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COMMUNITY AND ECONOMIC  
DEVELOPMENT DIVISION

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April 27, 1979

RELEASED

The Honorable Bob Packwood  
United States Senate



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Dear Senator Packwood:

In response to your November 1, 1978, request and later discussions with your office, we evaluated the Forest Service's reforestation and timber stand improvement program. As agreed with your office, we assessed the Forest Service's progress in implementing its July 1978 action plan for improving administration of these programs. As agreed, we determined whether the Forest Service had identified lands awaiting reforestation and timber stand improvement which could be readily classified as meeting tests of economic return. We also assessed the potential for increasing funding for these programs in future fiscal years. We gave particular attention to the reforestation backlog-- areas deforested prior to July 1, 1975--and whether it could be eliminated by October 1, 1984.

In two previous reports 1/, we cited the Forest Service' continuing problems in developing adequate inventories of reforestation and timber stand improvement needs and in using economic analyses of projects to determine work priorities. The Forest Service's action plan contained solutions for these problems.

The results of our review, which are discussed in detail in enclosure I, are summarized below.

RESULTS OF REVIEW

The reforestation and timber stand improvement needs are comprised of many costly projects that cannot be

1/"More Intensive Reforestation and Timber Stand Improvement Programs Could Help Meet Timber Demand" (Feb. 14, 1974, (B-125053)), and "Need to Concentrate Intensive Timber Management on High Productive Lands" (May 11, 1978, (CED-78-105)).

*[Handwritten signature]*

readily classified as meeting tests of economic return. The reported reforestation backlog has been reduced from 3.1 million acres on July 1, 1975, to a currently estimated 1.4 million acres, less than 2 percent of Forest Service commercial lands. Similar reductions have occurred in timber stand improvement needs. Furthermore, the reforestation and timber stand improvement needs may not be as large as currently reported. The reforestation backlog will probably not be eliminated by October 1, 1984, the end of the 8-year period established by the National Forest Management Act of 1976. <sup>1/</sup> The Forest Service's action plan, designed to strengthen reforestation and timber stand improvement programs, has not been carried out as scheduled.

The reported size of the reforestation backlog and timber stand improvement needs appears to be substantially overstated. The Forest Service's October 1, 1978, inventory of reforestation and timber stand improvement needs overstated needs by including lands not needing reforestation or timber stand improvement, noncommercial or low-productivity lands, lands expected to be found acceptable when examined or to regenerate naturally, and lands expected to be designated as wilderness. Duplications and other reporting errors also occurred. Conversely, the backlog was understated when unsuccessfully planted backlog acres were reported in the current needs category--lands deforested recently.

Much of the remaining reforestation backlog and some timber stand improvement needs consist of costly projects made difficult by such factors as steep slopes, rocky soils, extreme climatic conditions, and the lack of roads or ready access to project areas. The Forest Service's practice of giving priority to the least costly (per acre) projects has resulted in most of the easier projects being completed in many districts. The Forest Service is now faced with rapidly rising costs and difficult projects which cannot be readily classified as cost effective.

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<sup>1/</sup>The end of the 8-year period established in the act was originally interpreted to be October 1, 1984, but has been recently reinterpreted by the Forest Service to be October 1, 1985. Current Forest Service data and plans as included in this report are based on the October 1, 1984, goal.

Reforestation and timber stand improvement targets and funding proposals have not always been realistic. Forest Service accomplishments have fallen short of targeted goals in recent years due to such factors as nursery stock shortages, lack of site preparation, and increasingly difficult and costly projects. The backlog of lands needing reforestation will probably not be eliminated by October 1, 1984. Forest Service officials believe it will take several more years before the backlog is eliminated, yet no new schedule has been developed.

Forest Service officials were uncertain as to how many areas would meet tests of economic return. The Forest Service has not developed and implemented procedures for identifying the best investment opportunities for either reforestation or timber stand improvement. Minimum criteria are yet to be established on the economic return expected from reforestation and timber stand improvement investments. Economic analyses which we reviewed show low rates of return for many projects, and the inadequate inventory of reforestation and timber stand improvement needs further complicates identifying the best investment opportunities.

Increasing the level of work done on the reforestation backlog would not increase present timber harvest levels on many forests. Timber harvest levels are calculated on 10-year estimates of future forest growth, considering planning reforestation and timber stand improvement actions. Officials at many forests have assumed that their backlogs will be eliminated during their current 10-year calculation periods, and present harvest levels are based on this assumption. However, failure to reforest the backlog acres as scheduled in forest plans could result in reductions in harvest levels during the latter part of the 10-year periods.

Headquarters and field officials did not believe that a substantial program funding increase above the fiscal year 1979 level could be used efficiently in fiscal year 1980 because of the lead time needed for collecting seeds, growing seedlings in nurseries, and preparing the deforested areas for planting. Rather, they believed that a major program expansion could best be achieved by a series of gradual increases over several years to allow time for developing nursery stock, analyzing projects, and preparing sites for planting.

The Forest Service's July 1978 action plan, designed to strengthen the reforestation and timber stand improvement programs, has not been carried out as scheduled. Some deadlines have been deferred because of a late start and understaffing. Full implementation of the plan at the field level may not be achieved for several years.

### CONCLUSIONS

The problems cited in our previous reports continue to plague the Forest Service's efforts to reforest lands and to improve existing timber stands. The Forest Service continues to experience difficulty in determining the magnitude of reforestation and timber stand improvement needs and the economic value of accomplishing this work. While the Forest Service developed an action plan to overcome these and other program weaknesses, it will require several years to fully implement and is already behind schedule. As a result, major improvements in the management and operation of these programs cannot be expected in the near future.

Substantial reductions have been made in reforestation and timber stand improvement needs since 1975, lessening the urgency for increased appropriations. Much of the remaining reforestation backlog and some timber stand improvement needs consist of difficult and costly projects, many of which cannot be done by the October 1, 1984, goal. The Forest Service has not developed a realistic schedule of annual acre targets and funding needs for eliminating the reforestation backlog.

The difficult and costly nature of the remaining reforestation and timber stand improvement needs also increases the importance of economic analyses of investment alternatives. These needs cannot be readily classified as meeting tests of economic return. Analyses which we reviewed show the complexities of making assessments of economic values and point to the need for developing minimum economic criteria and ranking future work after considering economic factors.

In recent years the Forest Service has been unable to complete reforestation and timber stand improvement acres targeted by the Congress due, in part, to increasing project costs, shortages in nursery stock, and the lack of sufficient site preparation.

A major expansion in reforestation and timber stand improvement program levels would not appear to be appropriate

until program weaknesses are overcome and the action plan has been implemented nationwide.

RECOMMENDATIONS TO THE  
SECRETARY OF AGRICULTURE

In our May 1978 report, we recommended that the Secretary of Agriculture direct the Chief of the Forest Service to (1) decide on the minimum economic criteria for reforestation and timber stand improvement investments, (2) prepare economic analyses of reforestation and timber stand improvement projects, and (3) implement controls to insure that the most beneficial work is done. Forest Service officials agreed that these recommendations would significantly strengthen the programs and developed an action plan, containing remedies for many program weaknesses. That plan has fallen behind schedule. We recommend therefore that the Secretary of Agriculture direct the Chief of the Forest Service to give higher priority to implementing the plan in a more timely manner.

We also recommend that, to more accurately identify reforestation and timber stand improvement needs, the Secretary of Agriculture direct the Chief of the Forest Service to strengthen guidelines and review procedures for inventorying and reporting lands in need of reforestation and timber stand improvement. Specific instruction should be provided to:

- Include in the report only those acres actually in need of reforestation or timber stand improvement.
- Expedite land examinations scheduled by the Forest Service to identify and evaluate potential reforestation and timber stand improvement needs.
- Categorize and show the size of areas expected to regenerate naturally in future needs reports.
- Ascertain and report the magnitude of reforestation and timber stand improvement needs located in areas proposed for wilderness designation.
- Discontinue the practice of reporting unsuccessfully planted backlog acres as current needs, and return such acres to the backlog category of the report.

As reforestation and timber stand improvement needs are more accurately identified and their economic value better assessed, the Secretary should advise the Congress of the scope and economic benefits of remaining reforestation and timber stand improvement needs and when these needs can realistically be accomplished.

AGENCY COMMENTS

We discussed this report with Forest Service officials and incorporated their comments as appropriate. Forest Service officials agreed with our recommendations, but were reluctant to accept our recommendation that the Forest Service categorize and show the size of areas expected to regenerate naturally in future needs reports. They said such areas would be difficult to quantify due, in part, to the uncertainty of future natural seed development. We believe, however, that this information would be useful to the Congress in making decisions on future program funding levels.

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In developing this report, we obtained information from Forest Service officials in Washington, D.C., and four regional offices. Detailed information was obtained in regions 1 and 6, where we visited 5 forest offices and 10 district offices in 3 States. (See enc. II.) We also talked with contractors who plant and thin forest lands and obtained information from the Office of Management and Budget, Washington, D.C.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,



Henry Eschwege  
Director

C o n t e n t s

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REVIEW OF INTENSIVE TIMBER MANAGEMENT

The National Forest Management Act of 1976 (16 U.S.C. 1600 et seq.) called for accelerating reforestation and timber stand improvement (TSI) programs aimed at increasing timber harvests. The act responded to a backlog of national forest lands for which reforestation and TSI were long overdue by establishing a commitment to eliminate the backlog in an 8-year period, interpreted by the Forest Service to end October 1, 1984, <sup>1/</sup> and thereafter to annually reforest acreage equal to that deforested annually. The reforestation backlog is defined by the Forest Service as those areas in need of reforestation as of July 1, 1975, and not yet restocked.

Subsequent studies by both the Forest Service and GAO cited the need for improving the reforestation and TSI programs to assure that sound decisions would be made on the merits of projects and that mandated objectives would be met economically.

Responding to this need, the Forest Service developed an action plan with specific tasks and milestones designed to accomplish the mandates of the 1976 act, as well as to overcome program weaknesses.

The Forest Service does not expect the reforestation backlog to be eliminated by October 1, 1984. The more difficult and costly areas will probably remain in need. Problems exist in developing an adequate inventory of reforestation and TSI needs and in identifying the best investment opportunities through uniform analyses of economic return. Officials at many forests have already taken credit for reforesting their backlogs and are currently harvesting at levels which assume the backlogs will be eliminated during their 10-year planning periods. Reforestation and TSI shortfalls below annual work targets could reduce allowable harvest levels during the 10-year planning periods. The Forest Service's action plan for strengthening reforestation and TSI programs has suffered from a late start, missed deadlines, and understaffing.

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<sup>1/</sup>The end of the 8-year period established in the act was originally interpreted to be October 1, 1984, but has been recently reinterpreted by the Forest Service to be October 1, 1985. Current Forest Service data and plans as included in this report are based on the October 1, 1984, goal.

REFORESTATION AND TSI NEEDS MAY BE OVERSTATED  
AND INCLUDE DIFFICULT AND COSTLY PROJECTS

The backlog has been reduced in recent years to a reported 1,435,232 acres, which may still be an overstatement. Much of the remaining backlog consists of land that will be difficult and costly to reforest. Similarly, TSI needs may be overstated and include difficult and costly projects. Forest Service plans indicate that the reforestation backlog as well as existing TSI needs will not be eliminated by October 1, 1984.

Reforestation backlog and  
TSI needs have declined

The Forest Service has reported a decline of about 1.7 million acres in the reforestation backlog since July 1, 1975. As of that date the backlog was reported to be about 3.1 million acres. By October 1, 1978, the backlog was about 1.4 million acres, less than 2 percent of all Forest Service commercial lands. During the same period reported TSI needs declined by 7.7 million acres, leaving 2.6 million acres still in need.

The Forest Service prepares an annual report on reforestation and TSI needs. The report shows the reforestation backlog separate from current reforestation needs--areas deforested since July 1, 1975. It also shows existing TSI needs. Data for the needs report is generated at the district office level. The following table shows the reported reforestation backlog and the reasons for backlog reductions since July 1, 1975.

<u>Fiscal year</u>	<u>Beginning backlog</u>	<u>Reforested (note a)</u>	<u>Withdrawals (note b)</u>	<u>Ending backlog</u>
----- (acres) -----				
c/1976	3,145,295	371,826	708,679	2,064,790
1977	2,064,790	164,483	240,720	1,659,587
1978	1,659,587	146,222	78,133	1,435,232

a/Includes land that was reforested through natural regeneration. In fiscal year 1978 about 22 percent of the reported reforested acreage regenerated naturally.

b/Stocking changes, land class changes, multiple-use designations, and other factors.

c/Includes transition quarter.

About 60 percent of the reduction in the reported reforestation backlog since July 1, 1975, has resulted from examining land and deciding that areas are already adequately stocked, are not productive timberland, or are better suited for nontimber use. Similarly about 43 percent of the reductions in reported TSI needs during fiscal years 1977 and 1978 are attributable to examinations and land reclassifications.

The Forest Service has not completed examining and reclassifying lands. It had set October 1, 1978, as the goal to complete examining all reforestation and TSI needs. That goal has now been changed to October 1, 1979. By October 1978 about 70 percent of of the reforestation needs in regions 1 and 6 had been examined. Less than 40 percent of reported TSI needs had been examined in region 1. Officials in region 6 were uncertain as to the extent of TSI examinations. Officials expect further reductions in the reforestation backlog and TSI needs as more lands are examined.

But not all examinations will be completed by October 1, 1979. For example, at one region 6 district, 20,000 acres of lands reported as needing TSI were not scheduled to be examined until after October 1, 1979. District officials in region 1 told us all TSI examinations will not be completed by the deadline due in part to staff limitations and giving priority to reforestation examinations.

Not all districts understood the requirement for examinations. One district's officials said the district had not received a directive to examine all reforestation and TSI needs and had not planned to conduct such examinations, even though it had been allocated additional funds to do so.

Reported reforestation backlog and  
TSI needs may be overstated

The size of the reported reforestation backlog appears to be substantially overstated. The overstatements were due to including such things as lands not needing reforesting, noncommercial or low-productivity lands, lands expected to regenerate naturally, and lands expected to be found acceptable when examined. Double counting and other reporting errors have also occurred. Similar overstatements were made in TSI needs.

We examined the reliability of the reforestation and TSI needs reported for October 1, 1978, and identified these types of overstatements.

- District offices often listed units needing reforestation at their total size rather than listing only those acres actually needing reforesting. For example, about 46 percent of the backlog reported by one district was considered adequately stocked, overstocked, or not feasible to plant (e.g., rocky). Another district reported the gross acreage of units even though it contracted for only parts of them to be planted.
- Some districts erroneously included units which had not yet been logged.
- The reported backlog includes lands expected to regenerate naturally--not through plantings. The Forest Service has not called for a delineation of such lands. Region 1 officials expect 109,000 acres, or about 25 percent of its backlog to regenerate naturally. For one region 6 forest, about 16 percent of its backlog (8,482 acres) is expected to regenerate naturally. About 22 percent of the acres reported as reforested nationwide in fiscal year 1978 regenerated naturally. Forest Service officials said, however, that some of these areas had been planned and prepared for natural regeneration. They also noted that areas expected to regenerate naturally still represented needs.
- At several locations officials expected future examinations would find the lands acceptable, reducing the size of the backlog without further work. For example, one region 6 district examined and removed about 8,000 acres from its reforestation backlog since its latest report on the size of the backlog. A district official told us that these acres should never have been included in the needs report as they are noncommercial or borderline commercial forest lands. He said that in initially reporting the backlog, the district included any area with the slightest indication of potential for tree growth. He expected further reductions in the backlog as more examinations are

completed. An official also estimated that 90 percent of the district's reported TSI needs would be eliminated once examinations are completed.

- The finalization of Roadless Area Review and Evaluation (RARE II) <sup>1/</sup> proposals may reduce reforestation needs still further. Some locations had yet to quantify the impacts of wilderness withdrawals on reforestation and TSI needs. About 132,000 acres or 43 percent of backlog reported by region 2 have been proposed for roadless area designation.
- One district overstated its reported reforestation backlog of 5,852 acres by about 1,550 acres because of addition errors and the inclusion of lands previously planted, not yet harvested, or no longer in need of planting.
- Region 1 officials added acres to the reforestation backlog which should have been reductions. Regional officials told us this was done to balance report totals. Total regional reforestation needs were overstated by at least 60,000 acres due in part to the inclusion of acres already planted. Officials of one forest in region 1 consider the data on which the needs report is based to be grossly inadequate and the report to be unreliable. Forest officials formed a committee to develop ways to correct the situation in their forest by May 1979.
- Officials at two forests in region 6 had removed sizable acreages from the reported backlog only to have the regional office reinstate them. Officials at one forest had determined that 48,000 acres were adequately stocked; the other reported about 19,900 acres as not worth the cost of replanting. The regional office reinstated these

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<sup>1/</sup>RARE II was a Department of Agriculture land management planning process conducted to identify roadless and undeveloped areas in the National Forest System and to determine their best use. As a result, the Secretary, on January 4, 1979, proposed wilderness designation for more than 15 million acres of roadless areas.

acres pending further examination because forest officials had removed them without on-the-ground examinations. Regional officials expected, however, that much of the acreage would be removed after it is examined.

--At some districts, acres had been counted both in the backlog and as current needs.

--One district planted 1,325 backlog acres in 1978, yet reported only 545 acres as having been successfully planted, leaving the difference (780 acres) in the backlog. Officials explained that they had used a conservative approach in assessing the prospects for seedling survival in order to justify higher future funding levels.

In addition to the above factors which tended to overstate needs, some factors tended to understate them. These included data errors, acres omitted, and misclassification of backlog acres in the current needs category. But these understatements generally were smaller and occurred less frequently than the overstatements.

At all locations visited, backlog acres were being reported in the current needs category. For example, region 1 computer data, which we did not verify, showed that at least 13,000 acres of land deforested before July 1, 1975, were reported as current needs. At one region 6 district, about 25 percent of all reported current needs were actually deforested before July 1, 1975. Other locations reported lesser amounts of backlog lands in the current needs category. The 1976 act states that lands not certified as satisfactory (after treatment) are to be returned to the backlog. Forest Service policy and practice, however, is to place such acres in the current needs category to avoid repeated increases and decreases in the reported backlog.

The backlog was also understated when land was omitted. At one district, about 3,000 acres of logged land were not included in either the backlog or current needs categories because of a district practice to report only lands on which logging debris had been burned. About 580 of these acres had been logged before July 1, 1975, and should have been reported as part of the backlog.

In commenting on the factors discussed above, Forest Service officials suggested that the problems we identified may not exist nationwide. We pointed out, however, that the Forest Service regions we covered in our review had about half of the total reported reforestation backlog.

Reforestation backlog will not be eliminated by 1984, and difficult and costly projects will remain

Forest Service plans indicate the reforestation backlog will not be eliminated by October 1, 1984. Remaining projects are more difficult and costly to reforest due to such factors as steep slopes, difficult access, rocky soil, and extreme climatic conditions.

Forest Service headquarters officials compiled, in January 1979, the following schedule of annual target acres and costs for eliminating the reforestation backlog.

<u>Fiscal year</u>	<u>Target acres</u>	<u>Appropriated funds</u>	<u>K-V funds (note a)</u>
(000 omitted)			
1979	138,394	\$ 21,828	\$ 4,879
1980	195,722	38,227	4,604
1981	183,428	37,547	3,191
1982	159,680	35,977	2,112
1983	142,160	33,117	1,432
1984	121,056	28,693	1,400
Beyond 1984	<u>494,792</u>	<u>155,815</u>	<u>376</u>
Total	<u>1,435,232</u>	<u>\$351,204</u>	<u>\$17,994</u>

a/The Knutson-Vandenberg Act of 1930 (16 U.S.C 576) authorizes the collection of funds from timber purchasers for reforestation, timber stand improvement, and other activities. Such funds are referred to as K-V funds.

This schedule includes lands that will be planted as well as lands expected to be found adequately stocked when examined, lands expected to regenerate naturally, and lands which could be reclassified for nontimber use.

Because of such factors as inadequate access, roadless area designations, technology problems, environmental constraints, and cost effectiveness, the Forest Service classified about 35 percent of the backlog (494,792 acres) as not feasible to reforest by October 1, 1984.

The backlog is being reduced to more difficult and costly areas. For example, Forest Service officials cited increasing contract costs for both planting and thinning. Contractors and Forest Service officials told us that increased costs were due in part to more difficult projects--steeper slopes, more difficult access, extreme climatic conditions, and poorer soils.

Some officials told us they had already accomplished the most cost-effective reforestation and TSI projects. For example, officials in one district said that after fiscal year 1979, all of the district's easy and low cost projects will have been done. At another forest, costs to reforest the backlog were expected to more than triple as more difficult and costly areas are undertaken. Factors cited as contributing to project difficulty and cost were steep slopes, rocky soil, long crew walk-ins, expensive site preparation, irrigation, multiple replants, and removal of brush by hand.

All the locations we visited were planning to accomplish the rest of the backlog, even though some officials were skeptical. In region 1, lack of access to backlog lands could increase the backlog remaining in 1984. About 61,500 acres in one district in region 1 were deforested by fire as long ago as 1930 and remain in the reforestation backlog. The schedule above does not estimate funding needed to construct access roads. Some of the land in the backlog has been planted in the past but failed, sometimes due to poor soil conditions. Adverse weather conditions, nursery stock shortages, reduced funding, or other factors could result in accomplishment shortfalls.

ECONOMIC ANALYSES ARE NOT  
USED IN RANKING PROJECTS

Economic analyses are not being used to evaluate alternate investment opportunities and select high-priority projects. Plans calling for project selection on the basis of economic analyses have not yet been implemented. The four economic analyses we examined

showed that reforestation and TSI have low rates of return on investment.

Forest Service policy statements provide for programming projects on a cost-effectiveness basis; that is, the Forest Service is to select the lowest cost areas on the best sites first. Field officials confirmed that, due to the pressure to meet targets, funds were allocated to projects which would result in the most acres being achieved for the fewest dollars. This approach ignores timber value added by various projects. Slightly more expensive projects could add several times as much value. As discussed above, this approach also leaves the more difficult and costly projects for later accomplishment. If analyzed, many projects may be of marginal economic value.

Forest Service policy also states that areas on which the most favorable economic and social returns are expected are to be given first funding priority. None of the districts we covered in our review used economic analyses and return on investment as the basis for project selection. District offices had not been provided, and had not developed, criteria for judging cost-effective projects.

Economic analyses show  
low rates of return

At some locations, officials had conducted general analyses to test the economic return of alternate approaches to managing timber stands, testing such variables as planting, thinning, brush removal, and fertilizing. At one location, officials compared several options for treating an existing stand that was representative of some of the district's needs. The options with the highest rate of return were often those involving limited initial investments, such as no thinning or fertilizing. Alternatives involving precommercial thinnings, herbicide spraying, and planting additional trees showed less return on investment.

Another location evaluated representative projects to develop a ranking of the kinds of projects to be given priority. For 96 completed reforestation and TSI projects, the analysis showed only 11 would return 10 percent on invested capital, most would return less than 5 percent, and several would provide no return. The study concluded that work could be considered to have been cost effective in that region if one were

willing to accept long-term rates of 4 or 5 percent return on investment. Office of Management and Budget Circular A-94 prescribes a rate of 10 percent for use in evaluating such projects.

At a third location, an evaluation of the best local conditions--high productivity and low project costs--produced a 6-1/2 percent rate of return. Higher costs or lower productivity land would reduce this rate still further. And at a fourth location, precommercial thinning was shown not to be economically beneficial at the 7-percent rate used in the analysis.

Forest Service officials told us that timber management on Federal lands involved nontimber objectives and costs. For example, the Forest Service pursues wildlife protection and aesthetics objectives through selected logging systems, road locations, and boundaries of sale areas--practices which can result in extra costs in reforestation harvested areas. The economic analyses we examined did not consider the benefits or costs of nontimber objectives of Forest Service programs.

#### Factors affecting economic analyses

The expected rate of return from investments in reforestation and TSI is affected principally by the cost of doing work and the value and timing of wood produced. Reliable economic analyses will require accurate assessments of these factors.

The capability of land to grow wood greatly affects the outcome of economic analyses. In the analyses we examined, return on investment changed markedly in relation to land productivity. As noted in our May 1978 report (CED-78-105), concentrating intensive management practices on the most productive lands would seem to hold the greatest potential for increasing economic return.

However, several locations had not accurately reported the productivity of their lands for either reforestation or TSI. Some listed all their sites as having the same productivity, using assumed averages. Others overrated the productivity of their backlog lands. For example, officials at one district had guessed at the proper productivity category. This resulted in the district reporting all its needs as higher-than-actual productivity. Another district reported its entire reforestation backlog as capable of

growing 85 to 119 cubic feet of wood each year on an acre of land, a significant overstatement. By locating these backlog areas on land productivity maps for the district, we determined that none of the reforestation backlog should have been classified this high. On the contrary, about 95 percent of the acreage was in the lowest productivity class for commercial forest land (20 to 49 cubic feet) and about 2 percent was noncommercial forest land (less than 20 cubic feet).

As more costly and difficult projects are undertaken, economic analyses become even more important. The higher costs of doing remaining reforestation and TSI projects could result in the projects having little or no return on investment, especially for low productivity lands. At the locations visited, the making of economic analyses was complicated by the lack of reliable inventories of reforestation and TSI needs. Estimated costs to do the remaining work were generally based on the cost of doing current work rather than the higher costs likely to be encountered when more difficult projects are undertaken.

The Forest Service's action plan called for issuing guidance from headquarters by July 1, 1979, on how benefit-cost analyses will be used in administering reforestation and TSI programs. Headquarters officials estimate that such analyses might not be in general use throughout the Forest Service until mid-1981. Field officials believed that it would probably take longer.

#### Inconsistent systems for project selection

Some forest and district offices had developed systems for ranking projects. These systems varied between offices and may or may not result in selecting projects with higher rates of return on investment.

We compared two systems for ranking precommercial thinning needs used by neighboring districts in the same forest with similar productivity class lands and terrain. The two systems were substantially different. One system gave priority to the most productive lands, while the other gave priority to the least productive. One system was most sensitive to the number of trees per acre, while the other did not consider trees per acre. One system considered thinning costs as reflected in slope, access, and debris cleanup costs, while the

other did not consider costs. Neither system considered stand age, although Forest Service officials told us age was an important criterion.

LITTLE POTENTIAL FOR INCREASING  
REFORESTATION AND TSI EFFORTS

Reforestation and TSI programs are best carried out with an even flow of funding and proper long-range planning, not with sharp increases in funding and levels of effort. Major program expansion over the fiscal year 1979 level could best be achieved by gradual increases to allow time for seed collection, nursery stock development, site preparation, and economic analyses. Officials told us that a sharp increase in program funding could not be used efficiently. Past program targets have strained the capacities of some offices and shortfalls have occurred in accomplishing goals.

Forest officials plan for 10-year periods

Forest officials develop 10-year timber management plans to provide guidance and direction in developing and managing timber resources. Such planning permits an orderly phasing of timber harvests, followed by prompt site preparation and area planting.

Yield and harvest calculations are included in 10-year plans to assure that timber growth within each forest balances annual harvest levels, and to maintain a relatively even flow of timber to meet regional and national needs. As more reforestation and TSI work is done, current annual harvest levels may be increased, provided the forest has a substantial volume of mature timber available.

Many forests are presently harvesting at levels which assume that their entire reforestation backlog will be eliminated within 10-year plan periods. A shortfall of more than 10 percent of planned backlog accomplishment during the 10-year period could result in reducing harvest levels.

For example, officials at one forest planned to accomplish 14,353 acres of backlog reforestation during its 10-year plan period (1976-86), increasing its harvest by 11.5 million board feet a year. If, during the 10-year period, the forest officials determine that accomplishments will fall short by 10 percent or more

(1,435 acres), an adjustment in annual harvest is to be made. As of October 1, 1978, the forest reported about 850 acres of the backlog unreforestable due to technical reasons, with 11,389 acres remaining to be accomplished--less than a 10-percent shortfall.

Conversely, the timber management plans have not TSI assumed that all TSI needs will be done. Thus accomplishment levels of TSI above those contemplated in 10-year plans could increase programed harvest levels.

#### Funding proposals for fiscal year 1980

The President's fiscal year 1980 budget proposes a reduction from fiscal year 1979 of about 27 percent in appropriated funds for reforestation and TSI even though the Forest Service had planned for an increase. (See p. 7.) Budget documents state that proposed program funding would allow for continuing current timber sale levels while deferring activity on sites for which treatment is economically marginal.

The Forest Service develops another reforestation and TIS funding level each year. In accordance with the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (16 U.S.C. 1601), later amended by the 1976 act, the Forest Service prepared a program to eliminate the reforestation backlog and TSI needs by 1984 and to thereby justify increased timber harvest levels. The proposed RPA funding level from this program for fiscal year 1980, as developed in 1975 and adjusted for inflation, was \$255,615,000, which would be about a 48-percent increase over actual fiscal year 1979 funding. Corresponding increases were proposed in acres targeted for accomplishment. The RPA level incorporates funding for reforestation, TSI, and nurseries.

We inquired whether the higher RPA level could be used efficiently and whether corresponding acre targets could be accomplished. Forest Service headquarters officials said that the 1980 RPA level could not be accomplished due in part to an inadequate supply of nursery stock. They said that because nursery sowings are made 2 years before actual planting, reforestation levels are limited. They also said that some regions, including region 6, were already working at levels limited by nursery capacity.

Officials at some locations believed they could accomplish the RPA level in 1980, if funded, while officials at other locations did not. Officials at some locations said funding increases were not needed, nor could they be used efficiently. One factor noted as limiting 1980 reforestation levels was the amount of site preparation being done in 1979. For example, one region 6 forest faces reducing reforestation in fiscal year 1980 and disposing of about 3.8 million seedlings if more funding is not provided in fiscal year 1979 for site preparation. A recent ban on certain herbicides used in preparing sites for planting and removing competing brush could also hamper efficient expansion of reforestation and TSI levels.

#### Difficulties in meeting past targets

Officials at some locations cited difficulties experienced in meeting programmed targets. For example, one region 6 district had scheduled 200 acres of thinning with appropriated funds for fiscal year 1979, but was later directed by forest officials to accomplish 600 acres. A resulting compromise at 400 acres still left district officials concerned that they would have to program about 170 acres of economically marginal projects to meet the 400-acre target. Similarly, a district in region 1 had planned to thin 100 acres, but was given a target of 600 acres, which they said could not be accomplished.

Some districts altered their practices in efforts to meet targets. One district spread available seedlings as far as possible, planting at a density of 300 trees an acre rather than the more common 500 trees an acre planted the prior year.

Forest Service accomplishments in reforestation and TSI have fallen short of targeted goals in recent years. In February 1979 the Forest Service reported the following reforestation and TSI shortfalls to the House Appropriations Committee. (The figures include work accomplished with both K-V and appropriated funds.)

	<u>Region 1</u>	<u>Region 6</u>	<u>Nationwide</u>
	----- (acres) -----		
<u>Fiscal year 1977</u>			
Reforestation:			
Congressional target	44,474	140,320	487,893
Accomplishment	<u>39,286</u>	<u>105,164</u>	<u>382,979</u>
Shortfall	<u>5,188</u>	<u>35,156</u>	<u>104,914</u>
TSI:			
Congressional target	36,380	140,715	516,694
Accomplishment	<u>25,871</u>	<u>110,079</u>	<u>420,420</u>
Shortfall	<u>10,509</u>	<u>30,636</u>	<u>96,274</u>
<u>Fiscal year 1978</u>			
Reforestation:			
Congressional target	49,204	139,702	460,452
Accomplishment	<u>44,815</u>	<u>122,173</u>	<u>411,250</u>
Shortfall	<u>4,389</u>	<u>17,529</u>	<u>49,202</u>
TSI:			
Congressional target	35,002	107,256	467,128
Accomplishment	<u>25,524</u>	<u>83,158</u>	<u>420,414</u>
Shortfall	<u>9,478</u>	<u>24,098</u>	<u>46,714</u>
Total 2-year shortfalls and shortfalls as percentage of targets:			
Reforestation	9,577 (10%)	52,685 (19%)	154,116 (16%)
TSI	19,987 (28%)	54,734 (22%)	142,988 (15%)

The report attributed reforestation shortfalls to such factors as planting stock shortages and the lack of site preparation. TSI shortfalls were attributed to high contract costs, shortage of contractors, and an injunction on the use of certain herbicides. Personnel ceilings were not cited as hampering accomplishment, as most reforestation and TSI work is done by contractors. Officials told us, however, that more personnel would be required to administer contracts and oversee contractor performance if large increases are made in program levels.

Rapid cost growth for contract planting and thinning was cited as adversely affecting program accomplishments at locations we visited. Officials in region 6 said that contract planting costs increased by about 50 percent in 1 year. They said the cost increases were due in part to the lack of a sufficient number of contractors to bid--a situation attributable to recent workload increases. Further increases in targets could result in still higher contract costs, unless more contractors respond to bid invitations.

#### Action plan behind schedule

The Forest Service action plan, designed to strengthen reforestation and TSI programs, will require several years to fully implement and has not been carried out on schedule. As a result important program improvements are not yet being made.

The Forest Service completed preparing the action plan in July 1978 with specific tasks and milestones designed to accomplish the mandates of the 1976 act, as well as to overcome program weaknesses. Many of the action plan tasks cover recommendations made in our May 1978 report.

Completion target dates for the tasks in the plan range from July 1978 through fiscal year 1981. Many tasks call for issuing guidance or directives from headquarters. Thus, full field implementation could extend past action plan implementation dates. For example, national direction on making economic analyses of timber investments is to be issued by July 1, 1979, but as discussed on page 11, economic analyses may not be in general use throughout the Forest Service for several more years.

Target dates which have already come due have not always been met. Of the 42 target dates to be met before

April 1, 1979, few have been accomplished on schedule and 16 have been deferred from 3 to 12 months each from their original dates. For example, the plan called for developing criteria for defining the best potential rate of growth for tree stands by January 1, 1979. The deadline was deferred until July 1979 but Forest Service officials now estimate that this step will not be accomplished until October 1979. For another task the plan called for national direction on reviews of planting and natural regeneration success to be developed by October 1, 1978. That deadline has been set back 9 months to July 1, 1979.

Forest Service officials attributed the delays to understaffing and a late start. They said that the group responsible for plan implementation has not been at full strength and that other Forest Service special projects had drawn staff away from carrying out action plan steps. They said the target dates were established in May 1978 when they believed the plan would get underway by July 1978. However, late publication of the plan caused an initial 2- to 3-month delay.

FOREST SERVICE OFFICES

INCLUDED IN THIS REVIEW

HEADQUARTERS OFFICE, WASHINGTON, D.C.

REGION 1

Regional Office, Missoula, Montana  
Panhandle Forest, Coeur de'Alene, Idaho  
Wallace District, Wallace, Idaho  
Avery District, Avery, Idaho  
Clearwater Forest, Orofino, Idaho  
Lochsa District, Kooskia, Idaho  
Kelly Creek District, Orofino, Idaho

REGION 2

Regional Office, Lakewood, Colorado  
Computer Center, Fort Collins, Colorado

REGION 6

Regional Office, Portland, Oregon  
Willamette Forest, Eugene, Oregon  
Lowell District, Lowell, Oregon  
McKenzie District, McKenzie Bridge, Oregon  
Winema Forest, Klamath Falls, Oregon  
Chiloquin District, Chiloquin, Oregon  
Chemult District, Chemult, Oregon  
Olympic Forest, Olympia, Washington  
Shelton District, Shelton, Washington  
Soleduck District, Forks, Washington

REGION 9

Regional Office, Milwaukee, Wisconsin