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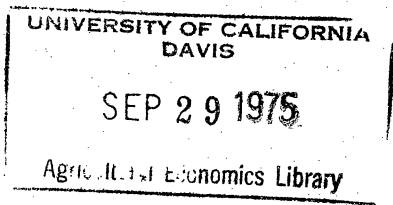
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Forestry
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1975



IN PURSUIT OF EFFICIENCY--A NEW MANAGEMENT
SYSTEM FOR THE FOREST SERVICE*

by

Lawrence W. Libby

Introduction

It comes as no surprise to the Forest Service, nor probably to anyone else, that the job of managing 187 million acres of public domain in a manner responsive to "the public will" is a complex task. It is so complex, in fact, that it is virtually impossible.¹ There is just no conceivable way the Forest Service can achieve a mix of uses on that land that is fully acceptable, at least not within the context of our current political system. That's not to say that the perfect system isn't worth looking for, as long as we accept the inevitable fact that there is no end to the search.

The Forest Service is under increasing pressure for improved "efficiency" in management of the 154 national forests and 778 ranger districts which comprise the 9 management regions (Figure 1). Pressure has come from political interests of remarkable diversity. The National Forest Products Association, spokesman for the timber industry, has publicly chastised the Forest Service for policies that "de-emphasize sound silvicultural practices, with production at half the forest's potential [4]."

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NFPA is demanding that the Forest Service make available more timber, at least as much as authorized by Congress, to help meet future housing needs. The Wilderness Society and other groups with an environmental focus have also called for management more responsive to comparative advantage. Agreement is a strange circumstance for these traditional adversaries in the chase for benefits of public forests. One suspects the good will is transitory, based on totally different perceptions of what "more efficient management" will mean. But it also rests on the ubiquity of the economic notion of comparative advantages. As Clawson has demonstrated quite clearly [3], greater attention to the input-output economies available for all forest outputs may actually produce that endangered economic species--a Pareto-better adjustment. With greater attention to production capability and various cultural practices, we could grow more timber on less land, releasing land for other uses. Agriculture has been absorbing those shifts for years, of course. But public forests are a quite different matter blessed with the Pinchot tradition and the foresters' inherent belief in "balanced use", as legitimized by the Multiple Use-Sustained Yield Act of 1960.² The "more for everyone" situation will be at best short-lived, as competition is resumed for particular pieces of real estate.

Two dimensions of efficiency are implicit in the current management crunch for the Forest Service. The first is a sub-optimization dimension--concentrating production, management and sale of timber in those areas where costs are lowest and ratio between revenue and cost, including capital cost, is most favorable. The second is broader--management choice with full (or at least better) knowledge of consequences. The latter would imply more accurate, systematic measurement of opportunities

foregone in producing units of timber, wildlife habitat, wilderness, or any other forest output. Both are applications of comparative economic advantage; as such, neither is an explicit policy goal of the Forest Service in its pursuit of a "better" management system.

This paper will consider the management task of the Forest Service in both dimensions noted above--first by identifying inter-regional differences in timber management costs, then by discussing the emerging management system as a response to demands for "efficiency," and finally by suggesting factors within the Forest Service that may mitigate against meaningful institutional change in management. Clearly, efficiency in this context is not a sterile technical relationship. Efficiency has little innate attractiveness as a policy objective, except perhaps to economists, who always worry about such things.

Differences in Timber Management Costs

Most Forest Service managers are well aware of cost differences in the managing of public timber for eventual sale and harvest. There are substantial differences among the regions, and among forests within each region. While these differences are generally known, it is far less clear how they are used in the management process.

Inter-regional differences in timber management costs have increased most noticeably in recent years. According to Forest Service data, average costs in 1964 of preparing timber for sale and administering the harvest were less than \$2.00 per thousand board feet of targeted output in all nine regions. By 1973, however, average costs of timber sale ranged from \$9.93 per thousand board feet of timber in the Rocky Mountain region, to \$3.76 per thousand board feet in the nation's woodpile, the Pacific Northwest.

Average estimated cost of reforestation, including planting, seeding and site preparation, varied in 1973 from \$163.55 per acre in California to \$103.22 per acre in the Southwest. The third major category of timber management costs, timber stand improvement, varied in 1973 from a high of \$60.29 per acre in the Rocky Mountain region, to \$32.77 per acre in the Southern Region. While it is difficult to total these per unit costs in any very precise way because of the output measures used, observation of any persistent cost differences would presumably be helpful in management planning.

These cost data for Fiscal 1973 are displayed in Table 1.

Ranking the nine regions by average cost of timber sale preparation and administration does reveal a fairly consistent pattern as shown in Table 2.

The specific numbers are less important than the general relationships suggested. All sorts of unique circumstances within each region influence specific cost levels. No attempt is made here to ferret out the particular circumstances that may have affected the judgment of national forest supervisors or regional foresters on what it would cost to offer timber for sale in any given year. As suggested, the important question with respect to observable differences in average costs among the regions and national forests is how this information is used in the management process. The apparent answer--not much, at least not in any systematic way. Primary considerations in deciding on where to harvest are allowable cut (a biological growth measure) and existing mill capacity, with relative management costs injected only on an ad hoc basis. There is some evidence that relative costs are examined more closely at the margin--in meeting an additional timber cut imposed by a higher management level. That is, when the incentive to economize is particularly

strong--more timber needed but not much extra money offered--relative costs apparently do make a difference. In several of the regions, average cost data are made available to forest supervisors for any planning deemed appropriate. Presumably those forests observing high costs of timber management compared to other forests could shift output priorities and save money. The information is offered, not force-fed.

Any reallocations of timber cut that way have been made in response to cost differences has not, as of 1972, had major effect on proportion of total cut contributed by each region (Table 3).

Toward a Better Management System

Beginning in the early 1970's, the Forest Service has been making important though incremental changes in its budgeting process. The general goal is to tie planning to past performance and the spending priorities of a budget. Part of the impetus has come from the PPBS push of the '60's. Political pressures noted above have had more immediate effect. The National Environmental Policy Act was the first to signal the need for more careful assessment of the consequences of management choices. Further legislative reinforcement has come through the recently enacted Renewable Resources Act [5] which requires the generation of broad impact data for long run program planning and management.

The emerging management system in the Forest Service is both strategy and structure. The intention is to create a system that emphasizes objectives or outputs of expenditure, rather than line item allocations. The current Forest Service buzzword for this strategy is Management by Objectives--it has been characterized as "open, iterative, sequential, adaptive and multidisciplinary with a perspective that is multi-objective, multi-functional, multi-year, multi-resource [2]." Those are impressive if

analytically empty adjectives. But they do suggest a system under "creative stress".

Structural innovations may be summarized as follows:

1. Reorganization of budget categories into "resource systems".

The general approach is to consider Forest Service programs and activities in six categories based on the predominant resource involved. They are: Land and Water, Timber Resource, Recreation and Wilderness, Range Resource, Wildlife and Fish Habitat, Human and Community. A primary role is ascribed to each in narrative form and existing Forest Service programs are arranged in terms of their contribution to each system.

The systems are also a prominent part of Forest Service efforts to implement the 1974 Renewable Resources Act. Long range programming under the act will be structured by resource systems. Initial efforts involve identifying appropriate "goal and objective sets" for each resource system.

New Forest Service Manual instructions for program budgeting also include discussion of the six resource systems as "a device for combining inputs to give an indication of the interrelationships of various Forest Service Programs in achieving goals [6]." They are at least formal recognition of the fact that specific spending activities do in fact impact on several outputs. The fiscal year 1976 Program Budget Summary, for example, asks the budget planner in the field to assign parts of each line item to the timber system, recreation system, range system, wildlife system and land and water system. For FY'77, each system is treated separately. Instead of focusing on the line item and the contribution it makes to each resource system, the revised format concentrates on the system itself and the expenditures relevant to it. Further refinement is needed, and the

system format has yet to revolutionize Forest Service budgeting, but it is an important structural innovation.

2. There is explicit requirement for negotiation among levels in the chain of command from Washington to the national forest to the ranger district within the forest and among "resource output categories". In the past budgeting was strictly top-down. Negotiations really occurred only at the national level. The production units did essentially what they were told. Instead of a budget it was a collection of budgets, with no explicit effort to trade off alternative outputs within a management unit. Fiscal year 1973 was the first in which field input in Forest Service budgeting was requested. In FY'74, the Washington Office merely assembled the budget request forms for each division of the Forest Service, and coordinated collection of the resulting budget requests. There was little if any guidance or control from Washington. A standardized budget planning form was developed for FY'75 and subsequent years. Field units will be involved more directly in determining the mix of outputs expected.

3. Field managers are asked to respond to alternative assumptions about the dollars they will ultimately have available. The "what if" nature of this approach does force the consideration of priorities at the forest and ranger district levels, to be reconsidered in the regional office. In FY'75, forest supervisors were asked to submit two separate requests, 5% less than previous year's allocation; 10% more than previous year. In FY'76, the levels were 10% less than FY'75, and 10% more than the previous year. For FY'77, the system is a little different. Budget level I is the base--slightly below the previous year's allocation. Level II is approximately 30% greater than FY'76 allocation. Then field managers are asked to build their budget proposals in increments from level I to level II.

Each additional increment is to be wholly within one of the resource systems. Increments must be listed in order of their priority with supporting narrative for each. The forest supervisor makes initial increment proposals, to be coordinated at the regional office with appropriate negotiation.

4. Budget planning is being conducted on a longer run basis, presumably facilitating adjustment to major shifts in public preference. Managers are forced to consider demands and priorities 5 to 10 years ahead. More systematic assessment of existing resources is also required-- under the Renewable Resources Act, and as input to the program budgeting process. This is in sharp contrast to the former situation where the budget was only an annual document. There will still be an annual document, of course, but now it will be more clearly tied to program planning over a longer time period.

There is obviously much more detail to the emerging program budgeting system for the Forest Service than has been presented here. It's likely that the basic structural approach will survive, while the details undergo continuous modification.

Observations on Performance - Will the New System Make Any Difference?

The real test of any new procedures, formats and data requirements that may be creeping into the Forest Service budgeting process is whether or not they will affect that agency's behavior with respect to the management job. Is there likely to be a change in forest output in quantity, character, or distribution that can be attributed to a new program budget system?

Observations of performance may be conducted at several levels. First, study may be directed at the agency itself: What differences

within the Forest Service may be attributed to a new management system. These are intermediate changes, of course, in the sense that most consumers are less concerned with how the agency conducts itself than how that conduct affects availability of services from the public forests. Secondly, observations may be made of the likely impacts on major users of the services of public forests. Attention in this paper is focused on former.

Within the Forest Service. There are at least two tests of meaningful change to the agency attributable to either the strategy or procedural adjustments comprising the emerging management system. First, we may observe adjustments to the agenda for choice by public forest managers. There should be some evidence that M.B.O. permits consideration of alternatives that were generally not available before. A second test might be the opportunity or incentive for applying a different set of implicit weights to the alternatives that do show up. That is, can the forest manager make a different set of choices than he could before all this started? And if he can, is there any incentive to do so? Is there meaningful change in the rules for choice within the Forest Service?

On a more modest level, one could argue convincingly that the process of generating an output-oriented management system and undertaking the resource inventory, will itself have useful internal impacts for the Forest Service. Analysts and policy specialists have begun the task of defining more systematically what the Forest Service is, and what it can do. Reorganizing the budget format around "resource systems", for example, can facilitate more careful observation of the relationships among physical resources. The effort to produce the management system and subsequently to comply with it has been, it seems, an important overhead investment for the agency. Whether or not all of this produces

dramatic changes in forest use around the country, "business as usual" will never mean quite the same thing as it did before.

A few more specific observations about changes within the agency may be useful:

First, the management style of the Forest Service could be irreparably affected by M.B.O. A more technical management system must place a greater premium on those staff people with the training, competence, and inclination to stack computer printouts rather than sawlogs. The new system may leave far less room for intuition as a guide to choice. At least the manager will have to more carefully document his intuition. It has been asserted that most regional foresters and forest supervisors know the relative capabilities of the forests they manage--where environmental costs are highest, where timber grows the cheapest, etc. But their data to verify those differences may be poor or non-existent. If the Washington Office is seeking to reduce national environmental disruption involved with producing sufficient timber, the field manager will have to more fully justify his output decisions. Many public foresters have long relied on the nebulous character of most non-timber aspects of public forests as the primary rationale for ignoring efficiency in timber production. They have shrugged off these efficiency concerns with platitudes about how you can't measure "the beauty of a mountain sunset in late fall." This has not necessarily been a deliberate philosophy among the public forest management establishment, but the fact of hard-to-measure non-timber benefits is a major support for current management behavior. Any effort to be more specific about opportunity costs of choice, or even to inventory all resources could challenge the established order.

A skeptic might argue that the Forest Service, a living organism with built-in resistance to self-destruction, will not tolerate the implementation of scientific management. The abstraction of better management is little challenge. The formulation of management guidelines, procedures, outlines, etc. will not generate much heat and in fact will itself be of positive value to the agency. But, if that system pinpoints trade-offs that managers prefer to leave fuzzy, or if the new system severely challenges the old style with new manager qualifications, it will run into trouble. At the very least, the disruptive change will be internalized, surrounded and "coordinated" into irrelevance. The forest manager must see some real reason to play this new game, particularly if he's been a consistent winner under the old rules. The M.B.O. network can't just be glued together and dropped on the desks of the regional foresters. It must be directly tied to accepted measures of success--like the regional budget allocation, or salary, or promotions. There is some danger, it seems, that all of the creative energy available to the Forest Service will be exhausted in the process of building the system, with little left over to determine the specific incentives necessary to affect management behavior.

Secondly, new rules for bargaining among management levels are implied by the program budgeting system. Budgeting guidelines filter down to the forest and ranger district levels, but these levels will now have more discretion in how they respond. There are two important considerations here. First, can the managers at the national forest level respond any differently than they have for the past 80 years. And secondly, if they can and have the incentives to do so, what effect will this apparent redistribution of power have on the Forest Service bureaucracy.

It is not at all clear that forest supervisors and their staffs have the capacity to respond in ways that are dramatically different. Lack of resource inventory data has already been noted. Analytical talent is generally lacking at the forest and district levels--primarily because it has not been needed in the past. Forest supervisors may complain heartily about the top-down management system and the compelling presence of the timber target around which all else revolves, but that system is at least dependable. Proposed instructions for implementing the program budgeting system list as the initial step, "Forests bring together their land and other resource capabilities as reflected in land use plans, expected manpower and funding levels, disciplinary expertise, public involvement information, and projections of program opportunity and business activity. These are used to generate feasible alternative projects and programs." That instruction, laying the groundwork for negotiation with the regional office, and subsequent steps, assumes a level of management sophistication generally not available to the forest supervisor. Redistribution of discretion or power in budgeting will not necessarily affect the choice agenda at the forest level--until, at least, considerably more information and new skills are available.

In many ways, the procedural changes summarized here are the easiest part of accomplishing a new management system for the Forest Service. Substantial challenges remain in putting the system in context with the diverse character of the day to day tasks of managing a national forest or ranger district. There is a delicate balance between the feeling of autonomy for the individual manager, and some set of system controls. The local manager has long supported a system that combines local freedom with the security of a well structured organization and

all the rules that go with it. The new system tends to establish more formal tests of "what should be done". There is more explicit opportunity for negotiation, but perhaps less to negotiate about. The new procedures may in fact cause a power shift back toward Washington, as technical relationships replace bargaining, with a resulting weakening of internal support among management levels.

FOOTNOTES

1. Mancur Olson has argued that public management is by nature incurably inefficient because of the types of outputs produced [8].
2. "Multiple Use" is defined as "Management of all the renewable resources of the National Forests so that they are used in the combination that will best meet the needs of the American people." Sustained yield refers to "achievement and maintenance in perpetuity of high level periodic output, without impairing the land [1]."

TABLE 1. REGIONAL DIFFERENCES IN COST OF TIMBER MGT - 1973.*

Region	Actual Obligations (\$000)				Million Board Feet Sold	Average Cost (\$/thous. brd. ft.)
	Timber Management	Reforestation	T.S.I.**	Total Expenditure		
Northern	7666	1750	2013	11429	1107	10.32
Rocky Mountain	2801	629	420	3850	278	13.84
Southwestern	3420	739	848	5007	354	14.14
Inter-Mountain	3251	1029	176	4456	322	13.83
California	10471	1909	838	13218	1777	7.44
Pacific Northwest	18893	2245	1754	22892	4653	4.92
Southern	7629	5092	1670	14391	1088	13.22
Eastern	4756	2585	964	8305	544	15.27
Alaska	2037	**		2037	74	27.52
Service-wide	62447	16400	8927	87774	10540	

* Data provided by the Division of Timber Management, U.S. Forest Service, Washington Office.

** T.S.I. - Timber Stand Improvement includes expenditures for thinning, fertilization and other improvement practices.

TABLE 2. REGIONAL RANKINGS OF AVERAGE COST OF SALE PREPARATION AND ADMINISTRATION*

Year	64	65	66	67	68	69	70	71	72	73	Average Rank
Region											
Northern	3	3	8	6	5	4	6	7	7	6	5.5
Rocky Mountain	5	5	3	4	4	7	7	4	5	1	4.5
Southwestern	2	2	5	2	1	3	1	1	1	2	2.0
Intermountain	4	4	4	5	6	6	5	5	3	3	4.5
California	8	6	6	7	7	5	4	6	6	7	6.2
Pacific Northwest	6	7	7	8	8	8	8	8	8	9	7.7
Southern	-	-	-	1	2	1	2	2	2	5	2.1
Eastern	-	-	-	3	3	2	3	3	4	4	3.0
Alaska	7	8	1	9	9	9	9	9	9	8	7.8

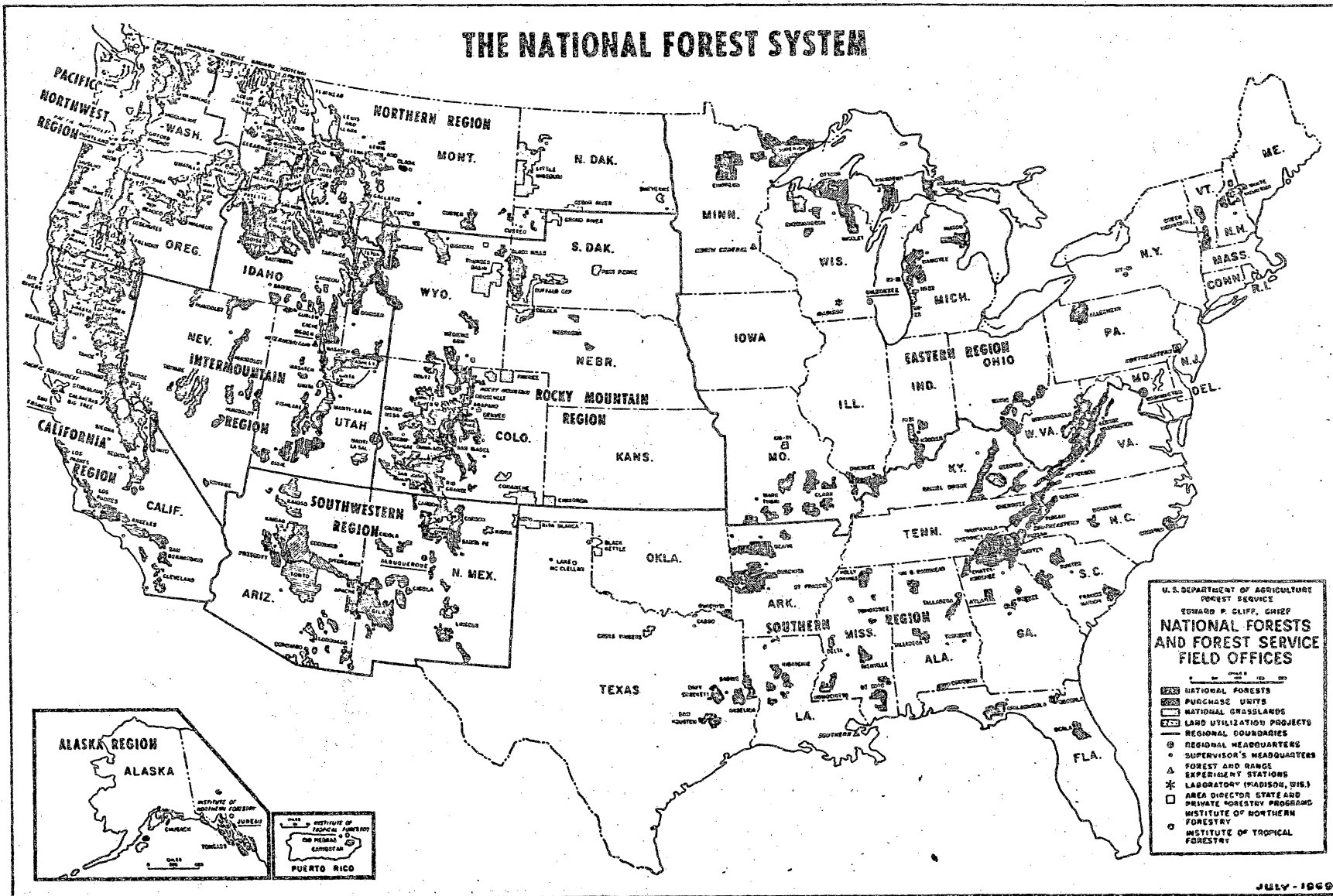
* Rankings are based on data supplied by Division of Timber Mgt., U.S. Forest Service.

TABLE 3. REGIONAL PROPORTION OF PLANNED SAWTIMBER HARVEST
1962-72.

<u>Year</u>	62	63	64	65	66	67	68	69	70	71	72
<u>Region</u>											
Northern	11	12	13	14	14	14	13	14	14	13	13
Rocky Mountain	3	2	2	3	3	3	4	4	3	3	3
Southwestern	5	4	3	4	3	4	3	3	3	3	3
Intermountain	4	4	4	4	4	4	4	4	4	4	4
California	16	16	16	17	17	18	18	17	18	18	18
Pacific Northwest	43	44	50	47	47	45	46	47	47	46	47
Southern*	10	9	6	6	5	6	5	5	4	5	5
Eastern*	4	5	1	1	2	2	2	2	1	2	1
Alaska	5	3	4	4	4	4	4	5	4	5	5

* For years 62-66, figures for regions 8 and 9 include timber output in those forests in region 7 that were subsequently included with those 2 regions in 1966.

THE NATIONAL FOREST SYSTEM



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EDWARD P. CLIFF, CHIEF
**NATIONAL FORESTS
AND FOREST SERVICE
FIELD OFFICES**

[Symbol] NATIONAL FORESTS
 [Symbol] PURCHASE UNITS
 [Symbol] NATIONAL CROSSLANDS
 [Symbol] LAND UTILIZATION PROJECTS
 [Symbol] REGIONAL BOUNDARIES
 [Symbol] REGIONAL HEADQUARTERS
 [Symbol] SUPERVISOR'S HEADQUARTERS
 [Symbol] FOREST AND RANGE EXPERIMENT STATIONS
 [Symbol] LABORATORY (PADISON, WIS.)
 [Symbol] AREA DIRECTOR STATE AND PRIVATE FORESTRY PROGRAMS
 [Symbol] INSTITUTE OF NORTHERN FORESTRY
 [Symbol] INSTITUTE OF TROPICAL FORESTRY

ALASKA REGION
ALASKA

INSTITUTE OF NORTHERN FORESTRY
ANCHORAGE
FAIRBANKS
TOMELETT

INSTITUTE OF TROPICAL FORESTRY
SAN JUAN
SAN PEDRO
SANTO DOMINGO
PUERTO RICO

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ABSTRACT

Session number _____ Session title _____

In Pursuit of Efficiency--A New Management System for the Forest Service.
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There is pressure for more efficient management of public forests--
broad exploitation of comparative advantage in producing timber and
other outputs. Better documentation of opportunity costs of management
choices will result from the new management system. Managers may resist
apparent loss of discretion. Performance requires linking system to
management incentives.