 3 yields \$1,010,000,000
+ \$100,000,000 = \$1,110,000,000

By choosing policy 2 here we still maximize the weighted value, even though the total increase in income is smaller. Here we see the importance of establishing weights and priorities on multiple goals. With this weighting, we choose the policy with the lowest total increase.

In situation C, extra consideration is to be given to income reaching the lowest quintile, but not to the extent shown in situation B. An extra premium or weight of 0.6 is given, so that any income to the lowest quintile will count slightly over half again as much as income going to other segments of the distribution. The optimizing behavior is

Maximize ($PI_t + 0.6\ PI_p$)

➧ Policy 1 yields \$1,000,000,000
+ \$120,000,000 = \$1,120,000,000
Policy 2 yields \$ 800,000,000
+ \$300,000,000 = \$1,100,000,000
Policy 3 yields \$1,010,000,000
+ \$ 60,000,000 = \$1,070,000,000

Policy 1 is the optimizing behavior even though it neither maximizes total increase in personal income nor maximizes the increase in personal income to the lowest quintile.[4]

[4]More properly, these examples should show a weight or premium of 1.0 in A, 2.0 in B, and 1.6 in C, because in this particular example a value of 1.0 is included in the increase of $PI_t$ for any and all goals. The a term then becomes the "extra" premium. To make the example directly comparable with a later one this distinction is ignored. This point is discussed in Marglin (1967, p. 24). Marglin's analysis is the basis for much of the theory used in developing the decision model, and should be consulted for more thorough treatment of this topic.

The Forest Service must be able to specify the order of priorities of its goals — that is, establish a weighting procedure both on the national level and on the more limited level of specific project areas. Without this, there is no basis for judgment of the optimality of its actions to achieve the goals specified. If we always had available a perfect measure of welfare, benefits, or satisfaction, we would not need to determine the weights as a separate process, because they would be automatically reflected in the measured value. The important distinction between weight and value arises because our measuring capability is inadequate.

### The Need for Flexibility in Goal Ranking

Flexibility during the initial goal formulation stages of planning is essential. Much of the information required for determining goal priorities will not become available until experimental programs are implemented. It is a difficult task, however, to maintain such flexibility without opening the flood gates to special interest pleading. Unless clear agreement on the priority of wilderness, for example, is arrived at in advance, then every timber cutting project may become the focal point of debate. This is counterproductive and limits the ability of the decisionmaker to implement an agreed-upon program.

This process of establishing weights or priorities in advance of project planning is not observable in much of the decisionmaking going on in firms and agencies today. Lowi (1969, p. 147) argues that this is no accident. This failure in bureaucratic decisionmaking is the direct result, Lowi claims, of the growth of "interest group liberalism." He makes an important distinction between involvement of the citizenry in the bargaining process and project planning on the one hand, and, on the other hand, a limited aspect of public involvement, logrolling. There is a world of difference between bargaining on the stakes of a particular case, which is logrolling, and bargaining on the rules and criteria applicable to the decision. Decisionmaking should proceed from firmly established rules, based on predetermined weights and priorities. The decisions that result from rules arrived at by con-

sensus should then be acceptable to all concerned.

Such bargaining on the rules in advance of project analysis can result in several different management prescriptions. For example, we might expect any one of three possible rules (goals) to result from discussions centering on the relative importance of timber and watershed resources. The three possibilities might be these:

1. Maximize timber production, subject to the constraint that some minimal amount of watershed protection be maintained.[5]

2. Maximize watershed protection, subject to the constraint that some minimum amount of timber production be maintained.

3. Increase and maintain (maximize) high levels of both timber cutting and watershed development, subject to the constraint that in the process nothing be done that will diminish the productivity of the land.

It should be obvious that the choice among these goals will depend on just how strongly members of the rule-formulating body hold their estimates of weights and priorities. The acceptable trade-offs will necessarily have been established in advance.

The later discussion in this paper will make clear that the actual establishment of weights during the ongoing National Forest management process is haphazard. Weights are established in varying degrees by public inputs such as logrolling, lobbying, and public hearings; by the budget process as it affects the achievement levels possible; and by administrative and management influences, both direct and indirect. To be effective, priority determination must become an explicit as well as an integral part of the planning activity.

Flexibility in goal ranking, as indicated, is desirable up to a point, and might alter a given situation in the following manner. If goals were ranked according to policy 2 in the timber-watershed example, certain actions would be dictated to achieve optimal solutions within that ranking of the goals. If, however, politico-socio-economic considerations should change the conditions under which the Forest Service operations are carried out, such as an acute shortage of timber during a housing boom, then the administrators might have to realign their goals (or have the goals realigned for them by congressional or administrative mandate). Watershed maintenance would then become the constraining goal, with the pursuit of maximum timber production as the dominant goal (i.e., ranking policy 1). Such a change would of course create severe problems in the long-range planning effort that is required in the management of forest resources, and if the alteration of priorities occurred too often, the planning capability of the Forest Service would be drastically reduced.

### Commodity and Noncommodity Goals

Very often the allocative decisions on public forest lands require consideration of criteria such as the complex ecological and hydrological subsystems that influence land management. Artificial definitions are employed in an attempt to distinguish between so-called "economic" and "noneconomic" variables. It seems more useful to call any problem of allocating scarce resources an economic one. If difference exists, it must be in the fact that certain resources (variables) simply do not pass through the market to have a value placed on them. Thus, for example, a distinction might be made as between "commodity" and "noncommodity" outputs. To suggest that just because a resource does not have a market value attached to it, it is therefore noneconomic, is to ignore the tremendous influence of environmental resources in modern economic analysis. Clean air and quiet surroundings are certainly just as "economic" as a sheet of plywood.

In the decisionmaking process, the achievement of nonmonetary goals will usually be at the expense or cost of other forgone opportunities, and these may appear in either monetary or nonmonetary form. Once the goal to be pursued in the management of the public

[5] This is the possibility used as a base for the planning model developed at the Pacific Southwest Forest and Range Experiment Station. See Navon, *Timber RAM . . . a long range planning method for commercial timber lands under multiple use management*, 1971. The maximization approach taken in that study, although it does not integrate the resources as this paper will recommend, is a step in the right direction.

forested lands is defined, it is the task of the specialist (economist, ecologist, silviculturalist, biologist, landscape architect, plant physiologist, etc.) to identify the outcomes of all possible (or relevant) alternative managerial policies. Both commodity and noncommodity values will be estimated, in such a way that these outcomes can then be viewed and ranked according to the optimal intermix of goals.

Decisionmaking is not an automatic process whereby we can specify goals, measure the possible output values as weighted by public priorities, and then push a button to get the appropriate decision. The type of planning and goal formulation that has been described can only provide alternatives. It then becomes the function of the decisionmaker, such as the land manager, to weigh these alternatives in the light of the social and economic inputs requisite to a balanced solution. "In the final analysis, the land manager . . . has the responsibility to decide to lengthen a road because the landscape is better served. He is required to make the judgment to require a more costly logging system, logging layout, or silvicultural system to protect soil or emphasize landscape aesthetics" (Nelson 1971, p. 14). But the inputs he receives are of utmost importance.

In the absence of a well-defined ranking of objectives, each local decisionmaker (regional forester, forest supervisor, district ranger, etc.) must tend to be influenced by the inputs of special interest groups. The decisionmaker must collect data, measure values, and analyze these according to the ranked goals. If each decisionmaker is allowed to establish not only the values or achievement levels, but also the weights, no uniform policy will be evident.

The foregoing discussion oversimplifies the decisionmaking process, but serves to emphasize the need to identify Forest Service goals and develop an appropriate decision model. The following section, dealing with the statutory and legislative directions given to the Forest Service, is the logical step toward establishing the basis for such a model.

# THE LEGISLATIVE MANDATE

We have seen that as yet no clear goal for the Forest Service has been defined. We have also reviewed the decisionmaking processes in which such a goal plays an essential part. The discussion that follows is an attempt to find in the legislation the direction needed to formulate a goal of the required quality — one broad enough to apply to all levels of administration and yet flexible enough to guide decisions on local problems.

The analysis in this section will show that a multiple use concept of management, though not always evident in the forefront of agency actions, nor consistently defined by the courts, has slowly been evolving in the legislation and has become a policy that now, at least in part, guides the day-to-day operations of the Forest Service. More specifically, one consistent thread, made up of three strands, will be seen to run throughout the fabric of the agency's policy orientation as expressed in the legislation. The first of the three strands is a conservation orientation, best expressed in the rule that no activity should take place if it will result in deterioration of the site. The second strand is an orientation toward perpetual production and use of the various forest products through sustained yield management. As will be seen, this strand has been conceived in both narrow and broad terms. The third strand, both a strength and a weakness, is a commitment to decentralized decisionmaking, with emphasis on the expertise of local authorities and officers. The thread itself is the notion that the National Forests must be managed so as "to best meet the needs of the American people." This notion must be given specific meaning if it is to serve as a goal.

The legislative review in these pages does not follow a straight path. There are many twists and turns. As R. H. Tawney (p. 34, 1967 reprint) said over 50 years ago,

> . . . not only in the investigation of the past but in the analysis of the present, the trail followed by the economist leads across a country whose boundaries and contours and lines of least resistance have been fashioned by the labor of lawyers. It is his wisdom to recognize that economic forces operate in a framework created by legal institutions, that to neglect those institutions in examining the causes of economic development or the distribution of wealth is as though a geographer should discuss the river system of a country without reference to its mountain ranges, and that, if lawyers have wrought in ignorance of economics, he must nevertheless consult their own art in order to unravel the effect of their operations.

It is well known that the lawyers' art is not usually characterized by brevity and clarity. Also, if lawyers write "in ignorance of economics," statutes cannot be easily translated into expressions of implementable goals in a decisionmaking framework. Nevertheless, we must "unravel the effect of their operations" if we are to get a handle on the management goals of the Forest Service.

Considered throughout this review of the statutory and legislative background of current management objectives will be the question of what, if any, priorities have been established. It will be shown that the current doctrinal debate as to equal priorities versus dominant use or single use is empty of meaning if past legislation is turned to for support. In reality the doctrine that has evolved through legislation assigns no priorities. The "protection of the productivity of the land" so frequently called for in the legislation encompasses all of the resources and their use.

Before we examine the legislation specifically applicable to the Forest Service, it will be helpful to consider the policy background against which the National Forests were established.

## Public Land Management Policies

The policies dominant during the greater part of the 19th century suggest four overriding objectives in the use of public lands: (1) to produce much-needed revenue for the operations of government; (2) insofar as possible, to promote the settlement and growth of new communities; (3) to reward veterans of military actions by offering them the opportunity of ownership (or scrip entry privileges); and (4) to promote the internal development of the nation through land grants designed to aid in financing education, highway construction, and charitable institutions. Each of these four objectives had its special set of supporters and spokesmen. As a result, the measures adopted were often inharmonious and incongruous (Gates 1968, p. 765 ff.).[6]

Three objectives developed subsequently. During the administration of Theodore Roosevelt, a fifth policy direction evolved that was to become significant in public land administration. To many people the overwhelming objective of American land policy became "conservation." Many Americans came to realize that the exploitation of their rich inheritance of natural resources, if continued through the predatory practices characteristic of the 19th century, would in the near future diminish the unique value of that inheritance. Many came to wonder whether permanent public ownership of some lands might not be superior to private ownership. This concern, with its awareness of the depletion of such resources as forests, ranges, wildlife, clear streams, and beautiful landscapes came to the foreground in the conservation movement. Various groups, including the so-called "preservationists" as well as the advocates of scientific management, came together to call for the permanent reservation of forests and watersheds in the public domain. The first National Park was established in 1872, and in an act passed in 1891 (26 Stat. 1103), the President was authorized to set aside "forest reserves" (subsequently renamed National Forests).

In the changing economic and social demands of the late 19th and 20th centuries, a sixth objective emerged — a policy of multiple-purpose development and use of the remaining store of public lands and associated resources. As interpreted by one observer (Gates 1968, p. 771-772),

> . . . instead of considering the economic value of land in terms of its best use either as rangeland or for forests, for watershed protection, recreation, preservation of wildlife, mining, industry or urban proliferation, the multiple purpose objective takes all these factors into consideration and upon that broad base, the future use of any particular tract may be determined.

The National Environmental Policy Act of 1969 (83 Stat. 852) adds a seventh dimension to the national policy for public lands. As will be seen in this study, the demand made in the act for an ecological basis for management direction and decisionmaking, together with the trend of the evolutionary legislation preceding it, is a basis for a clear specification of the Forest Service mandate, and calls for agency policies that will carry out the mandate.

These general objectives, however, do not establish a specific goal for the Forest Service. First, they are not strictly goals at all; the policies described for the 19th century period were in fact tools to achieve a real national goal — namely, economic growth and development. Second, the objectives described apply to all public lands. For a more precise statement of Forest Service goals, we must turn to the enabling legislation. From a brief review of the major statutes, and examination at greater depth of a few of the more important acts and their interpretation in the courts, we will be able to define the Forest Service mandate.

[6] Gates' *History of Public Land Law Development*, a volume written for the Public Land Law Review Commission, is an important source of information on the factional and legislative struggles over public land administration, and has been heavily drawn upon in the discussion that follows.

# Legislation and Judicial Interpretation to 1960

The following review covers the period up to the passage of the Multiple Use-Sustained Yield Act of 1960. Obviously, the account of the legislation cannot be exhaustive, but every effort has been made to consider significant elements in detail.

## Early Legislation

The early settlers of our country considered the forest an obstacle to economic development (Gates 1968). Destruction of the forests continued well into the 19th century, in spite of the efforts made to conserve and protect certain specific forest areas. Such protective action generally covered strategic materials such as naval stores of live oak, red cedar, and later white pine. In most areas, efforts were made to prevent trespass on the timber-growing public lands. Westerners generally viewed forest resources as valueless unless they were put to use in the improvement and development of the land, which meant clearing, fencing, building, draining, roadbuilding, and establishing social facilities. Moreover, a large-scale private industry had developed that tended to view timber on public lands as open to their saws, and millions of acres of timber were cut in this process. Such attempts as were made to prevent timber trespass were ineffective. Moreover, efforts by the Department of Interior and the General Land Office were hindered by three measures adopted in the 45th and 46th Congresses (1878-1879). The first, an amendment to a budget deficiency bill, stated in part,

> Where wood and timber lands in the Territories of the United States are not surveyed and offered for sale in proper subdivisions convenient of access, no money herein appropriated shall be used to collect and charge for wood or timber cut on the public lands in the Territories . . . for the use of actual settlers in the Territories, and not for export from the Territories . . . where the timber grew. If any timber cut on the public lands shall be exported from the Territories it shall be liable to seizure.[7]

The second measure, the Timber and Stone Act of 1878 (20 Stat. 89) provided that unoffered public lands valuable chiefly for timber (or stone) could be purchased at the minimum price of $2.50 per acre, in quantities up to 160 acres. Although this law was originally applicable only to the public lands of California, Oregon, Nevada, and Washington Territory, Congress extended its provisions to all the public land states in 1892 (27 Stat. 348). Virtually all historians consider the Timber and Stone Act an unmitigated disaster, probably with good reason. Nevertheless, the act may represent an important philosophical turning point. As pointed out by Vaux (personal communication 1971),

> The act recognized for the first time that there was such a thing as land chiefly valuable for FOREST. For the preceding century, and with the exception of Naval Reserves and mineral values, the public policy was premised on the assumption that all land was potentially agricultural land. In adopting the Timber and Stone Act, Congress should be credited . . . with finally recognizing that there was such a thing as forest land, distinct from agricultural land currently supporting a forest, even though it acted unwisely on its recognition.

The third measure, passed on the same day as the Timber and Stone Act, was the so-called Free Timber or Timber Cutting Act (20 Stat. 88). This law permitted the free cutting of timber for "agricultural, mining, or other domestic uses" on lands classified to be chiefly valuable for mining and mineral resources. Very little land was so classified, but lumbermen used the act as warrant for their cutting activities by taking a very liberal view of what ought to be interpreted to be mineral land (Hibbard 1965, p. 463-470).

These three measures, taken together with many other obstacles thrown up against protection of the public timber lands, illustrate the problems confronting those who worked toward scientific management and preservation of the nation's valuable timber reserves. As Gates (1968, p. 561) observes,

[7] Act of April 30, 1878, 20 Stat. 46; for discussion of this and the following statutes, see Gates (1968), p. 550 ff.

> One may conclude that the hopelessness of effectively protecting the public timberlands by the use of a small army of investigating agents who were ostracized by local society, upbraided by the local press and by the Representatives and Senators of the West, and the fact that their enforcement efforts were nullified by hostile juries, contributed to the realization at least among scientists that only through a positive program of Federal forest land management could a part of the remaining public forests be both withheld and protected for future use.

As a result of considerable ferment that centered around a discussion of forest practices, Congress enacted on March 3, 1891, the General Revision Act, section 24 of which (the so-called Forest Reservation Amendment) has since come to be known as the Creative Act of 1891.[8] As amended by later statutes, the act gave the President authority to "set apart and reserve, in any State or Territory having public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, [such lands] as national forests . . . ." Subsequent acts placed restrictions on the authority to create National Forests or additions within certain states. Legislation also gave authority to the Secretary of Agriculture to acquire forested lands by purchase, exchange, donation, and other methods.[9] In the Transfer Act of February 1, 1905,[10] jurisdiction over the National Forests was transferred from the Department of Interior to the Department of Agriculture.

### The Act of 1897

It is now possible to identify within the enabling legislation the explicit and implicit objectives specified by Congress to guide the managerial functions of the Forest Service. To determine whether or not the legislation establishes priorities, let us examine first the original enabling legislation — the Organic Administration Act of 1897.[11] It stated in part,

> All public lands . . . set aside and reserved as National Forests . . . shall be as far as practicable controlled and administered in accordance with the following provisions. No National Forest shall be **established, except to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flow and to furnish a continuous supply of timber** for the use and necessities of citizens of the United States; but it is not the purpose or intent of these provisions or of the Act providing for such reservations, to authorize the inclusion therein of lands more valuable for the mineral therein, or for agricultural purposes, than for forest purposes . . . . The Secretary of Agriculture shall make provisions for the protection against destruction by fire and depredation upon the public forests and National Forests . . . and he may make such rules and regulations and establish such service as **will insure the objects of such regulations, namely, to regulate their occupancy and use and to preserve the forest thereon from destruction** . . . .

The first section of the act has provided ammunition to one side in a continuing debate over the original establishment of priorities. They see the Act of 1897 as identifying three top-priority or "dominant" purposes of forest management: forest protection and improvement, protection of waterflow, and timber supply.[12] All other uses, products, or services of the forest, according to this view, are to be considered secondary or subordinate. It is important to determine whether or not this original legislation legally implies

[8] 26 Stat. 1103; as amended by Acts of March 4 and June 7, 1924, 43 Stat. 655; 16 U.S.C. 471.

[9] For a list of important laws relating to the establishment of National Forests, as amended, see USDA Forest Service (1964), p. 1-11.

[10] 33 Stat. 628; 16 U.S.C. 472, 524, 554. Laws relating to surveying, prospecting, locating, appropriating, entering, relinquishing, reconveying, certifying, or patenting were not subject to transfer and are still administered by the Secretary of Interior. Included here, of course, are the laws pertaining to mining activity within the National Forest. The resulting interdepartmental struggle has affected the practices and policies of both departments.

[11] Act of June 4, 1897, 30 Stat. 34, 35, 36; 16 U.S.C. 475; emphasis added.

[12] The following discussion relies heavily upon the work done by J. Michael McCloskey (1961). His conclusions as to interpretation, however, differ greatly from those presented in this study.

these stated priorities. The Forest Service has contended that the act is consistent with an equal priorities interpretation of the Multiple Use-Sustained Yield Act of 1960 (to be discussed later) and thus does not interfere with administration of the Forest for such purposes as grazing, recreation, and wildlife management. A third interpretation is that the 1897 Act constitutes "the original multiple use act, for it was under it that multiple use and sustained yield began." This third interpretation allows the conclusion drawn in this study. Namely, no statutory priorities of any kind are established for the various resources, and the appropriate decisionmaking process is thus not described by either equal priorities or single use doctrines.[13]

### Legislative History

The Act of 1897 was partly engendered by widespread dissatisfaction with the administration of the forest reserves established following the Creative Act of 1891. Westerners felt that large areas of land had arbitrarily been withdrawn from entry. The General Land Office within the Department of Interior felt that provision for the protection of the forests against fire and trespass was inadequate.[14] In 1896, the National Academy of Sciences appointed a seven-man commission to study and report on the administration of the forest regions. The commission noted, among other things, that the low pay, short tenure, and insecurity of the patronage system, and the poor quality of the appointees made it almost impossible to enforce the provisions of the 1891 Act.[15] The report recommended that 13 new forest reservations, containing some 22 million acres in seven states, be created. President Cleveland, having had the report orally communicated to him before it was made public, complied with immediate proclamations of February 22, 1897 (29 Stat. Proclamation 19-31).

The furor that arose over these forest reservations led directly to the enactment of the Act of 1897. The proclamations were suspended until March 1898 and the lands restored to a status by which they were subject to entry.

The Act of 1897, presented by Senator Pettigrew of South Dakota as an amendment to a civil appropriations bill, contained the essential elements of an earlier bill that had twice passed the House.[16] Interpretations of the legislative history of the act vary. In view of pressures by Western opponents of the proclamations, McCloskey (1961, p. 58) places strong emphasis on the provisions that limit the purposes for which reserves might be created. Gates (1968, p. 570) dismisses them as "too general to have any important limiting effect." Gifford Pinchot (1947, p. 114) felt that a compromise had been reached that left open the question of priorities. There is considerable room for historical debate on the actual intent of the Congress. Any interpretation must reckon with the fact that the bill was passed under conditions of considerable anger and consternation. As pointed out below, judicial interpretation prior to 1969 failed to clarify the issue.

### Judicial Interpretation

The interpretation of the 1897 Act by the courts prior to 1969 failed to provide specific guidelines that would settle conflicts that may arise between uses, except for the fact that any and all of the various forest resources, products, services, and uses were subject to the condition that no depredation of the forest was to be allowed.

The direct issue of priority versus equality in the resource uses was not generally raised

[13] Personal communication, Dean A. Gardner, Attorney in Charge, Office of the General Counsel, U. S. Dep. Agr., Ogden, Utah (January 12, 1972). A similar interpretation was set forth by Richard E. McArdle at the Fifth World Forestry Congress at Seattle, Wash., Sept. 10, 1960. He called the 1897 Act "the genesis of Multiple Use."

[14] See McCloskey (1961), p. 57-58, and compare with Gates (1968), p. 567-671 and *passim*; also Pinchot (1947), p. 79-132; and Cameron (1928), p. 205-211.

[15] "*Report of the National Forestry Committee of the National Academy of Sciences upon the inauguration of a forest policy for the forested lands of the United States,*" as noted in Gates (1968), p. 568.

[16] McRae Bill, H. R. 16, 55th Congr. 1st Sess., (1897). See Rogers (1969), p. 123-124.

in litigation, but several judgments are relevant. They concern themselves with the meaning of that section of the law granting the Secretary power to make rules and regulations to prevent destruction and depredation of the forests. One court contended that there was a separation of powers in this section, stating that the "grant of the power to regulate use and occupancy is in addition and independent of the power to issue rules and regulations to preserve the forests from destruction."[17] The separation of powers interpretation has not always been maintained, but the courts have consistently upheld the power of the Secretary to establish rules controlling the use of the forests, and some rulings, dealing with the legality of such uses as livestock grazing on the forest, leave open the possibility that priorities were in fact established among uses. The 1911 Supreme Court case of *United States* v. *Grimaud*[18] is an example.

Restating the position taken by the lower courts, the Supreme Court held that "to pasture sheep and cattle on the (forest) reservation, at will and without restraint might interfere seriously with the accomplishment of the purpose for which they were established. But a limited, regulated use for pasturage might not be inconsistent with the object sought to be attained by the statute." The Court's finding, together with later decisions described below, has led some writers to claim that grazing is placed in a position subordinate to the purposes for which the forests were established (McCloskey 1961, *passim*).

In the 1912 case of *United States* v. *Henrylin Irrigation Co.*,[19] the court stated that the forest reserves had been created for a special purpose. Although the court failed to spell out just what that purpose was, it found the Act of 1897 did not allow for any use or occupancy that interfered with the purposes of such reserves, thus implicitly, if not directly, upholding the decision in the Grimaud case.

Evidence of priorities as viewed by the courts came in 1922 when the court declared that favorable conditions of waterflow held precedence over grazing that might lead to erosion and floods.[20] A 1941 case held grazing to be subordinated to "furnishing a continuous supply of timber" where replanted acreage is involved.[21] This position was reaffirmed in 1944 when the court stated that the Forest Service "may exclude grazing entirely or regulate it appropriately to the benefit of . . . (the) . . . natural growth" of timber.[22]

A direct interpretation of the priority problem came in the 1952 case of *United States* v. *Perko*. Using the Act of 1897 as authority, the court stated ". . . the purpose of establishing a Forest Reserve under the statute is to conserve the timber and water flowage . . . . The use of the forest for recreational purposes is incidental to this main purpose" (108 F. Supp. at 322).

Given the economic situation in the first half of the century as it pertained to the demands that were being made upon the forests, it is not surprising that the courts emphasized timber and water. As conditions changed over time, court interpretations gave way to broader concerns. Moreover, all of the earlier cases made a direct reference to purposes for which the National Forests were established.

The problem of whether or not regulation of use and occupancy is separate from protective regulation is thus a source of contention. It is the view of this study that although the two sections of the act seem to be giving different instructions or direction, they have to be considered *in pari materia:* that is, the statute must be so interpreted as to give meaning

[17] *United States* v. *Reeves*, 39 F. Supp. 580 (W.D. Ark., 1941), 583. See Bayles (1964), p. 113 ff., for a discussion of changing interpretations within the Forest Service, especially with respect to rules and regulations concerning ingress and egress on the National Forests.

[18] 220 U.S. 506, quotation at 516. The Government brief in the McMichael case, discussed below, used the Grimaud case to support its contention of power to issue regulations on resources beyond those enumerated in the 1897 Act.

[19] 205 Fed. 970, 972 (D. Cal. 1912)

[20] *United States* v. *Gurley*, 297 Fed. 874 (N.D. Ga. 1922).

[21] *United States* v. *Johnston*, 38 F. Supp. 4 (D.W. Va. 1941).

[22] *Osborne* v. *United States*, 145 F. 2d 892 (9th Cir., 1944).

to both sections simultaneously. McCloskey has argued that a priority ranking is established, and supports his position by stating that "construction of the use and occupancy section usually requires a definition of the purposes of National Forests and determination of whether a use is implicit in one of these purposes or foreign to them and merely to be tolerated to the extent that it does not conflict with them" (McCloskey 1961, p. 59). Both sections, however, must be considered *together*, and not one subordinate to the other. To show that the courts have failed to support McCloskey's position we must move ahead to a recent court test.

### McMichael and McMichael v. United States

The McMichael case[23] (sometimes referred to as the Tote Goat case) is essential to a determination of the correct interpretation to be placed on the Act of 1897. It clearly tests the establishment of priorities by the 1897 Act.

Two men who had used and operated "tote goats" (trail bikes) in the Idaho Primitive Area on July 9, 1963, had been prosecuted under regulations of the Secretary of Agriculture prohibiting the use of motor vehicles within areas designated as wilderness.[24] In their brief presented to the Ninth Circuit Court of Appeals, the appellants argued,

> Even if the regulations constitute valid exercises of the delegated power [they contended that it did not] . . . the application of these regulations as is here attempted results in an unconstitutional application of the regulations . . . in that no Congressional purposes will be achieved by such application . . . and further that the actions of the Secretary of Agriculture in setting aside and designating the area in question . . . [are] arbitrary and capricious in that no stated Congressional purpose is achieved by such designation and promulgation.

The regulations had been promulgated pursuant to section 551 of the Act of 1897 granting the Secretary authority to make such rules and regulations as would insure the objects of the reservations. In support of their argument, the appellants stated that the purposes for which National Forests could be established, as set out in the 1897 Act, were not altered in any way by the provisions of the Multiple Use-Sustained Yield Act of 1960, and that to conform with these purposes even a "wilderness area" "should be administered [only] in such a fashion as to preserve and protect the forest or the water flow potential thereof." In arguing that the regulations in question "would seem to serve as a prime example of administrative policy-making in contradiction to that of Congress," the appellants stated,

> Since the power to make regulations is administrative in nature, legislation may not be enacted under the guise of its exercise by issuing a "regulation" which is out of harmony with, or which alters, extends, or limits, the statute being administered, or which is inconsistent with the expression of lawmakers' intent in other statutes. The administrative officer's power must be exercised within the framework of the provision bestowing regulatory powers on him and the policy of the statute which he administers. He cannot initiate policy in the true sense, but must fundamentally pursue a policy predetermined by the same power from which he derives his authority.
>
> Administrative regulations which go beyond what the legislature has authorized are void and may be disregarded.

The court review stated that the "appellants' position is that regulations establishing primitive, wilderness, and wild areas and providing limitations upon the use to be made of such areas are not authorized by Section 551" because the section specifies that any regulation must have the purpose of preserving the forest from destruction. The lines are drawn. We have here a specific question as to the interpretation to be placed on the meaning and intent of the legislation.

The court further stated,

> The consistent administrative interpretation of section 551, however, has been that while recreational considerations alone will not support the establishment of National Forest, they are appropriate subjects for regulation. Congress has tacitly shown its approval of this interpretation by appropriating the sums required for its effectuation.

The court concluded that the provisions contained in the Multiple Use-Sustained Yield

[23] 355 F. 2d 238 (9th Cir., Idaho, 1965).

[24] Secretary's Regulations U-1 (36 C.F.R. 251 (b)), and U-2 (36 C.F.R. 251.21 (a)).

Act of 1960 constitute "a recognition of past administrative construction."[25] The court cited the Senate Report accompanying the MU-SY Act which states, "the authority to administer recreation and wildlife habitat resources of the National Forests has been recognized in numerous appropriation acts and comes from the authority contained in the Act of June 4, 1897, to regulate the 'occupancy and use' of the National Forests." The court determined that "the regulations are valid" and that "the choice of what shall be preserved is an administrative choice in which geographical and topographical considerations are certainly germane but hardly subject to judicial review."[26]

In its judgment, therefore, the court acknowledges the authority of the Forest Service to administer the National Forest lands, without regard to any priorities claimed to be established in the 1897 Act, even though timber and water purposes are required for creation of a National Forest. It suggests that the agency will meet the letter of the law with respect to administration even if other resource uses sometimes take priority over timber and water or even exclude them from consideration. The court thus recognizes a distinction between establishment and regulation. The major consideration is to be whether the regulations serve to protect the forest. The earlier court findings were not quite so explicit on this issue, and as a result, there has been much misunderstanding among the various interested parties. The period between the passage of the 1897 Act and the present must be viewed as evolutionary, although intermittent court decisions leave the question open to some debate. In no case uncovered by this author do the early judicial proceedings directly contradict the interpretation in the McMichael case.

### Forest Service Direction in the Early Years

A review of the principal laws enacted prior to 1960 relating to the establishment and administration of the Forest Service similarly fails to inform the researcher as to priorities within the framework of goals.

#### The Transfer Act of 1905

The Transfer Act of February 1, 1905[27] included among its provisions the seeds of decentralization and reliance on local authority that characterize the Forest Service. It stated that "when practicable" forest supervisors and rangers were to be selected "from qualified citizens of the States or Territories in which the national forests respectively, are situated." A recent publication of the Forest Service argues that this provision is not in the best interest of the general public. It has been Forest Service practice to give its employees experience on various forests so that they will encounter many differing ecological subsystems and forest management problems. The Service now argues, in the face of considerable criticism of the practice, that to follow the earlier provision more closely would lead to "narrow" training of its forest managers.[28]

The 1905 Act also stipulated that "rights of way for construction and maintenance of dams, reservoirs, water plants, ditches, flumes, pipes, tunnels, and canals" were to be allowed within the National Forests for municipal and mining purposes, but they were to be subject to "such rules and regulations as may be prescribed by the Secretary of the Interior."

#### The Pinchot Letter

The famous "Pinchot Letter," signed by

[25]Whether or not this administrative construction was in fact consistent has been the subject of debate, as will be discussed in a later section on the MU-SY Act. There is evidence, however (Bayles 1964, p. 115), that such constructions are not necessarily binding.

[26]This last opinion by the court concerning what is and what is not subject to judicial review was substantially altered in the decision in the Overton Park Case, 1971. See p. 32, below.

[27]33 Stat. 628; 16 U.S.C. 472, 524, 554.

[28]USDA Forest Service. *Timber management for a quality environment.* Current Information Report No. 6, 1971, p. 27. For somewhat different comments, see 91st Congr. 2d Sess., Senate Document No. 91-115, *A university view of the Forest Service*, often referred to as the "Bolle Report," p. 18; see also USDA Forest Service (1971), p. 72.

Secretary of Agriculture James Wilson and sent to Gifford Pinchot, first head of the Forest Service, the same day that the Transfer Act was signed by President Roosevelt, contains a statement of agency policy. According to former Chief of the Service Edward Cliff, it "has guided the Forest Service for nearly a century, and still does so today. [It is] at the very heart of Forest Service history."[29] The letter, actually written by Pinchot, reads in part,

> In the administration of the forest reserves it must be clearly borne in mind that all land is to be devoted to its most productive use for the **permanent** good of the whole people and not for the **temporary** benefit of individuals or companies. All the resources of forest reserves **are for use** and this use must be brought about in a thoroughly prompt and businesslike manner, under such restrictions only as **will insure the permanence of these resources.**
>
> The vital importance of forest reserves to the great industries of the western states will be largely increased in the near future by the continued steady advance in settlement and development. The **permanence of the resources** of the reserves is, therefore, indispensable to continued prosperity, and the policy of this Department for their protection and use will invariably be guided by this fact, always bearing in mind that the **conservative use of these resources in no way conflicts with their permanent value.** You will see to it that the water, wood, and forage of the reserves are conserved and wisely used for the benefit of the home-builder first of all; upon whom depends the best permanent use of the lands and resources alike. The continued prosperity of the agricultural, lumbering, mining and livestock interests is directly dependent upon a **permanent and accessible supply of water, wood, and forage,** as well as upon the present and future use of these resources under businesslike regulations, enforced with promptness, effectiveness, and common sense.
>
> In the management of each reserve **local questions will be decided upon local grounds; the dominant industry will be considered first, but with as little restriction to minor industries as may be possible;** sudden changes in industrial conditions will be avoided by gradual adjustment after due notice; and where conflicting interests must be reconciled, the question will be decided from the standpoint of the greatest good of the greatest number in the long run.[30]

The Pinchot Letter places its strongest emphasis on the "permanence" of the forest resources. This has been a consistent policy objective of the Forest Service and is given real meaning in the Multiple Use-Sustained Yield Act of 1960.

The Pinchot Letter also emphasizes that "all resources of the forest reserves" are to be available for use. This has been interpreted to be consistent with the establishment of wilderness and primitive areas, among other restrictions on use. Pinchot stated that these resources include not only wood and water, but also "forage." Here we see that Pinchot was placing forage and the range areas within the National Forest boundaries on an equal footing with wood and water. With respect to the conditions necessary for prosperity and the role of the forest in that regard, he makes no distinctions among activities such as agriculture, lumbering, mining, and grazing livestock. We do find that there is a distinction to be made between "dominant industries" and "minor industries." Further, his emphasis upon commodity uses of the National Forest resources seems to fit with his well-known attitude that recreational and wildlife uses of the forest took a second seat (Pinchot 1947, p. 71.)

### The Use Books

For evidence of internal priority-setting, we turn now to the *Use Books*,[31] direct forerunner of the present-day *Forest Service Manual.* The apparent equal-priority approach to timber and forage uses of the forest taken by Pinchot did not last long if the regulations and statements in the early *Use Books* are any indication. We find in the first *Use Book*, published in 1905, that any timber that "can be cut safely and for which there is actual need"

[29] Letter from Edward P. Cliff, Chief, to Regional Foresters, Directors, and Area Directors, April 28, 1971.

[30] Emphasis added. The entire letter can be found in many of the Forest Service *Use Books* cited below. It is also in the history files of all Forest Service office headquarters. The portion of the letter quoted here is found in Cameron (1928) p. 239-240. See also *The principal laws relating to . . . Forest Service activities* (USDA Forest Service 1964, p. 67).

[31] USDA Forest Service, 1905 ff. Titles of these volumes vary over the years. For convenience they will be referred to here simply as *Use Book*, with the year of publication.

is subject to sale, and this statement is repeated in subsequent years.[32] Prior to enactment of the Transfer Act, the Department of Interior had stated even more forcefully that "timber will be sold, both live and dead, whenever the removal of such material will be beneficial, or at least not detrimental, to the forest reserves."[33]

These statements can be and at times were read to imply that all uses were to be subordinated to timber uses. It is apparent that the terms "safely" and "not detrimental" referred to protection of the productivity of the land and watershed. But the emphasis was not always in that direction. The 1906 *Use Book* contains similarly ambiguous statements on subordination of other uses to timber and water. It states that "the Forest Service will allow the use of the forage crop of the reserves as fully as the proper care and maintenance of the forests and water supply permits," and calls for the exclusion of livestock for as long as necessary to protect "camping places, lakes, and streams, roads, and trails, etc." (p. 71, 80). It is stated also that "Forest Reserves are for the purpose of preserving a perpetual supply of timber for home industries, preventing destruction of the forest cover which regulates the flow of streams, and protecting local residents from unfair competition in the use of forest and range" (p. 13).

The books for the next few years contain many examples of subordination of one resource or use to another under particular conditions. Grazing (along with recreation and wildlife) is referred to as an "incidental use" (1907, p. 22-23). Grazing was viewed, in 1913, as a temporary privilege to be allowed "only when it does not interfere with the purpose for which the National Forests are created" (Grazing Sec., p. 11). The year 1913 also saw grazing take second place to wildlife management with respect to natural breeding or feeding grounds (p. 35).

[32] As noted by McCloskey (1961), p. 67. See for example, *Use Book*, 1906, p. 35, and 1907, p. 61.

[33] U.S. Department of Interior. *Forest reserve manual, for the information and use of forest officers*, 1902, p. 14.

*Figure 3. — Recreational use of the National Forests has increased substantially since 1920, but it still consists largely of camping and sightseeing from the relative comfort of an automobile.*

A step in the evolution of the Forest Service attitude toward grazing is seen in the 1925 *Annual Report* of the Secretary of Agriculture. He recognized the importance of grazing and range as a resource and called for new legislation to give permanent recognition to grazing in the management functions of the Service. Range use was finally coming into its own, but was still to be held under control in order to "protect all of the resources in the National Forests" (U. S. Dep. Agr. 1925, p. 84).

In 1936, we find a statement bringing range and forage uses into apparent equality with other uses (fig. 4). The *Use Book* of that year states that "the well being of the livestock industry is equally entitled to fair consideration. Where camping would seriously interfere with the livestock using certain designated watering places, the forest supervisor may, by posting, exclude or restrict camping use" (Grazing Sec., p. 60).

The *Use Book* of 1921 stated that the preservation of natural scenery was part of the total conservation of timber, forage, and water resources.[34] By 1929, the concept of multiple use management had truly arrived, although the terminology was not yet used. In his *Annual Report* of that year, the Secretary of Agriculture stated that "National Forest Administration . . . aims at the coordinated development and use of all the forest resources, including recreational and wildlife resources" (U. S. Dep. Agr. 1929, p. 43). Thus as early as 1929, we find the specific identification of all five renewable surface resources later spelled out in the MU-SY Act of 1960 (fig. 5). Behan (1967, p. 47) found what is probably one of the earliest references to "multiple use" *per se* in a speech given by a District Ranger in 1934.

It has been noted that the *Use Book* of 1913 gave priority to wildlife over grazing. Wildlife management was not placed on an equal footing with timber and water by that

[34] As noted in McCloskey (1961), p. 68.


*Figure 4. — A 1932 prize-winning display shows the emergence of grazing as an important use of the National Forests. Note the recognition of site productivity and sustained yield principles.*


*Figure 5. — The evolution of the concept of multiple use is suggested by these Forest Service symbols. For more than 50 years the official emblem was the shield-shaped badge, used to identify both the Forest Service and the National Forests. In 1955 the shield was enclosed by a ring on which the multiple uses were spelled out. In 1960 the National Forest symbol was designed. Its "multiple use tree," the central theme of the design, contains six elements. The five loops or branches stand for the five major resources, and the trunk for the nation and its people who benefit from the use of these resources. The unbroken line symbolizes the interrelationship and interdependence of the six elements. Shown also is the Forest Service shield, pointing out a threefold responsibility for national leadership in forestry and forest research as well as National Forest System management.*

statement, however, inasmuch as the 1913 *Use Book* stated that such activities "must be subordinated to the regular protective and administrative work of the Forest Service" (Grazing Sec., p. 80). The Act of May 23, 1908 (35 Stat. 259) made such preservation of wildlife incumbent upon the Forest Service. The 1921 *Use Book* recognized that "game is a product of the forests. It adds materially to the enjoyment of the National Forests . . . as well as to their possible economic uses." It was stated that "failure to take an active part in game protection will be considered neglect of duty" (p. 70).

The conflicting and often confusing evidence of the development of management direction found in the *Use Books* may well be due to the purposes for which they were written. They were not meant to be an ongoing coordinated policy statement, but were communications from Washington to the field, often stressing specific problems, and this influenced the directions provided and stressed. It is not entirely correct to consider them equivalent to the current *Forest Service Manual*. Any priorities among forest uses and resources established during this period by administrative fiat must be seen as temporary and situation oriented. Outstanding in virtually every *Use Book* is the concern for the perpetuation of the forest environment and its protection from depredation. All resources, even timber and watershed management, were subject to this overriding provision.

### The Appropriation Acts

The belief of both the Congress and the Forest Service that many uses of the forest are compatible and permissible in forest land management is adequately documented by the various appropriation acts that apply to the agency. None of them provides substantial insight, however, into the priorities that were being established for the use of the resources of the forested lands. They provide for special functions and uses, but they do not supply the information needed by the Forest Service to solve conflicts.

Various Agricultural Appropriation Acts allotted funds or otherwise provided for such activities as the following: wildlife management and fish stocking in National Forest waters (34 Stat. 1269, 1905); issuance of permits for construction of private buildings for recreational purposes, and funds for range improvement and range research (38 Stat. 1101, 1915); construction of watering places, corrals, and range division fences and eradication of poisonous plants (39 Stat. 1450, 1917);

tree planting aimed at preventing the ravages of erosion and flooding (41 Stat. 706, 1920); construction of outdoor sanitary facilities at campgrounds (42 Stat. 519, 1922); purchase of denuded or cutover lands so as to manage them for protection of navigable streams (43 Stat. 654, 1924); and construction of a dam (44 Stat. 514, 1926). In all of these acts, and in others that could be cited, the permitted uses were designed to further the three purposes understood to be established in the Act of 1897, or were at least compatible with them. In none of the appropriation acts can a firm priority listing be found. In a later section of this paper, however, it will be possible to identify apparent priorities by analyzing budget allocations to each of the forest resources.

### The Weeks Act and the Clarke-McNary Act

The legislation passed in the years following the Act of 1897 may be viewed as broadening the scope of Forest Service responsibility. It did not, however, make significant progress toward defining goals for National Forest System management. The Weeks Act of 1911[35] was, in part at least, the result of the growing awareness that sound forest management should be applied to forested areas in the East as well as to the public lands of the West. The Weeks Act provided for the purchase or acquisition of "forested, cut-over, or denuded lands within the watersheds of navigable streams" for the "purpose of conserving the forests and the water supply" as may be "necessary to the regulation of the flow of navigable streams or for the production of timber . . . ." Before any such lands could be actually purchased it had to be shown that "the control . . . [would] promote the production of timber thereon." The act also provided for an annual $200,000 matching fund to be used in cooperation with the various States for the "protection from fire of the forested watershed of navigable streams." Some 26 million acres of land were acquired under the provisions of the act.

The Weeks Act thus stipulates two major priorities — protection of the watershed of navigable rivers and timber production. For two reasons, however, the act did not help to establish goals and priorities on the National Forest level. First, the provisions of the act do not apply to the management or creation of National Forests in other areas. Second, the act as amended stipulates that (with some exceptions) the "lands acquired under this act shall be permanently reserved, held, and administered as National Forest lands under the provisions of . . . [the 1891 Act and subsequent supplemental, and amendatory legislation]." Thus they were to be managed and administered, as opposed to being established, under the same policies as all other National Forests.

The Clarke-McNary Act of 1924[36] was, according to Gates (1968, p. 596), at least in part the result of "two sharply defined theories of the role of the Federal government in forest management and protection."

On the one hand there were those who might be called the "traditional conservationists" in the mold of Pinchot, who felt that drastic action should be taken to prevent further depredation of the forests from fire, disease, and insects. They also supported legislation requiring that private lumbermen follow the scientific practices used on the National Forests. To this group, it would appear, establishment of the right of government intervention was a significant goal in itself. Having witnessed the destruction of the European forests, these men sought to protect the forested lands in America through government control.

On the other hand was a group of younger foresters, led by William B. Greeley, who became Chief Forester in 1920. This group felt that although action was needed, it should be based on mutual cooperation between the Forest Service, the States, and the private foresters. Both groups influenced the ensuing legislation, and a slight change in attitude is detectable when the wording of the Weeks Act is compared with that of the Clarke-McNary

[35] Act of March 1, 1911, 36 Stat. 961-963; as amended by various subsequent legislation — 16 U.S.C. 480, 500, 513-519, 521, 552, and 563.

[36] Act of June 7, 1924, 43 Stat. 653; as amended 16 U.S.C. 471, 505, 515, 564, 565, 565a, 566a-b, 567, 568, 568a, 569, and 570.

Act. The former "authorized" cooperation between the Secretary and the various States "when requested to do so." The latter stated in several places that "The Secretary of Agriculture is hereby authorized and directed" to cooperate with the various States, State officials, and land grant colleges. We see here the emergence of a broadened responsibility for the Forest Service which goes beyond the management of the National Forest System.

A closer look at the Clarke-McNary Act indicates that it sought much broader objectives than state and private cooperation. It continued the matching funds feature of the Weeks Act in providing for support of fire protection, distribution of seeds for reforestation, studies of taxation on forest lands, and aid to small woodlot owners. It is important to note the wording of the law with respect to overriding goals, as opposed to methods of achievement. Throughout, forest protection is emphasized.

With respect to fire protection, section 1 of the act states that with the cooperation of the appropriate State officials the Secretary was to recommend "such systems of forest fire prevention and suppression as will adequately protect the timbered and cut-over lands therein **with a view to the protection of forest and water resources and the continuous production of timber on lands chiefly suitable therefor**" (emphasis added). Section 2 directs the Secretary to cooperate with States if he finds "that the system and practice of forest fire prevention and suppression . . . **substantially promotes the objects described in** [section 1]" in the "protection of timbered and forest-producing lands from fire." Section 2 expands the area of cooperation, stating that ". . . due consideration shall be given to the protection of watersheds of navigable streams, but . . . cooperation may . . . be extended to any timbered or forest-producing lands or watersheds from which water is secured for domestic use or irrigation within the cooperative States." Section 3 states that studies are to be carried out on tax laws, tax methods, and tax practices to discern their "effect . . . upon forest perpetuation." It further stipulates that the Secretary was to cooperate with the States in "such investigations and in devising **tax laws designed to promote and encourage the conservation and growing of timber,** and to investigate and promote practical methods of insuring standing timber on growing forests from losses by fire" (emphasis added). Section 4 provides for cooperation in the distribution of seeds and tree plants "to the end that . . . [they] . . . shall be used effectively for planting denuded or non-forested lands . . . and growing timber thereon." Sections 8 and 9 again emphasize "lands chiefly valuable for streamflow protection or for timber production." Section 9 contains some provisions concerning military lands, but those provisions do not in any way imply rules for the management of other National Forest lands.

It is interesting to see how at times means tended to be viewed as ends. Protection of the forests from fire (fig. 6) may be a case in point. We have seen in the discussion of these two acts that fire protection was to be a tool of forest management. Protection efforts came to be overdone, however, to the point where use of fire for silvicultural purposes was suppressed to a great extent. The result of this confusion of means and ends, it is claimed by some (Schiff 1962), was deterioration of the total forest environment. In recent years, overprotection of the forest from fire has been moderated, and controlled burning is becoming recognized by the public as well as by the Service as a useful option.

### The McSweeney-McNary Act

On May 22, 1928, Congress passed the McSweeney-McNary Act, the first important piece of legislation that truly reflected the evolving concept of multiple use management of the National Forests. Although this statute again emphasized the three resources specified in the Act of 1897, the beginnings of a multiple use research orientation for the Forest Service can be discerned. As amended by various ensuing acts the bill authorizes and directs the Secretary to conduct:

> Investigations, experiments, and tests . . . in order to determine, demonstrate, and promulgate **the best methods of reforestation and of growing, manag-**

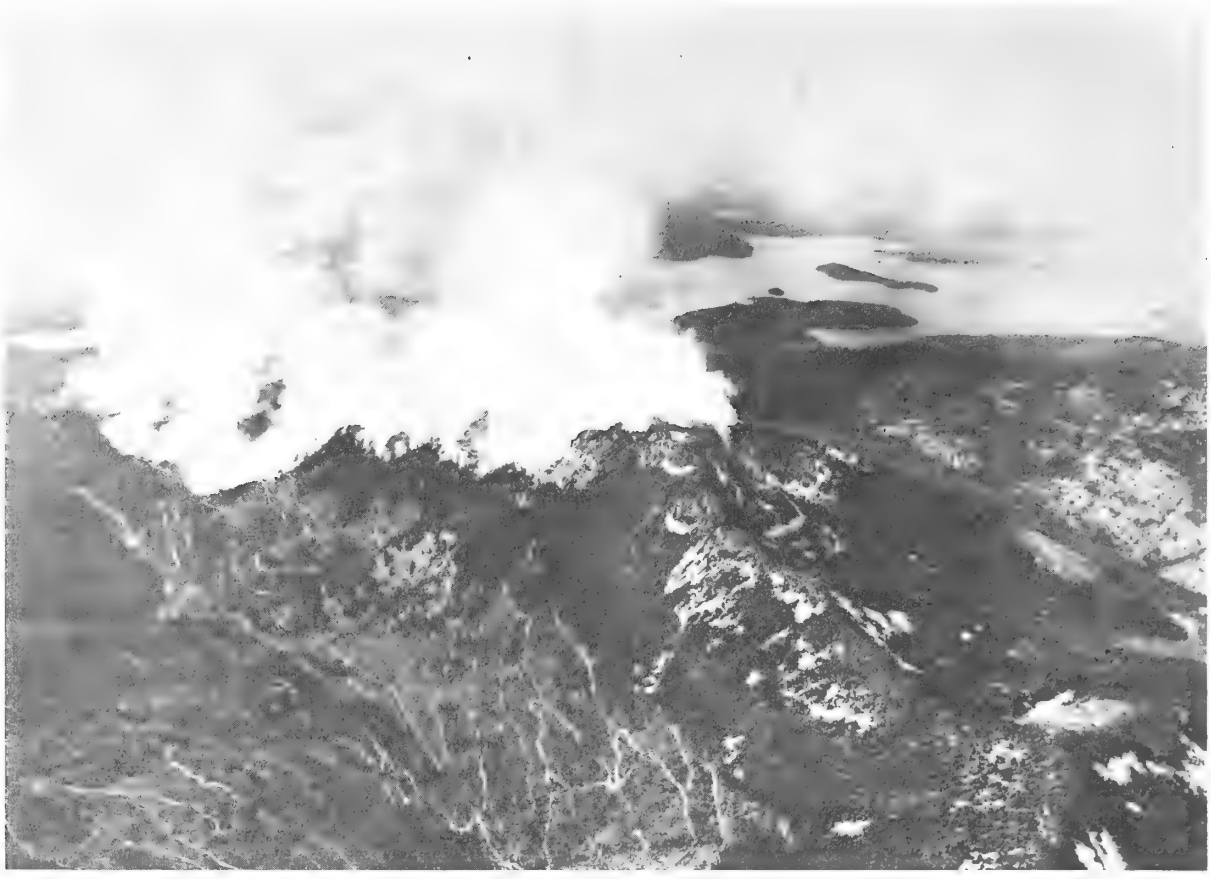

*Figure 6. — Large forest fires, such as the 1967 Sundance fire in northern Idaho, are spectacular, destructive, and dangerous. Protection of the forests from uncontrolled fire has always been a prominent aim in the legislation.*

ing, and utilizing timber, forage, and other forest products, of maintaining favorable conditions of water flow and the prevention of erosion, of protecting timber and other forest growth from fire, insects, disease or other harmful agencies, of obtaining the fullest and most effective use of forest lands, **and to determine and promulgate the economic considerations which should underlie the establishment of sound policies for the management of forest land and the utilization of forest products** (16 U.S.C. 581-581i, emphasis added).

The act also specifies that investigations could be made of forest wildlife, "habits of forest animals, birds, and wildlife, whether injurious to forest growth or **of value as supplemental resource,** and in developing the best and most effective methods for their management and control" (emphasis added). The act established the system of forest experiment stations, of which there are now nine, located throughout the United States. The only resource use later spelled out but not specifically identified in the McSweeney-McNary Act is recreation, although a very broad interpretation of the phrase "forest products" may even include it.

Section 9 of the act provided statutory authority for what was to become the Forest Survey unit of the agency (fig. 7). The primary objective specified was a comprehensive survey (or inventory) that would facilitate balancing the timber budget of the United States. Funding for this operation was and is separate from the overall budget allotment to research in the Forest Service and has been periodically adjusted upward to reflect in-

*Figure 7. — The McSweeney-McNary Act established the Forest Survey Unit. Here a forest inventory crew measures tree diameter on the Kootenai National Forest in 1965.*

creasing costs of maintaining the comprehensive resurvey work. The emphasis of the survey has consistently been on timber as the primary forest product, even though the legislation calls for a much broader scope and orientation. Section 1.4 of the *Forest Survey Manual* issued in 1952 repeats the wording of the 1949 *Forest Survey Manual* in its interpretation of legislative objectives: "By the terms of the legislation the Survey has a responsibility for 'other forest products' i.e., for gathering and interpreting data on forest products other than timber. This phase of the Survey is not covered in this manual." When the original, separately issued Survey Manual was incorporated into the more comprehensive *Forest Service Manual* as section 4813.1, in March, 1967, no mention at all was made of these "other forest products."

The only reference uncovered in this study to the broader responsibilities of the Forest Survey is found in a letter written by former Secretary of Agriculture Orville L. Freeman. With reference to a bill amending section 9 of the McSweeney-McNary Act to provide additional funding for the Survey, Freeman states,

> Increasing emphasis on the use of forest land for purposes other than for growing timber has produced a need for basic natural resources inventory data. This additional information is required for meaningful analysis of the total timber resource situation. Before these data can be obtained, research on kinds of information needed for making decisions on management of non-timber resources is required. Additional research is also needed to develop efficient procedures, techniques, and methods for surveying the forest land non-timber resources.[37]

[37]Letter to Hon. Hubert H. Humphrey, February 20, 1967.

It is questionable whether the McSweeney-McNary Act provides any new evidence of priorities among the forest resources. The emphasis on timber and related timber research, however, is consistent with earlier legislation. Nevertheless, as stated earlier, the act did reflect the evolving concept of multiple use management, and contains other implicit goals.

### The Knutson-Vandenberg Act

The Knutson-Vandenberg Act[38] sheds further light on the evolution of Forest Service goals. That act provided for the establishment of forest tree nurseries to be used in replanting and restocking cutover and denuded National Forest lands. It further provided that the Secretary could, in the public interest, require a deposit from any purchaser of National Forest timber to provide for planting or seeding, or for cutting, destruction, or other removal of undesirable trees or other growth, on the National Forest land cutover by the purchaser, in order to improve the future stand of timber. The Knutson-Vandenberg Act funds are thus available to the Forest Service outside of Congressional appropriations, in "one of the few arrangements by which funds derived from the federal lands are spent back upon them for their improvement without loss of time or money en route" (Clawson and Held 1957, p. 237). The intention of the act, though not completely adhered to in management of the National Forest lands, was to provide for the early replanting and regeneration of the National Forests following a timber removal action.

There is considerable evidence that the Knutson-Vandenberg Act was more than a first attempt at formalizing what was later to become the sustained yield provision in the Multiple Use Act of 1960. In recognizing that the cost of replanting a cutover area could properly be included in the purchase price, the legislators verged on defining the economic criteria they had called for in the earlier McSweeney-McNary Act. If the act had provided direction, rather than merely authorization, to the Secretary to require a deposit from timber purchasers, the economics of National Forest management would have been drastically altered. It is not unreasonable to speculate that rather than giving rise to the current economic debate over "rates of return on invested capital," such direction would have established a completely different orientation. The National Forests would have been viewed as a perpetual source of services. The cost of utilizing, harvesting, or exploiting its resources would have been built into management decisions. The act did not view the Forest as a stock, to be depleted in one area with "investment" elsewhere to make up the difference. With the deposit a rule, each timber sale would be self-liquidating, and provision for a perpetual forest would be insured.

This was not the ultimate effect of the law, however. Its provisions for revenue sharing have largely distorted its usefulness. The failure to obtain the results intended is due in part to inadequate funding for the replanting activity. In any event, the Knutson-Vandenberg Act was a further step in the direction of attaining legislative direction for "sustained yield management."

### Other Legislation

Though limited in application, the Bankhead-Jones Farm Tenant Act of July 22, 1937, provides the first comprehensive legislative statement of the multiple use approach to public management of the Forests.[39] That act, sometimes referred to as the Submarginal Land Retirement Act,

> authorized and directed . . . the Secretary . . . to develop a program of land conservation and land utilization . . . in order thereby to correct maladjustments in land use, and thus assist in controlling soil erosion, reforestation, preserving natural resources, mitigating floods, preventing impairment of dams and reservoirs, conserving surface and subsurface moisture, protecting the watersheds of navigable streams, and protecting the public lands, health, safety, and welfare.

[38] 46 Stat. 527, 16 U.S.C. 576 (June 9, 1930).

[39] 50 Stat. 525, amended by 56 Stat. 725, 76 Stat. 607, 76 Stat. 1157; 7 U.S.C. 1010-1012.

[Amended in 1962 to include protecting fish and wildlife].

The act originally provided, in a section repealed in 1962, that the Secretary could purchase such land as would meet the purposes of the act. Although not spelled out in the legislation, the "prime objective [was] . . . the purchase and retirement from farming of unprofitable, badly eroded, thin soiled, and exhausted land, and the removal of the occupants to other more promising areas where they could be rehabilitated and thus taken off the relief rolls. The land was to be used either for growing tree crops, for recreation, for wildlife refuges, or for pasturage under grazing controls" (Gates 1968, p. 599). Although the act must be viewed in the light of its depression-years objectives, it nevertheless marked a turning point in the legislative approach to forest land management.

The Forest Service was guided further in the direction of multiple use management with the passage of the Sustained Yield Forest Management Act.[40] The act provided that "In order to promote the stability of forest industries, of employment of communities, and of taxable forest wealth, through continuous supplies of timber; in order to provide for a continuous and ample supply of forest products; and in order to secure the benefits of forests in maintenance of water supply, regulation of stream flow, prevention of soil erosion, amelioration of climate, and preservation of wildlife," the Secretary was authorized to form cooperative sustained yield units among state, private, and federal lands. The act covered activities by both the Departments of Agriculture and Interior. Although all of the forest products and resources are mentioned in this Act, its main intention was undoubtedly to provide for the regulation and management of timber cutting activities. Section 3 of the act authorized the movement away from "usual procedures in selling such timber or other forest products [if] the maintenance of a stable community or communities primarily dependent upon the sale of timber or other forest products" would thus be furthered. If any priorities were established by this legislation, it must be said that it was in the direction of short-run monetary considerations as opposed to long-run ecological goals.

Further evidence that the Forest Service was being guided toward the formal recognition of multiple forest resources is given 3 years later in the Forest Pest Control Act of June 25, 1947.[41] That act called for concerted effort to eradicate and control forest pests "in order to protect and preserve forest resources . . . promote the stability of forest-using industries and employment associated therewith, aid in fire control . . . , conserve forest cover on watersheds, and protect recreational and other values of forests."

Although nothing in the two acts cited above alters any priorities understood to be established by the Act of 1897, we do find here an indication that Congress viewed the forests as useful for certain purposes other than securing favorable conditions of water flow, and a continuous supply of timber. Two years later, however, in the Anderson-Mansfield Reforestation and Revegetation Act of October 11, 1949, only three resources are directly mentioned; timber, forage, and watershed.[42] In the bill, designed to speed up the reforestation of denuded and cutover timber and range land, the primary emphasis is upon renewing or improving the stability of the local communities dependent upon the forest for their economic wellbeing. No mention whatever is made of recreation or fish and wildlife management.

Evidence of disregard for the potential uses of the forest is found in the laws relating to mining activities on National Forest lands. As noted earlier with reference to the Transfer Act of 1905, control over minerals and mining activities remained with the Department of Interior. The two basic laws that now govern mineral resources, the 100-year-old Mining Law of 1872[43] and the Mineral Leasing Law of 1920,[44] are widely recognized as obsolete. Under the 1872 Law, a mineral claim

[40] Act of March 29, 1944, 58 Stat. 132.

[41] 61 Stat. 177; 16 U.S.C. 594-1 to 594-5.

[42] 63 Stat. 762; 16 U.S.C. 581 j, 581 k.

[43] Act of May 10, 1872 (17 Stat. 91), as amended and supplemented (30 U.S.C. 22-47).

[44] Act of February 25, 1920, as amended and supplemented (30 U.S.C. 181-287).

of about 20 acres can be located almost anywhere on the public lands, the only specific exception being the designated National Parks. Having filed a claim with the county clerk, for which he is obliged only to prove the existence of a trace of valuable minerals, the claim owner virtually ties the hands of the Forest Service or Bureau of Land Management. On such claims, the agencies have almost no power to prevent destructive activities. The claim owner has the right to build roads, cut trees, dig massive holes, build an airport, or even build and maintain a winter sports complex, as long as he maintains the legal basis of the "mine." In Utah alone there are some 70,129 valid claims on Forest Service lands. Although only some 12,062 of these have had the necessary assessment work performed to maintain title, the other 58,067 represent a large amount of land that cannot be managed as it ought to be.[45] For the most part these lands, along with the activities associated with them, are outside the management scope of the agency.

The conditions attached to lands leased under the 1920 Law provide more direct control, but management powers are limited by practical considerations. The Multiple Use Mining Law of 1955[46] (the title is misleading) does not go beyond the statement that the United States has the right to manage the surface vegetative resources on nonpatented mining claims in the National Forest.

### A Comment on Legislation to 1960

Some general conclusions may be drawn from the preceding review. First, there is no apparent ranking of resource uses on the National Forest. The original provisions of the 1897 statute have in no way been altered or substantially modified by any congressional action taken to this point in the analysis. As indicated in the discussion, priorities were extremely flexible: here timber was viewed as primary, there water, and still elsewhere recreation, wildlife, or forage. For the most part, any activities, including the three mentioned in the 1897 Act, were subject to one major provision; they were not to be allowed if they directly or indirectly altered the productivity of the forest land so as to affect substantially the prospects of fulfilling the original intent of the forest reservation. Further, all the legislation to 1960 points to concern for the permanence of the forest resources. Some writers have claimed that the legislation subordinates all other resources or activities to timber and water, but this study maintains that such a conclusion is not warranted. The courts and legislation from 1960 on have consistently made clear that all uses of the forest were to be allowed. It must be recognized that in the earlier period of Forest Service management, special concern was shown for timber management and production. Against this background, the intent of Congress in passing the legislation of the 1960's can be more clearly discerned.

## The Multiple Use - Sustained Yield Act (MU - SY)

On June 12, 1960, the Multiple Use-Sustained Yield Act (MU-SY Act)[47] was passed and proclaimed by its proponents as a major victory for scientific forest management. For the first time since the original enabling legislation of 1897 (which continued to provide the primary body of law guiding and directing the activities of the Forest Service) Congress listed in a single statute all of the renewable surface resources understood to come under the management of the Service. The unusually brief act specifies in part,

> It is the policy of the Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. The purposes of **this Act are declared to be supplemental to, but not in derogation of, the purposes**

[45] Editorial, "Interior Secretary Morton proposes needed revision of old mining law," *Ogden Standard Examiner*, November 28, 1971, p. 4A. See also O'Callaghan (1967), p. 249.

[46] 69 Stat. 369. A compendium of the laws pertaining to mining and other subsurface uses of the National Forests can be found in USDA Forest Service (1964), p. 26-40. For a readable treatment of this difficult subject area, see Swenson (1968).

[47] 74 Stat. 215; 16 U.S.C. 528-531.

**for which the National Forests were established as set forth in the Act of June 4, 1897** (16 U.S.C. 475) . . . .

The Secretary of Agriculture is authorized and directed to develop and administer the renewable surface resources of the National Forest for multiple use and sustained yield of the several products and services obtained therefrom. In the administration of the National Forests due consideration shall be given to the relative values of the various resources in particular areas. The establishment and maintenance of areas of wilderness are consistent with the purposes and provisions of this Act . . .

As used in this Act, the following terms shall have the following meanings:

(a) "Multiple Use" means the management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources, each with the other, **without impairment of the productivity of the land** with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

(b) "Sustained yield of the several products and services" means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forests **without impairment of the productivity of the land** (emphasis added).

Although much has been written on the political maneuverings behind the passage of this piece of legislation, only a few of the preliminaries will be dealt with here.[48]

Strong pressures had been building up throughout the nation, acting in apparently different directions, but all exerted in behalf of single-purpose, priority uses of the forests or forest segments. Recollecting the events of 10 years earlier, R. E. McArdle (Chief of the Forest Service in 1960) states:

> To further complicate the situation I faced during my early years as Chief came more frequent questions as to our legislative charter for allowing some uses of the National Forests, specifically grazing, wildlife management, and recreation. The best legal advice I could get was that although specific enactments comparable to those for timber and water might be lacking, there was adequate evidence, these experts believed, to defeat any court challenge that might be raised. Nevertheless, the lack of clearcut, specific authority caused us some concern.[49]

McArdle's statement simply echoes the findings in the legislative review provided thus far. There still exists the problem of priority among the recognized and sanctioned uses of the various forest products and services. The original draft legislation of the MU-SY Act sent to Congress did not include the provision earlier alluded to that nothing in the bill was to be in derogation of the 1897 statute. If, as some have argued, priorities of resource management were established in the 1897 Act, then by the inclusion of the reference to the 1897 Act, the MU-SY Act simply specified the uses and resources that would have to be considered subordinate uses.

The inclusion of that reference was the direct result of actions taken by the National Lumber Manufacturers' Association, specifically at the request of Mr. Nolan, general counsel of Weyerhauser. In reporting on the reaction of the Forest Service representatives to the hearings on this point, Edward Crafts reports:

> Our position in rebuttal was that the 1897 Act did not precisely say . . . that the primary purposes of the National Forests were timber and water . . . If you read the 1897 Act carefully,

[48] See McCloskey (1961), p. 50-56; Crafts (1970); and McArdle (1970).

[49] McArdle (1970), p. 59. The "experts" proved correct, as indicated by the court findings in *McMichael* v. *United States*, discussed above.

> you cannot find anything in it that gives priority to timber and water. **Yet, to be perfectly frank, that had been the customary understanding in the past both in the Forest Service and outside** . . . Our interpretation of the sentence is that it really has no significance with respect to management of the National Forests. It does, however, concerning their **establishment.** The 1897 Act said, among other things, that no National Forest shall be established **except for certain specified purposes and then a little later timber and water are mentioned as two of the purposes.** Now when the Multiple Use Act says that it is not in derogation of the 1897 Act but supplemental to it, the effect is that the National Forests now may have as one of the purposes of establishment one of the other resources enumerated in the first sentence. But in addition you must also have either water or timber. In other words, it means that a National Forest cannot be established just for recreation alone or for range alone, but it can have one or more of those purposes as objectives of **establishment** if it also has water or timber.[50]

A brief review of the hearings on the bill and the statements made on the congressional floor at the time of its consideration indicates that much effort was expended in an attempt to preserve "pet" priorities — those of special importance to certain groups. The listing of the resources alphabetically in the bill was merely an attempt to prevent any overt indication of that intent. Widespread support for the bill was achieved by "satisficing" all of the various interest and pressure groups. In the end, however, it is doubtful if any of the maneuvering altered the basic direction outlined in the act.

The overriding priority, common to both the Act of 1897 and the MU-SY Act of 1960, is concern for the permanence (i.e., sustained yield) of the forest, which is to be regarded as an ecological system. Thus, as emphasized throughout the foregoing discussion, regardless of any administrative priorities that may have been established among the resources (or uses, or products) of the forest, all management considerations must be directed toward the prevention of "destruction and depredation" of the forests (Act of 1897) and toward the "harmonious and coordinated management of the various resources . . . without impairment of the productivity of the land" (MU-SY Act).[51]

There is no indication from the foregoing that there has been any legislative intent to identify priorities in use. Historically, National Forest administration has consistently evolved, albeit slowly, toward a position of no established priorities, with weights left to be assigned on a regional or local basis. Even now that evolution is proceeding within the organization. Further evidence of the validity of this interpretation is found in the enactment of the National Environmental Policy Act of 1969 and the Wilderness Act of 1964.

## The Wilderness Act

In the Wilderness Act of 1964,[52] a National Wilderness Preservation System was established with provisions for review of certain areas as to the suitability of their remaining within the wilderness classification (fig. 8). Having set up the reasons why a wilderness system was desirable and specifying what it meant by an area of wilderness, the bill specified that "all areas within the National Forest classified at least 30 days before the effective date of this Act . . . as 'wilderness,' 'wild,' or 'canoe' are hereby designated as wilderness areas." Having then set up a process for review of the land so designated, the act continues,

> (a) The purposes of this Act are hereby declared to be within and supplemental to the purposes for which National Forests and units of the National Park and national wildlife refuge systems are established and administered and . . . .
>
> (1) Nothing in this Act shall be deemed to be in interference with the purposes

[50] Crafts (1970) p. 52, emphasis added. The court opinion in the McMichael case is in agreement with this interpretation, although it cites a "consistent administrative interpretation" that Crafts' statement indicates did not prevail.

[51] Rogers (1969, p. 129) similarly interprets the law: "There is no obligation whatever upon the Secretary to sell one log from National Forest lands, **except as it may be incident to the management of those lands for sustained-yield production.** He is authorized to sell, but not required to do so, and the amount he sells is completely within his administrative discretion" (emphasis added).

[52] 78 Stat. 890; 16 U.S.C. 1131-36.

*Figure 8. — A highline trail in the vicinity of Dream Lake in the Bridger Wilderness Area, Bridger National Forest. The Wilderness Act declared the management of such areas for wilderness values to be within the intent of multiple use directives.*

for which National Forests are established as set forth in the Act of June 4, 1897 (30 Stat. 11), and the Multiple-Use Sustained-Yield Act of June 12, 1960 (74 Stat. 215).

Here then we have a direct indication by the Congress of its interpretation of the meaning of the original enabling legislation. In the Wilderness Act the Congress declared that the use and classification of certain portions of the National Forest System as wilderness areas, independent of their commercial value for timber and watershed protection, is recognized to be "within" the intent of the original legislation. No new priorities are established by this legislation, but it does give clear evidence that as of 1964 the Congress of the United States was interpreting the meaning of the 1897 Act very broadly. The action did not suggest that there was any question as to the valid management of the National Forests for purposes other than those specified in the 1897 statute. The wording of the Wilderness Act was such as to minimize the importance of any priorities that may have been established in timber production in the 1897 Act. Any priority of uses that may have existed due to Forest Service policies over the years must then be viewed as just that — discretionary policy, in no way directed by the 1897 Act itself.

There is considerable disagreement as to the intent of Congress with respect to the expansion of such wilderness classifications, but that is beyond the scope of this study. A review of the 8 years of legislative background of the act suggests that once again political realities dictated a wording vague enough to persuade the various interest groups that the bill said what they wanted it to say (see Keane 1971b).

## The National Environmental Policy Act [NEPA]

The National Environmental Policy Act of 1969 (83 Stat. 852) added yet another dimension to the interpretation of the legislative di-

rection given to the Forest Service in its management functions. It reinforced the provisions of the Multiple Use-Sustained Yield Act. The NEPA stated as its purpose "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality."

Section 102 of the NEPA contains the following extremely important provisions:

> The Congress authorizes and directs that, **to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act,** and (2) all agencies of the Federal Government shall . . . identify and develop methods and procedures . . . which will insure that **presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking** along with economic and technical considerations . . . [all agencies are to] **study develop and describe appropriate alternatives** to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources . . . [and to] initiate and utilize ecological information in the planning and development of resource-oriented projects . . . (emphasis added).

The NEPA is unequivocal in its specification that alternatives of land management are to be both identified and thoroughly evaluated. The courts have since given further emphasis to that requirement. In the case of *Citizens to Preserve Overton Park, Inc.* v. *John T. Volpe*[53] the Supreme Court took important action. The case involved the decision to route a six-lane highway through a public park in Memphis, Tennessee. The Department of Transportation had shown no evidence that it had investigated alternative routes. Neither had it made a full assessment of the environmental impact of its actions. The Court remanded the case to a lower court for adjudication. Separate opinions by Justices Black and Brennan in the Overton Park case are an important clue to future directions that the Court might be expected to take. A reading of their opinion indicates that they found it repulsive to think that important decisions were being made without the raising of a finger to comply with congressional intent.

The opinion in the case of *Calvert Cliffs Coordinating Committee, et al.* v. *U. S. Atomic Energy Commission*[54] is even more direct in the interpretation it places on the NEPA. Calling the act an "action-forcing" mandate, the court said that agencies are compelled to follow the mandate of the NEPA and stated that "the procedural aspects are not highly flexible, but rather establish a strict standard of compliance." The court showed that it is less willing to listen to arguments about the time required to implement the law than agencies are willing to offer them as excuses for noncompliance. The court stated: "The introduction of environmental matters cannot have presented a radically unsettling problem. And, in any event, the obvious sense of urgency on the part of Congress should make clear that a transition, however 'orderly,' must proceed at a pace faster than a funeral procession."

Although opinions may differ as to the intent and meaning of the legislative direction contained in the Act of 1897 and subsequent acts, the NEPA is explicit in stating how any such differences are to be resolved. Whenever a statute leaves room for doubt as to its intent, the act directs that it be "to the fullest extent possible . . . interpreted and administered in accordance with the policies" of the act (see Donovan 1971). It further states that the "policies and goals set forth in this act are supplementary to those set forth in existing authorizations of Federal agencies." The act is far reaching and there are indications

[53] 28 L. Ed. 2d 136, 401 US 402, 1971.

[54] 449 F. 2d 1189 (D.C. Cir., 1971).

that its implementation will place a considerable burden on the various agencies as they attempt to meet its requirements. But there is little room for equivocation in one respect. The Forest Service must interpret its management function as preserving and enhancing the environmental values and amenities to the greatest extent possible (fig. 9). The NEPA gives broader meaning to such phrases as "destruction and depredation" and "without impairment of the productivity of the land," contained in earlier legislation.

## The Mandate and the Goal

Where, then, do we stand in our search for goals and priorities to guide the policy formulation and management of the National Forest System? Two conclusions are indicated.

### Maximize Total Value

First, the goal specified to the Forest Service is to maximize the total value of the National Forests. Although this goal is nowhere spelled out, the sum total of the legislation reviewed implies it. Maximization, for example, is not specifically identified, but nevertheless is called for. Thus Pinchot ordered that "all land is to be devoted to its **most productive use.**" Further, his call for "the **greatest** good of the greatest number in the long run" implies maximization, if anything. The McSweeney-McNary Act told investigators " to determine and promulgate the economic considerations which should underlie the establishment of sound policies. . . ." The MU-SY Act calls on the agency to make the **most judicious** use of the land. (Other aspects of the goal will be specifically indentified in a following section.) The Forest Service, in seeking to thus maximize total value, must evaluate as completely as possible the environmental effects of any actions it takes with respect to the various resources in their realm of management. These resources are implied in the early legislation and finally specifically identified in the

*Figure 9. — The Forest Service mandate requires the preservation and enhancement of environmental values and amenities, including such panoramic vistas as this one of Little Redfish Lake on the Sawtooth National Forest in Idaho.*

MU-SY Act. They are fish and wildlife, outdoor recreation, range and forage, environmental amenities and esthetics, soil and watershed, and timber.

To guide policy, two overriding considerations are apparent in virtually all of the legislation reviewed: first, no activity may be engaged in if it will result in the destruction, depredation, or diminishing of the land's productivity; and second, all resources are to be managed on a sustained yield basis. As we have seen, these have been treated as separate considerations in some of the legislation, but as one integral policy in others. In the framework of the decisionmaking process set out in the earlier discussion, these environmental and production considerations form a part of the total goal. Because no specific direction is given in the NEPA as to how attempts to "improve" the environment should be made, these two objectives will be viewed as "constraining" elements in the agency goal, rather than separate goals.

The problems of maintaining the productivity of the land are complex, and their solution requires research into ecological relationships and the development of specific concepts of productivity with respect to individual resources. Some aspects of these problems will be mentioned in later sections of this paper. The legislation is clear, however, that "as far as possible" the obstacles must be met and research efforts must even more than in the past be aimed in that direction.

### No Assigned Priorities

Beyond the goal of maximizing the total value of the forest, including the goal constraints of environmental protection and sustained yield management, the second conclusion reached here is that there is little indication that Congress has specifically indicated priorities among forest uses. The MU-SY Act speaks of "relative values" of resources but does not clearly distinguish these from priorities.

Any attempt to derive from the MU-SY Act an implication of either equal priorities or a dominant-use, single-purpose priority seems unjustifiable. It is apparent that in the struggle to get the legislation through the Congress by enlisting the support of diverse interest groups, it was necessary to guarantee that no priorities would be specified in the act. No priorities does not mean equal priorities; it means the absence of any specified priorities. Although, in the decisionmaking process, all of the various resources are to be given equal consideration, nothing in the legislation that has been reviewed suggests that once values for the various resources are established in connection with any proposed action, those values are to have "equal weights" attached to them. Rather, the opposite is implied. The weights to be assigned to each of the resource values appear to have been left for determination on a local or regional basis.

The question remains, then, has the Forest Service used its legislative mandate to develop a clear statement of goals to guide its management decisions? A policy statement by Edward Cliff may clarify the problem.

In February 1970, Chief Cliff issued to all Forest Service personnel a pamphlet titled "Framework for the Future," dealing with the objectives and policy guides of the agency. The statement attempted to provide "a new framework to help guide our thinking and decisionmaking throughout the Service . . . [and] identify the general scope and character of the role the Forest Service should play in the society of today and tomorrow."[55]

The objectives are statedly not listed by priority. Chief Cliff recognizes that "there is a hierarchy of objectives, policies, and goals at each major level of the Forest Service organization structure." The statement further recognizes that "the interrelationships among various objectives and policies must be an integral part of decisionmaking at all organizational levels, ranging from the most all-encompassing, long-range planning, to identification of specific targets of immediate concern." The objectives listed in "Framework for the Future" are

a. To promote and achieve a pattern of natural resource uses that will best meet the needs of people now and in the future.
b. To protect and improve the quality of air, water, soil, and natural beauty.

[55] Embodied in the *Forest Service Manual* as Section 1033.

c. To help protect and improve the quality of the open space environment in urban and community areas.
d. To generate forestry opportunities to accelerate rural community growth.
e. To encourage the growth and development of forestry-based enterprises that readily respond to consumers' changing needs.
f. To seek optimum forest landownership patterns.
g. To improve the welfare of underprivileged members of society.
h. To involve the public in forestry policy and program formulation.
i. To encourage the development of forestry throughout the world.
j. To expand public understanding of environmental conservation.
k. To develop and make available a firm scientific base for the advancement of forestry.

It should be apparent to the reader that this list of "objectives" does not satisfy the requirement we have set up in our discussion of decisionmaking. We need an explicit statement of overriding goals. The list in "Framework for the Future" is simply a group of statements on program scope and methods of goal achievement. They do not represent goals themselves, except perhaps for "a" and "b", which are so broad that they lack real meaning. As Hagenstein (1971) comments, "it is disquieting to find the program scope is confused with objectives."

This list of objectives, in its apparent failure to recognize the place of goals in decisionmaking, is a clue to the day-to-day operations of the Forest Service. Such a broad and unfocused policy orientation has the unintended effect of diverting attention from the overriding goal of National Forest land management. The best way to identify the goal of National Forest management is to look at the actual and implied goals as specified in the enabling legislation of the Forest Service. This we have done. The next step then, is to take the legislative mandate and from it construct the decision model it implies.

# A GOAL-ORIENTED DECISION MODEL

It has been seen that rational decisionmaking requires clear specification of the goals to be achieved. The preceding discussion has reviewed the legislative background and the evolution of the Forest Service mandate. Some critics claim that all past legislation simply adds up to confusion and the agency is left to "fly by the seat of its pants." I believe, however, that a stipulated goal and an implied decision model can be discerned in the legislation. This section puts forward a simple, generalized model that seeks to express the goal contained in the legislation in a symbolically descriptive format.

The decision model presented here is not intended as a comprehensive planning tool. Rather, it is an attempt to supply a base against which to evaluate charges that the Forest Service pursues no goals. If there has been a failure on the part of the agency, this consists, I believe, in its apparent inability to clarify its goals in the framework of a decision model. Further, a clear plan of execution is lacking — one that is in harmony with a stated goal. Once a goal is stated, investigators may legitimately criticize either the goal itself, or the actions taken by the Forest Service to achieve it.

Failure to identify a goal is subject to criticism in itself, but too often critics take a different approach. Unable to find evidence of an internally held goal, they tend to assume some goal that in their view ought to guide the Forest Service, and then discuss agency action or inaction in relation to it. The question is not in what ways does the agency fail to live up to your goal or mine, but rather, is the agency actively and efficiently pursuing the goal specified to it by the people through Congress?

It is of course a proper function of investigators to question the suitability of this or that goal specified in the legislation. It is perfectly justifiable to suggest changes in that goal to improve management of the National Forests or more closely reflect the "needs of the American people," which legislation aims to serve. In this context, criticism of current agency practice may be reasonable. Change is needed, for example, when it is apparent that existing goals inadequately reflect social welfare considerations and public desires, or when the mandated goals are impossible or extremely difficult to achieve.

The model presented here is a "bare bones" description of the goal of the agency with respect to National Forest administration. It is necessarily simplified to accommodate a wide audience. Some readers may find the presentation woefully abbreviated; others may find it overly detailed. The aim has been to steer a middle course.

The model is not intended as a final or perfect interpretation of the legislation, although every effort has been exerted to make it an accurate appraisal. It is presented primarily to fill a void in current decisionmaking practices. Many ongoing agency projects are, in part at least, also aimed at filling this void, and this study will perhaps be helpful in such studies. The model glosses over some important considerations in order to be broadly useful. Future agency action may correct this deficiency; the creation of a more complex model as a planning tool lies within the agency responsibility.

You, the reader, especially if you are a professional forester within the agency, should relate to the model in a very special way. First, ask yourself if what follows adequately

represents the legislative mandate. If it does not, or you can see other mandated goals that are not identified here, work to build a more accurately descriptive decision model. Second, if this is the goal that is being actively pursued by the agency, ask yourself whether the public clamor represents an attack on the goal itself or on efforts to achieve it.

It may be that even though the model is an accurate description of the mandate, it is so broad and vague or so demanding as to be impossible to implement. Constraints placed on the actions of the agency may tie its hands. The required information may be impossible to generate. The model may have more than one optimal solution or prove to be otherwise open ended. Society, with its constantly changing attitudes and priorities, may so drastically alter future decisions as to make the implied long-range planning difficult if not impossible. These are possibilities, not necessarily facts. But if the goal is untenable, the agency would do well to stop deluding itself that it is carrying out its mandate, and actively work for the adoption of a goal that can be achieved.

Even those who deny that the model adequately embodies the legislative mandate cannot ignore the necessity of building such a model. To those who feel that the decision model expressed here is too "ivory tower," too academic, the question must be asked, If this is not the goal you seek and if your actions are not taken in relation to this goal, then what goal do you pursue? Whatever the legislative mandate is, total commitment to goal-oriented decisionmaking is essential in National Forest management.

## The FOREST Model

The legislative mandate is here interpreted to require the Forest Service to **maximize the total weighted value of the National Forests, always keeping in mind the requirement that all of the renewable resources are to be managed on a sustained yield basis without impairment of the productivity of the land.** A further constraint, not specifically identified so far in our discussion, is the budget requirement.

The name of the model, FOREST, is an acronym made up of the first letter of each of six terms for the separate renewable surface resources named in the legislation as subject to direct management control by the Forest Service. The resources, all but one of which are referred to in the MU-SY Act, are fish and wildlife (F), outdoor recreation (O), range (forage) (R), environmental amenities (E), soil and watershed (S), and timber (T).[56] Although the resources are separately identified, it is clear that the intent of the mandate, as expressed in the NEPA, the MU-SY Act, and most of the earlier legislation, was to manage them in harmony with one another, so that the end result would be to maximize the sum of all their values. There is no indication that it was the intention of Congress to call for the maximization of any one of the resources — timber, or outdoor recreation, for example — without consideration of how such production would affect the total benefit to be derived from the forests — that is, maximization of T or O without reference to F, R, E and S. Thus the MU-SY Act calls for "harmonious and **coordinated** management . . . with consideration being given to the relative [i.e., weighted] values of the various resources. . . ." Thus the model integrates the concept of multiple use with the preceding legislation and the more comprehensive mandate of the NEPA. Reidel (1971) calls for just such a model.

In the model, the basic symbols are qualified by subscript and superscript symbols. The subscripts are coefficients representing weights or priorities on the separate resources and on the values derived from them. The value of the output is indicated by an asterisk. Thus F* stands for the value of fish and wildlife. The stipulated goal thus appears in the model as follows:

$$\text{MAXIMIZE } [{}_{f}F^{*} + {}_{o}O^{*} + {}_{r}R^{*} + {}_{e}E^{*} + {}_{s}S^{*} + {}_{t}T^{*}]$$

[56]The acronym is "pure," that is, it reflects the language of the legislation in identifying the resources, with one exception. The MU-SY Act speaks only of watershed, but it is common practice within the agency to combine soil and water in most management considerations. Although five of the six resources are thus specifically named in the MU-SY Act, and the sixth in the NEPA, the model is meant to represent much more than just those acts.

The model is definite in its implications. It indicates that the agency does not have a large number of different goals. Rather, a single goal calls for those actions by which the greatest total value will be derived from the National Forests. Since the actual value of any of the resources is determined in part by the output of the other resources — for example, the benefits derived from watershed are functionally related to the size and method of timber harvest — the total value will not necessarily be maximized by the attempt to maximize each of the resources independently. The model emphasizes that we are working with alternatives of individual resource management within alternatives of land use — wheels within wheels. By calling for the maximized sum of separately identified resource values, the model recognizes that in actual practice each resource will necessarily be separately managed to some extent. But the legislation calls for the integration of such management efforts to insure that all independent decisions, taken together, achieve the desired result. The legislation thus calls for the **total value** of FOREST to be maximized, the value of each individual resource being considered only within its ecological setting. This general equilibrium requirement of the legislation is difficult to put into practice. For the most part, as will be seen in later discussions, the agency now aims at partial equilibrium solutions that stress the maximization of value, use, or production of each resource separately. This is not consistent with the mandate given to the agency.

The FOREST model is limited to National Forest administration, and thus ignores much of the activity within the agency as it relates to some areas of research and to State and private cooperation and other activities. For obvious reasons, the discussion of the model brushes lightly over certain issues that are subject to debate among specialists, such as the correct interpretation of this or that provision in the legislation — specifically, alternative formulations of the implications contained in the sustained yield provisions of the law. The model embodies some arbitrary decisions on the expression of certain considerations. An illustration is the treatment of the Wilderness Act of 1964.

The question might well be asked, Where are wilderness values in the stipulated goal? In order to make the model as manageable as possible, I chose to reflect wilderness values as contained in the other specified resources. Various values inherent in wilderness areas are thus considered to be represented in outdoor recreation, in environmental amenities, in soil and watershed, and in fish and wildlife. From another viewpoint, wilderness might be seen not as six resources but rather as one resource containing those six resources and others — the FOREST, an entity, in which the resources have no value apart from the wilderness itself. By treating the wilderness as spread out among the various renewable surface resources, the FOREST model does not adequately take account of the nonrenewability of a **virgin** forest or wilderness. Nevertheless, for descriptive purposes this treatment was deemed warranted.

Other resources may come to mind that are not spelled out in the model, such as minerals within the National Forest boundaries. The review of legislation made clear that minerals are not directly or adequately controllable under the current Forest Service directives. This situation might well be altered in the near future, but it seemed inappropriate to include minerals in a management decision model based on the existing legislation.

A further example of choice between possible approaches is the treatment of environmental amenities (E). As stated, each of the resources in the goal is identified in the MU-SY Act, with the exception of environmental amenities, which although alluded to or implied in much of the earlier legislation, were not given specific recognition until the passage of the NEPA. It would not have been unwarranted to treat the environment as an all-encompassing term, rather than as a separate resource, thus expressing the intent of the NEPA with respect to interagency cooperation. With this in mind, the NEPA might be interpreted as calling for the maximization of the value of the urban, or agricultural, or oceanic environments, etc. This treatment did not fit well, however, into an analysis of the responsibility for the limited area of National Forest administration. The reader will undoubtedly find other instances of choice

among alternative expressions of particular aspects of the Forest Service mandate.

## The FOREST Model Elaborated

On the basis of the preceding statement, we now consider the model in symbolic form as a more complete statement of Forest Service goals. As such, it is adaptable as a decision-making tool.

### Symbolic Statement

The mandate to maximize the weighted value of the National Forests subject to constraints in the form of site productivity, sustained yield, and budget, can be expressed in the following manner:

#### GOAL

Maximize the sum of the weighted values of the FOREST resources.

$$\text{MAXIMIZE} \left[ {}_{f}F^{*} + {}_{o}O^{*} + {}_{r}R^{*} + {}_{e}E^{*} + {}_{s}S^{*} + {}_{t}T^{*} \right]$$

The symbols are interpreted according to the following pattern:

F* is the value of fish and wildlife. It may be derived from the actual physical output multiplied by a unit market price or some other estimator.[57] The output is determined partly by technology and the levels of productive inputs used in the production (or management) of fish and wildlife (that is, capital $K_F$, labor $l_F$, land $L_F$). In the light of ecological interaction it is also determined in part by the levels of physical output of the other FOREST resources. Thus, F = function of $K_F$, $l_F$, $L_F$, O, R, E, S, T, that is, the production function.

The lower case f, in the symbolic statement of the goal above, indicates the weight or premium placed on values derived from use or production of fish and wildlife.

#### CONSTRAINTS

1. Site Productivity

Total productive capability of the FOREST in the future must not be impaired relative to such productive capability of the FOREST today.

$$(\text{FOREST})_{p+1} \geq (\text{FOREST})_{p}$$

where p = current period, p+1 = future period.

2. Sustained Yield

Growth or net periodic increments in each of the resources in the future must be maintained at a level at least equal to the present level of growth. Under no circumstances are the current levels of harvesting or use of the resources to be greater than the net periodic increment or ability of the resources to renew themselves (p period = $p_1$, $p_2$, . . . , $p_n$; periods of undefined length).

| *Net periodic increment of resource in future period(s)* | | *Net periodic increment of resource in current period* | | *Periodic harvest of resource* |
|---|---|---|---|---|
| $G_{F(p+1)}$ | $\geq$ | $G_{F(p)}$ | $\geq$ | $H_F$ |
| . | | . | | . |
| . | | . | | . |
| . | | . | | . |
| $G_{T(p+1)}$ | $\geq$ | $G_{T(p)}$ | $\geq$ | $H_T$ |

3. Budget Restrictions

Actual expenditures on the separate resources may vary by as much as 7 percent of the amount budgeted, but such variation is limited in that the total actual expenditures may not exceed the total amount budgeted.

The subscript *a* indicates actual expenditures; the subscript *b* indicates amounts budgeted for each of the separate resources.

**Total Expenditures $\leq$ Total Budget Allotment**

$$(F_a + O_a + R_a + E_a + S_a + T_a) \leq$$

$$(F_b + O_b + R_b + E_b + S_b + T_b)$$

where the above is further constrained such that

$$1.07\ F_b > F_a > .93\ F_b$$

.

.

.

$$1.07\ T_b \geq T_a \geq .93\ T_b$$

[57] More precisely, the imputed unit value may be a market price, a shadow price, or a Lagrangian multiplier and would show up as a coefficient f*. Thus f*F = F*.

### The Production Function

This study purposely does not enter into the calculations necessary to implement the model. Nor does it attempt to specify the nature of the interactions between the resources, that is, the production function for each of the separate resources. We have seen in the explanation of the symbols above that for each resource a comprehensive production function must be spelled out. This shows the relation of that resource to each of the others and defines its own labor, capital, land, and technological input-output relationships. For outdoor recreation, for example, the physical output O = function of ($K_O$, $l_O$, $L_O$, F, R, E, S, T,). To make this production function determinate will require a total management effort by specialists, including silviculturists, biologists, hydrologists, economists, and many others. Much of this work has long been a major part of agency research, using and developing the comprehensive data that are available on the ecological and social subsystems of the forests. If it is oriented to the specified goal, the work of agency specialists can be redirected toward fitting together the sundry pieces into a meaningful management tool as required by the decision model.

An illustration of the general pattern of resource value measurement will be helpful. The value of timber is partly based on the prices offered in the market for the different timber species and products. These prices represent an expression of value as established in the market. Such prices, however, vary over time, and a thorough analysis would require demand and supply projections indefinitely into the future for the various timber products. Further, the value of timber will be affected by the harvest program levels pursued by the Forest Service as these affect the allowable cut calculations. The demand for the timber (harvested) will be affected by changes in population, construction technology, and other conditions. Further, unharvested timber is valuable in itself as it interacts in the ecological and social subsystems. Thus a "market" price for timber will not be applicable to that portion of timber which is classed as wilderness. In this and other ways, the estimator or index number of timber values will be altered and shaped by the interaction of timber resources with the other resources of the forest. In this context the statement in the MU-SY Act that the best combination is "not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output" is given meaning.

An estimate of unit value for timber must be comparable to the estimate of unit value of watershed. The value of watershed, however, may be measured in terms of water quality, erosion and soil stability, yield or water flow, water turbidity, or other considerations. These values depend in large part on the program levels applicable to the other forest resources. Similarly, the value of fish and wildlife may be measured in total population (for example, the size of an elk herd) as well as in numbers of species. Again, as indicated in the model, the physical output (and thus the realizable value) will be in part determined by the physical outputs of the other resources.

It is apparent that in a decision model of this type, the values must be stated in terms of some common unit of measurement. Normally, when a firm produces two or more outputs, it must have an index of values (a numeraire) that allows the addition of diverse physical outputs. (Price often serves as a numeraire, making it possible to add the value of apples and the value of oranges.) Obviously, the FOREST model calls for such a numeraire by which to estimate an imputed unit value for each resource. These may be shown as f*, o*, r*, e*, s*, t*. Just how these unit value estimators are to be determined is the problem, however. As will be seen in later discussion, the agency already has trouble getting reliable estimates of physical outputs (the F, O, R, E, S, T terms in the model). How it will get a suitable numeraire is not within the scope of this study to suggest. The model, as previously stated, is not a planning tool in itself, but rather an effort to interpret what the law says is the agency goal. The weakness of the model in this regard reflects the desire of Congress to find some way to measure the immeasurable. Implied but not specified in the goal is the research required to carry out the agency's responsibility as spelled out in the NEPA. To that end, the act calls for insuring

"that unquantified environmental amenities and values may be given appropriate consideration in decisionmaking." Noting the weakness of the model, however, does not lessen the force of its implications.

### The Site Productivity Constraint

Constraint 1 is designed to specify in the decisionmaking model the statement contained in the MU-SY Act and emphasized in the NEPA that no action is to be taken if it means there will be "impairment of the productivity of the land." The legislative review indicates that this provision occurred many times in earlier laws and court decisions apart from its connection with sustained yield. For this reason, it was treated as a separate constraint. If this site productivity constraint were taken literally, however, it would preclude any management action; therefore it has been interpreted in a "total" sense. For example, the construction of a logging road necessary to realize the value in timber (T*) might very well be expected to decrease the achievable value of soil and watershed (S*) by virtue of erosion accompanying even the best-designed road.[58] The road may at the same time, however, increase the achievable values of outdoor recreation (O*). A literal interpretation would, therefore, preclude any management action since it would mean the site had deterioriated with respect to the potential value to be achieved in soil and watershed. The legislators undoubtedly recognized, however, that one resource may gain at the expense of another in a limited area. Thus in the symbolic terms of the model, $(FOREST)_{p+1} \geq (FOREST)_p$ means that the total production capability of the land in the future time periods must be enhanced, or at a constraining level, cannot be made less than in the previous time period.

### The Sustained Yield Constraint

Constraint 2 is designed to show the implication of sustained yield in the decisionmaking process. The MU-SY Act specified that " 'sustained yield of the several products and services' means the achievement and maintenance in perpetuity of high level annual or regular periodic output of the various resources of the National Forest . . . ." To illustrate, for outdoor recreation this suggests that campgrounds should not be so heavily utilized as to destroy their capacity for use in the future (fig. 10). In some instances this has meant closing off certain areas to public use temporarily, until the resource base could be restored to its former level. Here we might be saying that the use or harvest of a resource must be nonconsumptive.

It could conceivably be argued that the sustained yield constraint makes the site productivity constraint inoperative, because in its strictest sense, the sustained yield constraint may not allow net reductions in output (productivity) over time.[59] The two constraints must be viewed simultaneously, however. As far as can be determined from the legislation, the site productivity constraint seems to apply to potential output or use value in a long-run sense, without regard to the present harvest levels. It seems to be designed to prevent activities in the present that will preclude the attainment of potential values in the future. Sustained yield, on the other hand, seems to apply to the shortrun situation, as determined by specific management activities.

The weakness of the model in this respect merely reflects ambiguity in the legislation. Both management and legislative efforts should be made to clear up this problem. One point should be emphasized. Both constraints represent the current awareness that the National Forests are important for values other than timber. The sustained yield constraint applies to all of the renewable surface resources of the forests, including watershed, range, recreation, and wildlife.[60] Current prac-

[58] Choice of this example does not imply that a road may not in fact increase watershed values, or leave them unaffected, under certain conditions.

[59] See Keane, *Even flow — Yes or No?* (1971a). There is considerable debate as to the economic sense (or nonsense) of the sustained yield provision in the law. For a discussion of the issues see Smith, *An economic view suggests the concept of sustained yield should have gone out with the crosscut saw* (1969).

[60] The MU-SY Act fails to recognize that in order to raise output from timber or recreation on virgin forest, it is necessary to destroy that virgin quality. Limiting sustained yield management direction to "renewable" resources may lead to serious neglect of certain ecological considerations.

*Figure 10. — By 1968, when this picture was taken, 30 years of recreation use had destroyed virtually all understory vegetation in the Point Campground, Redfish Lake, Sawtooth National Forest, Idaho. Rehabilitation was necessary to maintain the area's value as a recreation site.*

tices of the agency do not seem to recognize the implications of this strong condition in its legislative mandate. The site productivity constraint similarly applies to the total productivity of the forest, and not just to the productivity of a site in relation to timber production.

Both constraints can be viewed in yet another light. Economists have for some time struggled with the problem of income distribution and time preference. When one generation consumes the natural resources base in the present time period in order to generate economic growth it is performing two separate distribution functions. On the one hand, it is making possible higher levels of consumption of the goods that will be produced in the factories established with the use of such resources. This may be viewed as a net benefit to the future generations. It is in this light that the national debt (to the extent that it is used to generate economic growth and prevent unemployment) far from being a burden on the future is beneficial. On the other hand, when the resources that are being used in the current time period are nonrenewable (such as virgin timber, or minerals) or are renewable only over a long period of time, there is a net

transfer or capital borrowing by the present generations. Principles of sustained yield, site productivity, and conservation generally express a natural resource ethic that attempts to provide some kind of parity between present and future generations. Furthermore, by precluding certain actions today, such an ethic leaves open the range of options in the future. Open alternatives may be viewed as good in and of themselves — they insure that "no one generation becomes unduly burdened because of the mistakes or foolishness of their predecessors."[61]

### The Budget Constraint

Constraint 3, budget restrictions, represents the administrative aspect of costs in the Forest Service. Obviously, in the evaluation of alternative projects aimed at realizing one or more of the values of the FOREST, costs must be weighed against benefits. Although social welfare may be best achieved by carrying out all projects where the aggregate social benefits outweigh the aggregate social costs (both discounted to the present, assuming the relevant rate of discount can be determined), agency budgets are not established in that manner. Arthur Smithies (1971, p. 140) describes the budgeting process in the government sector as follows:

> Where a goal is definitely fixed, the problem then becomes one of cost minimization. In many, if not most, practical situations, the problem poses itself the other way around. Given the need for action in an area, the decisionmakers ask themselves how given sums can most effectively be spent. By considering alternative ways of spending varying sums, they can arrive at a series of optimal budgets. Hence, the term "cost-effectiveness." The actual size of the agency's budget will depend on competition with other agencies and with the taxpayer. There is an essential difference between minimizing the cost of attaining a given objective and maximizing the results of a given expenditure. In the latter case, objectives or preferences are not necessarily fixed. The process involves the discovery or revision of the preference function itself.

The actual budgeting process as it applies to the Forest Service will be discussed in a later section. It is evident, however, that those programs (and projects) must be chosen which yield the greatest net progress toward the specified goal, while staying within the fiscal-year budget allocation. The agency can spend all of its money, no more. (We can assume that it will not spend less, although the optimal solution could conceivably come at a lower level of expenditure.)

The Forest Service is further constrained in its program implementation by the breakdown of the congressional appropriation into specific allotments of funds among the various resource activities and functions, including timber resource management, recreation-public use, wildlife habitat management, range resource management, soil and water management, and others. This is reflected in the model, which shows the total budget as the sum of its component parts ($F_b + O_b + R_b + E_b + S_b + T_b$). Because it is limited to National Forest administration, the model does not purport to include all of the line items in the Forest Service appropriation schedule.

The actual level of expenditures ($F_a$, etc.) is shown as opposed to the initial amount budgeted or allotted to that function ($F_b$, etc.) The agency is given a limited amount of discretion in the budget allotment procedure in that it may shift up to 7 percent into or out of any given line item, but it is not obligated to do so. All of this is indicated in the model. The limitation applies separately to each of the terms, but cannot nullify the constraint that the total expenditures must be no greater than the total amount originally budgeted.

An exception to the total limitation is special funding as contained in sundry civil appropriation bills. In addition to the congressional line appropriations, the agency has access to other sources of funds, such as the Knutson—Vandenberg monies and the separate Timber Survey appropriation under the McSweeney-McNary Act. These outside funds are generally very closely restricted to specific

[61] See Green (1971, p. 2). The sustained yield constraint could properly be expressed in terms of present value of the separate resources. The discount rate selected may, under certain circumstances, indicate the degree to which the public holds onto a conservation ethic. Assuming no other considerations complicated the choice of discount rate, the greater the rate the less strong would be the conservation orientation, because returns coming at some distant time would be given less value.

uses, and are to be viewed as included in the total budget term, which therefore will be greater than the congressional appropriation. A more refined budget statement would be required in the practical implementation of the model.

## Weighting

The weighting coefficients (f, o, r, e, s, t) in the model, as discussed earlier, recognize that different resources may be viewed by the society as more important than others. The review of legislation indicated that although much effort has been expended by vested-interested groups and by the Forest Service itself to specify what these weights ought to be, no such priorities have in fact been established by law. If the interpretation that equal priorities are set on each of the resources is implemented, the weights may be dropped out, and the goal becomes one of maximizing the sum of the values determined for each of the resources. This would be indicated by changing the goal to read: Maximize ($F^*$+ $O^*$+ $R^*$+ $E^*$+ $S^*$+ $T^*$).

The model calls for the separate identification of (1) the value of the resources, and (2) their weights. A gray area here is created by the apparent lack, which has been mentioned earlier, of any readily devisable index or numeraire on which to establish the values independent of the weights. Any index or equivalency table will undoubtedly blur the required distinction, as evident from a simple example. Having measured the achievable output level of S (soil and watershed) and the achievable output level of R (range) for a given program level, the problem is to determine a trade-off schedule, to the effect that additional units of grazing can be obtained if the resulting deterioration of the watershed is allowed. The relationship between the two resources can be specified as an interaction function: a gain of x units of R can be realized only with a loss of y units of S. But, does the gain in R represent an increase in value sufficient to offset the value lost in S? If a pure numeraire existed, this question could be answered unequivocally. As it is, such a trade-off must be in part decided on the basis of value and in part on the basis of the decisionmaker's own view of the relative value of two resources — that is, his priority system.[62] The model calls for the separation of the two concepts.

It must be recognized that the decisionmaker will always be working in an environment of uncertainty. The model cannot make decisions — that is the role of the land manager. What the model can do is spell out the systematic analysis and logic upon which a decision and its underlying assumptions are based. It can keep out in front of the policymaker the goal he is seeking to achieve. Just as importantly it can be used to spell out the consequences of alternative actions by showing the effects of such decisions. It extends his ability to understand the implications of any given action. Most important it can prevent him from taking an irreversible step to solve a small problem, without considering a much larger one — that is, getting out on a limb only to find that in the meantime his own actions resulted in the severance of the limb from the tree.[63]

Management direction must be all of a piece. The policy of functionalism fulfills specific stipulated requirements of separate legislative acts in a distinct and separate manner. The FOREST model emphasizes that each such legislative direction is only a thread in the total fabric, which is the goal itself, to which all actions should be addressed.

We turn now to a discussion of the problems and prospects of implementing goal-oriented decision management systems in the agency. Our question is, What incongruities exist that prevent the agency from fully meeting its obligations as described by the FOREST mandate?

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[62] See Major (1969), p. 1178. He claims that in the area of water resources planning, at least, a reasonable approximation or estimate of the appropriate weights is possible.

[63] See Forrester (1971). For an economist's perspective on why "small" decisions taken only in the context of the particular situation may well prove undesirable, see Kahn, *The tyranny of small decisions* (1966).

# PRIORITIES IN PRACTICE

In considering the weight setting that takes place in Forest Service practice, we will be concerned with the indications of priorities, both stated and implicit. Like the legislation that has been reviewed, management practice in the Forest Service has taken an evolutionary course.

In the formative years of Forest Service administration, the significant task was protection. Very often the forester was working in isolation, separated by time and distance from the forces at work in other segments of the economy. People still in the Service recall, in the early years of their careers as assistants to District Rangers, going out during the early spring with little more than an ax, a string of mules, a saw, a horse, and a rifle (fig. 11). They might spend the entire summer away from the district office, and return in the late fall, if they were fortunate, ahead of that first big snowfall that had kept others like themselves stranded for the winter. Two- and three-week excursions were often undertaken with only a verbal order to "check things out in the northwest corner."

Management direction was minimal. Fire detection and suppression, and prevention of timber trespass, were the key elements of the ranger's job. The change from resource protection to resource management was a slow, evolutionary process reflecting the changes in the economic complex of which the forests were a part. Demand for forest products rose as industry expanded.

Similarly, demand for the recreational opportunities offered by the forested land rose rapidly as the population grew, migrated, and reached a level of affluence that allowed for more leisure time. All these changes were accompanied by a shrinking of the resource base in relation to the growing pressures for utilization, and for the first time America was faced with a scarcity of land, timber, and water. Economists could no longer speak of "free air" and "free water," and were forced to change the direction of their analysis. More and more during the late 1940's and early fifties, concern over land management was evident in the literature.

The shift toward intensive management of the National Forests had begun quite early, with emphasis on aiding private and State foresters to improve their technical awareness and competence. Not surprisingly, such efforts were first made in the direction of forest products, particularly timber, forage, and water. As the review of early legislation indicates, the major emphasis was on timber management. This meant that patterns of organizational structure were established in the Forest Service and became firmly fixed. Time was essential to effect the necessary transition to broadly based land management. Although there has been a massive effort by the entire agency to adjust to the changing resource needs of the nation, it has not been fully effective. Patterns of functional thinking still exist. In-service studies have pointed out the immense distance yet to be traveled. Reward systems based on such functional achievements as effectiveness in timber sale operations are being modified. As time passes, the multiple use approach called for in the legislation may become an actual fact. What we need to do now is to examine where we are on the road to that goal.

*Figure 11. — A pack train such as this one setting out on Clear Creek, Boise National Forest, was a familiar sight in the early days of the Forest Service.*

## Accomplishments of the Multiple Use - Sustained Yield Act

A review of the past decade shows that the MU-SY Act, in spite of its failure to spell out its intentions in clear terms, has provided the needed element of time. In any institution that is to survive in a dynamic society, change must be orderly and purposeful rather than merely convulsive. The very vagueness of the MU-SY Act made possible new directions. In the period up to the passage of the act, too little effort was made by functionally oriented decisionmakers to consider other resource activities related to their own. This led to internal differences on policy and continuing struggles between individual administrators. The MU-SY Act, obliging the various functional units to work in conjunction with one another, gave legal backing to existing pressure to view the FOREST as an ecological entity, to be managed on that basis. This pressure had been building for some time. Long before passage of the act, the concept of multiple use served as a buffer between both internal and external factions. No longer could the FOREST be viewed solely in terms of its "commodity" elements (Martin 1969).

Harmonious and coordinated use of the resources was not an immediate accomplishment. Such a result could hardly have been achieved merely by the passage of a bill, although current criticism of Forest Service management suggests that such was the expectation. The bill did help to develop an administrative strategy that would allow the conflict

of internal forces to take place within a limited arena. These forces, generated by the functional orientation within the Service, could thus be integrated and directed toward the pursuit of the common management goal. The attempt in this study to describe the goal of the agency in the FOREST model may result in discussions that will work toward integration.

There is reason to believe that the MU-SY Act has had similar importance with respect to external forces affecting the Forest Service. If external pressures are focused on a stated policy, the resulting criticism can be constructive. In spite of its failure to spell out a program for multiple use, the act served an essential purpose. Conflicts among various user groups have become acute during the past two decades. These conflicts are especially sharp between timber interests on the one hand, and the recreationists and preservationists on the other. The multiple use doctrine provided the forest managers with a much-needed weapon to ward off single-interest onslaughts on the public forests. Here, again, time was an essential requirement. It was hoped that the environmental, biological, and ecological subsystems could be better understood and that management techniques could be established to allow a closer approach to full compliance with the original intent of the legislation. Although loud protests were heard from forest users of various persuasions, the multiple use doctrine allowed the foresters to fend off numerous attempts to overcut timber stands, overrestrict forest areas as wilderness, or otherwise unwisely use the public resource base. If for no other reason, the Multiple Use-Sustained Yield Act has more than proved itself an important piece of legislation.

Although the bill may not have lived up to the expectations of many people as a clarification of key issues, it did provide the Forest Service with precious time to begin moving in a new direction in the evaluation of forest management procedures. That this new direction is being taken is indicated in the articles presently appearing in the professional journals. Much is still to be done to translate the legislative mandate into a guide for decisionmaking, but the corner is being turned.

## Weight Setting Implicit in Management Practice

The weighting of the various resources, as we have seen, is the basic element in decisionmaking. In the absence of any congressionally established weights or priorities, the Forest Service is left to establish its own. One possible course is to specify that equal weights be attached to each of the resources; then the FOREST model becomes a special case. Although the claim is sometimes made that all resources have equal priority, this is not generally true in Forest Service practice. Instead, priorities often enter, as it were, through the back door, so that weights are established by default, without a clear awareness by persons within the agency that such weight-setting is going on.

### Research and Inventory Techniques

The legislation requires that each of the various resources be given "consideration" in any decision or action. If, however, the Forest Service desires to give equal priorities to the various resources, then special care must be taken to see that each is considered to an equal degree. To give actual equality to the various resources, similar effort must be expended to secure data and organize them to produce the relevant information.

If one resource is emphasized in inventory work or research at the expense of others, then decisionmaking is already influenced by an unequal weighting of the resources. That is, in the language of the FOREST model, we have unequal specification of the value(*) of the various resources. Only if the required information is available for each of the resources can an unambiguously optimal decision be made. Obviously, the state of knowledge within the Forest Service does not currently meet such a standard. Spokesmen for the agency may staunchly maintain that timber is not given a higher priority than the other forest resources, but their claims will remain unconvincing until equally well-developed information is available and utilized for the other resources. This point was made clear in *Forest Management in Wyoming*

(USDA Forest Service 1971, p. 69). The study team reports:

> Resource inventories were lacking on all four Forests when extensive logging was begun. At that time, the best information was the Timber Resource Inventory, but because equivalent data were not available about other resources the Timber Resource Inventory was easily misinterpreted. Although it provided the factual base for calculating the allowable cut, in the absence of data about other important values the calculations did not fully take into account the needs of wildlife and fisheries, recreation, and scenic quality.

There is no intent to imply that timber is alone in being given special consideration by virtue of its more refined data base. The opposite may be true. Within the agency there has often been a tendency to suggest that a project is desirable because of its "unquantifiable" or "unknown" benefits, as indicated by unreliable or incomplete data. Supporters of wilderness area classification are especially prone to this practice. The justification of one resource by reference to benefits to another may be similarly based on unreliable data, as when Service personnel suggest that a certain timber cutting practice or timber sale will "do wonders" for the wildlife habitat. Perhaps it may, but perhaps is not enough.

Knowledge and information are not "free" goods. Research and data gathering bears a cost, both in money and in the man-hours and other resources utilized in the research effort. There is no suggestion here that a dollar spent in one type of research is equal in results to a dollar spent on some other type of research. But the present allocation of research funds, stressing as it does the gathering of information on timber, does not appear on the surface to be in compliance with the intent of the legislation. This in turn reflects the congressional budget appropriations and cannot be divorced from a public priority-setting mechanism. Although the enabling legislation does not set research priorities, funding legislation does, as a later discussion will show.

Lack of data is not always the problem, as anyone who has attended agency meetings knows. "We have so much data we simply don't know what to do with it," was a comment made at one meeting attended during this study. Such a statement can only mean that too little thought has been given to the purposes behind the collection of certain types of data. The evidence suggests that some data collection activities have become burdens rather than benefits.

It is possible to identify implicit priorities, therefore, with reference not only to the particular resources being studied, but also to the techniques employed in getting at the information gathered. The *Forest Survey Manual* supplies very specific direction on how to measure tree and stand volumes. What it fails to do, however, is to place the timber inventory in any reasonable ecological setting. A recent study emphasizes "the need for resource inventory work that will describe and update timber and other resources in relation to the land, land-use status, and other factors that affect forest development and use. Timber and other resource inventories must be coordinated and related to land characteristics and other current factors that are significant in multiple use management . . ." (Wikstrom and Hutchison 1971, p. ii).

Any timber inventory must provide the necessary data to allow determination, for example, of whether the stand is on a stable land base, or whether it is part of a migration route for elk or deer. Is it an important nesting area for bird or game populations? What is its future value as a recreation site? In other words, how does it fit into the social and ecological systems? What is its functional relationship to the other resources of the FOREST? Only when this question is answered can it be said that all resources are given equal consideration.

### Subjective Decisionmaking

The need for coordinated resource inventories points up the fact that the alternatives open to the land manager have complex ramifications. These complexities, apparently, have led to a tendency in the Forest Service to give the local forest administrator broad discretionary authority, and subjective factors have thus entered the decisionmaking process. It is possible and natural that "one ranger may be 'recreation conscious' and view each plot of land as a possible campsite. Another may be fascinated by opportunities to im-

prove wildlife habitat. Still another may be a 'timber beast' and view all other activities as distractions from his main job of growing trees" (Hall 1963, p. 284).

In the absence of congressional direction, other than funding, to establish priorities among the various resources, the local decisionmaker has usually set those priorities. Prior to recent changes in management practice, the District Ranger, who as a rule knew the special characteristics of his particular area better than anyone else, was seen as the "key man in multiple use management." Guided by his staff (with the aid and direction of the Forest Supervisor and the Regional Director and their staffs), the District Ranger sought to develop a multiple use plan that would give consideration to all of the resources and uses of the forest under his control (Hall 1963).

Great reliance was placed on the sound judgment, the "savvy," and the professional competence of the District Ranger. The multiple use concept, as it was being practiced, served mainly to emphasize that all of the various possible conflicts and alternatives should be considered by the decisionmaker faced with complex situations. There was no guarantee, however, that the various priorities implicit in a particular situation would be recognized as such.

Partly as a result of recent studies, prompted by public criticism of management practices on certain National Forests, broad changes are being made. Some studies have pointed out a lack of direction that leads to priority setting in a narrow framework unrelated to an overriding goal. The findings of the Task Force investigating management priorities on the Bitterroot National Forest are of special interest:

> Multiple use planning on the Bitterroot National Forest has not advanced far enough to provide the firm management direction necessary to insure quality land management and, at the same time, to provide all segments of the public with a clear picture of long-range objectives.
>
> Multiple use planning is not an instant process. Good plans are evolved over time and must be viewed as dynamic working tools that must be improved constantly as needs and circumstances change. **The principal single fault this Task Force finds . . . is that multiple use planning is not far enough advanced.** Many of the questions that have been raised by the public may be boiled down into one simple overall question: How does the National Forest plan to fit everything together so the **various resource needs can be met without impairing other uses and values?** The "how" has yet to be adequately demonstrated in multiple use plans. Effective land management requires precise mapping and specific management prescriptions for land units within which the management objectives, or the planned mix of uses, are reasonably homogeneous. It requires in some cases that operational restrictions be placed on resource uses and activities to prevent damage to other resources. All of this must be done in such a manner that all segments of the public can contribute to the development of objectives. **Once the objectives are nailed down,** there can be complete continuity and consistency of action on the part of the administrators and understanding on the part of the public.
>
> The multiple use plans on the Bitterroot National Forest do indicate a tone or direction for management; if this tone could be transmitted to the day-to-day activities, the quality of management on the ground would be improved greatly. However, the plans contain too few specific coordinating decisions. Because the organization is spread so thin, some important and long-term land management decisions have been made by some of the least experienced personnel, without the important overall controls a complete multiple use plan provides, and without adequate supervisory guidance. In instances, the results have been disappointing. (USDA Forest Service 1970, p. 10, 11; emphasis added.)

The "simple overall question" put forth in the second paragraph comes very close to implying the FOREST goal. A directive from the Regional Forester in 1971 called upon the Forest Supervisor of the Bitterroot National Forest to drastically alter his management plans to reflect the findings of the Task Force.

A strong element in criticism of subjective decisionmaking has been the charge that production goals hold priority over quality of environment. Some of the problems pointed out in recent studies of forest management may in fact be attributable to such an attitude. In some of the Wyoming Forests, for example, when areas that had been included in earlier allowable cut calculations were later found to be unloggable, there was no attempt to rectify the miscalculations. Rather, the "cut was concentrated in the area that could be logged" (USDA Forest Service 1971, p. 8). In another instance, however, a study team called for just

such practices by stating that if after various maneuvers to increase the value of a sale to the purchaser "the sale still will not produce a normal profit margin, it should be considered a submarginal block of timber and not offered for sale." If the recommendation had stopped there, no one could quarrel with it. But it went on to say that then, "The allowable cut should be achieved by preparing some other block for sale" (Worrell 1963, p. 64). That submarginal block of land should never have entered into the calculation of allowable cut in the first place, and cutting timber elsewhere simply is not justified. The kind of coordinated inventory referred to earlier is a part of the solution to this problem. There is strong evidence, however, that priorities are being set as a result of undefined but also unmistakable pressures on the decisionmaker. The comments of the Bitterroot National Forest Task Force are relevant here:

> There is an implicit attitude among many people on the staff of the Bitterroot National Forest that resource production goals come first and that land management considerations take second place. The desire to keep the land productive has always been an implicit objective in Forest Service management. Anyone who says otherwise has a faulty sense of history. . .The emphasis on resource production goals is not unique to the Bitterroot National Forest and does not originate at the National Forest level. It is the result of rather subtle pressures and attitudes coming from above. While the goals of management on the National Forests are broad and sound, the most insistent pressure recently has been to increase the timber cut on these National Forests in order to make more timber available to ease the shortage of housing materials. The insistence of this pressure is indicated by the fact that the Forest Service is required, once a week, to report accomplishments in meeting planned timber sale objectives to its Washington Office in order to keep the Secretary of Agriculture, Congress, and outside groups informed of progress in meeting timber cut commitments (USDA Forest Service 1970, p. 9).[64]

Considerable effort has been made by the Forest Service in the very recent past to erase the public's impression that timber production goals are foremost in its scale of importance. The pervasive force of such goals in the agency patterns of thought is still evident, however. The *Review of Timber Appraisal Policies* (Worrell 1963), mentioned above, argues that the interdependence between the Forest Service and the private mill operator or lumber industry in a community may even call for selling timber at economic losses, with a "profit deficit allowance" as a "last resort means of maintaining a dependent firm or community" (p. 34). In such a policy, the place of sustained yield and allowable cut calculations is difficult to see. Although it is clear that no statement in the legislation spells out the purposes of timber sale, it is equally clear that cutting timber is not a "functional" operation of the agency to be pursued under any and all conditions. As we have seen, the legislation calls for the cutting of timber if, and when, it can be shown that such action will increase the total realizable value of the FOREST. Any evidence in the legislation that the survival of a local mill is a primary consideration is subject to the broader ecological direction provided in the MU-SY Act and the NEPA.

### Forest Service Directives

The existence of priorities established without reference to an overriding goal also must be recognized in Forest Service policy on restrictive directives. These have been kept at a minimum, with the aim of reducing the problems that arise when directives are so specific that they have to be constantly modified to fit special situations. This policy has the effect, however, of making directions and guidelines vague or subject to wide discretionary interpretation. In discussing legal aspects of cooperative road agreements between the Forest Service and private owners, Bayles (1964) identifies an illustration. He feels that additional regulations are needed to determine the basis of cost-sharing between the parties to a cooperative access road in the National Forest. Former Secretary Hardin's regulation concerning this issue provides that

> When roads are constructed under cooperative agreements to meet mutual needs of the United

[64] See also USDA Forest Service 1971, *passim*. For an example of the not so "subtle" pressure being exerted on the agency see *Economic report of the President*, February 1971, "Timber Resources," p. 134.

States and others for access, determinations of the shares of costs to be born by the United States and the cooperating parties will include consideration of: (1) The standard of road required for the planned hauling; (2) the share of the planned use; (3) the location and volume of tributary timber owned by each party and expected to be hauled over the road or roads; (4) the tributary areas owned or controlled by each party; (5) expected use by the public; and (6) other appropriate considerations.[65]

Bayles (p. 117) argues that "this provision does not provide adequate guidelines for the cooperators and regional foresters to use in negotiating." No indication is given of the value to be assigned public recreation use, nor of the extent to which the Forest Service is to consider "recreation, mining, grazing, watershed management and other uses of the forest lands as 'substantial planned uses.' " Bayles concludes that the regulation "would seem to give negotiators nothing more than a nebulous beginning and would undoubtedly result in widely varying solutions rather than the establishment of norms which would aid the process of negotiation."

Other instances of inadequate guidelines in the regulations have been suggested during the course of this study in conversations with lawyers. In the absence of an overriding goal such as that contained in the FOREST model, many agencies and departments have adopted the mechanism of the Code of Federal Regulations to provide specific direction. In contrast to the Department of Interior, for example, which has volumes of regulations, the Department of Agriculture (especially for Forest Service activities) uses this mechanism only rarely. The current volume of the Code of Federal Regulations (1970) defines in part the Forest Service role under the subjects of organization; functions and procedures; administration; administration of the forest development transportation system; administration of lands under Title III of the Bankhead-Jones Farm Tenant Act by the Forest Service; timber; grazing; wildlife; land uses; trespass; use of "Smokey Bear" symbol; and land disposal. "These regulations have the force and effect of law and are binding upon the Forest Service as well as upon the public."

[65] 36 C.F.R. 212.11(c) (Supp. 1970).

Surprisingly, nothing in these regulations directly or specifically refers to multiple use management or to sustained yield considerations. Thus, there is apparently no particular form for the making of multiple use decisions beyond any contained in the *Forest Service Manual*. There is definitely no approximation to the kind of directives or regulations implied in the FOREST model. At least one lawyer has contended that the Forest Service has failed to comply with the Public Information Act and that in future litigation, the lack of regulations will force the court to interpret the *Manual* as filling that lack. That is, Forest Service statements of intention to perform certain actions in the decisionmaking process become binding in the absence of official regulations (personal communication, Dean Gardner).

## Public Involvement in Weight Setting

The opinions of the public, individually and in groups, may affect weight setting both directly and indirectly. The current effort to include the local public in decisionmaking is to some extent the result of public criticism of the Service for activities such as clearcutting and roadbuilding in certain areas. It seems evident, however, that the responsibility for involving the public is not as clearly defined as present agency interpretation would suggest.

Conversations with National Forest administrators (especially Forest Supervisors) in the course of this study indicate that they believe public involvement is important to agency public relations. Beyond this basic agreement, however, differences of opinion exist. Some Forest Supervisors showed a desire to seek advice from the public as to priorities in the initial stages of the investigatory process, as in the formulation of District or Forest level multiple use plans. Others, however, felt that agency expertise should be dominant in the policy formulation process, and the public consulted primarily for information. These foresters felt that if the agency could simply present clearly the decisions that had been reached, and provide the local public with the

relevant information behind that decision, much controversy could be avoided. In their eyes, the public is responsive and receptive to the work of the agency if it is made aware of the complex management considerations that enter into any given decision.

The public, if the numerous articles in the news media are indicative, prefers the former approach, allowing local residents actual involvement in decisionmaking. Two questions are relevant here. First, what, if any, legal requirements exist with respect to public involvement? Second, in the absence of any legal requirements, what policy might the Forest Service best adopt?[66] Answers to the second question will be explored in a separate discussion, but we can consider the first question here.

### Program Formulation

The *Forest Service Manual* (Sec. 1033-8) states that it is the objective of the agency to "involve the public in forestry policy and program formulation." In pursuit of that objective the Forest Service will "seek out and obtain local and national views in the process of policy and program formulation." The agency strives to discharge its "responsibilities in ways that make our management processes visible and our responsible people accessible." Further, it will "consult with and seek cooperative actions with agencies at all levels of Government and with private groups and individuals, in programs for resource management and economic development."

Although the statements in the *Manual* have not as yet been deemed law (as are the Secretary's rules and regulations contained in the Code of Federal Regulations), there is some feeling within the legal profession that in the absence of exercise of the rulemaking function, they will take on the coloring of law. In this light, the statements just quoted would seem to place the agency under compulsion to seek out public opinion in policy formulation. The wording in the *Manual* is so broad, however, that it is doubtful that an individual could obtain standing in court on the basis of not having had access to the decisionmaking function. In fact, the remaining portions of applicable law seem to preclude that possibility.

A detailed discussion of such aspects of rulemaking and policy formulations as notice, hearings, publications, investigation, and other matters is contained in *American Jurisprudence*.[67] It states that in general, notice and hearing is not a constitutional requirement, although certain statutes call for these in specific situations. In the absence of statutory restrictions,

> An agency . . . is no more required to give previous notice of an intent to make a regulation or to grant a hearing on the merits of the regulation to be adopted than is the legislature in exercising its lawmaking functions . . . Where a rule of conduct applies to more than a few people, it is impracticable that everyone should have a direct voice in its adoption . . . . An administrative agency in the exercise of legislative power is not limited to hearings required or provided by statute but may conduct an independent investigation and survey to determine facts as a basis of an order or regulation . . . An administrative agency not required to grant a hearing as a basis of its regulations may make its rules without regard to the evidence heard, and special findings of fact are not necessary to support a regulation where the statute does not require it either in terms or effect.

With only a few exceptions there is not, from a strict legal point of view, any requirement for public involvement in the decisionmaking process of the Forest Service. Exceptions apply to such matters as certain aspects of wilderness establishment, actions and appeals under certain acts, and particular plans affecting Indian lands or range allotments.

Beyond these provisions, two additional points must be considered. First, the National Environmental Policy Act has been supplemented by Executive Order 11514, which in Section 2, Responsibilities of Federal Agencies, stipulates that agencies shall:

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[66] The Forest Service is currently formulating directives on public involvement. The direction suggested here should be compared with USDA Forest Service, *A guide to public involvement in decisionmaking*, 1971.

[67] 2d ed., v. 2, Administrative Law, Sec. 276-283. San Francisco, Bancroft-Whitney Company, 1962.

(b) Develop procedures to ensure the fullest practicable provision of timely public information and understanding of Federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage State and local agencies to adopt similar procedures for informing the public concerning their activities affecting the quality of the environment.

(c) Insure that information regarding existing or potential environmental problems and control methods developed as part of research, development, demonstration, test, or evaluation activities is made available to Federal agencies, States, counties, municipalities, institutions, and other entities, as appropriate.

(e) Engage in exchange of data and research results, and cooperate with agencies or other governments to foster the purposes of the Act.

(f) Proceed, in coordination with other agencies, with actions required by section 102 of the Act.

In reporting on his interpretation of these provisions, Dean A. Gardner, Attorney in Charge, Office of the General Counsel (U.S.D.A., Ogden, Utah), stated that he felt that the "degree of public involvement in reaching a decision is more a matter of complying with the recent statutory policy and directives of the National Environmental Policy Act and the public information regulations than it is a question of judicial considerations." He further states his opinion that it is the primary responsibility of the resource manager, beyond any specific considerations of public involvement, "to carry out an adequate investigation . . . and that the management decisions should be based upon a demonstrable record of reviewing the alternatives and an alternative which is supported by substantial evidence."[68]

The second point to be considered is the application of a policy statement by Secretary of Agriculture Hardin (July 24, 1971), in implementation of the Administrative Procedures Act and the recommendation of the Administrative Conference. The statement calls for public participation in rulemaking relating to public property, with certain exceptions:

> The exemptions permitted from such requirements where an agency finds for good cause that compliance would be impracticable, unnecessary or contrary to the public interest will be used sparingly, that is, only when there is a substantial basis therefor. Where such a finding is made, the finding and a statement of the reasons therefor will be published with the rule.[69]

The definition of the term "rulemaking" for the purposes of the act is given to mean "agency process for formulating, amending, or repealing a rule." In turn the definition of the term "rule" is "the whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency . . . ."

If this definition is taken at its face value, every alteration in the *Forest Service Manual* would have to be subject to public hearings, to say nothing of every multiple use plan or action proposal. For example, such efforts of the Forest Service as the newly formulated and very forward-looking inventory plans would have to be subject to public hearings, because they are certainly designed to implement law and policy. This interpretation may not be correct, however. The Secretary specifically refers, as quoted above, to the exemptions granted to agencies (contained in the act at 5 U.S.C. 553, section b, part A), to the effect that the subsection does not apply "to interpretative rules, general statements of policy, or rules of agency organization, procedure or practice." The kinds of changes that

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[68] Personal communication, January 12, 1972.

[69] *Federal Register*, Vol. 36, No. 143 (Saturday, July 24, 1971), p. 13804. Applies to Administrative Procedures Act, 5 U.S.C. 553.

may be desired in specific "functional handbooks and guides" or the adoption of the FOREST model as a working management guide appear to be covered by this exemption.

We have arrived, then, at a partial answer to our first question, What are the legal requirements for public involvement? With respect to decisionmaking, none, beyond the desire on the part of the agency to keep the public informed as to its activities, and with its possible exemptions, the Secretary's rule described above. This conclusion should not be allowed, however, to overshadow the important function of public involvement. The discussion in a later section will indicate how the FOREST model suggests the shape that a prudent policy might take.

### Appeal from Agency Decisions

The legal requirements for public involvement in another area remain to be considered. A major problem the Forest Service shares with some other Federal agencies is the current propensity of many individuals and interest groups to seek court action against a decision by a government agency on the basis that the decision is not in the public interest. In the earlier review of legislation, some of the relevant court interpretations have been discussed. There is evidence both of reluctance to substitute the opinion of the court for that of the agency, and of a desire to see that important decisions are made in compliance with the intent of the legislation.

From most indications the Forest Service is not exempt from the provisions of section 701 of the Administrative Procedures Act which provides that the action of "each authority of the Government of the United States" is subject to judicial review except where there is a statutory prohibition on review or where "agency action is committed to agency discretion by law."[70]

The legal question is, just when is a decision by an agency to be held unlawful and set aside according to the standards set up in section 706 of the Administrative Procedures Act? Section 706 calls for such action if decisions are found to be

a. arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law,
b. contrary to constitutional right, power, privilege, or immunity,
c. in excess of statutory jurisdiction, authority, or limitations, or short of statutory rights,
d. unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of any agency hearing provided by statute,
e. without observance of procedure required by law, or
f. unwarranted by the facts to the extent that the facts are subject to trial *de novo* by the reviewing court.

The implications of the act and of court interpretation of the NEPA are fairly clear. As far as possible and within the limits of prudence, all decisions applicable to the natural resources of the FOREST should be fully documented and should be based on a complete and comprehensive multiple use — environmental impact analysis. The likelihood that the contemplated action may be raised as an issue in the courts gives this precaution special force, but is difficult to estimate. Adoption of the FOREST model and adherence to the management prescriptions implied in it will adequately serve the purpose.

The opinion has been stated by Rogers (1969, p. 121, 122, 131) that the public can do little to counter actions taken by the Forest Service that are contrary to what they feel is the public interest because the court cannot define the legally directed course of action. Rogers considers the "uncontrolled discretion in executive decisionmaking" of the agency to be guided by "statutes vague to the point of license" and goes on to say that "most of the statutes themselves are of such generality as to afford little, if any, standards by which a court could say that administrative decisions

[70] 5 U.S.C. 701. The exception is a narrow one. See Burger (1965), p. 55 ff.; also, U. S. Congr. 79, 1st Sess., Senate Report No. 758, Senate Committee on the Judiciary, 1945, p. 26.

have not followed the Congressional mandates." If the interpretation stressed throughout this study is correct, and the legislation does in fact provide a clear mandate, as expressed in the FOREST model, such concern is misguided. It is the Forest Service itself that must be concerned to fulfill its legal responsibility.

The absence of legislatively directed priorities has left the Forest Service open to attack by individuals and groups from various directions. Some see the problem as a failure of the legislation — an "empty mandate" — but we have seen that the legislation does provide a limited but clear mandate. Some see the apparent failures of management as explained by the impossibility of attaining the necessary technical capability of measurement of complex ecological factors. But with goal-oriented management, the required "state of the art" may well be achieved. Again, some charge that every local land manager in the Service is free to set his own priorities. This is true only up to a point, and is becoming less and less true as time passes. One aspect of the problem that does not often figure in public criticism, however, is the budget problem, discussed in the next section. Whatever the successes or failures of the Forest Service in determining their needs, the provision for fulfilling those needs comes from congressional appropriations.

## Weighting in the Budget Process

The preceding discussion of priority setting in practice has pointed out that weights are often established in the budgeting process. In the final analysis the budget allocation determines not only to what extent "back door" priorities can be acted upon, but also which resources, uses, and activities will be given greatest attention in management programs. In the absence of defined priorities, the money that the agency has to spend on its various activities will dictate the extent to which it can reach its goals.

In the public debate over whether or not Forest Service decisions are optimal, an essential point is often overlooked. Rather than aiming their attacks at the agency itself, the individuals and interest groups would do better to work toward setting clear priorities. That is, their attacks should be aimed not only at forcing the agency to spell out the basis for certain decisions, but also at the budgeting process, because it is there that the weights are being heavily influenced.

The two prominent aspects of the problem are the total budget and its allocation. First, how is the total budget appropriation related to the actual total needs of the Forest Service in carrying out its operations? An easy approach to budget problems would be to say simply that more money is needed. This study does not take that approach. It does not, in fact, address itself at all to the matter of total budget, since any and all agencies in the government could probably make a strong case for increases in funding. Outside interests could put forth strong arguments to cut or reduce the total budgets of many government agencies. Rather than make a plea for more money, this study urges a close look at the second and more important aspect of the budgeting problem. With the given total appropriation, how does the allocation procedure relate to the agency's legislative mandate as expressed in the FOREST model? It will be evident that the significant incongruities identifiable in the budgeting process prevent or make extremely difficult full compliance with the legislative mandate.

To state the question in another way, Does the allocation procedure reflect the ecological and environmental imperatives found in the enabling legislation? Has Congress fulfilled its obligation in providing a balanced allocation of funds that will allow the full pursuit of the objectives that it has established for the Forest Service? Equally important, has the agency shown full awareness of its mission in its budget requests?

Three possibilities must be considered. First, if it can be shown that the budget requests and the final congressional appropriations (not in total dollar amounts, but in relative distribution among the various resources) are in line with the agency's objectives, then current criticism must be due to the agency's failure to perform its management job ade-

quately. In this light, the current outcry over management action and inaction begins to take on new and added significance. Second, there may be major discrepancies between the agency's budget requests (again in relative terms) and the congressional appropriations. To the extent that appropriations differ from requests, emphasis is shifted among resources, activities, and functions. If this is happening, then remedial action by an aggrieved public is clearly indicated. Lobbying could force a realignment of congressional appropriations. Third, it may be that the agency budget requests do not realistically reflect legislated goals.

The importance of the issue raised in this discussion can hardly be overestimated. It is the question of who best knows what is in the public interest. Some would argue that if the Forest Service is capable of carrying out the mandate of the FOREST model by generating the necessary information and calculations, then it ought to be able to determine where, how, and when money is to be spent in performing its program-implementing activities. This argument maintains that because the agency is dealing with complex biosystems, the general public cannot be expected to understand all that is required to make a competent determination of what should be done. In short, the prescription is to get the budget requests in line with the overriding decision model (assuming it is properly implemented) and all will be well.

There are several reasons to suspect that current budget requests do not clearly reflect legislative goals. First, the agency has not to date shown a complete goal orientation and, therefore, it is unlikely that requests represent funding of optimal programs. Second, and more important in its practical thrust, is the familiar political and bureaucratic nature of the budgetmaking process in virtually all government agencies. Initial budget requests are submitted 1½-2 years in advance of the fiscal year covered. Although some will deny that the agency tends to let past appropriations affect current requests, the tendency pervades most bureaucratic budgeting processes, and the Forest Service is unlikely to escape it.[71]

[71] Haveman (1970), p. 89-97; Lowi (1969), *passim.*

If, time after time in the past, the agency has seen its requests for timber sales administration, for example, fully funded, while at the same time other parts of its request were pared down, there will be a strong incentive to inflate the timber budget (with a strong probability of getting it through), while at the same time neglecting other budget items to some extent.

An agency officer may know that any requests for either soil and watershed funds or research funds outside of the States represented by the subcommittee members will in all probability be reduced. If he has similar assurance that if he does not ask for range management funds he will simply "lose" that much of the total budget, he is likely to inflate the range figure. Year-to-year budget requests may tend to be reduced, when necessary, in areas seen as likely to be lost or not fully funded. Although recognition of this fact may cause consternation, the practice is so familiar in bureaucratic situations that the burden of proof is placed on the agency that claims to be free of it. The general rule is that the agency request represents what it can get rather than what it needs.

Analysis of data in the Appendix indicates that Forest Service requests may have been made on just such a basis. Changes obviously occur as agency budget requests are passed along on their way to the final appropriation. Many of these changes are due to the agency's inability to demonstrate adequately the full range and consequences of management alternatives. This, in turn, makes it difficult to argue convincingly for program redirection. This process began long ago. Once it began, it was very difficult to reverse, and changes in program directions came very slowly. This may explain in part why the MU-SY Act has been so slow in achieving significant changes.

### Congress and Priorities

If an agency's budget request is influenced to some extent by what it can get, the question remains whether what it can get truly serves the public interest. Perhaps the Congress, being the center of the public arena, has a better "feel" for what the public wants and needs. Thus, we may note that during the

period 1963-1969, Forest Service estimates of needed funds for its "Development Program" were actually funded at the following levels (Vaux 1971, p. 5-6):[72]

| | |
|---|---|
| Timber sale administration and management | 94.2% |
| Reforestation and stand improvement | 41.8% |
| Recreation-public use | 46.7% |
| Soil and water management | 53.7% |

Vaux comments,

> Thus, the Forest Service problem seems to be how to get interest groups and the Appropriations Committee to go along with its particular assessments of value trade-offs [i.e., weights]. The problem is not that the foresters can't make up their minds which bale of hay to chew on, but that some members of the public and Congress don't agree with them, and therefore take action appropriate to frustrate execution of the Forest Service's determinations. One possible way of dealing with this problem is for Congress to withdraw its delegation of authority to fix trade-offs administratively and locally, and to itself play a primary role in their determination . . . . What this suggests . . . is that the key problem underlying this issue is, not how to define multiple use criteria more sharply, but how to validate in the eyes of the public and of the Congress the trade-offs that are used in practice to determine land use.

### Politics and Policies

An explanation of what motivates the congressional policymakers is needed. Theories of government behavior are numerous and varied. Recently, however, a number of political theorists have come to accept as a close approximation what, for lack of a better name, can be referred to as the "Self-Interested Policymaker" model.[73]

This theory suggests that the bargaining that takes place in Congress is similar to that in a competitive market situation. That is, Congressmen, Presidents, bureaucrats, and other public policymakers maximize the attainment of each one's personal objectives. Correspondences with the competitive market include behavior such as "touching all bases" prior to making a decision (being highly consultative) and exerting strong effort only when there is a high probability of success; a further correspondence is the operation of a kind of law of demand as it applies to the "costs" associated with any given action. The theory also touches on Adam Smith's "invisible hand" by arguing that this self-interested policymaking somehow achieves simultaneously maximum "social benefits."

Although it can be seen that the bargaining mechanism implied in this theory could, under ideal conditions, lead to policy and spending decisions that truly represent the public interest, the model has the same inherent problems of the purely competitive market. These problems, generally offered as explanations of market failure, include "externalities, lack of knowledge and information, monopoly power, cartelization, public goods, immobilities, and so on" (Haveman 1970, p. 145; see also d'Arge and Hunt 1971). Their existence in public-sector bargaining implies the strong probability that imperfections and misallocations of resources can be expected. Here, as in the economists' model of the competitive system, failure or suboptimization occurs because all of the costs and benefits are not taken into account.

This brief reference to the problems of policymaking and budgeting decisions in the political arena serves merely to emphasize two important considerations necessary to understanding of the Forest Service position. First, the agency can be and is in fact influenced by bureaucratic tendencies in government that undermine the goals of scientific management. Second, the Congress does not necessarily have a firm hand on what is called the "public interest." On the basis of these facts, and the results of a review of past policy on budgeting, we will discover in the following discussion that there is no easily identifiable

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[72] Data are available in U.S. Congress, Department of Interior and Related Agencies Appropriations for 1970, 91st Congr., 1st Sess., Part 3, p. 92. These estimates were not used in the final budget requests shown in the Appendix.

[73] The following discussion is largely based on the treatment found in Haveman, *The economics of the public sector* (1970) p. 140-147. See also Buchanan and Tullock (1962), Downs (1957), and McKean (1965). Lowi (1969) argues against the theory.

relationship between the allocation of funds and the goals stipulated in the legislation.[74]

### Forest Service Budgets, 1955-1972

The reader should be wary of arguments (such as the one that follows, and others in the literature) that compare agency requests with appropriations and then suggest that the root of the problem is the failure of Congress to appropriate funds in accordance with "actual" needs. The budget requests of the Forest Service may be unrealistic estimates of actual need. It must be recognized that an even stronger assertion of this possibility might be made on the basis of more extensive research.[75]

The Appendix contains information of vital importance to understanding of the management direction taken by the Forest Service. As indicated above, the ability of the agency to pursue rationally what it views as optimal programs depends on the level of funding for its budget request. Appendix table 1 contains budget data for the years 1955 to 1972 on four separate aspects of the budgeting process: The initial requests submitted by the Forest Service; the budget requests forwarded by the Department of Agriculture; the President's budget request, prepared by the Office of Management and Budget, formerly the Bureau of the Budget; and actual congressional appropriations (including supplemental bills and appropriations).

The budget request of the Forest Service is first reviewed and revised by the Secretary of Agriculture. With revisions and adjustments, this Department request is then forwarded, without mention of alterations made, to the Office of Management and Budget. At this level the President's budget is formulated, and additional changes are made before this is forwarded to the Congress for hearings in the appropriations committees.

The steps in the budget process are good indications of the priority formulation process. Alterations of the original Forest Service priorities show up quickly as over- or underfunding of the various line item requests. A view of the allocations at various levels as a percent of the original agency request reveals priority determinations.

### Evidence of Forest Service Priorities

The data presented does not lend itself directly to an estimate of the "absolute" priority ranking among the various resources, nor to determination of the numerical value of the weights used in agency decisionmaking. Nevertheless, changes in the relative ranking are evident. During the period prior to the enactment of the MU-SY Act (1955-1962), the Forest Service attempted through its budget requests to place greater emphasis on the noncommodity resources of the FOREST. Timber and range were being deemphasized in favor of other resource considerations. Following the "catching up" period which ended in 1962, the agency began to show relatively constant priorities for all of the resources. This conclusion rests on the following analysis.

In the absence of legislatively stipulated priority rankings, some other indication of the relative priorities between the various resources must be found. Two different sets of calculations are suggested here. The percentage of the total budget request for National Forest protection and management that is allotted to each of the separate resources is a clue to the relative importance of that re-

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[74] See Kaufman (1960) for an informed and easily understood account of the budget-setting process within the Forest Service. He argues in part that the "goals" of the administration are carried out in large part by control over the allocation of funds. What is missing is any convincing argument that programs and projects that do receive funding are in fact those that would best achieve the legislative objectives. Although certain changes have occurred in the intervening years, Kaufman's analysis is still valuable.

[75] Representatives of many interest groups, as well as individuals, suggest that their investigations show misplaced allocation of funds. Generally, however, they are really saying that funds are not allocated according to the "weights" or "trade-offs" they would like to see established. (See U.S. Congress, Department of Interior and Related Agencies Appropriations for 1970, 91st Congr., 1st Sess., Part 3; and Public Land Law Review Commission, *One third of our Nation's land*, 1970, Wash., D.C., Govt. Printing Office.) Hagenstein (1971) argued that not enough attention (i.e., allocated funds) is being given to the "economic development" aspects of the Forest Service's goals.

source in the budget "pie," as shown in figure 12. The diagram tells only part of the story, however. Since the allocations to the various resources vary widely, relative changes could be taking place annually without producing any significant change in the size of the slice. Thus, it will be necessary to look also at the annual percentage increase that takes place in budget requests for each of the various resources. This will indicate the changes, if any, taking place in the relative priority rankings. Analysis of the data suggests the following general interpretation.

The period prior to enactment of the MUSY Act showed a considerable deemphasis on timber ($T_1$) and range (R) resources. This is in contrast to what might be expected in view of criticism of the agency on this score. These

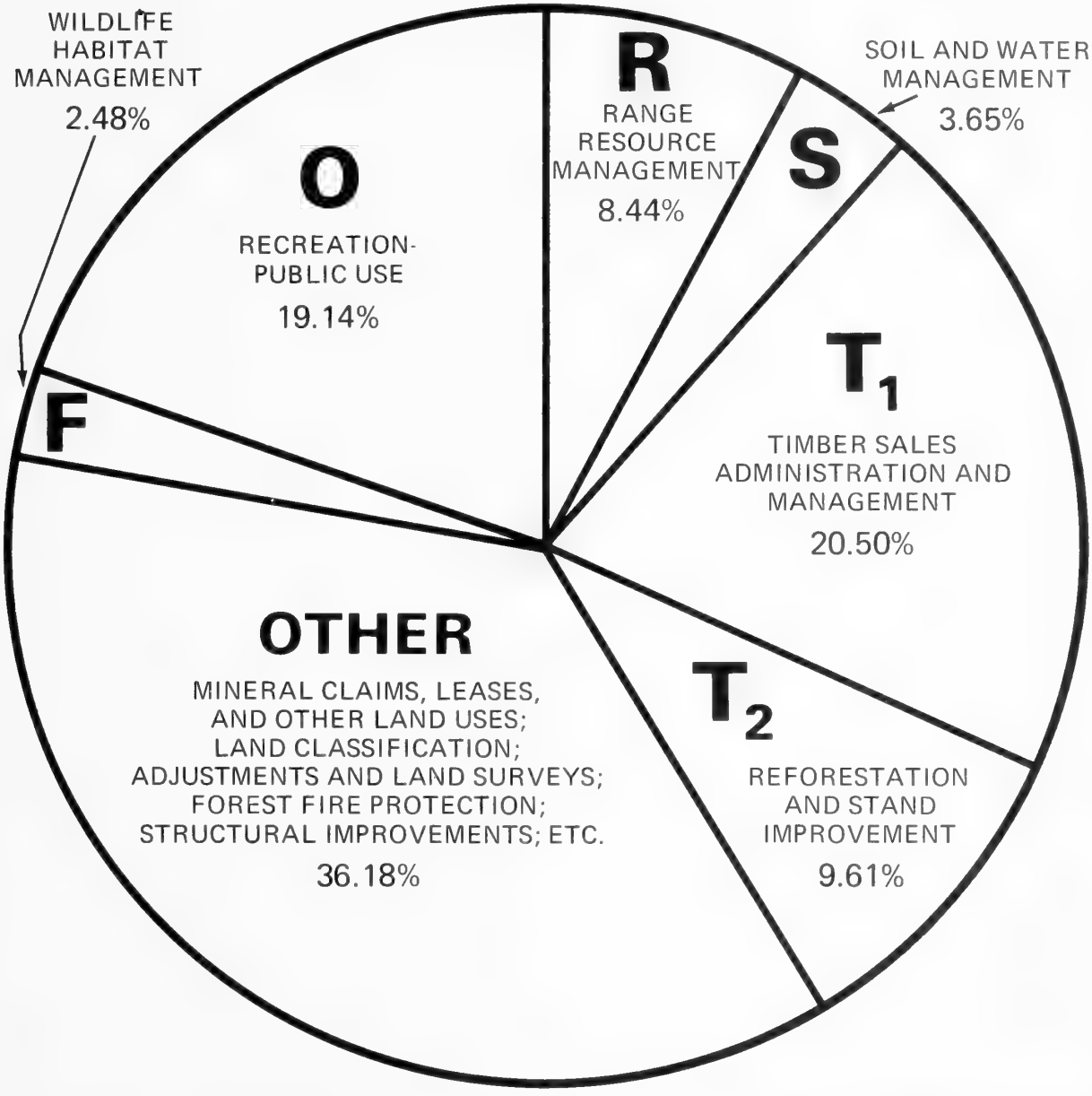



*Figure 12. — The budget allocations for National Forest protection and management, as requested by the Forest Service; note that there is no specific allocation for environmental amenities (E). Percentages are averages for the period 1955 through 1972.*

two commodity resources showed average annual percentage increases in Forest Service budget requests of 15.84 percent and 9.21 percent, respectively. Compared to these we find increases in the other resources for the same period (1955-1961) as follows:

| | |
|---|---|
| Soil and water management (S) | 59.84 percent |
| Wildlife habitat management (F) | 51.92 percent |
| Recreation-public use (O) | 49.34 percent |
| Reforestation and stand improvement ($T_2$) | 32.06 percent |
| Forest research | 22.45 percent |

Thus, even though the aggregated data obscure certain aspects of this, it is obvious that during the period prior to the enactment of the MU-SY Act all of these noncommodity resources had implied priorities that were gaining relative to timber. This relative shift in the priority ranking existed even though the aggregated data shows that each was considerably smaller than the timber request.

Passage of the MU-SY Act could not have been reflected in the agency's budget requests until the 1962 budget was put forward, because of the timing of the budget preparation process. In that year there was a large increase in requested amounts for every one of the FOREST resources, with the exception of timber. The increased requests in that year would tend to distort the picture formed by the data for the years following passage of the MU-SY Act; they are therefore eliminated from consideration.[76] Average annual percentage increases in Forest Service requests for the period 1963-1972 show the following trends: F, 4.43 percent; O, 9.38 percent; R, 3.97 percent; S, 9.36 percent; $T_1$, 10.74 percent; $T_2$, 8.74 percent; and Forest research, 6.30 percent.

The data for the later period (1963-1972) tends to suggest that after "catching up" in certain management and resource areas, the agency began to show relatively constant implied priorities. Had the data been rounded to the nearest whole number, four of the line items (O, S, $T_1$, and $T_2$) would have had average annual increase within two percentage points of each other. Even with the exceptions of Range resource management, Wildlife habitat management, and Forest research, the differences are relatively small. They certainly do not show the wide variation of earlier periods. This would indicate that the requested allocation of the budget pie, as it now stands, is seen by the agency as representing a much more balanced program than it did before the passage of the MU-SY Act. If this were not so, then attempts to alter the size of the pie should have continued to show differentials of the magnitude evident before 1962.

Missing, of course, is any observable link between the requests made by the agency and the actual amounts that would be needed to carry out an "optimum" program. Failure to tie its budget requests directly to an explicitly goal-oriented management plan leaves the agency's request open to drastic alterations. Nowhere is this more evident than in the data that will be presented here as to the budget process at higher administrative levels. Unconvinced that the agency has optimally sliced the pie, those charged with administering the budget process at higher levels cut and pare at will, thus altering the priorities established earlier.

**Priorities at the Higher Budget Levels**

In the 1960 Senate floor debate on the MU-SY Act, Senator McGee of Wyoming entered in the *Congressional Record* the budgetary history of Forest Service appropriations

[76] The budget presented for 1962 may be viewed as a transition budget which attempted to correct past imbalances. Once the "corrections" were made, a new path could be followed. If the surge in budget requests is included in the average annual percentage increase, thus making the period 1962-1972, we find that timber and range are given a reduced emphasis. Those two resources had average annual increases of 11.49 percent and 8.58 percent, respectively. Forest research came in for a rather drastic cut in priority, showing average annual budget request increases of only 10.62 percent, placing it near the bottom of the implied priority scale. The other resources showed average annual increases as follows: $T_2$, 26.71 percent; S, 21.96 percent; F, 14.56 percent; and O, 12.61 percent. It should be noted that the figure for Soil and watershed management does not reflect allocations under the Water Resources Development Act, passed in 1966. This note should serve to remind the reader that the data being presented is highly aggregated and does not reflect special year-to-year circumstances.

from the fiscal year 1955 through the fiscal year 1961.[77] Senator McGee charged at that time that Congress "found it necessary to correct slashes made by the Bureau of the Budget which, in fact, have eroded the high principle to which this administration has given lipservice." Not mincing words, he argued that the "administration has sabotaged its own multiple use program." On the basis of a 12-year program projection by "Forest Service experts in our Government," McGee stated that "one-eyed bookkeepers" in the Bureau of the Budget were the culprits behind a "story of default on a responsibility; of a failure to measure up to words with deeds."

A charge very similar to that made by McGee came ten years later from the chairwoman of the Subcommittee on Department of Interior and Related Agencies, Julia Hansen. She stated, "I have a suspicion that when the Forest Service budget is reviewed by the Office of Management and Budget, too many people assume that the entire purpose of the Forest Service is only in the timber cutting area and this is not true."[78]

Although the data presented here tend to verify such charges, an even more important area of concern is pinpointed. Each of the three administrative levels above the Forest Service which handle the agency's request may be expected to make alterations in the actual size of the pie. This is in line with their responsibility to coordinate and integrate the requests from many such agencies which come under their purview. It is their job to see that the relative priorities among agencies are established and maintained. Thus the Department of Agriculture, having weighed the facts presented to it, must slice its own pie.

While this is taking place, the other cabinet-level departments are performing similar budget studies. These are all forwarded to the Office of Management and Budget, where the President's budget is established. For the most part, this office aims to adjust the various Department level requests in view of the priorities given to it by the current administration. Final action is then forwarded to the Congress. It should be noted that by the second and third stages of the budget process the major task is to allocate slices of the pie to agencies or departments, not to programs, functional activities, and projects. Unless the higher levels are ready to analyze the costs and benefits of project level allocations, they must accept as valid the relative allocations presented by the agency. If they go beyond altering the size of the agency slice by readjusting allocations among, say, the resources of the FOREST, they should be prepared to justify this action on technical grounds, just as the agency itself should be.

This study has maintained that there is evidence to suggest that the Forest Service has failed to convince that its budget requests are in any way tied to an optimal goal-oriented management plan. Just as important, however, is the evidence that the three higher branches of government have failed to accept the requests of the agency as valid. With respect to sustained-yield management, in fact, they have made it difficult or impossible for the Forest Service to fulfill the legal requirement. Timber cutting and reforestation and stand improvement are complementary activities (fig. 13). Agency critics have angrily charged that sustained yield principles have been ignored. The allowable cut calculations simply were not in line with provisions for regeneration of cutover sites. This was partly due to the budgetary process. The Forest Service has committed itself to increasing timber harvest significantly by 1980. Whether this will be possible with reference to the legal mandate for sustained yield, time will tell. At this time, however, it appears that the past limitations on timber growing efforts may have diminished the opportunity to meet the commitment.

The relation of Forest Service requests to higher level budgets is shown in figure 14. Over the 18-year period covered by the data presented, the Department of Agriculture supported agency requests for Timber sales ad-

[77] *Congressional Record*, 86th Congr., 2d Sess. (Vol. 106, Part 9), p. 12079-12083. The data, updated to 1972, appear in the Appendix.

[78] U.S. Congress, House, Department of Interior and Related Agencies Appropriations for 1972, 92d Congr., 1st Sess., Hearings, Part 6, p. 293. Mrs. Hansen also mentioned problems associated with the impoundment of funds previously appropriated (see p. 293, 409).

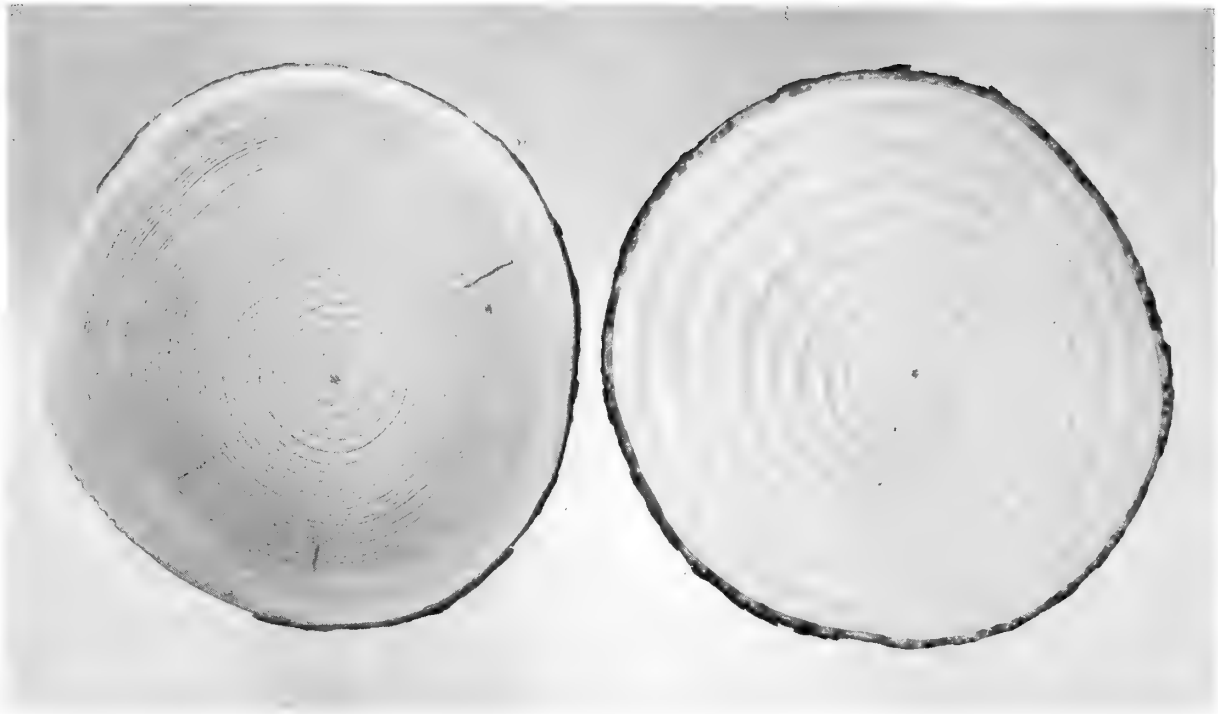


*Figure 13. — Stand improvement includes proper spacing of trees. These two lodgepole pine cross sections came from the same area. The section with wide annual rings was cut from a 17-year-old tree established in an opening created by timber harvest. The section with narrow rings was cut from a 105-year-old tree growing in an overcrowded stand.*

ministration and management ($T_1$) at the 99 percent level, but forwarded only 81 percent of agency requests for Reforestation and stand improvement ($T_2$). The other two levels of the budget process present similar pictures. The Bureau of the Budget supported $T_1$ at 93 percent of agency requests, but forwarded only 67 percent of suggested funding levels for $T_2$. Many people, both in and out of the Forest Service, would like to know what technical information was available to these higher level budget makers which continued to elude the agency itself.

It is interesting to note in figure 15 that greater emphasis was given to the Reforestation and stand improvement item before the MU-SY Act was passed than after, by both the Congress and the Bureau of the Budget. The charts show the support levels for the period prior to the MU-SY Act, the period after its passage, and the entire 18-year period.

The discussion above has established a basis on which the relative priorities assigned to the FOREST resources by the three higher levels in the budgetmaking process can be estimated. Relative priority ranking here is probably best evidenced by the willingness to either accept or cut the original budget requests of the Forest Service. If budget cuts are necessary, or full financing deemed unwarranted, then seemingly, cuts should appear more often and to a greater extent in the low-priority items. If the priority rankings are consistent with those of the Forest Service itself, there should be little variation, if any, in the percentage of separate line items funded, even though the total budget request is cut.

The year-to-year fluctuation in funding levels as set by the higher budget review bodies (fig. 15) reveal an unmistakable and consistent emphasis on two of the resources in the FOREST. Without exception, over any period measured, all three budget levels place Timber sales administration and management ($T_1$) as the number one priority. Again, without exception, all three budget levels place Range resource management (R) as the

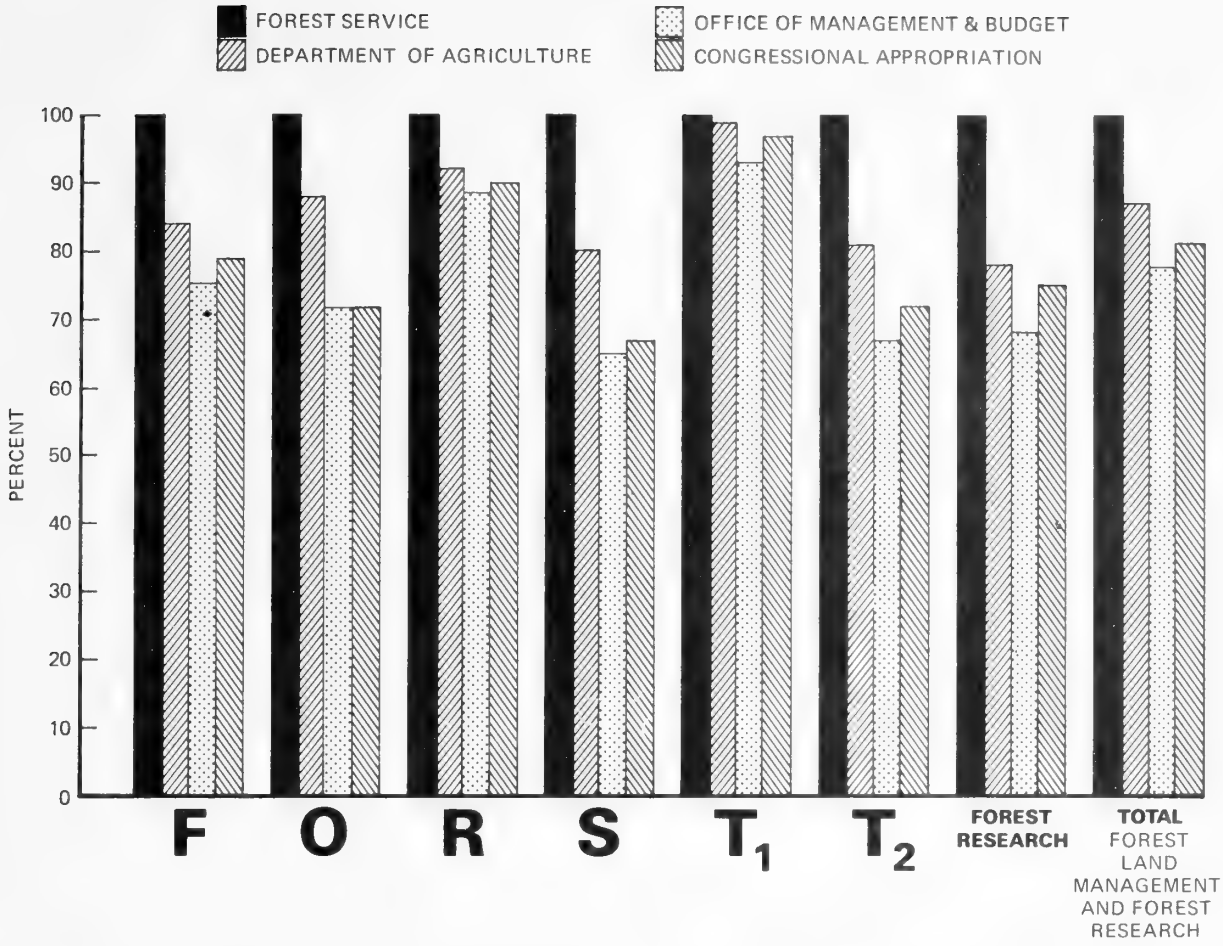



*Figure 14. — Budget estimates and appropriations as percents of original Forest Service request. Percentages are averages for the period 1955 to 1972.*

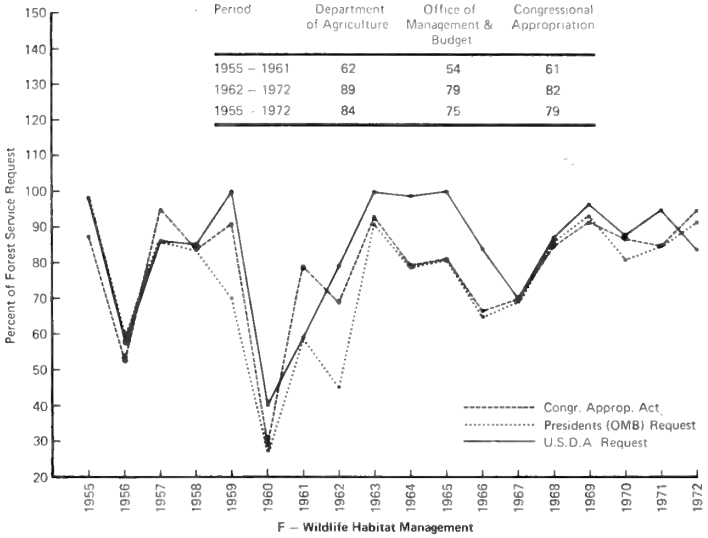
number two priority. The attempt by the Forest Service to maintain a relative consistency in the slicing of the pie is thus thwarted all along the line. With respect to the other noncommodity resources no consistent pattern emerges. In general, Soil and water management, Reforestation and stand improvement, and Forest research are given the lowest implied priorities. No attempt has been made in this study to investigate the intermittent influence of passage of legislation such as the National Environmental Policy Act.

Both Senator McGee and Representative Hansen suggest that the Congress has been forced to patch up holes made by the Bureau of the Budget. The fact that in every area except Recreation-public use (O) the congressional appropriation has been above the amount submitted by the Bureau of the Budget would lend credence to that argument. It is important to notice, however, that except for Wildlife habitat management, the level of congressional support for the original requests by the agency has fallen since the passage of the MU-SY Act. This is especially apparent in the areas of Forest research and Reforestation and stand improvement, where the support levels fell from 87 percent in the period 1955-1961, to 73 percent and 71 percent, respectively, from 1962 to 1972.

The data presented for the 7-year period 1955-1961 are of particular interest. Senator McGee charged that the Bureau of the Budget had undermined the Forest Service attempt to get effective "multiple use management." It appears, however, that the actual program cutting came one step earlier in the Department of Agriculture review of the agency

Average percent of Forest Service request

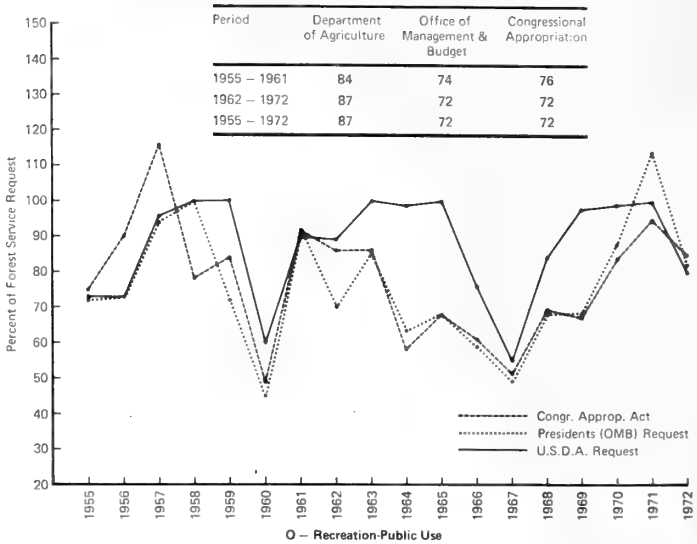
| Period | Department of Agriculture | Office of Management & Budget | Congressional Appropriation |
|---|---|---|---|
| 1955 – 1961 | 62 | 54 | 61 |
| 1962 – 1972 | 89 | 79 | 82 |
| 1955 – 1972 | 84 | 75 | 79 |




F – Wildlife Habitat Management

Average percent of Forest Service request

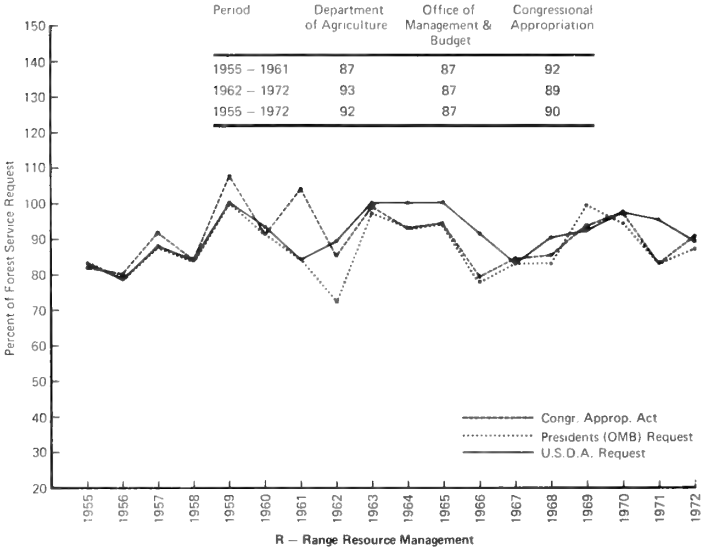
| Period | Department of Agriculture | Office of Management & Budget | Congressional Appropriation |
|---|---|---|---|
| 1955 – 1961 | 84 | 74 | 76 |
| 1962 – 1972 | 87 | 72 | 72 |
| 1955 – 1972 | 87 | 72 | 72 |




O – Recreation-Public Use

Average percent of Forest Service request

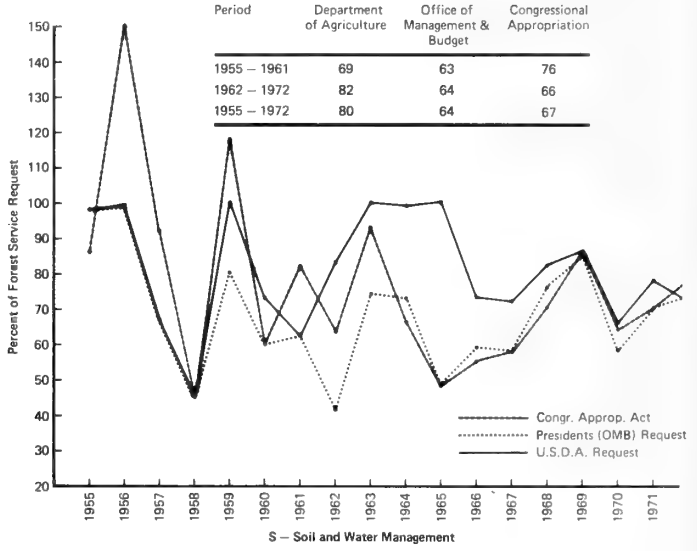
| Period | Department of Agriculture | Office of Management & Budget | Congressional Appropriation |
|---|---|---|---|
| 1955 – 1961 | 87 | 87 | 92 |
| 1962 – 1972 | 93 | 87 | 89 |
| 1955 – 1972 | 92 | 87 | 90 |




R – Range Resource Management

Average percent of Forest Service request

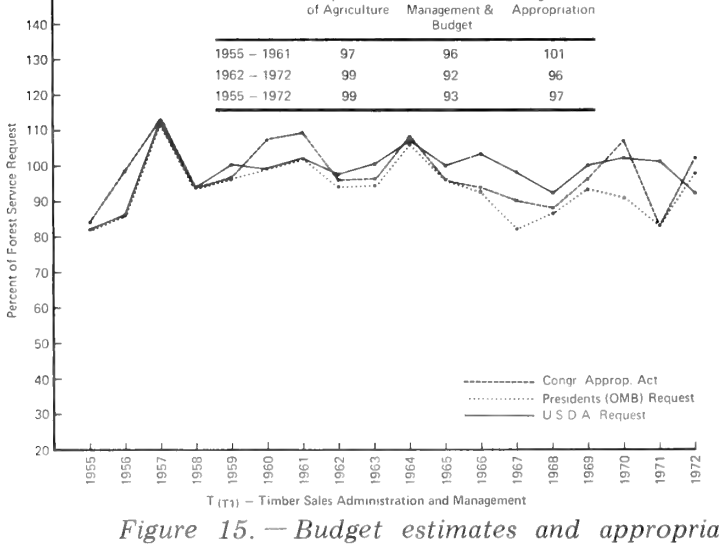
| Period | Department of Agriculture | Office of Management & Budget | Congressional Appropriation |
|---|---|---|---|
| 1955 – 1961 | 69 | 63 | 76 |
| 1962 – 1972 | 82 | 64 | 66 |
| 1955 – 1972 | 80 | 64 | 67 |




S – Soil and Water Management

Average percent of Forest Service request

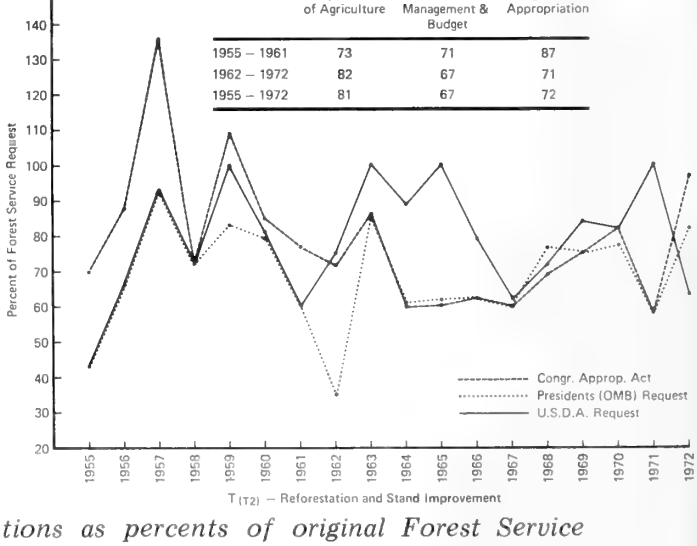
| Period | Department of Agriculture | Office of Management & Budget | Congressional Appropriation |
|---|---|---|---|
| 1955 – 1961 | 97 | 96 | 101 |
| 1962 – 1972 | 99 | 92 | 96 |
| 1955 – 1972 | 99 | 93 | 97 |




$T_{(T1)}$ – Timber Sales Administration and Management

Average percent of Forest Service request

| Period | Department of Agriculture | Office of Management & Budget | Congressional Appropriation |
|---|---|---|---|
| 1955 – 1961 | 73 | 71 | 87 |
| 1962 – 1972 | 82 | 67 | 71 |
| 1955 – 1972 | 81 | 67 | 72 |




$T_{(T2)}$ – Reforestation and Stand Improvement

*Figure 15. — Budget estimates and appropriations as percents of original Forest Service request, showing annual levels and averages for selected periods, 1955 to 1972.*

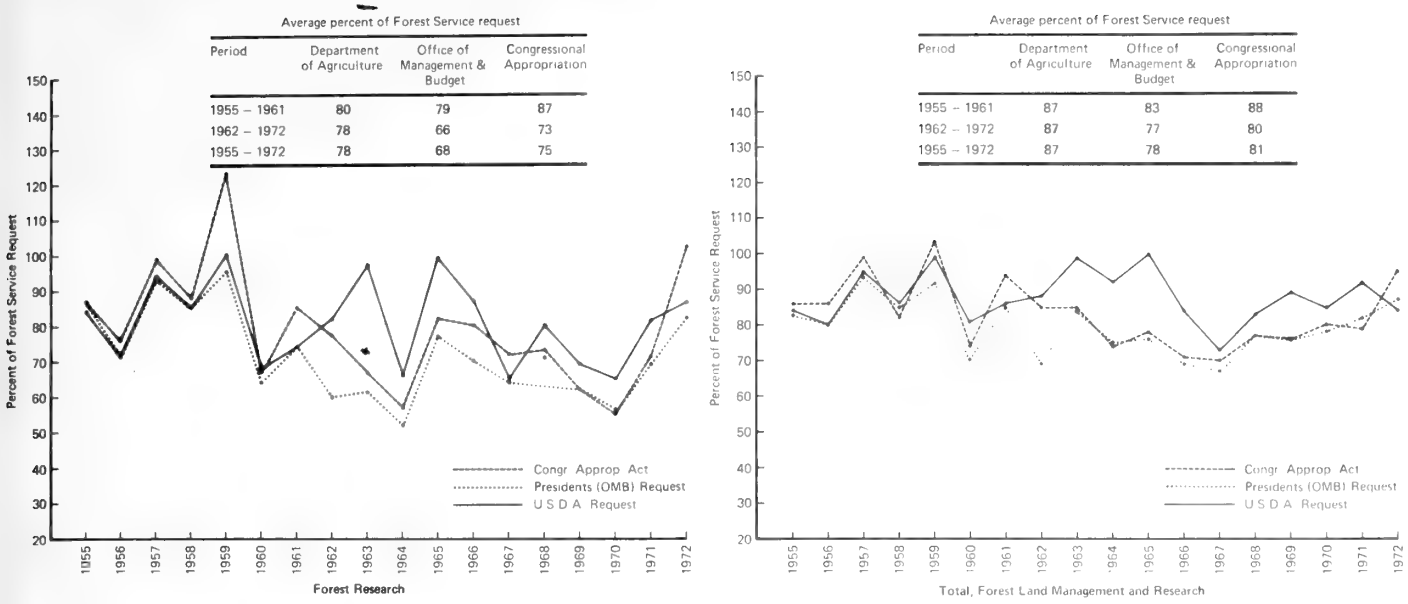



*Figure 15. (Continued)*

request. The President's budget, calculated as a percentage of the Department of Agriculture's request, shows that in the period 1955-1961 the so-called "one-eyed bookkeepers" were forwarding requests equal to 96.2 percent of the departmental requests. In only two instances did the President's Budget call for funding below 90 percent of the level requested by the Department of Agriculture, and it was precisely in these two resource areas (F and O) that we find the greatest apparent reluctance on the part of the Congress to correct slashes. It is in these two areas that the Forest Service is least able to demonstrate the consequences of management alternatives.

It would appear, then that during the period prior to enactment of the MU-SY Act (1955-1961), the largest deviations from the original requests by the Forest Service were coming at the hands of the Department of Agriculture. This situation was altered somewhat in the period following the passage of the MU-SY Act (1962-1972); the data indicate that the Bureau of the Budget on the average only requested 87.8 percent of the department request in its messages sent to Congress. In the latter period, cuts were made at both levels of the administration. A possible explanation may be found in the political realities. The relationship of the Secretary of Agriculture to the Office of the President is very similar to that of the Bureau of the Budget. Thus, in the earlier period, a similarity between the two in handling of budget requests is not surprising. The process by which reductions at these two levels are later reversed in the congressional appropriations is apparent from the testimony before the congressional appropriations subcommittees. It would appear that when budget cuts are suggested by the two intermediate administrative departments, the Forest Service responds by reducing its requests in the areas "closest to home" with respect to specific Senate and House members seated in the subcommittees. As the hearings proceed, the Congressmen one by one inquire about the funding of their favorite projects only to find that these are the items that have been reduced. Not surprisingly, they are quick to catch such items. When the final appropriations package is presented to the full Appropriations Committee, most of the cuts have been restored. Obviously, this process is not specifically operative with respect to the Forest Service, as evidenced by the following exchange during congressional hearings in 1968:[79]

> **Chairman Proxmire**: We might as well be as blunt and comprehensive as we can on this. The problem is, we are not just dealing with sheer economic theory. We are dealing with some hard, tough political facts. The people who really determine whether we go ahead with many of these projects are the members of the Senate and the House Interior Committees and the Secretary of the Interior. The President and Members of Congress have many, many other obligations and we tend to delegate to these gentlemen our decisions to a considerable extent in this area.

[79] As quoted in Haveman (1970, p. 146).

Look at the Interior Committee of the Senate and you will see that its members come from the following States: Washington, New Mexico, Nevada, Idaho, Alaska, Utah, North Dakota, Arizona, South Dakota, Wisconsin — I am happy to see there is one member from Wisconsin — Montana, California, Colorado, Idaho again, Arizona again, Wyoming, Oregon.

Practically all Western States. It is hard to find anyone from east of the Mississippi who ever serves on the Interior Committee.

**Representative Moorhead**: I might say to the Chairman, the same pattern holds in the other body.

**Chairman Proxmire**: Exactly.

So we have, you see, an atmosphere of bias, understandable bias, an atmosphere of political force here which I think we have to recognize.

The budget data could be analyzed much more closely, but it seems unlikely that any additional useful conclusions could be drawn. It is not possible to show unequivocally now that the Forest Service budget requests (or the recommendations made at any one of the other levels) are the scientifically determined best estimates of need. This can only be accomplished when budget requests are directly tied to a goal-maximizing program. If the budgeting process could be oriented toward the legislative mandate, and to the specified goal as expressed in the FOREST decision model, the Forest Service might take the giant step required. When budget requests **directly** reflect the ecological and silvicultural implications of the FOREST model, the agency will be closer to solving its budget problems.

# WEIGHT SETTING IN THE FRAMEWORK OF THE DECISION MODEL

In the previous section, some of the incongruities in current Forest Service practice have been pointed out. It remains for us to consider the progress now being made toward goal-oriented decisionmaking, and the ways in which the decision model can help to accelerate that progress. Achievements are being made in methods of public involvement and in research techniques in the exploration of alternatives. Progress in solving budget problems may be slow, but if the agency can see clearly the direction it must take in the light of its mandate, even here much may be accomplished. An essential step toward the future is the identification of priorities on the national level.

## National and Local Priorities

The distinction between values and weights, or priorities, in the FOREST model is a crucial one, as we have seen. In the weighting of goals, the political and social desires of the nation's citizens, as expressed through the democratic process, are reflected. Values, on the other hand, are the achievable levels of output, appropriately measured, for the various resources. Ecological and environmental interrelationships are stressed in the measurement.

The conclusion has been reached in this study that in the legislation the weights to be assigned to each of the resource values are left to be determined on a local or regional basis. It seems proper now to suggest that these ought to be determined on the national level. In decisionmaking, the value ratios between the interrelated resources must be identified, but this process in itself requires a weighting. Presumably, nationally perceived needs ought to outweigh those perceived locally. The knotty question is, just how much weight should each have in determining priorities? This has both theoretical and political importance that should not be underestimated.

Our difficult question may be put in another way to ask, Whose forests are they (see Held 1967)? This problem has intrigued historians for three generations and will probably never be fully solved to the satisfaction of all. People in the forested regions of the West will always feel that the interest of people in the East in preserving recreational and scenic values competes with their concern for commodity values important to their economic welfare. Recently we hear a new tone in statements on the issue. It is said that there is no logic in keeping millions of acres locked up in the wilderness areas, when so many people living in poverty in the East will never see the trees unless they are utilized in a program aimed at urban renewal and housing construction. Full implementation of a goal-oriented FOREST-type model will require that a practical answer to our question be found.

That answer could have the following general outlines. The public should be given every opportunity to be heard at the national level (both in Congress and in the Washington Office of the Forest Service) on matters affecting rules and decisions of a legislative character. This could be done as amendments of the overriding legislated goal are considered and weights are assigned for use by local decisionmaking units in their evaluations of proposed

projects. Here a distinction is to be made between programs and projects. Programs specify an all-encompassing direction to be taken by the Forest Service, such as policy statements concerning issues of national (as opposed to local) importance. This is the process that was largely responsible for the enactment of the Multiple Use-Sustained Yield and the National Environmental Policy Acts. On this level the various public groups can most effectively express their wishes and affect agency policy. This is the proper role of the "advocacy" process.

What we have been saying is that the process of advocacy can best serve the public interest if used in the rulemaking or program development area of agency decisionmaking. Once the goal is specified (as elaborated in the FOREST model), the advocacy process, instead of being a clash of vested interest groups, becomes an assessment of program impact. It would bring about the marginal adjustments that may be needed when adequate information is lacking at the stage of program formulation. This is the kind of flexibility called for in goal setting. When public involvement is used in program areas, the agency becomes relatively free to apply its expertise to project evaluation (for example, specific timber sales or recreation developments). The constant necessity of dealing with local or other interest groups is diminished, and "special pleading later on [shows] up clearly as an attempt to gain exception from general policies already agreed upon . . ." [80]

In the area of public appeal from agency decisions, the FOREST model should provide a useful base for constructive challenge. Because it is drawn from the legislation, particularly the Multiple Use-Sustained Yield Act and the National Environmental Protection Act, it can help to insure compliance with the law. Use of the model requires that all feasible alternatives be reviewed and considered. If the model is faithfully adhered to, the public should have no ground for raising this issue in the courts.

The Forest Service is already making progress in meeting its legal requirements in this area, as indicated in the incorporation of economic analysis and program level alternatives in the resource inventories. Perhaps one of the best examples is the multidisciplined study being conducted in the Larch Mountain-Bull Run area of the Mt. Hood National Forest.

The approach being taken by the study team, which includes a landscape architect (who also represents recreational activity), a silviculturist, a civil engineer, and a logging engineer, is to ask the fundamental question, How best can this area be used? The team was directed to study and evaluate alternatives for the study area and attempt to consider all actions feasible in terms of what the land will support.

Drawing from its common pool of data, the team and its assistants broke itself into three subteams. Each, paying no attention to the other two, decided how it would manage the Larch Mountain-Bull Run area if the dominant use was recreation (timber, water) and all else was secondary. The result was three alternate plans, each mapped and zoned in careful detail. Only in one small portion — a watershed supplying the community of Corbett on the Columbia River — were the three plans fairly unanimous. In a final step, a fourth alternative was produced which, in the consensus of its drafters, embodied the best features of all three plans.[81]

Although the study is not completed, it does suggest one useful approach to the recognition of the legal requirement to investigate alternative uses of the land. The "dominant-subordinate" approach taken does not seem appropriate to the task, however. The "total environment" approach suggested by the FOREST model would dictate that all resources be considered in the early planning stages. Nevertheless, this type of policy formulation is certainly an improvement over some of the methods used in the past, and could be channeled with relative ease toward a greater emphasis on the total FOREST. More important in the short run is the fact that such efforts may well prevent unnecessary and costly court action.

[80] Marglin (1967), p. 19. See also Freeman (1969), p. 169.

[81] "Something new in forest planning," *Columbian*, Vancouver, Washington, July 9, 1971.

## Closing the Back Door

Earlier discussion has centered on the priorities that enter, as it were, through the back door. A review of some of the major efforts now being made to avoid such weighting by default will suggest a direction for the future. Certain segments of the agency are working to get more complete and reliable data and information on which to base decisions. The account of these projects presented here is only representative; there are others currently underway in other National Forest Regions, and no implication is intended that other similar efforts are not worthy of emphasis and close scrutiny.

The need for resource inventory work that will describe and update timber and other resources in relation to other factors has been pointed out. Though still in the formative stages and recognized as experimental, the *Plan for the timber inventory of the Sitgreaves National Forest*[82] illustrates the manner in which the agency is trying to tackle its complex problems.

The objective of the inventory, as stated in the plan, is to provide necessary information for meaningful timber planning, including data on the "capability of the land to grow trees," in order to calculate effectively the real contribution of various sectors of the Forest toward sustained yield. This has not been done adequately in the past.

In this inventory, timber volume on those areas of the Sitgreaves National Forest characterized by unstable landforms, steep grades, critical watersheds, or unproductive stony and unfertile soil types will be taken out of the net figure to be used in the calculations that help to determine sustainable output and the allowable cut.

Further, the data gathered will be used to evaluate various management alternatives so as to determine the levels of timber output associated with different levels of program cost. This is the essential service that the economics research personnel can perform — to discover the alternative uses of the land and then inform the public of the costs and benefits associated with each possible use and program. Although, theoretically, it would be desirable to investigate the infinite possible levels of management programs, this is not feasible. The Sitgreaves plan envisions the assessment of a practical range of program levels of development plans, insuring that analysis of management alternatives at the margin is at least approximated. A more recent inventory plan,[83] just formalized, puts the case even more clearly when it states,

> . . . the object of forest resource inventories is to provide the basic information about forest land and associated resources required to identify and evaluate alternatives of land use and management. This must be done in relation to the overall goal . . . . [This plan] describes, as far as possible, those variables that permit relating or linking timber growing to other use opportunities so that alternatives of timber growing can be considered in relation to alternatives of land use.

There are many practical problems to be solved in the effort to achieve greater equality in data gathering among the various resources. One obstacle is lack of manpower to collect the kind of interrelated data called for. Considering the types of information that must be generated by a team of men in the field even in a relatively simple timber inventory plan, it is obvious that additional inputs as to wildlife, range, etc., would become an intolerable burden under existing limitations of costs and training time.

A solution to this problem is available, however, and the Forest Service seems to be moving rapidly toward it. Cooperation, presently along functional lines, is being sought in the task of setting up criteria for the various inventories, so that data can be interchanged. In addition, efforts are being made toward better coordination of data collection procedures. Such coordination is essential to description of use interrelationships.

In terms of the FOREST goal, the apparent optimum approach to inventory and data collection is to incorporate the separate functional areas into one comprehensive manage-

[82] Jerry T. Goon, Leonard A. Lindquist, and Thomas O. Farrenkopf, Intermountain Forest and Range Experiment Station, 1971.

[83] USDA Forest Service, *Plan for the timber inventory of the Ashley National Forest*, prepared by Forest Survey Staff, Intermountain Forest and Range Experiment Station, 1972.

ment plan. Increasingly, "mapping" techniques are being used to consider all resource uses simultaneously and to identify problem areas. The data for the various functions usually are separately mapped and then placed on overlays, so that resource managers and decisionmakers can get a comprehensive view of a particular area. A problem in this approach is that a map prepared at considerable expense is likely to become a static record rather than a dynamic decisionmaking tool. Changes such as a forest fire or a thinning operation are expensive and difficult to incorporate in the prepared map. Some attempts have been made to carry out the mapping technique on digital computers, which are capable of receiving and adjusting for new inputs into the mapping process. Two such systems currently in use are the Wildland Resources Information System (WRIS), currently being tested on the Stanislaus National Forest, and Computer Mapping for Land Use Planning (COMLUP), which is more widely used in the Washington Office project INFORM. The computer mapping technique has much to recommend it, and as more research is done in this area, technical difficulties will be worked out.[84]

Time and effort by the agency will be required to incorporate such projects into its management decisionmaking process and a goal-oriented, FOREST-type model. Two points should be emphasized here. First, research efforts designed to improve the inventory process are to be encouraged. Second, future plans should include similar efforts toward increasing the fund of knowledge of forest resources other than timber. The legislation calls for integration of the various inventories, including watershed, wildlife, range, and recreation into a generalized management plan similar to the FOREST model. The approach indicated by current inventory plans should be extended to cover the entire environmental and ecological system of the National Forests. With adequate funding and proper administrative direction, such an effort does not appear to be beyond the reach of the Forest Service within the decade of the seventies. The fact must be recognized that most of the current inventory plans do not contain adequate coverage of the interaction of wildlife on the timber-growing potential of the Forest, for example. Such studies must be made part and parcel of the total management effort.

[84] For a discussion of this point in budget hearings, see U.S. Congress, House, Department of Interior and Related Agencies Appropriations for 1972, 92d Congr., 1st Sess., Hearings, Part 4, p. 180.

## Controlling Budget Priorities

The earlier discussion of budget problems pointed out that the required step toward solution is to make budget requests directly reflect the implications of the FOREST model. If budget requests are tied directly to explicit program and project planning, the agency will be able to support them as actual needs to carry out the mandate of the legislation. This can only be done if the agency forthrightly adopts a goal-oriented, management decisionmaking program and works directly to improve its capability to demonstrate the costs and consequences of alternative management programs, projects, and activities. If the "priority juggling" evident in the budget data is to stop, the Congress, the Office of Management and Budget, and the Department of Agriculture must be shown the reasoning behind the Forest Service budget requests and the evidence to support it.

If and when the required goal-oriented management effort becomes a reality, the only alterations in the budget requests at the first two levels (Department of Agriculture and Office of Management and Budget) should be in the total size of the budget package, as dictated by public priorities that relate forest land management to other government functions. If the higher level budget review bodies seek to alter priorities established by the agency, they should use the means available to them to secure changes in the legislative mandate that determines the budget requests.

The Congress, however, as the representative of the public in a democracy, has a slightly different role. In its reaction to the new direction taken by the Forest Service, the Congress may recognize the goal orientation of the budget requests, yet still proceed to alter the relative allocation of funds among the

various FOREST resources. This should be done only as an indication that new or different priorities are being established on behalf of the public. The Forest Service will then have the responsibility of making sure that the public is aware of the implication of the shift in priorities, a task the agency can perform only if it can demonstrate the specific consequences of the changes.

The previous conclusion rests on what seems to be logical ground. It is, however, admittedly idealistic in that it does not take into account the realities of politics. This being so, the agency is faced with a more awesome responsibility. It must be able to demonstrate not only the consequences of alterations in the priorities it has established in the budget, but also the consequences of changes in levels of funding. If the agency budget request is funded at only the 80-percent level, for example, project relationships within program areas will be changed.

If optimal programing is to be achieved, such shifts must be recognized and pointed out to those who would alter the management effort implied in the original request. Such analysis must become an integral part of the goal-oriented decisionmaking process.

## The Economist and the Decision Model

In the past, economists have attempted to treat the problems of decisionmaking in multiple goal situations. Each such attempt has begun with the assumption that the ranking among goals was known and clearly specified. Such economic studies, in the absence of a defined goal, have been of limited usefulness to the Forest Service. If a FOREST-type decision model is accepted throughout the agency, this shortcoming will be eliminated.

In the initial stages of such a new management policy the economist should prove helpful in determining just what initial weights are to be placed on the FOREST resources. Together with the political scientist and sociologist, the economist should be able to achieve a relatively good estimate of the weights desired by the public. The estimate will not be perfect, but it will provide a starting point. Continued research in this area will improve the approximation techniques.

Economic analysis is not an end in itself. It cannot guarantee that proper decisions will be made. Decisionmaking, particularly in the political arena, is an art. Economic analysis will serve to insure that as the artist goes to work his palette will contain all the necessary colors, tints, and shades. The economist, it is hoped, will force the organization to face up to the issue of stating its objectives.

Economic analysis can serve three major functions, each tending toward improvement of the ability of the Forest Service to demonstrate the costs and consequences of alternative policies. It is here that improvement is most immediately needed. First, goal identification depends on the degree of knowledge possessed. Economic analysis can make sure that most of the costs and benefits are accounted for. To some extent, the interrelationships of the resource uses of the FOREST can be discerned through an interdisciplinary approach. Economic analysis can integrate that knowledge, especially by identifying previously unrepresented beneficiaries or cost bearers (in terms of the actual resources or in terms of specific public interests). The result should be more nearly correct assessments of the value of any particular program or project.

Second, economic analysis can make clear the trade-offs represented by a decision to forgo an "economic efficiency" criterion in favor of noncommodity goals. The nation may decide that concern for the environmental amenities of the forest should result in decisions to pursue less economic growth and development in favor of a better quality of life. If so, economic analysis will help to insure public awareness of how much "economic" gain must be given up to attain its objective. The economic analysis may serve also to highlight the problems of fulfilling the existing mandate of the Forest Service. It will be useful in helping the public, through its representatives in Congress, to make such alterations in the prescribed objectives as will better meet the needs and desires of the nation.

Finally, implementation of a goal-oriented,

FOREST-type model, together with its implied economic analysis, will force the participants in the political decisionmaking process to focus their discussions and debates on the correct issues. It will force the participants in current controversies to spell out the implications and consequences of alternative courses.

* * * *

In the foregoing pages a highly rationalistic and analytic approach to goal setting and decisionmaking has been taken. The decision model obviously is not a panacea. Efficiency in management depends on organizational structure; the decisionmaking process cannot be divorced from the sociological characteristics of particular organizations. For the Forest Service, an in-depth organizational study may be a crucial step toward making possible the application of any goal-oriented model. Organizational theory, based in the social sciences, would provide a useful perspective. We must understand how the agency perceives its goals if we are to design decisionmaking systems aimed at achieving those goals.

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# APPENDIX

## NOTE

The variance in budget requests shown in the following tables illustrates the point made in the text discussion of alterations in the budget. Such alterations in the slicing of the budget pie come from many sources. Seldom is the technical information on which such changes are based made evident, so that a judgment can be made of their consistency with a goal-oriented program. This is particularly evident in table 2, which compares Office of Management and Budget requests for 1970, a budget year reflecting a change in the Presidency.

Table 1.--Budget requests and amounts appropriated, USDA Forest Service appropriation for Forest protection and utilization, fiscal years 1955-1972[1]

| Subappropriation, activity and function[2] | 1955 | | | | 1956 | | | | 1957 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forest Service request[3] | Dep. of Agr. request[4] | President's budget[3] | Appropriation[3] | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation |
| | Thousands of dollars | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management[5] | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 8,729 | 7,116 | 7,116 | 7,296 | 9,496 | 8,136 | 8,136 | 9,285 | 10,197 | 11,380 | 11,305 | 11,392 |
| Reforestation and stand improvement | 1,492 | 637 | 637 | 1,050 | 1,577 | 1,046 | 1,046 | 1,390 | 1,512 | 1,406 | 1,406 | 2,058 |
| Recreation - public use | 2,991 | 2,169 | 2,167 | 2,243 | 3,299 | 2,401 | 2,401 | 2,960 | 3,847 | 3,695 | 3,628 | 4,463 |
| Wildlife habitat management | 574 | 564 | 564 | 498 | 978 | 564 | 564 | 513 | 728 | 627 | 627 | 694 |
| Range resource management: | | | | | | | | | | | | |
| Management | 2,326 | 2,286 | 2,286 | 2,038 | 2,819 | 2,286 | 2,286 | 2,026 | 3,015 | 2,613 | 2,607 | 2,535 |
| Revegetation | 1,042 | 363 | 363 | 613 | 1,121 | 598 | 598 | 810 | 929 | 825 | 825 | 1,083 |
| Improvements | 1,469 | 1,368 | 1,367 | 1,329 | 1,450 | 1,400 | 1,400 | 1,467 | [6]1,708 | [6]1,550 | [6]1,536 | [6]1,566 |
| Soil and water management | 373 | 366 | 366 | 321 | 369 | 366 | 366 | 555 | 917 | 614 | 614 | 842 |
| Mineral claims, leases, and other land uses | 1,845 | 1,817 | 1,817 | 1,688 | 2,043 | 1,817 | 1,817 | 1,717 | 2,922 | 2,679 | 2,562 | 2,422 |
| Land classification, adjustments, and surveys | 1,248 | 1,248 | 735 | 1,014 | 985 | 942 | 942 | 724 | 985 | 985 | 985 | 767 |
| Forest fire protection | 10,402 | 9,341 | 9,341 | 9,334 | 12,593 | 10,466 | 10,466 | 10,770 | 11,752 | 11,502 | 11,502 | 11,669 |
| Structural improvements for fire and general purposes (construction and maintenance) | 3,495 | 2,886 | 2,876 | 3,566 | 3,726 | 3,089 | 3,089 | 3,995 | 5,881 | 4,862 | 4,771 | 5,510 |
| Subtotal, National Forest protection and management | 35,986 | 30,161 | 29,635 | 30,990 | 40,456 | 33,111 | 33,111 | 36,212 | 44,393 | 42,738 | 42,368 | 45,001 |
| Fighting forest fires[7] | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 5,250 | 5,250 | 5,250 | 5,250 | 5,250 | 5,250 | 5,250 |
| Insect and disease control | 6,657 | 5,286 | 5,015 | 4,938 | 7,775 | 6,108 | 6,108 | 6,272 | 6,272 | 5,122 | 5,120 | 5,120 |
| Acquisition of lands (Weeks Act) | | | | 125 | 75 | | | 190 | | | | 100 |
| TOTAL, FOREST LAND MANAGEMENT | [8]48,643 | 41,447 | 40,650 | [9]42,053 | 54,306 | 44,469 | 44,469 | 47,924 | 55,915 | 53,110 | 52,738 | 55,471 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research[10] | 3,256 | 3,099 | 3,095 | 3,105 | 4,250 | 3,810 | 3,810 | 4,280 | 4,864 | 4,630 | 4,630 | 5,183 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 183 | 183 | 183 | 183 | 183 | 183 | 183 | 213 | 360 | 226 | 225 | 326 |
| Forest insect research | 623 | 462 | 612 | 612 | 623 | 623 | 623 | 623 | 734 | 737 | 734 | 771 |
| Forest disease research | 487 | 448 | 448 | 448 | 547 | 447 | 447 | 447 | 604 | 608 | 607 | 614 |
| Subtotal, forest protection research | 1,293 | 1,093 | 1,243 | 1,243 | 1,353 | 1,253 | 1,253 | 1,283 | 1,698 | 1,571 | 1,566 | 1,711 |
| Forest products utilization research | 1,531 | 1,231 | 1,231 | 1,231 | 3,231 | 1,231 | 1,231 | 1,231 | 1,753 | 1,771 | 1,771 | 1,680 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 1,316 | 816 | 816 | 816 | 1,216 | 816 | 816 | 816 | 1,364 | 1,076 | 1,025 | 1,049 |
| Forest economics research[11] | 144 | 124 | 144 | 144 | 144 | 144 | 144 | 144 | 402 | 408 | 358 | 377 |
| Subtotal, forest resource economics research | 1,460 | 940 | 960 | 960 | 1,360 | 960 | 960 | 960 | 1,766 | 1,484 | 1,383 | 1,426 |
| TOTAL, FOREST RESEARCH | 7,540 | 6,363 | 6,529 | 6,539 | 10,194 | 7,254 | 7,254 | 7,754 | 10,081 | 9,456 | 9,350 | 10,000 |

(con. next page; for footnotes see end of table)

Table 1.--Cont.[1]

| Subappropriation, activity and function | 1958 | | | | 1959 | | | | 1960 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation |
| | *Thousands of dollars* | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 15,084 | 14,049 | 14,021 | 14,022 | 14,347 | 14,347 | 13,735 | 13,735 | 17,976 | 17,779 | 17,715 | 19,215 |
| Reforestation and stand improvement | 3,372 | 2,415 | 2,414 | 2,414 | 2,914 | 2,914 | 2,412 | 3,162 | 4,050 | 3,297 | 3,255 | 3,455 |
| Recreation - public use | 12,335 | 12,312 | 12,307 | 9,576 | 12,306 | 12,306 | 8,819 | 10,298 | 20,966 | 12,634 | 9,373 | 10,173 |
| Wildlife habitat management | 994 | 840 | 839 | 839 | 1,189 | 1,189 | 836 | 1,086 | 4,278 | 1,724 | 1,159 | 1,259 |
| Range resource management: | | | | | | | | | | | | |
| Management | 3,004 | 2,819 | 2,811 | 2,812 | 2,812 | 2,812 | 2,800 | 2,800 | 3,094 | 3,077 | 2,973 | 2,973 |
| Revegetation | 2,145 | 1,282 | 1,282 | 1,281 | 1,281 | 1,281 | 1,280 | 1,530 | 1,861 | 1,610 | 1,595 | 1,595 |
| Improvements | 1,666 | 1,625 | 1,625 | 1,625 | 1,625 | 1,625 | 1,622 | 1,872 | 2,251 | 1,997 | 1,960 | 1,960 |
| Soil and water management | 2,287 | 1,031 | 1,029 | 1,029 | 1,279 | 1,279 | 1,027 | 1,517 | 2,660 | 1,947 | 1,603 | 1,603 |
| Mineral claims, leases, and other land uses | 4,115 | 4,092 | 4,086 | 4,086 | 4,486 | 4,086 | 3,978 | 3,978 | 4,861 | 4,348 | 4,232 | 4,332 |
| Land classification, adjustments, and surveys | 1,441 | 1,192 | 1,190 | 1,190 | 1,090 | 1,090 | 1,090 | 1,340 | 1,387 | 1,137 | 1,117 | 1,117 |
| Forest fire protection | 13,591 | 12,557 | 12,546 | 12,546 | 12,546 | 12,546 | 12,533 | 12,784 | 15,264 | 14,046 | 13,673 | 13,973 |
| Structural improvements for fire and general purposes (construction and maintenance) | 13,944 | 8,732 | 8,725 | 7,725 | 8,725 | 8,725 | 8,620 | 10,900 | 13,353 | 11,375 | 8,879 | 8,879 |
| Subtotal, National Forest protection and management | 73,978 | 62,946 | 62,875 | 59,145 | 64,600 | 64,200 | 58,752 | 65,002 | 92,001 | 74,971 | 67,534 | 70,534 |
| Fighting forest fires[2] | 5,250 | 5,250 | 5,250 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 10,000 | 10,000 | 5,000 | 5,000 |
| Insect and disease control | 6,419 | 5,208 | 5,205 | 5,205 | 6,250 | 5,380 | 5,205 | 5,705 | 7,454 | 5,954 | 5,882 | 6,882 |
| Acquisition of lands (Weeks Act) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| TOTAL, FOREST LAND MANAGEMENT | 85,747 | 73,504 | 73,430 | 69,450 | 75,950 | 74,680 | 69,057 | 75,807 | 109,555 | 91,025 | 78,516 | 82,516 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research[10] | | | | | | | | | | | | |
| Timber management research[1] | | | (13) | | | | 3,655 | | | | 4,600 | |
| Watershed management research | | | (13) | | | | 1,099 | | | | 1,380 | |
| Wildlife habitat research | | | (13) | | | | 819 | | | | 900 | |
| Subtotal, forest and range management research | 6,105 | 5,430 | 5,420 | 5,680 | 5,880 | 5,880 | 5,573 | 6,449 | 9,244 | 7,164 | 6,880 | 7,104 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 642 | 392 | 391 | 641 | 691 | 641 | 641 | 741 | 1,096 | 896 | 785 | 835 |
| Forest insect research | 983 | 808 | 806 | 806 | 806 | 806 | 806 | 855 | 1,269 | 925 | 915 | 995 |
| Forest disease research | 844 | 694 | 693 | 693 | 693 | 693 | 693 | 693 | 1,050 | 750 | 740 | 820 |
| Subtotal, forest protection research | 2,469 | 1,894 | 1,890 | 2,140 | 2,190 | 2,140 | 2,140 | 2,289 | 3,415 | 2,571 | 2,440 | 2,650 |
| Forest products utilization research | 2,644 | 2,219 | 2,215 | 2,215 | 2,865 | 2,865 | 2,615 | 2,640 | 3,972 | 3,047 | 2,794 | 2,854 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 1,560 | 1,409 | 1,406 | 1,406 | 1,406 | 1,406 | 1,406 | 1,406 | 1,505 | 1,505 | 1,490 | 1,490 |
| Forest products marketing research | | | | | | | 221 | | | | 236 | |
| Forest economics research[1] | 624 | 394 | 394 | 394 | 394 | 394 | 173 | 394 | 1,128 | 427 | 186 | 447 |
| Subtotal, forest resource economics research | 2,184 | 1,803 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 2,633 | 1,932 | 1,912 | 1,937 |
| Forest research construction[1] | | | | | | | | 2,500 | 2,500 | | | |
| TOTAL, FOREST RESEARCH | 13,402 | 11,346 | 11,325 | 11,835 | 12,735 | 12,685 | 12,128 | 15,678 | 21,764 | 14,714 | 14,026 | 14,545 |

(con. next page; for footnotes see end of table)

Table 1.--(con.)

| Subappropriation, activity and function | 1961 Forest Service request | 1961 Dep. of Agr. request | 1961 President's budget | 1961 Appropriation | 1962 Forest Service request | 1962 Dep. of Agr. request | 1962 President's budget | 1962 Appropriation[14] | 1963 Forest Service request | 1963 Dep. of Agr. request | 1963 President's budget | 1963 Appropriation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Thousands of Dollars | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 19,875 | 20,175 | 20,175 | 21,595 | 23,662 | 22,895 | 22,295 | 22,780 | 24,778 | 24,778 | 23,180 | 23,688 |
| Reforestation and stand improvement | 5,765 | 3,465 | 3,465 | 4,451 | 17,664 | 13,301 | 6,151 | 12,750 | 17,864 | 17,864 | 15,250 | 15,415 |
| Recreation - public use | 16,430 | 14,830 | 14,830 | 15,180 | 23,806 | 21,180 | 16,580 | 20,500 | 30,829 | 30,829 | 26,120 | 26,397 |
| Wildlife habitat management | 2,170 | 1,270 | 1,270 | 1,718 | 4,684 | 3,718 | 2,118 | 3,220 | 3,764 | 3,764 | 3,420 | 3,491 |
| Range resource management: | | | | | | | | | | | | |
| Management | 3,500 | 3,000 | 3,000 | 3,859 | 5,512 | 4,759 | 4,059 | 4,610 | 4,781 | 4,863 | 4,710 | 4,853 |
| Revegetation | 1,950 | 1,600 | 1,600 | 1,911 | 2,698 | 2,721 | 2,111 | 2,540 | 2,700 | 2,694 | 2,660 | 2,682 |
| Improvements | 2,365 | 1,965 | 1,965 | 2,388 | 3,880 | 3,338 | 2,588 | 3,180 | 3,398 | 3,323 | 3,180 | 3,213 |
| Soil and water management | 2,615 | 1,615 | 1,615 | 2,151 | 6,483 | 5,401 | 2,651 | 4,090 | 6,084 | 6,084 | 4,490 | 5,636 |
| Mineral claims, leases, and other land uses | 5,470 | 4,370 | 4,370 | 5,182 | 4,995 | 3,946 | 5,582 | 6,800 | 4,218 | 4,218 | 7,200 | 3,634 |
| Land classification, adjustments, and surveys | 1,475 | 1,125 | 1,125 | (15) | 3,436 | 3,436 | (15) | (15) | 3,708 | 3,708 | | 3,723 |
| Forest fire protection | 15,820 | 14,345 | 14,345 | 16,051 | 21,627 | 20,551 | 18,051 | 20,390 | 22,662 | 22,662 | 21,790 | 22,045 |
| Structural improvements for fire and general purposes (construction and maintenance) | 11,271 | 9,246 | 9,100 | 9,802 | 14,812 | 12,992 | 10,479 | 12,140 | 12,726 | 12,725 | 12,140 | 12,206 |
| Rehabilitation of burns | | | | 1,050 | | | 1,050 | 1,050 | | | 1,050 | |
| Subtotal, National Forest protection and management | 88,706 | 77,006 | 76,860 | 85,338 | 133,259 | 118,238 | 93,715 | 114,050 | 137,512 | 137,512 | 125,190 | 126,983 |
| Fighting forest fires[7] | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Payment to employees compensation fund[16] | | | | | | | | | | | | 29 |
| Insect and disease control | 7,400 | 6,900 | 6,900 | 7,252 | 9,881 | 9,652 | 7,402 | 9,350 | 14,663 | 14,663 | 10,750 | 10,570 |
| Acquisition of lands (Weeks Act) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 300 | 1,925 | 1,925 | 500 | 500 |
| TOTAL, FOREST LAND MANAGEMENT | 101,206 | 89,006 | 88,860 | 97,690 | 148,240 | 132,990 | 106,217 | 128,700 | 159,100 | 159,100 | 141,440 | 143,082 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research:[10] | | | | | | | | | | | | |
| Timber management research[11] | | | 4,748 | 5,292 | | | [17]5,547 | 5,892 | | | 6,029 | 6,148 |
| Watershed management research | | | 1,521 | 2,186 | | | [18]1,871 | 2,121 | | | 2,256 | 2,329 |
| Range management research[12] | | | | | | | | 938 | | | 1,013 | 1,047 |
| Wildlife habitat research | | | 1,086 | 1,097 | | | 1,262 | 469 | | | 519 | 524 |
| Forest recreation research | | | | 162 | | | 267 | 317 | | | 397 | 401 |
| Subtotal, forest and range management research | 9,241 | 7,450 | 7,355 | 8,737 | 13,083 | 10,127 | 8,947 | 9,737 | 12,762 | 12,762 | 10,214 | 10,449 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 1,181 | 916 | 905 | 1,029 | 1,852 | 1,379 | 1,156 | 1,349 | 2,289 | 2,289 | 1,479 | 1,505 |
| Forest insect research | 1,341 | 1,061 | 1,049 | 1,165 | 1,925 | 1,590 | 1,465 | 1,590 | 2,496 | 2,496 | 1,725 | 1,784 |
| Forest disease research | 1,085 | 890 | 880 | 980 | 1,778 | 1,405 | 1,130 | 1,405 | 2,375 | 2,375 | 1,525 | 1,581 |
| Subtotal, forest protection research | 3,607 | 2,867 | 2,834 | 3,174 | 5,555 | 4,374 | 3,751 | 4,344 | 7,160 | 7,160 | 4,729 | 4,870 |
| Forest products and engineering research: | | | | | | | | | | | | |
| Forest products utilization research | 4,408 | 3,123 | 3,103 | 3,527 | | | 4,097 | 4,302 | | | 4,502 | 4,656 |
| Forest engineering research[13] | | | | | | | | 175 | | | 215 | 214 |
| Subtotal, forest products and engineering research | 4,408 | 3,123 | 3,103 | 3,527 | 5,550 | 4,640 | 4,097 | 4,477 | 6,360 | 6,360 | 4,717 | 4,870 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 1,580 | 1,500 | 1,490 | 1,583 | 1,600 | 1,633 | 1,583 | 1,583 | 1,630 | 1,630 | 1,583 | 1,624 |
| Forest products marketing research | | | 312 | 379 | 886 | 536 | 429 | 483 | 1,066 | 1,066 | 659 | 728 |
| Forest economics research[11] | 745 | 550 | 238 | 303 | 620 | 496 | 396 | 549 | 912 | 912 | 498 | 514 |
| Subtotal, forest resource economics research | 2,325 | 2,050 | 2,040 | 2,265 | 3,106 | 2,665 | 2,408 | 2,615 | 3,608 | 3,608 | 2,740 | 2,866 |
| Forest research construction | 2,500 | 1,000 | 1,000 | 1,075 | 6,775 | 6,115 | 1,075 | 5,195 | 8,105 | 7,000 | 750 | 2,550 |
| TOTAL, FOREST RESEARCH | 22,141 | 16,490 | 16,332 | 18,778 | 34,078 | 27,921 | 20,278 | 26,368 | 37,995 | 36,890 | 23,150 | 25,605 |

(con. next page; for footnotes see end of table)

Table 1.--(con.)

| Subappropriation, activity and function | 1964 | | | | 1965 | | | | 1966 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forest Service request | Dep. of Agr. request | Presi-dent's budget | Appro-pria-tion | Forest Service request | Dep. of Agr. request | Presi-dent's budget | Appro-pria-tion | Forest Service request | Dep. of Agr. request | Presi-dent's budget | Appro-pria-tion |
| | *Thousands of dollars* | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 26,678 | 28,617 | 29,600 | 28,859 | 30,654 | 30,734 | 29,314 | 29,314 | 32,644 | 33,558 | 30,262 | 30,809 |
| Reforestation and stand improvement | 25,921 | 22,970 | 15,690 | 15,690 | 27,551 | 27,551 | [22]16,709 | 16,609 | 28,160 | 22,247 | 17,491 | 17,360 |
| Recreation - public use | 42,726 | 42,132 | 26,860 | 25,016 | 38,447 | 38,423 | [22]25,910 | 24,935 | 46,774 | 35,602 | 27,510 | 28,604 |
| Wildlife habitat management | 4,542 | 4,482 | 3,580 | 3,580 | 4,470 | 4,473 | 3,624 | 3,624 | 5,884 | 4,961 | 3,808 | 3,872 |
| Range resource management: | | | | | | | | | | | | |
| Management | 5,135 | 5,135 | 5,020 | 5,020 | 5,391 | 5,404 | 5,108 | 5,108 | 6,360 | 6,228 | 5,254 | 5,362 |
| Revegetation | 2,857 | 2,857 | 2,720 | 2,720 | 2,780 | 2,780 | 2,737 | 2,737 | 3,324 | 2,822 | 2,780 | 2,810 |
| Improvements[6] | 3,817 | 3,817 | 3,260 | 3,260 | 3,675 | 3,683 | 3,280 | 3,280 | 4,887 | 4,215 | 3,339 | 3,379 |
| Soil and water management | 7,943 | 7,862 | 5,760 | 5,289 | 11,081 | 11,080 | 5,345 | 4,702 | 10,472 | 7,620 | 6,146 | 5,722 |
| Mineral claims, leases, and other land uses | 3,996 | 3,985 | 3,740 | 3,740 | 4,041 | 4,044 | 3,794 | 3,794 | 4,466 | 4,318 | 3,904 | 3,976 |
| Land classification, adjustments, and surveys | 5,251 | 5,192 | 3,840 | 3,840 | 5,012 | 5,090 | 3,899 | 3,899 | 7,115 | 5,790 | 4,512 | 4,345 |
| Forest fire protection | 25,731 | 25,560 | 22,495 | 22,795 | 27,495 | 27,499 | 23,011 | 23,011 | 30,963 | 27,208 | 23,564 | 24,454 |
| Structural improvements for fire and general purposes (construction and maintenance) | 14,188 | 14,145 | 12,360 | 10,958 | 13,672 | 13,879 | [22]10,921 | 10,921 | 15,792 | 13,767 | 11,052 | 11,166 |
| Water resource development related activities | | | | | | | | 1,850 | 16,000 | 9,202 | 4,532 | 4,770 |
| Subtotal, National Forest protection and management | 168,785 | 166,754 | 134,925 | 130,767 | 174,269 | 174,640 | 133,652 | 133,784 | 212,841 | 177,538 | 144,154 | 146,629 |
| Fighting forest fires[7] | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Payment to employees compensation fund | | | 520 | 520 | | | 615 | 615 | | | 669 | 669 |
| Insect and disease control | 10,923 | 10,923 | 10,763 | 10,763 | 13,046 | 13,025 | 10,852 | 10,602 | 13,564 | 12,866 | 12,575 | 12,175 |
| Acquisition of lands (Weeks Act) | 3,500 | 1,500 | 500 | 962 | 6,000 | 6,000 | 500 | 643 | 5,137 | 1,680 | 680 | 680 |
| TOTAL, FOREST LAND MANAGEMENT | 188,208 | 184,177 | 151,708 | 148,012 | 198,315 | 198,665 | 150,619 | 150,644 | 236,542 | 197,084 | 163,078 | 165,153 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research:[10] | | | | | | | | | | | | |
| Timber management research[12] | | | 6,332 | 6,562 | | | 6,619 | 7,164 | | | 7,546 | 8,029 |
| Watershed management research | | | 2,399 | 2,635 | | | 2,713 | 2,978 | | | 3,130 | 3,280 |
| Range management research | | | 1,080 | 1,142 | | | 1,161 | 1,211 | | | 1,190 | 1,258 |
| Wildlife habitat research | | | 540 | 585 | | | 595 | 675 | | | 691 | 730 |
| Forest recreation research | | | 414 | 414 | | | 421 | 421 | | | 432 | 516 |
| Subtotal, forest and range management research | 13,882 | 11,455 | 10,765 | 11,338 | 12,968 | 12,972 | 11,509 | 12,449 | 16,013 | 14,881 | 12,989 | 13,813 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 2,783 | 1,852 | 1,547 | 1,822 | 2,066 | 2,047 | 1,848 | 1,848 | 3,350 | 2,739 | 2,247 | 2,860 |
| Forest insect research | 2,872 | 2,181 | 1,844 | 2,005 | 4,401 | 4,404 | 2,241 | 2,411 | 5,336 | 4,287 | 3,735 | 3,856 |
| Forest disease research | 2,593 | 1,828 | 1,635 | 1,696 | 2,260 | 2,261 | 1,767 | 1,847 | 2,901 | 2,403 | 2,043 | 2,081 |
| Subtotal, forest protection research | 8,248 | 5,861 | 5,026 | 5,523 | 8,727 | 8,712 | 5,856 | 6,106 | 11,587 | 9,429 | 8,025 | 8,797 |
| Forest products and engineering research:[10] | | | | | | | | | | | | |
| Forest products utilization research | | | 4,829 | 4,969 | | | 5,069 | 5,269 | | | 5,890 | 6,077 |
| Forest engineering research | | | 221 | 221 | | | 300 | 400 | | | 409 | 416 |
| Subtotal, forest products and engineering research | 7,125 | 5,462 | 5,050 | 5,190 | 7,702 | 7,580 | 5,369 | 5,669 | 8,629 | 7,721 | 6,299 | 6,493 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 2,038 | 1,921 | 1,676 | 1,676 | 2,346 | 2,303 | 1,854 | 1,854 | 2,189 | 2,211 | 1,903 | 1,939 |
| Forest products marketing research | 1,258 | 1,027 | 750 | 1,000 | 639 | 606 | 1,016 | 1,116 | 2,016 | 1,582 | 1,464 | 1,491 |
| Forest economics research[11] | 779 | 513 | 531 | 531 | 1,425 | 1,414 | 540 | 540 | 868 | 833 | 556 | 658 |
| Subtotal, forest resource economics research | 4,075 | 3,461 | 2,957 | 3,207 | 4,410 | 4,323 | 3,410 | 3,510 | 5,073 | 4,626 | 3,923 | 4,088 |
| Forest research construction | 12,300 | 4,100 | [23] | 635 | 4,972 | 4,972 | 3,800 | 3,951 | 5,256 | 4,076 | 1,318 | 4,183 |
| TOTAL, FOREST RESEARCH | 45,630 | 30,339 | 23,798 | 25,893 | 38,779 | 38,559 | 29,944 | 31,685 | 46,558 | 40,733 | 32,554 | 37,374 |

(con. next page; for footnotes see end of table)

Table 1.--Budget requests and amounts appropriated, USDA Forest Service appropriation for Forest protection and utilization, fiscal years 1955-1972[1]

| Subappropriation, activity and function[2] | 1955 | | | | 1956 | | | | 1957 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forest Service request[3] | Dep. of Agr. request[4] | President's budget[3] | Appropriation[3] | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation |
| | Thousands of dollars | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management[5] | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 8,729 | 7,116 | 7,116 | 7,296 | 9,496 | 8,136 | 8,136 | 9,285 | 10,197 | 11,380 | 11,305 | 11,392 |
| Reforestation and stand improvement | 1,492 | 637 | 637 | 1,050 | 1,577 | 1,046 | 1,046 | 1,390 | 1,512 | 1,406 | 1,406 | 2,058 |
| Recreation - public use | 2,991 | 2,169 | 2,167 | 2,243 | 3,299 | 2,401 | 2,401 | 2,960 | 3,847 | 3,695 | 3,628 | 4,463 |
| Wildlife habitat management | 574 | 564 | 564 | 498 | 978 | 564 | 564 | 513 | 728 | 627 | 627 | 694 |
| Range resource management: | | | | | | | | | | | | |
| Management | 2,326 | 2,286 | 2,286 | 2,038 | 2,819 | 2,286 | 2,286 | 2,026 | 3,015 | 2,613 | 2,607 | 2,535 |
| Revegetation | 1,042 | 363 | 363 | 613 | 1,121 | 598 | 598 | 810 | 929 | 825 | 825 | 1,083 |
| Improvements | 1,469 | 1,368 | 1,367 | 1,329 | 1,450 | 1,400 | 1,400 | 1,467 | [6]1,708 | [6]1,550 | [6]1,536 | [6]1,566 |
| Soil and water management | 373 | 366 | 366 | 321 | 369 | 366 | 366 | 555 | 917 | 614 | 614 | 842 |
| Mineral claims, leases, and other land uses | 1,845 | 1,817 | 1,817 | 1,688 | 2,043 | 1,817 | 1,817 | 1,717 | 2,922 | 2,679 | 2,562 | 2,422 |
| Land classification, adjustments, and surveys | 1,248 | 1,248 | 735 | 1,014 | 985 | 942 | 942 | 724 | 985 | 985 | 985 | 767 |
| Forest fire protection | 10,402 | 9,341 | 9,341 | 9,334 | 12,593 | 10,466 | 10,466 | 10,770 | 11,752 | 11,502 | 11,502 | 11,669 |
| Structural improvements for fire and general purposes (construction and maintenance) | 3,495 | 2,886 | 2,876 | 3,566 | 3,726 | 3,089 | 3,089 | 3,995 | 5,881 | 4,862 | 4,771 | 5,510 |
| Subtotal, National Forest protection and management | 35,986 | 30,161 | 29,635 | 30,990 | 40,456 | 33,111 | 33,111 | 36,212 | 44,393 | 42,738 | 42,368 | 45,001 |
| Fighting forest fires[7] | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 5,250 | 5,250 | 5,250 | 5,250 | 5,250 | 5,250 | 5,250 |
| Insect and disease control | 6,657 | 5,286 | 5,015 | 4,938 | 7,775 | 6,108 | 6,108 | 6,272 | 6,272 | 5,122 | 5,120 | 5,120 |
| Acquisition of lands (Weeks Act) | | | | 125 | 75 | | | 190 | | | | 100 |
| TOTAL, FOREST LAND MANAGEMENT | [8]48,643 | 41,447 | 40,650 | [9]42,053 | 54,306 | 44,469 | 44,469 | 47,924 | 55,915 | 53,110 | 52,738 | 55,471 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research[10] | 3,256 | 3,099 | 3,095 | 3,105 | 4,250 | 3,810 | 3,810 | 4,280 | 4,864 | 4,630 | 4,630 | 5,183 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 183 | 183 | 183 | 183 | 183 | 183 | 183 | 213 | 360 | 226 | 225 | 326 |
| Forest insect research | 623 | 462 | 612 | 612 | 623 | 623 | 623 | 623 | 734 | 737 | 734 | 771 |
| Forest disease research | 487 | 448 | 448 | 448 | 547 | 447 | 447 | 447 | 604 | 608 | 607 | 614 |
| Subtotal, forest protection research | 1,293 | 1,093 | 1,243 | 1,243 | 1,353 | 1,253 | 1,253 | 1,283 | 1,698 | 1,571 | 1,566 | 1,711 |
| Forest products utilization research | 1,531 | 1,231 | 1,231 | 1,231 | 3,231 | 1,231 | 1,231 | 1,231 | 1,753 | 1,771 | 1,771 | 1,680 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 1,316 | 816 | 816 | 816 | 1,216 | 816 | 816 | 816 | 1,364 | 1,076 | 1,025 | 1,049 |
| Forest economics research[11] | 144 | 124 | 144 | 144 | 144 | 144 | 144 | 144 | 402 | 408 | 358 | 377 |
| Subtotal, forest resource economics research | 1,460 | 940 | 960 | 960 | 1,360 | 960 | 960 | 960 | 1,766 | 1,484 | 1,383 | 1,426 |
| TOTAL, FOREST RESEARCH | 7,540 | 6,363 | 6,529 | 6,539 | 10,194 | 7,254 | 7,254 | 7,754 | 10,081 | 9,456 | 9,350 | 10,000 |

(con. next page; for footnotes see end of table)

Table 1.--(con.)

| Subappropriation, activity and function | 1958 | | | | 1959 | | | | 1960 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation |
| | Thousands of dollars | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 15,084 | 14,044 | 14,021 | 14,022 | 14,347 | 14,347 | 13,735 | 13,735 | 17,976 | 17,779 | 17,715 | 19,215 |
| Reforestation and stand improvement | 3,372 | 2,414 | 2,414 | 2,414 | 2,914 | 2,914 | 2,412 | 3,162 | 4,050 | 3,297 | 3,255 | 3,455 |
| Recreation - public use | 12,336 | 12,212 | 12,307 | 9,576 | 12,306 | 12,306 | 8,819 | 10,298 | 20,966 | 12,634 | 9,373 | 10,173 |
| Wildlife habitat management | 994 | 840 | 839 | 839 | 1,189 | 1,189 | 836 | 1,086 | 4,278 | 1,724 | 1,159 | 1,259 |
| Range resource management: | | | | | | | | | | | | |
| Management | 3,004 | 2,811 | 2,811 | 2,812 | 2,812 | 2,812 | 2,800 | 2,800 | 3,094 | 3,077 | 2,973 | 2,973 |
| Revegetation | 2,145 | 1,282 | 1,282 | 1,281 | 1,281 | 1,281 | 1,280 | 1,530 | 1,861 | 1,610 | 1,595 | 1,595 |
| Improvements[1] | 1,666 | 1,625 | 1,625 | 1,625 | 1,625 | 1,625 | 1,622 | 1,872 | 2,251 | 1,997 | 1,960 | 1,960 |
| Soil and water management | 2,267 | 1,031 | 1,029 | 1,029 | 1,279 | 1,279 | 1,027 | 1,517 | 2,660 | 1,947 | 1,603 | 1,603 |
| Mineral claims, leases, and other land uses | 4,115 | 4,092 | 4,086 | 4,086 | 4,486 | 4,086 | 3,978 | 3,978 | 4,861 | 4,348 | 4,232 | 4,332 |
| Land classification, adjustments, and surveys | 1,441 | 1,192 | 1,190 | 1,190 | 1,090 | 1,090 | 1,090 | 1,340 | 1,387 | 1,137 | 1,117 | 1,117 |
| Forest fire protection | 13,491 | 12,557 | 12,546 | 12,546 | 12,546 | 12,546 | 12,533 | 12,784 | 15,264 | 14,046 | 13,673 | 13,973 |
| Structural improvements for fire and general purposes (construction and maintenance) | 13,944 | 8,732 | 8,725 | 7,725 | 8,725 | 8,725 | 8,620 | 10,900 | 13,353 | 11,375 | 8,879 | 8,879 |
| Subtotal, National Forest protection and management | 73,978 | 62,946 | 62,875 | 59,145 | 64,600 | 64,200 | 58,752 | 65,002 | 92,001 | 74,971 | 67,534 | 70,534 |
| Fighting forest fires | 5,250 | 5,250 | 5,250 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 10,000 | 10,000 | 5,000 | 5,000 |
| Insect and disease control | 6,419 | 5,208 | 5,205 | 5,205 | 6,250 | 5,380 | 5,205 | 5,705 | 7,454 | 5,954 | 5,882 | 6,882 |
| Acquisition of lands (Weeks Act) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| TOTAL, FOREST LAND MANAGEMENT | 85,747 | 73,504 | 73,430 | 69,450 | 75,950 | 74,680 | 69,057 | 75,807 | 109,555 | 91,025 | 78,516 | 82,516 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research[10] | | | | | | | | | | | | |
| Timber management research[1] | | | (13) | | | | 3,655 | | | | 4,600 | |
| Watershed management research | | | (13) | | | | 1,099 | | | | 1,380 | |
| Wildlife habitat research | | | (13) | | | | 819 | | | | 900 | |
| Subtotal, forest and range management research | 6,105 | 5,430 | 5,420 | 5,680 | 5,880 | 5,880 | 5,573 | 6,449 | 9,244 | 7,164 | 6,880 | 7,104 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 642 | 392 | 391 | 641 | 691 | 641 | 641 | 741 | 1,096 | 896 | 785 | 835 |
| Forest insect research | 983 | 808 | 806 | 806 | 806 | 806 | 806 | 855 | 1,269 | 925 | 915 | 995 |
| Forest disease research | 844 | 694 | 693 | 693 | 693 | 693 | 693 | 693 | 1,050 | 750 | 740 | 820 |
| Subtotal, forest protection research | 2,469 | 1,894 | 1,890 | 2,140 | 2,190 | 2,140 | 2,140 | 2,289 | 3,415 | 2,571 | 2,440 | 2,650 |
| Forest products utilization research | 2,644 | 2,219 | 2,215 | 2,215 | 2,865 | 2,865 | 2,615 | 2,640 | 3,972 | 3,047 | 2,794 | 2,854 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 1,560 | 1,409 | 1,406 | 1,406 | 1,406 | 1,406 | 1,406 | 1,406 | 1,505 | 1,505 | 1,490 | 1,490 |
| Forest products marketing research | | | | | | | 221 | | | | 236 | |
| Forest economics research[1] | 624 | 394 | 394 | 394 | 394 | 394 | 173 | 394 | 1,128 | 427 | 186 | 447 |
| Subtotal, forest resource economics research | 2,184 | 1,803 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 2,633 | 1,932 | 1,912 | 1,937 |
| Forest research construction[11] | | | | | | | | 2,500 | 2,500 | | | |
| TOTAL, FOREST RESEARCH | 13,402 | 11,346 | 11,325 | 11,835 | 12,735 | 12,685 | 12,128 | 15,678 | 21,764 | 14,714 | 14,026 | 14,545 |

(con. next page; for footnotes see end of table)

Table 1.--(con.)

| Subappropriation, activity and function | 1961 Forest Service request | 1961 Dep. of Agr. request | 1961 President's budget | 1961 Appropriation | 1962 Forest Service request | 1962 Dep. of Agr. request | 1962 President's budget | 1962 Appropriation[14] | 1963 Forest Service request | 1963 Dep. of Agr. request | 1963 President's budget | 1963 Appropriation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Thousands of dollars | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 19,875 | 20,175 | 20,175 | 21,595 | 23,662 | 22,895 | 22,295 | 22,780 | 24,778 | 24,778 | 23,180 | 23,688 |
| Reforestation and stand improvement | 5,765 | 3,465 | 3,465 | 4,451 | 17,664 | 13,301 | 6,151 | 12,750 | 17,864 | 17,864 | 15,250 | 15,415 |
| Recreation - public use | 16,430 | 14,830 | 14,830 | 15,180 | 23,806 | 21,180 | 16,580 | 20,500 | 30,829 | 30,829 | 26,120 | 26,397 |
| Wildlife habitat management | 2,170 | 1,270 | 1,270 | 1,718 | 4,684 | 3,718 | 2,118 | 3,220 | 3,764 | 3,764 | 3,420 | 3,491 |
| Range resource management: | | | | | | | | | | | | |
| Management | 3,500 | 3,000 | 3,000 | 3,859 | 5,512 | 4,759 | 4,059 | 4,610 | 4,781 | 4,863 | 4,710 | 4,853 |
| Revegetation | 1,950 | 1,600 | 1,600 | 1,911 | 2,698 | 2,721 | 2,111 | 2,540 | 2,700 | 2,694 | 2,660 | 2,682 |
| Improvements | 2,365 | 1,965 | 1,965 | 2,388 | 3,880 | 3,338 | 2,588 | 3,180 | 3,398 | 3,323 | 3,180 | 3,213 |
| Soil and water management | 2,615 | 1,615 | 1,615 | 2,151 | 6,483 | 5,401 | 2,651 | 4,090 | 6,084 | 6,084 | 4,490 | 5,636 |
| Mineral claims, leases, and other land uses | 5,470 | 4,370 | 4,370 | 5,182 | 4,995 | 3,946 | 5,582 | 6,800 | 4,218 | 4,218 | 7,200 | 3,634 |
| Land classification, adjustments, and surveys | 1,475 | 1,125 | 1,125 | (15) | 3,436 | 3,436 | (15) | (15) | 3,708 | 3,708 | | 3,723 |
| Forest fire protection | 15,820 | 14,345 | 14,345 | 16,051 | 21,627 | 20,551 | 18,051 | 20,390 | 22,662 | 22,662 | 21,790 | 22,045 |
| Structural improvements for fire and general purposes (construction and maintenance) | 11,271 | 9,246 | 9,100 | 9,802 | 14,812 | 12,992 | 10,479 | 12,140 | 12,726 | 12,725 | 12,140 | 12,206 |
| Rehabilitation of burns | | | | 1,050 | | | 1,050 | 1,050 | | | 1,050 | |
| Subtotal, National Forest protection and management | 88,706 | 77,006 | 76,860 | 85,338 | 133,259 | 118,238 | 93,715 | 114,050 | 137,512 | 137,512 | 125,190 | 126,983 |
| Fighting forest fires[7] | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Payment to employees compensation fund[16] | | | | | | | | | | | | 29 |
| Insect and disease control | 7,400 | 6,900 | 6,900 | 7,252 | 9,881 | 9,652 | 7,402 | 9,350 | 14,663 | 14,663 | 10,750 | 10,570 |
| Acquisition of lands (Weeks Act) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 300 | 1,925 | 1,925 | 500 | 500 |
| TOTAL, FOREST LAND MANAGEMENT | 101,206 | 89,006 | 88,860 | 97,690 | 148,240 | 132,990 | 106,217 | 128,700 | 159,100 | 159,100 | 141,440 | 143,082 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research:[1] | | | | | | | | | | | | |
| Timber management research[11] | | | 4,748 | 5,292 | | | [17]5,547 | 5,892 | | | 6,029 | 6,148 |
| Watershed management research | | | 1,521 | 2,186 | | | [18]1,871 | 2,121 | | | 2,256 | 2,329 |
| Range management research[19] | | | | | | | | 938 | | | 1,013 | 1,047 |
| Wildlife habitat research | | | 1,086 | 1,097 | | | 1,262 | 469 | | | 519 | 524 |
| Forest recreation research[6] | | | | 162 | | | 267 | 317 | | | 397 | 401 |
| Subtotal, forest and range management research | 9,241 | 7,450 | 7,355 | 8,737 | 13,083 | 10,127 | 8,947 | 9,737 | 12,762 | 12,762 | 10,214 | 10,449 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 1,181 | 916 | 905 | 1,029 | 1,852 | 1,379 | 1,156 | 1,349 | 2,289 | 2,289 | 1,479 | 1,505 |
| Forest insect research | 1,341 | 1,061 | 1,049 | 1,165 | 1,925 | 1,590 | 1,465 | 1,590 | 2,496 | 2,496 | 1,725 | 1,784 |
| Forest disease research | 1,085 | 890 | 880 | 980 | 1,778 | 1,405 | 1,130 | 1,405 | 2,375 | 2,375 | 1,525 | 1,581 |
| Subtotal, forest protection research | 3,607 | 2,867 | 2,834 | 3,174 | 5,555 | 4,374 | 3,751 | 4,344 | 7,160 | 7,160 | 4,729 | 4,870 |
| Forest products and engineering research: | | | | | | | | | | | | |
| Forest products utilization research | 4,468 | 3,123 | 3,103 | 3,527 | | | 4,097 | 4,302 | | | 4,502 | 4,656 |
| Forest engineering research[1] | | | | | | | | 175 | | | 215 | 214 |
| Subtotal, forest products and engineering research | 4,468 | 3,123 | 3,103 | 3,527 | 5,559 | 4,640 | 4,097 | 4,477 | 6,360 | 6,360 | 4,717 | 4,870 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 1,580 | 1,500 | 1,490 | 1,583 | 1,600 | 1,633 | 1,583 | 1,583 | 1,630 | 1,630 | 1,583 | 1,624 |
| Forest products marketing research | | | 312 | 379 | 886 | 536 | 429 | 483 | 1,066 | 1,066 | 659 | 728 |
| Forest economics research[13] | 745 | 550 | 238 | 303 | 620 | 496 | 396 | 549 | 912 | 912 | 498 | 514 |
| Subtotal, forest resource economics research | 2,325 | 2,050 | 2,040 | 2,265 | 3,106 | 2,665 | 2,408 | 2,615 | 3,608 | 3,608 | 2,740 | 2,866 |
| Forest research construction | 2,500 | 1,000 | 1,000 | 1,075 | 6,775 | 6,115 | 1,075 | 5,195 | 8,105 | 7,000 | 750 | 2,550 |
| TOTAL, FOREST RESEARCH | 22,141 | 16,490 | 16,332 | 18,778 | 34,078 | 27,921 | 20,278 | 26,368 | 37,995 | 36,890 | 23,150 | 25,605 |

(con. next page; for footnotes see end of table)

| Subappropriation, activity and function | 1964 Forest Service request | 1964 Dep. of Agr. request | 1964 President's budget | 1964 Appropriation | 1965 Forest Service request | 1965 Dep. of Agr. request | 1965 President's budget | 1965 Appropriation | 1966 Forest Service request | 1966 Dep. of Agr. request | 1966 President's budget | 1966 Appropriation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Thousands of dollars) | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 26,678 | 28,617 | 29,600 | 28,859 | 30,654 | 30,734 | 29,314 | 29,314 | 32,644 | 33,558 | 30,262 | 30,809 |
| Reforestation and stand improvement | 25,921 | 22,970 | 15,690 | 15,690 | 27,551 | 27,551 | [22]16,709 | 16,609 | 28,160 | 22,247 | 17,491 | 17,360 |
| Recreation - public use | 42,726 | 42,132 | 26,860 | 25,016 | 38,447 | 38,423 | [22]25,910 | 24,935 | 46,774 | 35,602 | 27,510 | 28,604 |
| Wildlife habitat management | 4,542 | 4,482 | 3,580 | 3,580 | 4,470 | 4,473 | 3,624 | 3,624 | 5,884 | 4,961 | 3,808 | 3,872 |
| Range resource management: | | | | | | | | | | | | |
| Management | 5,135 | 5,135 | 5,020 | 5,020 | 5,391 | 5,404 | 5,108 | 5,108 | 6,360 | 6,228 | 5,254 | 5,362 |
| Revegetation | 2,857 | 2,857 | 2,720 | 2,720 | 2,780 | 2,780 | 2,737 | 2,737 | 3,324 | 2,822 | 2,780 | 2,810 |
| Improvements[6] | 3,817 | 3,817 | 3,260 | 3,260 | 3,675 | 3,683 | 3,280 | 3,280 | 4,887 | 4,215 | 3,339 | 3,379 |
| Soil and water management | 7,943 | 7,862 | 5,760 | 5,289 | 11,081 | 11,080 | 5,345 | 4,702 | 10,472 | 7,620 | 6,146 | 5,722 |
| Mineral claims, leases, and other land uses | 3,996 | 3,985 | 3,740 | 3,740 | 4,041 | 4,044 | 3,794 | 3,794 | 4,466 | 4,318 | 3,904 | 3,976 |
| Land classification, adjustments, and surveys | 5,251 | 5,192 | 3,840 | 3,840 | 5,012 | 5,090 | 3,899 | 3,899 | 7,115 | 5,790 | 4,512 | 4,345 |
| Forest fire protection | 25,731 | 25,560 | 22,495 | 22,795 | 27,495 | 27,499 | 23,011 | 23,011 | 30,963 | 27,208 | 23,564 | 24,454 |
| Structural improvements for fire and general purposes (construction and maintenance) | 14,188 | 14,145 | 12,360 | 10,958 | 13,672 | 13,879 | 10,921 | 10,921 | 15,792 | 13,767 | 11,052 | 11,166 |
| Water resource development related activities | | | | | | | | 1,850 | 16,000 | 9,202 | 4,532 | 4,770 |
| Subtotal, National Forest protection and management | 168,785 | 166,754 | 134,925 | 130,767 | 174,269 | 174,640 | 133,652 | 133,784 | 212,841 | 177,538 | 144,154 | 146,629 |
| Fighting forest fires[7] | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Payment to employees compensation fund | | | 520 | 520 | | | 615 | 615 | | | 669 | 669 |
| Insect and disease control | 10,923 | 10,923 | 10,763 | 10,763 | 13,046 | 13,025 | 10,852 | 10,602 | 13,564 | 12,866 | 12,575 | 12,175 |
| Acquisition of lands (Weeks Act) | 3,500 | 1,500 | 500 | 962 | 6,000 | 6,000 | 500 | 643 | 5,137 | 1,680 | 680 | 680 |
| TOTAL, FOREST LAND MANAGEMENT | 188,208 | 184,177 | 151,708 | 148,012 | 198,315 | 198,665 | 150,619 | 150,644 | 236,542 | 197,084 | 163,078 | 165,153 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research:[10] | | | | | | | | | | | | |
| Timber management research[13] | | | 6,332 | 6,562 | | | 6,619 | 7,164 | | | 7,546 | 8,029 |
| Watershed management research | | | 2,399 | 2,635 | | | 2,713 | 2,978 | | | 3,130 | 3,280 |
| Range management research | | | 1,080 | 1,142 | | | 1,161 | 1,211 | | | 1,190 | 1,258 |
| Wildlife habitat research | | | 540 | 585 | | | 595 | 675 | | | 691 | 730 |
| Forest recreation research | | | 414 | 414 | | | 421 | 421 | | | 432 | 516 |
| Subtotal, forest and range management research | 13,882 | 11,455 | 10,765 | 11,338 | 12,968 | 12,972 | 11,509 | 12,449 | 16,013 | 14,881 | 12,989 | 13,813 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 2,783 | 1,852 | 1,547 | 1,822 | 2,066 | 2,047 | 1,848 | 1,848 | 3,350 | 2,739 | 2,247 | 2,860 |
| Forest insect research | 2,872 | 2,181 | 1,844 | 2,005 | 4,401 | 4,404 | 2,241 | 2,411 | 5,336 | 4,287 | 3,735 | 3,856 |
| Forest disease research | 2,593 | 1,828 | 1,635 | 1,696 | 2,260 | 2,261 | 1,767 | 1,847 | 2,901 | 2,403 | 2,043 | 2,081 |
| Subtotal, forest protection research | 8,248 | 5,861 | 5,026 | 5,523 | 8,727 | 8,712 | 5,856 | 6,106 | 11,587 | 9,429 | 8,025 | 8,797 |
| Forest products and engineering research:[10] | | | | | | | | | | | | |
| Forest products utilization research | | | 4,829 | 4,969 | | | 5,069 | 5,269 | | | 5,890 | 6,077 |
| Forest engineering research | | | 221 | 221 | | | 300 | 400 | | | 409 | 416 |
| Subtotal, forest products and engineering research | 7,125 | 5,462 | 5,050 | 5,190 | 7,702 | 7,580 | 5,369 | 5,669 | 8,629 | 7,721 | 6,299 | 6,493 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 2,038 | 1,921 | 1,676 | 1,676 | 2,346 | 2,303 | 1,854 | 1,854 | 2,189 | 2,211 | 1,903 | 1,939 |
| Forest products marketing research | 1,258 | 1,027 | 750 | 1,000 | 639 | 606 | 1,016 | 1,116 | 2,016 | 1,582 | 1,464 | 1,491 |
| Forest economics research[11] | 779 | 513 | 531 | 531 | 1,425 | 1,414 | 540 | 540 | 868 | 833 | 556 | 658 |
| Subtotal, forest resource economics research | 4,075 | 3,461 | 2,957 | 3,207 | 4,410 | 4,323 | 3,410 | 3,510 | 5,073 | 4,626 | 3,923 | 4,088 |
| Forest research construction | 12,300 | 4,100 | [23] | 635 | 4,972 | 4,972 | 3,800 | 3,951 | 5,256 | 4,076 | 1,318 | 4,183 |
| TOTAL, FOREST RESEARCH | 45,630 | 30,339 | 23,798 | 25,893 | 38,779 | 38,559 | 29,944 | 31,685 | 46,558 | 40,733 | 32,554 | 37,374 |

(con. next page; for footnotes see end of table)

Table 1.--(con.)

| Subappropriation, activity and function | 1967 | | | | 1968 | | | | 1969 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation | Forest Service request | Dep. of Agr. request | President's budget | Appropriation |
| | *Thousands of dollars* | | | | | | | | | | | |
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 38,375 | 37,737 | 31,635 | 34,575 | 41,658 | 38,488 | 35,900 | 36,752 | 41,076 | 40,981 | 38,073[25] | 39,546 |
| Reforestation and stand improvement | 29,294 | 18,256 | 17,640 | 17,640 | 22,807 | 16,400 | 17,640 | 15,790 | 21,248 | 17,888 | 15,884 | 16,013 |
| Recreation - public use | 60,758 | 33,312 | 29,876 | 31,248 | 50,679 | 42,559 | 34,638[26] | 35,199 | 55,129 | 54,237 | 37,566 | 36,956 |
| Wildlife habitat management | 5,638 | 3,946 | 3,807 | 3,971 | 5,012 | 4,384 | 4,301 | 4,284 | 4,782 | 4,643 | 4,446 | 4,403 |
| Range resource management: | | | | | | | | | | | | |
| Management | 6,531 | 5,485 | 5,404 | 5,527 | 6,791 | 5,971 | 5,682 | 5,831 | 6,319 | 6,001 | 5,892 | 6,001 |
| Revegetation | 3,164 | 2,844 | 2,820 | 2,854 | 3,033 | 2,895 | 2,854 | 2,895 | 3,234 | 2,938 | 3,124 | 2,948 |
| Improvements[4] | 4,387 | 3,426 | 3,395 | 3,442 | 4,544 | 3,996 | 3,442 | 3,496 | 3,962 | 3,554 | 4,368 | 3,564 |
| Soil and water management | 10,876 | 7,822 | 6,261 | 6,361 | 8,362 | 6,888 | 6,361 | 5,870 | 6,933 | 5,994 | 5,915 | 5,994 |
| Mineral claims, leases, and other land uses | 4,565 | 4,069 | 4,004 | 4,097 | 4,397 | 4,191 | 4,097 | 4,191 | 4,433 | 4,260 | 4,230 | 4,299 |
| Land classification, adjustments, and surveys | 9,003 | 6,265 | 5,805 | 5,725 | 8,850 | 7,111 | 6,349 | 6,210 | 7,309 | 6,353 | 6,534 | 6,353 |
| Forest fire protection | 30,557 | 26,221 | 25,120 | 25,577 | 29,864 | 26,975 | 26,172 | 26,720 | 30,469 | 27,533 | 27,589 | 28,124 |
| Structural improvements for fire and general purposes (construction and maintenance) | 15,744 | 11,091 | 10,909 | 11,040 | 11,759 | 10,705 | 11,040 | 9,738 | 11,596 | 5,327 | 8,793 | 8,350 |
| Water resource development related activities | 16,038 | 9,727 | 6,416 | 6,766 | 15,590 | 9,720 | 8,660 | 8,259 | 20,193 | 20,193 | 8,299 | 8,353 |
| Subtotal, National Forest protection and management | 234,930 | 170,201 | 153,182 | 158,823 | 213,346 | 180,283 | 167,136 | 165,235 | 216,683[27] | 199,902 | 170,713 | 170,904 |
| Fighting forest fires[7] | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 4,275 | 4,275 | 4,275 | 4,275 |
| Payment to employees compensation fund | | | 733 | 733 | | | 759 | 759 | | | 1,118 | 1,118 |
| Insect and disease control | 13,302 | 12,517 | 12,371 | 12,371 | 12,481 | 12,074 | 11,563 | 11,778 | 12,783 | 12,081 | 11,969 | 11,983 |
| Acquisition of lands (Weeks Act) | 3,630 | 2,480 | 2,480 | 2,480 | 5,529 | 2,050 | 2,480 | 1,800 | 2,280 | 1,120 | 1,800 | 1,300 |
| TOTAL, FOREST LAND MANAGEMENT | 256,862 | 190,198 | 173,766 | 179,407 | 236,356 | 199,407 | 186,938 | 184,572 | 236,021 | 217,378 | 189,875 | 189,580 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research:[1] | | | | | | | | | | | | |
| Timber management research | | | 8,086 | 8,417 | | | 8,937 | 8,952 | | | 9,157 | 9,317 |
| Watershed management research | | | 3,303 | 3,477 | | | 3,650 | 3,796 | | | 3,944 | 4,031 |
| Range management research | | | 1,267 | 1,294 | | | 1,294 | 1,267 | | | 1,385 | 1,318 |
| Wildlife habitat research | | | 735 | 912 | | | 912 | 935 | | | 989 | 1,018 |
| Forest recreation research | | | 519 | 479 | | | 811 | 828 | | | 894 | 855 |
| Subtotal, forest and range management research | 18,520 | 14,040 | 13,909 | 14,579 | 19,370 | 17,318 | 15,604 | 15,778 | 19,248 | 17,445 | 16,369 | 16,539 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 3,442 | 3,442 | 3,284 | 3,442 | 4,202 | 3,384 | 3,112 | 3,086 | 4,084 | 3,805 | 3,323 | 3,418 |
| Forest insect research | 7,241 | 7,241 | 3,883 | 3,896 | 5,418 | 4,478 | 4,103 | 4,104 | 5,422 | 4,422 | 4,325 | 4,424 |
| Forest disease research | 3,201 | 2,126 | 2,096 | 2,171 | 2,882 | 2,562 | 2,358 | 2,341 | 3,118 | 2,537 | 2,472 | 2,530 |
| Subtotal, forest protection research | 13,884 | 12,809 | 9,263 | 9,509 | 12,502 | 10,424 | 9,573 | 9,531 | 12,624 | 10,764 | 10,118 | 10,372 |
| Forest products and engineering research:[1] | | | | | | | | | | | | |
| Forest products utilization research | | | 6,505 | 6,483 | | | 6,863 | 6,999 | | | 7,341 | 7,403 |
| Forest engineering research | | | 671 | 583 | | | 798 | 745 | | | 42 | 772 |
| Subtotal, forest products and engineering research | 7,440 | 7,240 | 7,176 | 7,066 | 8,455 | 8,260 | 7,661 | 7,744 | 8,046 | 8,294 | 8,266 | 8,175 |
| Forest resource evaluation research: | | | | | | | | | | | | |
| Forest survey | 2,456 | 2,084 | 2,055 | 2,100 | 2,504 | 2,512 | 2,203 | 2,257 | 2,828 | 2,728 | 2,511 | 2,370 |
| Forest products marketing research | 2,625 | 1,790 | 1,773 | 1,625 | 2,408 | 1,613 | 1,625 | 1,511 | 1,853 | 1,653 | 1,649 | 1,561 |
| Forest economics research | 1,186 | 676 | 663 | 791 | 1,186 | 1,195 | 1,088 | 983 | 1,322 | 1,177 | 1,214 | 1,127 |
| Subtotal, forest resource evaluation research | 6,267 | 4,550 | 4,491 | 4,516 | 6,098 | 5,320 | 4,916 | 4,751 | 6,003 | 5,558 | 5,374 | 4,958 |
| Forest research laboratories[1] | 3,755 | - | | 3,285 | 3,777 | 3,444 | 3,278 | 3,415 | 1,281 | 1,150 | | |
| TOTAL, FOREST RESEARCH | 49,866 | 38,639 | 34,839 | 38,953 | 50,202 | 44,845 | 41,030 | 41,219 | 47,202 | 44,821 | 40,127 | 40,216 |

Con. next page; first two footnotes see end of table

| Subappropriation, activity and function | 1970 Forest Service request | 1970 Dep. of Agr. request | 1970 President's budget | 1970 Appropriation | 1971 Forest Service request | 1971 Dep. of Agr. request | 1971 President's budget | 1971 Appropriation | 1972 Forest Service request | 1972 Dep. of Agr. request | 1972 President's budget | 1972 Appropriation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FOREST LAND MANAGEMENT | | | | | | | | | | | | |
| National Forest protection and management | | | | | | | | | | | | |
| Timber resource management: | | | | | | | | | | | | |
| Sales administration and management | 45,238 | 46,304 | 41,191 | 47,170 | 63,204 | 63,946 | 52,310 | 55,724 | 62,583 | 57,835 | 61,164 | 63,737 |
| Reforestation and stand improvement | 20,786 | 17,069 | [2][3]16,013 | [3][0]16,535 | 33,369 | 33,369 | 19,412 | 20,259 | 33,107 | 20,759 | 27,075 | 32,232 |
| Recreation - public use | 46,960 | 46,661 | 41,237 | 39,193 | 37,065 | 37,065 | 42,225 | 37,432 | 47,411 | 38,106 | 38,697 | 40,291 |
| Wildlife habitat management | 5,415 | 4,756 | 4,403 | 4,642 | 5,435 | 5,173 | 4,642 | 4,934 | 6,492 | 5,434 | 5,943 | 6,187 |
| Range resource management: | | | | | | | | | | | | |
| Management | 7,222 | 6,893 | 6,001 | 6,571 | 7,105 | 7,675 | 6,571 | 7,105 | 8,785 | 7,205 | 6,940 | 7,290 |
| Revegetation | 3,177 | 3,154 | 3,187 | 3,252 | 3,936 | 3,698 | 3,252 | 3,384 | 3,384 | 3,384 | 3,339 | 3,419 |
| Improvements[6] | 4,039 | 3,976 | 4,447 | 3,728 | 6,069 | 4,937 | 4,378 | 4,583 | 4,903 | 4,583 | 4,511 | 4,641 |
| Soil and water management | 10,551 | 6,929 | 6,098 | 6,317 | 9,027 | 7,044 | 6,317 | 6,721 | 12,078 | 8,721 | 8,796 | 9,422 |
| Mineral claims, leases, and other land uses | 5,088 | 4,920 | 4,392 | 4,633 | 7,250 | 5,483 | 4,633 | 5,149 | 6,916 | 5,246 | 4,884 | 5,428 |
| Land classification, adjustments, and surveys | 8,448 | 7,091 | 6,653 | 6,919 | 8,828 | 7,797 | 6,769 | 7,231 | 8,602 | 7,431 | 7,089 | 7,390 |
| Forest fire protection | 33,451 | 30,144 | 27,966 | 29,283 | 35,559 | 32,242 | 29,210 | 31,030 | 33,125 | 30,925 | 30,305 | 31,496 |
| Structural improvements for fire and general purposes (construction and maintenance)[31] | 14,902 | 10,031 | 10,129 | [3][0]9,517 | 9,134 | 7,389 | 10,056 | 9,834 | 7,989 | 7,726 | 7,230 | 9,757 |
| Water resource development related activities | 10,287 | 8,759 | 8,353 | [3][0]1,100 | 4,962 | 3,775 | 4,109 | 3,775 | 4,508 | 3,775 | 3,698 | 3,861 |
| Subtotal, National Forest protection and management | 215,564 | 196,687 | 180,070 | 178,860 | 230,943 | 219,593 | 193,884 | 197,161 | 239,883 | 201,130 | 209,671 | 225,151 |
| Fighting forest fires[7] | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 | 4,275 |
| Payment to employees compensation fund | | | 1,100 | 1,456 | | | 1,456 | 1,459 | | | 1,622 | 1,622 |
| Insect and disease control | 9,931 | 10,504 | 10,473 | 11,346 | 13,504 | 12,025 | 11,346 | 11,752 | 12,201 | 10,602 | 10,250 | 10,555 |
| Acquisition of lands (Weeks Act) | 1,980 | 800 | 1,300 | 1,300 | | | 1,300 | 1,300 | | | | 1,300 |
| TOTAL, FOREST LAND MANAGEMENT | 231,750 | 212,266 | 197,218 | 197,237 | 248,722 | 235,893 | 212,261 | 215,947 | 256,359 | 216,007 | 225,818 | 242,903 |
| FOREST RESEARCH | | | | | | | | | | | | |
| Forest and range management research:[4] | | | | | | | | | | | | |
| Timber management research | | | 9,438 | 10,125 | | | 10,319 | 11,238 | | | 10,943 | 11,702 |
| Watershed management research | | | 4,031 | 4,343 | | | 4,416 | 4,832 | | | 4,624 | 6,136 |
| Range management research | | | 1,348 | 1,420 | | | 1,420 | 1,534 | | | 1,497 | 1,576 |
| Wildlife habitat research | | | 1,187 | 1,238 | | | 1,238 | 1,431 | | | 1,401 | 1,880 |
| Forest recreation research | | | 855 | 904 | | | 904 | 1,038 | | | 1,019 | 1,059 |
| Subtotal, forest and range management research | 21,474 | 17,903 | 16,859 | 18,030 | 22,018 | 21,623 | 18,297 | 20,073 | 23,515 | 20,527 | 19,484 | 22,353 |
| Forest protection research: | | | | | | | | | | | | |
| Forest fire research | 4,592 | 4,365 | 3,638 | 3,821 | 4,839 | 4,272 | 3,821 | 4,069 | 4,827 | 4,169 | 3,988 | 5,160 |
| Forest insect research | 5,922 | 5,018 | 4,551 | 4,783 | 5,811 | 5,422 | 4,783 | 5,114 | 6,011 | 5,186 | 4,998 | 5,696 |
| Forest disease research | 3,594 | 2,932 | 2,634 | 2,810 | 3,693 | 3,239 | 2,810 | 3,023 | 3,923 | 3,098 | 2,954 | 3,450 |
| Subtotal, forest protection research | 14,108 | 12,315 | 10,823 | 11,414 | 14,343 | 12,933 | 11,414 | 12,206 | 14,761 | 12,453 | 11,940 | 14,306 |
| Forest products and engineering research:[10] | | | | | | | | | | | | |
| Forest products utilization research | | | 7,640 | 8,057 | | | 8,227 | 8,766 | | | 8,570 | 9,346 |
| Forest engineering research | | | 893 | 909 | | | 1,080 | 1,154 | | | 1,130 | 1,473 |
| Subtotal, forest products and engineering research | 10,503 | 9,320 | 8,533 | 8,966 | 11,529 | 11,423 | 9,307 | 9,920 | 11,694 | 10,005 | 9,700 | 10,819 |
| Forest resource economics research: | | | | | | | | | | | | |
| Forest survey | 3,074 | 2,768 | 2,520 | 2,680 | 3,419 | 3,504 | 3,115 | 3,344 | 4,044 | 1,981 | 3,266 | 3,421 |
| Forest products marketing research | 2,085 | 1,944 | 1,620 | 1,664 | 1,981 | 1,934 | 1,664 | 1,981 | 2,481 | 3,344 | 1,943 | 2,023 |
| Forest economics research | 1,566 | 1,087 | 1,070 | 1,097 | 1,515 | 1,563 | 1,269 | 1,367 | 1,567 | 1,367 | 1,335 | 1,403 |
| Subtotal, forest resource economics research | 6,725 | 5,799 | 5,210 | 5,441 | 6,915 | 7,001 | 6,048 | 6,692 | 8,092 | 6,692 | 6,544 | 6,847 |
| Forest research construction | 20,627 | 2,236 | | 71 | 10,785 | | | 1,185 | | | | 5,035 |
| TOTAL, FOREST RESEARCH | 73,437 | 47,573 | 41,425 | 43,922 | 65,590 | 52,980 | 45,066 | 50,076 | 58,062 | 49,677 | 47,668 | 59,360 |

(con. next page--footnotes)

Table 1.--(con.)

[1] Does not include State and private forestry cooperation except as noted. Includes supplemental appropriations and transfers except as noted.
Sources: All data for 1955-1961 from Congressional Record, 86th Congr. 2d sess., vol. 106, part 9, p. 12079-12083 (except for 1961 Appropriation data, which were adjusted to reflect supplemental appropriations). Data for 1962-1972 for Forest Service and Department of Agriculture requests, furnished in memorandum by Director of Budget and Finance, Washington Office, USDA Forest Service, November 2, 1971; for President's budget and appropriation, drawn from "Forest Service Appropriation Estimates--Historical Summary," USDA Forest Service, for years shown. President's budget is prepared by the Office of Management and Budget, formerly Bureau of the Budget; appropriations are taken from congressional appropriation acts.
Note: The wide diversity of sources of these data has made necessary many decisions as to exclusion or inclusion of various amounts. As far as possible, such decisions are noted below. The data for various years, however, are therefore not strictly comparable, and should not be used for precise determinations or for comparison with other sources of similar data.

[2] Designations of activities and functions vary over the years. For convenience in comparison, latest designations are shown and earlier forms are noted below. Breakdowns for activities and functions are shown only for the years in which they appear in the sources, except as otherwise noted.

[3] Adjusted to reflect transfers from and to other agencies under departmental reorganization (Congr. Rec.).

[4] Adjusted for comparability purposes. Also adjusted by transfer of amount previously shown for "Ranger district management" to other projects within "National forest protection and management" (Congr. Rec.).

[5] So designated in 1958. Previously "Salaries and expenses," which included National Forest protection and management, fighting forest fires, control of forest pests (now insect and disease control), and forest research. For comparison, appropriation structure is shown as contained in the 1958 budget estimates (Congr. Rec.).

[6] Includes $700,000 cooperative range improvements.

[7] Excludes supplemental requests and appropriations.

[8] Error in addition in source; original shows $49,090.

[9] Error in addition in source; original shows $42,253.

[10] Data for breakdown for this activity not readily available for all years.

[11] So designated in 1965; previously "Production economics research."

[12] So designated in 1965; previously "Forest management research."

[13] Not separately designated until 1959.

[14] Adjustments for supplemental appropriations and transfers not clear in source.

[15] So designated in 1961; previously "Land utilization projects." Amounts previously included here were allotted to other activities in original budget request.

[16] Did not apply before 1963; not a request item for either Forest Service or Department of Agriculture.

[17] Includes $90,000 for miscellaneous construction and maintenance of research facilities (Hist. Summary).

[18] Result of an increase of $85,000 for Watershed management research, and a decrease of $400,000 in nonrecurring portions of the emergency research program on the San Dimas Experimental Forest (Hist. Summary).

[19] Included under "Wildlife habitat research" for period 1959-1962 (Hist. Summary).

[20] Not a separate request before 1962.

[21] Included under "Forest products utilization research" until 1962.

[22] Amounts shown reflect decreases made by amendment, House Document 240, March 9, 1964, as follows: Reforestation and stand improvement, $300,000; Recreation and public use, $100,000; Structural improvements, $100,000 (Hist. Summary).

[23] A separate appropriation was proposed in lieu of request (Hist. Summary).

[24] Includes following adjustment in original President's budget request (not further explained in source): Recreation and public use, +110,000; Wildlife habitat management, +$330,000; Range resource management, +$155,000; Forest fire protection, +$205,000; Insect and disease control, -$800,000 (Hist. Summary).

[25] Includes supplemental appropriation of $460,000 for timber sales acceleration (Public Law 91-47, July 22, 1969) (Hist. Summary).

[26] Does not include $25,000 penalty mail included in source.

[27] Error in addition in source; original shows $204,411.

[28] Figures are President Johnson's budget; see table 2 for comparison with President Nixon's budget request.

[29] Unexplained discrepancy; reported as $40,237,000 in one of two issues of "Historical Summary" for 1970.

[30] Excludes the following amounts as a result of President Nixon's Construction Deferral Plan of September 4, 1969: Recreation and public use, $172,000; Forest fire protection, $98,000; Water resources development related activities, $510,000; and Research construction, $860,000 (Hist. Summary).

[31] Designated in 1968 as "Construction and maintenance of improvements for fire and general purposes (including communications)" to clarify the actual purpose for which funds were used. Changed again in 1971 to "maintenance" only, with construction funds separately designated. Figures for 1971 and 1972 have been adjusted, for comparison, to include construction.

[32] Excludes $605,000 transferred from Forest land management and $235,000 transferred from Forest roads and trails (Hist. Summary).

Table 2.--Comparison of budget requests for Presidents Johnson and Nixon for USDA Forest Service, Forest protection and utilization, fiscal year 1970[1]

| Subappropriation, activity and function | President Johnson's budget | President Nixon's budget |
|---|---|---|
| | --Thousands of dollars-- | |
| FOREST LAND MANAGEMENT | | |
| National Forest protection and management | | |
| Timber resource management: | | |
| Sales administration and management | 41,191 | 44,651 |
| Reforestation and stand improvement | 16,013 | 16,013 |
| Recreation - public use | 41,237 | 37,081 |
| Wildlife habitat management | 4,403 | 4,403 |
| Range resource management: | | |
| Management | 6,001 | 6,001 |
| Revegetation | 3,187 | 2,948 |
| Improvements | 4,447 | 3,564 |
| Soil and water management | 6,098 | 5,994 |
| Mineral claims, leases, and other land uses | 4,392 | 4,299 |
| Land classification, adjustments, and surveys | 6,653 | 6,353 |
| Forest fire protection | 27,966 | 27,966 |
| Structural improvements for fire and general purposes (construction and maintenance) | 10,129 | 9,129 |
| Payment to employees compensation fund | 1,100 | 1,100 |
| Subtotal, National Forest protection and management | 172,817 | 169,502 |
| Fighting forest fires | 4,275 | 4,275 |
| Water resource development related activities | 8,353 | 7,028 |
| Insect and disease control | 10,473 | 9,573 |
| Acquisition of lands (Weeks Act) | 1,300 | 1,300 |
| TOTAL, FOREST LAND MANAGEMENT | 197,218 | 191,678 |

| Subappropriation, activity and function | President Johnson's budget | President Nixon's budget |
|---|---|---|
| | --Thousands of dollars-- | |
| FOREST RESEARCH | | |
| Forest and range management research: | | |
| Timber management research | 9,438 | 9,438 |
| Watershed management research | 4,031 | 4,031 |
| Range management research | 1,348 | 1,318 |
| Wildlife habitat research | 1,187 | 1,018 |
| Forest recreation research | 855 | 855 |
| Subtotal, forest and range management research | 16,859 | 16,660 |
| Forest protection research: | | |
| Forest fire research | 3,638 | 3,618 |
| Forest insect research | 4,551 | 4,472 |
| Forest disease research | 2,634 | 2,594 |
| Subtotal, forest protection research | 10,823 | 10,684 |
| Forest products and engineering research: | | |
| Forest products utilization research | 7,640 | 7,595 |
| Forest engineering research | 893 | 893 |
| Subtotal, forest products and engineering research | 8,533 | 8,488 |
| Forest resource economics research: | | |
| Forest survey | 2,520 | 2,520 |
| Forest products marketing research | 1,620 | 1,561 |
| Forest economics research | 1,070 | 1,070 |
| Subtotal, forest resource economics research | 5,210 | 5,151 |
| TOTAL, FOREST RESEARCH | 41,425 | 40,983 |

[1]SOURCE: Forest Service Appropriation Estimates--Historical Summary--Fiscal Year 1970



U.S. GOVERNMENT PRINTING OFFICE: 1973 — 784-487 / 27 REGION NO. 8

ALSTON, RICHARD M.

1972. FOREST — Goals and decisionmaking in the Forest Service, USDA Forest Serv. Res. Pap. INT-128, 84 p., illus. Intermountain Forest and Range Exp. Sta., Ogden, Utah 84401.

A goal-oriented decision model for National Forest management, based on a review of the legislation, calls for maximizing the sum of the weighted values of six resources: Fish and wildlife (F), outdoor recreation (O), range or forage (R), environmental amenities (E), soil and watershed (S), and timber (T). Priorities established in management practice, through public involvement, and through the budget process, have been set without direct reference to an overriding goal. The model should help to direct current agency efforts to strengthen the ability to demonstrate the consequences of alternative actions.

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Headquarters for the Intermountain Forest and Range Experiment Station are in Ogden, Utah. Field Research Work Units are maintained in:

Boise, Idaho
Bozeman, Montana (in cooperation with Montana State University)
Logan, Utah (in cooperation with Utah State University)
Missoula, Montana (in cooperation with University of Montana)
Moscow, Idaho (in cooperation with the University of Idaho)
Provo, Utah (in cooperation with Brigham Young University)