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REPORT NO. 7

FOREST SERVICE RESPONSE TO RECOMMENDATIONS OF FORESTRY DEANS

Made to the Council on Environmental Quality

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In 1971, the President's Council on Environmental Quality commissioned the Deans of five forestry schools to make independent, impartial studies of clearcutting practices on National Forests in their regions.[1/] The studies by the five Deans were completed and reported to the Council on Environmental Quality. Early in 1972 the Congressional Research Service of the Library of Congress abstracted and summarized these reports and the policy recommendations they contained. These recommendations on clearcutting and other forest management activities were printed in the Congressional Record. The Forest Service is taking this opportunity to respond to these recommendations and present to the public many of the ways it is meeting the challenge of forest management in the environmental Seventies.

The past several years have seen considerable national attention and concern focused on the practice of clearcutting as a timber-harvesting technique on the National Forests. For those unfamiliar with the term, clearcutting is a method of timber harvesting whereby all trees on a selected site are removed in one cut. It is used primarily to provide for the best regeneration of certain shade intolerant species of trees. A modification of the clearcutting system, more accurately termed patch logging or strip cutting, is used on National Forest lands. Patches of 10 - 60 acres and sometimes larger, are logged as single settings. These patches are separated for as long as practicable by living forest, in order to secure the optimum dispersal of seed and to avoid the high hazard of large continuous areas of slash, particularly in regard to fire and insect pests. But until a site is regenerated a patch cut area is not particularly attractive to most people. Mainly because of this harsh visual aspect, critics contend that clearcutting has no place in the National Forests. Other critics claim it causes soil erosion and depletes the land of nutrients.

The Forest Service believes that much of the public concern expressed over clearcutting actually stems from the conflicts arising out of resource use. The public has come to realize that many of our

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1/ These Deans are: Dr. Robert E. Dils, Dean, College of Forestry and Natural Resources, Colorado State University (Rocky Mountains); Dr. Charles W. Ralston, Dean and Professor of Forest Soils, School of Forestry, Duke University (Southern Pine Region); Dr. Lee M. James, Professor and Chairman, Department of Forestry, Michigan State University (Northern Forest Types); Dr. W. W. Ward, Director and Professor of Silviculture, School of Forest Resources, Pennsylvania State University (Northeastern Hardwoods); Dr. James S. Bethel, Dean, College of Forest Resources, University of Washington (Pacific Northwest and Alaska).

natural resources are finite; thus some parts of the public want all the forests preserved without use; others want all the forests put to work, so to speak.

There are a great many intangible values inherent in the National Forests on which we cannot put an exact price tag. Solitude, scenic vistas, refuges for wildlife are some; undisturbed wilderness areas are reminders of our origins as a Nation. But the Forest Service and the Nation cannot turn their backs on the great productive values of the National Forests. The 187 million acres of National Forest System lands provide one-third of the Nation's lumber used in home and other construction; grazing for domestic cattle as well as wildlife; over half the water supply for 18 Western States; and many forms of outdoor recreation for millions of Americans annually.

In their reports, the Forestry Deans gave some attention to the economic aspects of clearcutting. One third of the total timber harvested on the National Forests is by clearcutting. Thus it is easy to see that any suspension or extreme limitation of clearcutting on the National Forests would have serious economic consequences on the Nation. Nationally, it would be difficult to meet our commitments to provide housing. It would increase inflation as lumber and plywood prices started to soar. People would find it even more difficult than it is now to buy homes. But the local consequences in timber-based communities would be even more disastrous. Many lumber and forest products mills would be closed.

The need for clearcutting as a silvicultural management tool and the economic consequences of reductions in clearcutting on National Forests simply cannot be ignored. But there can and will be changes in clearcutting procedures.

Since 1969, there have been a number of reviews and studies made of clearcutting and other National Forest management practices.[2/] Some of these were made by the Forest Service itself; others by outside organizations.

[2/] The major Forest Service studies were those on the Bitterroot National Forest; the Monongahela National Forest; the Wyoming National Forests and a nationwide survey of National Forest timber management conducted by a special multi-discipline team of Forest Service staff experts. In addition to the Deans' studies, other outside reviews included one by the West Virginia Legislature on timber harvesting on the Monongahela National Forest, and one by a team of University of Montana scientists, headed by Forestry School Dean Arnold Bolle, on management practices on the Bitterroot National Forest in Montana.

The Senate Public Lands Subcommittee, chaired by Senator Frank Church of Idaho, held hearings in the spring of 1971 on clearcutting on the public lands, and has recently issued a set of guidelines for clearcutting on federal timberlands. The Forest Service has agreed that the guidelines are technically sound and compatible with the series of studies and reports previously undertaken and has said it will use these guidelines.

As a result of these many studies and reviews, including the one by the five Forestry Deans, the Forest Service is changing its management direction in ways that will allow the National Forests to provide the goods and services the Nation needs, while protecting and enhancing the environment of forests and related lands. The agency has listened to the expressions of concern from the public and has analyzed the results of the many studies and reviews. It has already taken a number of steps toward a new management direction and is preparing to take many others in the near future. The Forest Service is pleased to have this opportunity, in responding to the recommendations made by the Deans of the Forestry Schools, to inform the public as to what these steps are and what paths our new management directions are going to take. We believe this response will help clarify the situation in the National Forests in regard to clearcutting and other management practices.

Although each Dean studied and reported on his geographical area of interest independently, in several instances the recommendations of one or more Deans on the same subject were similar. In such cases we have combined similar recommendations and responded to their intent as a whole.

The Forest Service hopes that with all the reviews and studies completed, and with the new management directions it has taken, that the National Forests can now achieve their full potential in providing Americans with all the tangible and intangible forest resources to which they are entitled. It hopes the public will join with the Forest Service and that together they will be able to ensure that the products and benefits of the National Forests will be as available to Americans of future generations as they are to us today.

The multiple-use concept is viable but it must receive more than just lip service. Realistic plans with inputs by all interests are needed and frequent reviews and updating are absolutely essential. The principle of multiple use should be implemented as a management guide or working tool.

The multiple use concept has historically been reflected in National Forest resource management plans and programs. Until the 1950's these plans generally were developed closely along functional resource lines, but they did contain information on the use, condition, and needs of other associated resources, and included analysis of the social and economic impacts of planned management activities.

The key weaknesses in those early plans and the implementing activities were: (1) the lack of adequate resource inventories and in-place data on the location, condition, and use of the non-timber resources; (2) the lack of adequate public participation and input; and (3) a tendency for each resource program to follow the functional lines under which the impact plans were developed. Funding levels and budget direction contributed to the latter deficiency.

Following passage of the Multiple Use-Sustained Yield Act of 1960, intensive efforts were made to correct the weaknesses then apparent in National Forest management. These efforts included the employment and utilization of more specialists such as soil scientists, hydrologists, landscape architects, wildlife biologists, engineers, geneticists, and others. Changes in management objectives, policies, and directives were made to more clearly and forcefully impress upon Forest Service people the urgent need for well coordinated planning and conduct of all resource management activities. Such coordination is essential to demonstrating in theory and practice the concept of multiple use of our forest resources.

Periodic review of management activities and results has always been a part of National Forest administration. Yet in response to greater awareness and concerns for a quality environment both within and without the Forest Service, we have had to take closer and more intensive looks at the results of management activities.

During the last 3 years the Forest Service has made five intensive reviews of timber management and associated resource activities. Four of these were Regional and one was a Service-wide or national review. In all cases, they were made by teams representing several resource disciplines. Although, for the National Forests as a whole, those reviews showed that, generally, a good job of multiple-use resource management was and is being done, some serious problems were identified. At the same time, action was prescribed or suggested for treating those problems. The prescribed action is now underway or being implemented as rapidly as funds and people resources permit.

To date the Forest Service has filed statements with the Council on Environmental Quality on 60 major environmental actions. These include statements on proposed actions such as timber cutting practices, wilderness proposals, national recreation areas, pesticides, powerlines, multiple use unit plans, timber management plans, and mining regulations. Greater use is and will be made of these impact statements, as well as recurring management reviews, environmental analyses, and more intensive inventory and data systems to provide better information on associated National Forest resources and values. Together with the growing public input into management plans and programs, they will assure application of the multiple-use concept in its fullest sense.

Some of the concepts and laws in which the public agencies must operate seemingly are in conflict. Congress or the courts must act to clarify these conflicts and permit an orderly development of policy.

With the increasing public interest in the environment and land management, there is a corresponding interest in the concepts and laws related to these subjects. The Forest Service, however, does not find significant conflict between the basic laws dealing with it and its program areas. It is true that some of these laws are broad and subject to varying interpretation. Also, some segments of the public believe many laws dealing with environmental and land management do not deal with the subject matter in enough detail, leaving too much discretion in the hands of the administrators.

The recent great increase in the number of environmental laws that have application to Forest Service programs has created some confusion and uncertainty as is true during any testing period. The Congress, the courts and the Executive are all striving to develop concepts and laws which will meet today's needs and resolve conflicts and uncertainties that exist.

The Forest Service recognizes a continuing need to study, propose and support needed changes in laws, authorities and concepts to meet today's challenges. This must be done as an integral part of our program and policy review and development.

To do all that the public would like in quality management would require a tremendous net input of men and money. The Forest Service has recognized some of its own deficiencies and has repeatedly requested additional funds for multiple use. Since at best, the Agency will not get all of what it needs to do the job required, some reordering of priorities will be necessary.

In 1961 a 10-year plan called the "Development Program for the National Forests" was sent to Congress by the President. It called for funding to accelerate forest development on the public lands. Through fiscal year 1971, however, this Program was financed at an average of only 67 percent. There were wide variations in funding for individual items within the program. For example, although timber sales administration was financed up to 96 percent of the level called for, reforestation and stand improvement received only 39 percent funding; recreation and public use, 45 percent; and wildlife habitat 61 percent. This wide variation in funding helped to create the imbalance in Forest Service programs apparent today at a time when the Agency is faced with an increasing number and variety of external and internal pressures. The Agency is being asked to consider everything from a substantial increase in National Forest timber harvest to the dedication of large areas of so-called "de facto" wilderness to primitive-type management. It is being asked to harvest timber from steep and fragile soils, and to fertilize young timber stands while at the same time voices caution against accelerating erosion and adding nutrients to streams and lakes.

The Forest Service wants to be responsive to the greatest possible number of the needs and demands placed upon it. It wants to do the high quality management job that the public has the right to expect. But it must be recognized that the Forest Service cannot, in any case, meet all the demands placed upon it because a forest's capacity is finite. With its present level of funding and personnel, the Forest Service cannot even approach the optimum response. It is, however, endeavoring to provide the best possible management with the resources it has available, involving a reprogramming of activities.

Accordingly, the Forest Service is developing a process that identifies a balanced mix of programs for resource protection and development. Called the Environmental Program for the Future, it focuses on a 10-year look ahead, periodically updated. It deals with all three major Forest Service programs: Forestry Research, State and Private Forestry, and National Forest Management. The National Forest Program is further described by three systems: Timber, recreation and other resources. This is done to show the mix of activities needed to bring the systems into balance and to increase both commodity and non-commodity production.

The Forest Service is presently expanding the process both in depth and scope. In this second look, called Phase II, it is hoped to expand the number of outputs that is presently displayed and to add some approach to help identify the consequences of management alternatives on environmental quality. The objective of Phase II is to identify for a ten-year period the best balance of Forest Service Programs and activities under three different funding levels and to explain why the identified mix, and not some other mix, was selected.

<u>There should be more attention directed to forest land zoning; federal forest lands should be classified as to primary or dominant use.</u>

The Forest Service cannot agree that the best interests of the public would be served by the zoning of National Forest lands for "dominant" or primary use. The dominant use concept has become popular because some of its proponents believe that productivity of the various resources can be greatly increased through a single use of a land area. The Forest Service does not believe this to be true, and on the contrary, feels that dominant use would have the opposite effect--the land would not be used to its full capability. Dominant use can become exclusive use and may not permit changes in use to meet changes in needs.

The Forest Service believes that under the intensive application of multiple-use management the optimum combinations of uses and activities can be planned that will maximize the total public benefits.

The demands for goods and services from the National Forests and other public lands is increasing dramatically. Competition between user groups for the land is keen. It is possible that some controversy could be eliminated between the Forest Service and user groups if each group were assured of National Forest areas dedicated to its interests. But since most natural resources are expected to be in short supply in the future, this would only lead to more controversy. At the same time, total forest resource productivity would diminish.

The total land base available to the Nation to provide forest resources cannot increase. But the demands upon this land base can and will increase. It is probable that within the next thirty years demands for water and for outdoor recreation will triple and demands for forest products will double from what they are today. The only way these demands can be met is by increasing productivity of all forest resources, not by segregating areas to produce one resource only.

Moreover, there is no evidence that most uses of forest resources conflict so severely as to be completely incompatible. Timber harvesting, for example, is never an exclusive use. The intensity of the harvest is regularly altered to reflect consideration of other resources.

This does not mean that no priorities should be set on use for some areas. Wilderness is the most obvious example of a priority use. Others include intensive recreation developments such as ski areas or campgrounds, archeological areas, winter feeding areas for big game, zoological areas dedicated to rare or endangered species, and research natural areas. But in general, the Forest Service believes larger public benefits accrue if the best possible balance or mix of forest resource uses is obtained from National Forest lands. This balance can best be obtained under intensive application of multiple-use management, not under dominant use.

Implementation of "dominant use zoning" on the National Forests would undoubtedly make the immediate job of the Forest Service easier. But in the long run, it would seriously impair the ability of the National Forests to respond to the needs and values of succeeding generations.

The concept of management of our natural resources through "prescription generalization" by type and/or by regions is no longer acceptable because of the wide variability of a given type and the range of demands upon our resources. Rather we need to think literally in terms of acre-by-acre management.

The Forest Service agrees that acre-by-acre management is highly desirable. It is, however, also costly because it means that inventories, land examination, determination of optimum combinations of objectives, prescriptions, and treatments must be structured and applied to smaller and smaller units of land. Forest Service progress toward this end has been constant, but is necessarily limited by the availability of funds.

A number of recent Forest Service actions, while still some distance from acre-by-acre management, are significant steps toward this goal. Interdisciplinary teams have been formed to determine multiple-use objectives for designated units of land on many National Forests. Additional teams are being formed as rapidly as resources permit. Field procedures have been changed to attain higher administrative in-depth review of compartment prescriptions to avoid over-generalization.

A number of other actions underway or planned to improve the overall quality of National Forest management are also directly responsive to the recommendation. Among these are (1) establishment of criteria and procedures to recognize specific areas where timber will not be harvested because there is no suitable alternative to clearcutting, but where clearcutting is environmentally unacceptable; (2) recognition of areas where final harvest cuts must be deferred because doubt exists about the adequacy of restocking during the next 5 years; and (3) discontinuance of off-site planting and large scale conversions to non-indigenous species until feasibility has been demonstrated by study and research.

Other actions responsive to the recommendation deal with more intensive inventories, obtaining "in place" resource data, and classification of major types into ecological subdivisions for more accurate management and better coordination of uses. Progress is underway or completed on developing criteria and management procedures for sites where specific regional regeneration or environmental problems occur.

So long as the harvesting and regeneration practices on primary timberlands are not injurious in terms of site productivity and watershed effects, the managing agency should be free to follow clearcutting or any cutting method suggested by the technical body of knowledge available.

Traditionally, and with good reason from long experience, the prescription of scientific practices in natural resource management has been the responsibility of professionals trained in the sciences treating the respective resources which they manage. Foresters, soil scientists, wildlife biologists, and landscape architects are qualified by training and experience to examine a forest stand and the associated resources, determine its condition, diagnose the problem (management needs) from the standpoint of management objectives, and prescribe the proper treatment.

So long as the full force of the knowledge and expertise available in the professionals employed by an agency such as the Forest Service can be brought to bear on the management of the forest resources for which it is responsible, then the proper treatment can be prescribed and applied for meeting management objectives. Arbitrarily limiting the practices which can be prescribed to meet an objective or solve a resource management problem--as statutory or other direction to prohibit clearcutting on the National Forests would do--limits the opportunities for the managing agency to prescribe and apply the practice(s) which would best treat the conditions encountered. The result could well be inability to meet overall management objectives both in the short-run and the long-run.

Cutting practices that are applied in such a way as to be injurious to other resources are not to be condoned. Misapplication, though, of a scientifically sound and proven practice in isolated cases should not preclude its proper use when needed. Management of National Forest timber and other resources can be more responsible and more responsive to public needs and wishes and a quality environment when the land manager is free to choose and apply clearcutting or any other practice which is best suited to the resource conditions and objectives with which he is confronted.

More opportunity should be provided to try new and imaginative techniques in forest land management. There apparently is a feeling that agency personnel are too boxed in by fixed agency policies.

The Forest Service is understandably concerned that employees may feel they are unduly constrained by fixed agency policy. Much of the success of the Forest Service as an agency has occurred through the applied creative and innovative actions of its employees. Because the Forest Service is a decentralized agency, a great deal of dependence is placed on the man-on-the-ground to do his job well. Agency policy and practice has delegated authority to the lowest organizational level possible for effective work.

The Civil Service Commission recently evaluated the Forest Service personnel management program. Included in its overall assessment were these strong items:

1. Mission oriented and active productive organizations

2. Interested, capable and effective employees

3. Continuing efforts to improve management methods

4. Overall effective communications with employees at all levels with especially good communications regarding mission goals.

Also included in the evaluation were several items on training and the Employees' Suggestion program which the Commission felt needed improvement. For example, the Commission report said about the Employee Suggestion Program that "Forest Service people are alert, imaginative, and use creative approaches to jobs. There is a systematic means for sharing new ideas and approaches, but it needs additional emphasis by managers at all levels to increase servicewide participation and provide wider distribution of new ideas."

Much has been done and is being done by the Forest Service to help employees feel freer in their approach to jobs. There is much yet to be done. One of the major shifts that has evolved recently is the ever-increasing use of a team approach to problem solving. Examples of this are the appointment of "ad hoc committees," interdisciplinary planning teams, and special study teams.

Although a major effort is underway to increase employee job involvement, the Forest Service welcomes the expressions of dissatisfaction with the status quo. It is from such dissatisfaction that some of the greatest gains are made.

Increasing emphasis on multiple-use planning and management appears inevitable. To prepare for this we need to start a training program now for the foresters who will be putting multiple-use plans together and applying the management recommendations.

The Forest Service agrees with the need for increased multiple-use training and is trying to provide such training.

Basically, the program uses four types of training. The first is formalized classroom training conducted by the Agency. Most Forest Service regions conduct a basic orientation training session for new professionals. Engineering has expanded its orientation training to include required self-study and reading in the area of Multiple-Use Management.

The second major kind of training is on-the-job instruction provided by supervisors who review new professionals' work. This kind of supervision is performed daily.

The third major training element is self-study. In addition to a wide variety of reading, this includes attendance at adult education classes sponsored by community schools, colleges and universities, other agencies, or professional and interest-oriented groups. Forest Service personnel are encouraged to take advantage of such opportunities. They are encouraged to study outside their own tight "professional" area and to accumulate a wide range of understanding of other interests.

The fourth major education area for multiple-use training is inspection of work and enforcement of standards. Critique, comment, and discipline are an essential part of learning an administrative system. Some Forest Service administrators have been slow in following through on corrective actions. There is room for improvement in follow-up.

Also, the Forest Service is cooperating with the University of Michigan in the development of a gaming-simulation program which brings together two functions in a training exercise--natural resource management and human resources understanding and utilization. This program will teach multiple use planning for the primary purpose of managerial development similar to the way flight simulators train airplane flight crews. It will provide experience without resource risk.

There is a need to involve the entire profession and the public in the development goals and priorities in public land management. Complete, documented facts presented to the public well in advance of a potentially controversial decision would do much to dispel the resentment felt by a majority of the young and many of their elders....A major effort is indicated to try to make earlier determinations of what the public wants from its forests....It must be recognized that there has developed a credibility gap between at least a part of the public and the land management agencies.

The Forest Service agrees that there has been a general decline of public confidence in land management agencies and the forestry profession. The Agency has initiated a new "Inform and Involve" program in a major effort to inform the public of the scientific, social, environmental, and economic factors that relate to land and resource management. A major objective of "Inform and Involve" on all levels of the Forest Service is constructive involvement of the public in providing information, comment and points of view that will lead to better land and resource management decisions as well as regain public confidence in the profession.

In the East, public involvement in land use decisions was a key part of a major Forest Service effort to coordinate planning and programs on all the National Forest in the Appalachian Mountains. A series of public meetings was held throughout the area to obtain public reaction to a proposed comprehensive land use plan for the region.

In the East and South the Forest Service has asked through local and national media for public comment and recommendations to determine primitive outdoor recreation possibilities on National Forest lands. In the West, an extensive public involvement effort is underway in selecting areas to be studied for wilderness potential. In population centers west of the 100th meridian more than 180 public meetings will have been held by late May solely to discuss possible wilderness study areas. An indication of the Forest Service effort and the public's interest is the more than 500 people at the first meeting (Feb. 26, 1972) in the Pacific Northwest.

Past and present objectives are to seek out and obtain local and national comments and points of view from individuals and organizations to assure that management decisions are based on facts and interwoven with the public involvement processes.

In the complexity of today's Forest Management, Research, State and Private Forestry, we are, nevertheless, making significant headway in informing and involving the public in the decision-making processes of land and resource management. More land than ever before under Forest Service management is receiving public scrutiny by request. The Forest Service is listening to the public's wants from its forests and implementing their concerns in the decision-making process.

An inadequate job of public relations or educating the public as to why cuttings--particularly clearcuttings--are made seems apparent. Well-prepared signs explaining the need for cutting for mistletoe control or cutting that concurrently will provide timber and improve wildlife habitat would be accepted by much of the public.

The Forest Service recognizes a need for a better job of informing the public about harvesting practices, and has taken some steps in this direction as part of its Inform and Involve Program. In addition, it has encouraged use of signs in sensitive areas where timber harvesting occurs. A noticeable increase has occurred in using this information device in the last five years.

Following are several examples of some of the types of signing actions which are being used:

In the DeSoto National Forest of Mississippi, signs are used to explain forest management at side-by-side tracts of slash pine, one clearcut and reforested and the other unmanaged. The difference dramatizes the beauty and values of a managed forest over an unmanaged one. The signs also explain that unmanaged strips between plantations were left for use by wildlife.

The Rio Grande National Forest of Colorado has pleasant signs bannered with the words "Let the Sun Shine In". From vistas along the highway they describe the need for baring new seedlings to sun and rain for vigorous growth. Clearcuts to achieve this regeneration can be seen in the distance.

The Nicolet National Forest in Michigan combines signs with a short roadside walking tour to provide an insight into the need for clear-cutting aspen. The signs identify trees which were saved in the cutting process for birds and wildlife. It also compares clearcut with unmanaged area, citing the values which are enhanced by management, including added food for wildlife in the clearcut areas.

In the Kaniksu National Forest of Idaho, where clearcuts approach the road, signs are posted to explain the need for clearcutting, including the use of the harvesting device to help control blister rust.

Finally, although the device does not involve signing, the Alaska National Forests, with the cooperation of the State of Alaska, have set up highly successful information guide services on the State's inland passage ferry ships. Forest Service personnel emphasize explanation of clearcuts along the channels, easily seen from the ferries.

It is not reasonable to expect that privately-owned forest lands will continue to provide public benefits without reimbursement. On the other hand, it is not likely that the public lands can provide all of the desired recreational opportunities. There is an obvious need for a forest land policy that includes both public and private ownerships.

There is no doubt that private forest lands must play a vital (and certainly larger) role in helping meet the Nation's need for timber, recreation, and other forest resources. There is a great need for the owners of small, non-industrial private forest lands to be motivated and encouraged to protect, develop, and manage their forest lands at a level adequate to meet the emerging national demands. The Forest Service works with the State Foresters through a number of cooperative programs to help achieve these ends. It helps them to develop plans and new approaches to encourage individual landowners to practice sound multiple-use forest management on their lands.

Because of the great amount of private forest lands in the East, the Forest Service in 1966 established two State and Private Forestry Area offices, one in the Northeast and one in the Southeast, to devote full time to its cooperative forestry programs. These Area offices encourage, assist, and promote improved utilization and environmental enhancement of State and private forests and related resources. In 1971, the Area offices were reorganized along goal-oriented lines to better accomplish such objectives.

Also in the East much private forest land is adjacent to or intermingled with the National Forest lands. Thus, since the latter part of 1970, the National Forests east of the 100th meridian have been managed under a system which calls for planning on the basis of the social, economic and physical characteristics of an area rather than administrative boundaries. Called "unit planning" this means that plans are outlined for an area which may extend beyond National Forest, State, county, or other boundaries where private land activities have an impact.

The unit plan provides the Forest Service with information to program and carry out its work on each unit but it also provides for and serves as an example for management of adjacent lands. The Forest Service encourages local, county, regional planning, and other ordinances that support the unit plan and its management. In regard to needed recreation facilities, for example, the unit plan not only locates sites where high quality recreation concessions will be allowed on National Forest lands, but also locates those sites on adjacent private lands where the Forest Service believes such recreation facilities would be advantageous.

Harvesting plans by managing agencies should be pursued in an atmosphere of close participation with local user groups.

The Forest Service agrees. It is asking the public to participate in setting objectives of forest management. For many years it has made use of such means as citizen advisory committees and show-me trips to obtain citizen participation in management decisions. This listening effort has recently been greatly expanded. An example of this is the several listening sessions held in Florida in different locations to gain public views on the Ocala National Forest management plan. Environmental statements are prepared on major programs. These are published and reviewed. Viewpoints are solicited. In many cases timber sales have been revamped and modified to include suggestions from the public.

But the Forest Service is doing much more. It is developing plans and procedures so that the environmental stability on the National Forests can be measured and changes predicted with some degree of certainty. There are main thrusts in gathering data, planning small areas in detail, making prescriptions for treatments and involving the public in decisionmaking. In time, given adequate funds, allowable harvests will be determined by tabulating yields predicted from these small areas.

Various programs using computers are being used to store, retrieve, and manipulate data. Some of these are the Resource Allocation Model, Current Inventory of Stand Conditions and Total Resource Information programs. The Total Resource Information, known as TRI, can account for area plans in cells as small as an acre. TRI uses large scale aerial photographs which record timber stands and plans in detail. Prescriptions are made for treatments of the stands. Other programs manipulate data and make long-range predictions of the results of various alternatives. However, much more data on environmental change is necessary to improve the accuracy of predictions.

The effects of timber harvest on other resources are being measured on the Black Hills. It has been found that thinning timber stands actually increases the production of forage as well as wood. Thinning also allows more rain to fall through the crowns making more water available for growth. Water quality is being monitored by short-term monitoring stations installed on streams coming from timber sales. These stations are used to measure chemical and physical parameters, to determine emerging problems and to establish baselines from which predictions of change can be made.

There are 13 such stations installed on the Rock Creek Timber Sale on the Lolo National Forest near Missoula, Montana. There are a total of 54 stations set up presently on the National Forests with 80 planned for operation in FY 1973. In addition there are several hundred stations where spot measurements are made.

Current directives place much greater emphasis on management of hardwoods. All sites capable of growing good quality broad-leaved species are to be maintained or converted to these types. This policy recognizes and should perpetuate key habitats for wildlife and water protection zones.

Most of the hardwood areas in the National Forests are on lands in the eastern United States acquired under the authority of the Weeks Act of March 1, 1911, as amended. One of the two major purposes of that Act was the protection of the watersheds of navigable streams. Management of the hardwood types has been directed toward that end since establishment of the National Forests. The reduced flood frequency and more stable streamflows along streams to which the National Forests are tributary demonstrate the effectiveness of timber management practices in those watersheds.

Native wildlife are a natural and valuable resource associated with the hardwood types in the National Forests. As such, the hardwood types and lands capable of producing good hardwoods have been managed as wildlife habitat in cooperation with State wildlife management agencies. The variety and the population growth of most wildlife species in those areas is evidence of the success of that management.

Application of the even-age system of management and clearcutting on National Forest lands has contributed significantly to the diversified and productive habitat favoring most wildlife species. Under the cooperative habitat improvement programs, several big game species have increased dramatically in numbers as a result of habitat improvement brought about through timber harvesting.

Current Forest Service direction and emphasis on hardwood management will assure perpetuation of watersheds in good hydrologic condition and quality habitats for wildlife. On pine sites, such as dry ridges, some of the hardwood is being converted to pine. This is carefully planned so that the pine is complementary to the wildlife habitat furnished by the hardwoods. The pine furnishes warm shelter areas in the winter and the seeds are a favorite part of the diet of birds and animals.

More effort should be directed to the identification of high-production timber sites and to the potential for further yield improvement on these sites through such measures as weeding, thinning, fertilization, and use of genetically superior stock. Intensive management of highly productive sites could relieve the pressure for timber harvest on sites of lower productivity.

Two elements are involved here: Identification of good sites, and intensification of timber culture thereon. Forest Service actions previously instituted, now underway, or planned that are responsive to this recommendation are as follows:

1. Identification of highly-productive sites

For well-stocked forest stands, site index information is most often adequate, available, and regularly used to identify productive sites for all major species.

On brushlands and in deteriorated forests, however, site classification is difficult and current techniques are often inadequate. Soil-site correlations have been developed for some species, and research is underway on others, primarily high value hardwoods. Classification based on characteristic vegetation associations (habitat types) have been developed for three northwestern ecosystems, and several Regions have instituted use of these as a framework for prescription and management. An action plan developed as part of "National Forest Management in a Quality Environment" will result in guidelines (including timber productivity) for a national classification of ecosystems. Exploratory research to accumulate basic ecological information is underway in 11 ecosystems, but much additional research will be required in some 35 forest types of major importance. Other action plans have been developed which approach the site classification problems from another point of view--to redefine priorities (including growth and economic evaluations) for reforesting non-stocked land, and to discontinue conversion of natural stands to unproven off-site or non-indigenous species.

2. Yield improvement

As markets for small trees and formerly unused species have developed, timber management on the National Forests has steadily intensified. Commerical thinnings are becoming standard practice in all Regions, as markets permit, and non-commercial thinnings rate high priority for use of limited funds available for stand improvement.

The use of selected seed and genetically improved stock is rapidly becoming standard practice for establishing pine plantations in southern forests. Application of other intensive culture techniques, as well as application to additional forest types await the

results of research and economic analyses demonstrating feasibility. Much of this research and analyses is underway.

Silvicultural research on weeding and thinning has been conducted in most of the 37 major commercial tree types on the National Forests, and information on the effect of these practices on growth and yield is accumulating fairly rapidly. Research in fertilization and genetic improvement has intensified in recent years, but few results are yet adequate for guides for field use and many important species are unexplored. In the last four years, research projects involving different combinations of all the intensive cultural practices recommended, and of additional practices, have been initiated in southern pines, Douglas-fir, and several hardwoods.

Improvement in timber sale administration and supervision is needed.

The Forest Service concurs.

All Forest Service administrators recognize the need of achieving a consistently high level of sale administration and inspection. They are continually trying to improve administration through new methods and ideas, a number of which are now underway:

1. A timber sale administration certification program for field personnel has been started by one Forest Service Region, and additional Regions have indicated interest in a similar program.

2. As a prelude to certification, the Forest Service is improving quality and coverage of sale administration training at the field level. Special efforts are being made to train all who participate in sale administration and provide refresher training to experienced people.

3. Financing of the timber sale preparation and harvest program has increased significantly over the past several years. This has enabled the Forest Service to increase the number of specialists employed, such as geologists, soil scientists, landscape architects, etc.

4. Development of clear, unambiguous contract language and written instructions has occurred to promote consistent contract interpretation by sale administrators and purchasers.

5. Persuasion of timber purchasers of the need to provide better supervision of their sale operations has intensified.

6. Strengthening of debarment regulations has been instituted to increase authority for eliminating chronic offenders from operating on the National Forests.

The entire area of timber sale contracts needs to be thoroughly reviewed and overhauled. Presently it is virtually impossible to alter a contract even for widely recognized environmental improvement. Some sales presently approved but not yet executed will undoubtedly come home to haunt the Forest Service because contracts cannot be re-negotiated in light of changing public goals and values for quality forest management.

Historically, rules and regulations relating to contracts have provided that any modification of a timber sale requires (1) mutual agreement between buyer and seller (sale purchaser and Forest Service) and (2) that no modification be disadvantageous to the Government. Any reduction in financial return to the Federal treasury was usually considered a disadvantage.

Because environmental values have changed, some older timber sale contracts do not contain language acceptable for today's standards. Changes would cost money and could only be made through a modification causing a reduced Federal return.

The Forest Service recognized a need for authority to make environmental modifications of timber sale contracts and, so, on July 9, 1971, a representative case was sent to the Comptroller General of the United States.

An opinion was requested as to whether it could be held that intangibles (environmental protection) could be considered in determining whether a contract modification requiring additional environmental improvement with reduced stumpage returns would be to the disadvantage of the United States Government.

The Comptroller in a decision of August 4, 1971, B-173551, ruled "it is our opinion that the benefit to the Government, whether it be tangible or intangible, may properly constitute legal consideration for the modification....we conclude that the contract may, by mutual agreement, with the purchaser, be properly modified....Any such modifications should be completely documented to show that concessions by the Government are reasonably related to, and justified by, increased cost of operation to the purchaser."

Subsequent to this decision, several timber sale contracts have received environmental modifications. Since any formal contract is binding on both parties, each such modification, as noted in the Comptroller General's decision, must be mutually agreeable between both parties. Unilateral modification for environmental purposes is not permitted. However, when appropriate reflection of environmental costs has been made, most timber sale purchasers willingly agree to necessary modification.

Major efforts should be made towards ways and means of effecting more complete utilization of the forest crop and to find better ways of slash disposal and removal of logging debris. Leaving such debris in the forest is both inefficient and unesthetic.

The appearance of timber harvest residues has a great deal to do with how people feel about National Forest management or about timber harvesting on any land. Little or no research is available to determine what specific factors create positive or negative impressions, but a cluttered landscape of post-logging debris can be upsetting to an individual looking for tranquil mountain beauty. Uncluttering the harvest area by residue rearrangement, disposal or utilization will probably diminish many of the negative psychological factors.

In the summer of 1971, Forest Service Chief Edward P. Cliff assigned a Task Force to review debris treatment and utilization. It was to prepare a resume of current actions and make recommendations for needed research, development or management changes influencing or affecting debris treatment and utilization. The Task Force report is complete and the Forest Service is now planning improvement action, including:

1. Those things that can be done without increases in manpower and money, and

2. Those programs requiring additional funds through Congress.

Such things as rewriting timber sale and contract arrangements, reordering research priorities, and redirecting management attention may achieve near-term improvement in treatment of timber harvest residues. Other matters involve principally research and development activities and will take longer to achieve results. Nutrient recycling, new forest products, equipment technology, and the biological and social aspects of debris must be further studied.

The newly prepared Task Force report details all of this information and makes significant recommendations which, if enacted, will cause major improvement in timber harvest residue treatment and utilization.

There is a need for improved utilization of small trees and tree parts.

Recently several multifunctional efforts have been directed at characterizing residues and determining possibilities for their better utilization. In Wyoming a study has been undertaken by the Intermountain Forest and Range Experiment Station cooperating with U.S. Plywood Champion Papers, Inc. At the Pacific Northwest Forest Experiment Station a residue reduction study is being initiated. At the Forest Products Laboratory the proposed project STRETCH will be significant in increasing the effectiveness of forest tree utilization.

Project STRETCH is designed so softwood dimension lumber yields from small logs can be increased by as much as 15 percent by employing "Best Opening Face" sawmill methods. This method, using computer decisionmaking and automatic saw setting, is especially useful in manufacturing small logs into structural lumber.

Edge Glue and Rip (EGAR) is a proposed sawmilling method in which logs would be sawn into unedged lumber flitches approximately 2 inches thick. The unedged lumber would be kiln dried, edged to maximum width, and edge-glued into panels 36 to 48 inches wide. The panels would be electronically scanned for defects, the defect data fed into a computer, and automatic saws would produce 4 to 12 inch lumber with the highest possible grades. Increased yields of 15 percent could be gained along with better lumber grades.

Press-Lam is a system for producing lumber-type products by rotary knife-cutting logs into 1/2-inch sheets. Sheets would be press-dried and while still hot spread with glue and assembled into desired products. Products can be treated with preservatives or fire retardants before assembly.

Other Processing Improvements: Needed research on additional processing innovations for more effective utilization include studies of numerically controlled lumber and veneer driers, advancement of chipping headrigs, improved adhesives, preservatives, and fire retardants, and application of advanced engineering principles in structural design.

Residues: Residues created in conventional lumber and plywood manufacture are presently being used in the manufacture of paper and fiberboard products. Where fiber conversion manufacturing facilities are available, essentially 100 percent of mill residues are being utilized. The exception is bark. More research is needed to develop uses for bark. Nearly 50 percent of the timber cut remains in the woods as trees too small to harvest, trees too defective to convert, or dead trees, tops, and limbs.

Three major research efforts offer promise. First, whole log chipping at the logging site offers the possibility for cheaply converting junk wood into easily transported chips. In addition, field chipping offers the potential for site cleanup and site preparation for seeding or planting using mechanical methods. A second technology, chip pipelines, offers a simplified means for transporting wood chips over long distances where other surface transport methods are either nonexistent or chip vans are in conflict with highway or surface traffic. A third technology, bark chip separation and segregation, offers the potential for converting field made chips into clean chips suitable for papermaking.

All three of these technologies are ready for pilot testing, and could, singly or in combination, significantly extend the utilization of small trees or parts of trees. It must be pointed out, however, that the inelastic nature of the paper and fiberboard market makes substantial utilization of "junk wood" more of a potential than an immediate reality even with new technologies. The real urgency for woods cleanup may be more nearly equated with the merits and benefits of site treatment than the additions to wood supplies in the short term.

In addition, the Forest Products Utilization program of State and Private Forestry is presently undergoing a realignment to provide increased emphasis on the reduction of wood waste and the utilization of wood residue. Plans call for locating a forest products technologist at the Forest Products Laboratory and one at the Seattle Unit of the Pacific Northwest Station to facilitate the implementation of research findings on improved utilization. Regional and Area FPU personnel have been assigned direct liaison responsibilities with specific research projects throughout the Nation that pertain to wood residue reduction. Several regional research implementation workshops will be held to familiarize Forest Service and State forestry personnel with up-to-date research results.

A major new action program called Project STEP (Softwood Timber Extension Program) will also be initiated soon. This program is oriented toward putting more softwood timber on the market through increased technical assistance by State forestry personnel and private consultants.

Forestry research in the Southern Region characteristically has been pragmatic and addressed to short range problems related to the silviculture, management, and utilization of pine. Studies of environmental effects and multiple use management should have high priority; specifically, (a) external effects should be motivated for all studies of intensive silvicultural practices; (b) more attention should be given to hardwood research; (c) more thought on social and economic aspects of forest amenity values is needed.

The Forest Service agrees as to the needs mentioned. It has been reshaping and strengthening the program to meet these needs. It is studying the environmental effects of intensive culture, including fertilization and other chemicals introduced into the forest environment and tillage and drainage. A greatly increased research and development program on prescribed burning has been planned and is being staffed. Increased hardwood research is underway, and an intensive research and development program is being focused on cottonwood culture. A new multifunctional research effort focused on the integrated area of the Southern Appalachians will provide models as tools for guiding management decisions with consideration of social and economic values of the amenities as well as the more tangible values of uses and products.

In addition, the Forest Service has strengthened its research aimed at protecting forest land values from insects, diseases and wild fire. A major part of this new thrust has been towards the biological control of destructive pests, thus reducing the need for chemical control that in itself may have undesirable environmental impacts.

Research is needed in timber utilization and to produce hardwood substitutes for softwoods.

At the present time ways are being sought to utilize more hardwoods in the production of structural particleboards. Such boards from residues might be used as substitutes for the hugh consumption of structural plywood from high quality roundwood. Work on the development of structural particleboards is being undertaken at the Forest Products Laboratory and the Southern Forest Experiment Station. The North Central Forest Experiment Station is completing work on utilization of aspen chips along with softwoods in the production of mixed species particleboards. Some cooperative work has also been done in the development of structural hardwood plywood. The Forest Products Laboratory, the North Central Forest Experiment Station, and the Northeastern Forest Experiment Station shared in this effort.

The use of hardwoods instead of softwoods in papermaking is growing. An estimated 20 percent of paper production is derived from hardwoods, primarily oak, gum, and aspen.

There is little likelihood that hardwoods will make significant entry into construction lumber markets except for pallets, farm structures, and railroad car construction. The greatest potential for hardwood replacement of softwoods is for particleboards and related fiberboard products. Further work is needed in the experimental development of structural particleboards from hardwoods and trial applications of potential products in construction.

Attention should be given to harvesting equipment and methods. Jammer and heavy equipment logging should not be tolerated on some areas. Perhaps the Forest Service could provide leadership in the development of smaller machines with decreased bearing pressures to minimize soil disturbance in logging.

The Forest Service has long recognized the adverse impacts on operating heavy equipment on wet or unstable soils. A standard timber sale contract provision provides that heavy equipment will not be operated when ground conditions are such that excessive damage will result.

Timber sales are designed to minimize the impact of logging on soils as well as other resource values. When sensitive soil conditions are recognized, harvesting methods are specified which will keep damage within acceptable limits. Thus, some form of cable logging is often specified to protect the soil, even though logging with tractors or rubber-tired skidders would be possible.

The Forest Service presently is seeking funding of a five-year research program in logging systems. This program, dubbed FALCON, will be directed toward evaluation of advanced harvesting techniques which will have a minimum impact on sensitive forest environments. Soil studies under the FALCON program will be aimed toward predicting and controlling soil nutrient changes, soil movement and the impacts at various harvest systems on soil stability. Engineering Research under the program will give special emphasis to helicopters, balloons and skyline harvesting systems. Initial research and development will be centered in the mountainous areas of the West; however, later phases will be specifically aimed at the wet-land problems of the South.

The design, construction, use and maintenance of forest roads is the most serious probable source of environmental difficulties and other use conflicts. At present a new road system must be carried by the immediate timber sale contract and/or appropriated funds which puts undue pressure on the agency to get maximum income from the cutting to pay for the road. The problem will continue to be troublesome until a properly financed and regulated road program is developed.

The Forest Service agrees that present funding of the forest roads system is inadequate.

Typically, new roads are constructed from funds made available by Congress (appropriated) or through a timber sale purchaser by decreasing the price paid for standing timber. The greatest mileage of National Forest road system overall is constructed through the timber sale contract; appropriated road construction funds are always short of needs. In some instances, timber harvest (silviculture) options are improved where road construction can be accomplished by means other than through the timber sale contract.

Clearcutting as a primary method of harvesting develops the greatest volume of timber for the least area and thus usually requires the least amount of road. On the other hand, very light partial cut might require an extensive road system.

Where a road system exists or can be constructed by use of appropriated funds, the manager has the greatest flexibility to apply proper silviculture. Thus it follows that an increase in appropriated road money will, as the Deans indicate, improve the forest manager's environmental options.

Logging with balloons, helicopters, and special equipment shows promise.

The Forest Service has proposed a special research and development effort to develop, evaluate, and demonstrate aerial logging systems including balloons, helicopters, and advanced skylines. In addition, for special cases like the wetlands of the South or the muskegs of Alaska, other logging devices like surface effect vehicles will be explored. The program is called FALCON (Forest, Advanced Logging, and CONservation).

FALCON is designed to do six things:

1. Identify critical and fragile forest areas requiring special treatment for harvesting.

2. Test, evaluate, and demonstrate candidate logging systems and system components.

3. Develop and evaluate wholly new concepts for logging.

4. Develop methods and procedures to integrate various logging systems for most effective and economic use.

5. Determine environmental impact of advanced logging methods on regeneration, health of residual stands, site productivity, soils and hydrology and esthetics.

6. Refine and engineer systems which appear to have economic value and which will benefit the environment for immediate application.

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