95-1077 ENR

CRS Report for Congress

Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems

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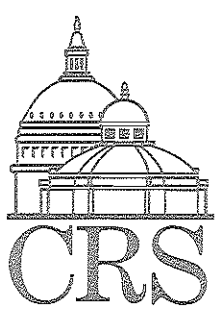
October 30, 1995



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Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems

SUMMARY

The Forest Service currently sells timber by (a) planning and preparing the sale, (b) offering the sale, usually at an oral auction, and (c) administering the timber harvest. Many of the concerns about the timber program have focused on harvest administration, because purchasers have incentives to minimize their costs and to remove only those logs whose value for products exceeds the price paid to the Forest Service. Some critics suggest that this, together with an alleged "timber bias" and other inappropriate incentives, has contributed to environmental damages (*e.g.*, deteriorating forest health), poor fiscal performance (*e.g.*, below-cost timber sales), and a lack of accountability (*e.g.*, timber theft). Possible legislative changes to the timber sale system are being considered by various interest groups and Members of Congress.

Harvest contracting has been proposed as an alternative to the current sale system that would alleviate many of these concerns. This approach would entail a two-step process: (a) a timber harvest contract to cut and remove the wood, and (b) log sales from the collected and sorted wood. Potential advantages include: better implementation of ecosystem management; opportunities to improve forest health without merchantable timber; elimination of below-cost timber sales; and reduction in timber theft. Disadvantages include: Government log market operations; possibly lower log values (Federal revenues); potentially less funding for sale planning and preparation and lower timber harvest levels; and conceivably less accountability because of the lack of adequate harvest contract performance measures.

Alternatively, many suggestions for modifying parts of the current system have been proposed to redress some of the criticisms. Various proposals address fair market value and cost recovery (*e.g.*, tree measurement sales; transaction evidence appraisal; sealed bidding; higher minimum prices); reforestation and timber stand improvement (*e.g.*, restricting the K-V Fund; relaxing reforestation requirements; allowing wood removal in precommercial thinning; relaxing prescribed burning standards); road construction (*e.g.*, public participation in road planning; prohibiting new roads; modifying purchaser road credits); and law enforcement (*e.g.*, independent law enforcement organization; higher consciousness of the problem; stiffer penalties). Many of the proposals have the potential to reduce the environmental damages from timber harvesting and the associated road construction by altering incentives or reducing harvests, although such benefits are likely to be relatively modest. Fiscal results would probably improve, since higher prices, lower unit costs, and better revenue collection are often the purpose of the proposals. However, such changes (particularly higher prices and lower harvest levels)) could economically injure timber purchasers that depend on Federal timber, and thus indirectly hurt some local communities.

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Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems

The U.S. Forest Service, within the U.S. Department of Agriculture, is the largest timberland owner and timber supplier in the United States. There are numerous, often long-standing, concerns about the timber sale practices and procedures -- that they contribute unnecessarily to environmental degradation, that they are fiscally inappropriate or irresponsible, and that they have permitted fraud and theft of Federal assets. Numerous alternatives to the current timber sale system have been described over the past two decades;[1] many of the ideas and conclusions from these efforts form the basis for the alternatives described in this report, and some are being considered by Members of Congress as possible legislative solutions to the perceived problems.

This report first describes the current Forest Service timber sale system and the major concerns over the consequences of the sale system. It then reviews the option of a complete overhaul of the current approach that would separate the timber cutting and removal from the sale of the wood, and analyzes the consequences of this approach. The final section describes a large number of changes in the current system that could be implemented individually or in combination (although some possibilities may be mutually exclusive), and examines the results of these options.

BACKGROUND

THE CURRENT TIMBER SALE SYSTEM

Under the current system, the Forest Service:

(1) prepares a timber sale by: identifying the sale site; planning the roads and cutting prescriptions (*i.e.*, which trees will be cut and which will be left); appraising the timber (to establish minimum acceptable bids); preparing the supporting environmental documentation; and advertising the sale in a local newspaper;

(2) awards the contract to the qualified bidder who offers the highest bid (usually at an oral auction), determined as the total value for the estimated volume at the bid rate for each species; and

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[1]For a discussion of many of these studies, see: Chris Liggett, Cliff Hickman, Rick Prausa, and Nick Reyna. *Timber Program Issues: A Technical Examination of Policy Options*. Washington, DC: U.S.D.A. Forest Service, Jan. 1995. pp. 157-183. (Hereafter referred to as Liggett, *et al., Timber Program Issues*.)

(3) administers the contract by: checking road construction to assure that standards have been met; checking harvest area to assure that stumps are low enough, that all merchantable material is removed, and that only marked trees have been cut and removed; and spot-checking the scaling (measurement) of the wood removed in scaled sales, to assure that the purchaser is paying all that is due.[2]

Voiced concerns have focused primarily on the harvest administration, because the incentives for the purchasers do not necessarily yield the results desired for the forest or for the U.S. Treasury. Purchasers are interested in obtaining wood for their mills (or for resale, if they are not manufacturers) whose value exceeds the stumpage cost plus the costs to fell, yard, load, haul, and mill (or resell) the timber. Thus, purchasers are benefitted by minimizing costs, such as for building roads or for yarding logs, regardless of the environmental consequences, down to the minimum enforceable standards specified in the contracts (or beyond if the standards are not enforced).

For scaled sales, purchasers also benefit most by removing the most valuable logs and leaving the least valuable logs, unless they can be converted into cull, or "per-acre" material (PAM), for which the purchasers make fixed payments. The Forest Service must enforce size and quality standards to assure that all merchantable material is removed and paid for.

This is not to suggest that timber purchasers would break the law if not closely monitored. Undoubtedly, most are law-abiding citizens trying to earn a legitimate return from their labor and/or investments, and have a strong interest in protecting the environment. However, in many areas, competition for Forest Service timber is strong, particularly with the decline in timber sales over the past 7 years.[3] When bid prices are high, many purchasers are squeezed to recover their variable costs, let alone make a profit. Purchasers therefore may seek opportunities to push the many standards to, or even beyond, the limits.

THE CURRENT CONCERNS

Many interest groups and Members of Congress have expressed concerns about the Forest Service timber sale program over the past 15 years or more. These concerns can generally be grouped into three categories: environmental effects, fiscal results, and agency and employee accountability. These categories will be used to compare the alternatives to the current system. In addition, the

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[2]In scaled sales, the purchaser pays the bid rate for the volume removed. In tree measurement (also known as lump-sum) sales, the purchaser pays the total bid regardless of the quantity removed. These alternatives are described in more detail under Adjustments to the Current System.

[3]Forest Service timber sales peaked in FY1987 at 11.3 billion board feet (BBF); they declined to 3.4 BBF in FY1994. While the decline has been greatest in the Pacific Northwest, Forest Service timber sales have declined in every region.

consequences for the timber purchasers and the local communities will be examined in the comparisons.

Environmental Effects

The recent concern over the poor health of western pine ecosystems has been attributed at least partly to inappropriate silvicultural practices, both before and since the national forests were established.[4] Because of the timber industry's needs, logging in mixed conifer stands has emphasized cutting the large pines and leaving the true firs and Douglas-fir to dominate the remaining stands.[5] However, true firs and Douglas-fir are more susceptible to the damage (including insect and disease attacks as well as direct damage) that has occurred during the decade-long drought in the interior West, and thus may contribute to the risk of catastrophic wildfires. Salvage sales are one tool that can be used to improve forest health,[6] but critics object to granting the agency the discretion to use timber sales to correct problems partially created by past timber sales.

A more general concern in some quarters is over Forest Service "bias" toward timber outputs, at the expense of ecosystem conditions and other resource values. While timber harvests are important, other important values are not measured, and managers are not rewarded for achieving these other values.[7] Some have attributed this "bias" to inappropriate incentives, particularly related to the agency's numerous trust funds and special accounts.[8] The Forest Service has several trust funds and special accounts that are either funded by timber revenues or provide funds for timber management (or both).[9]

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[4]See: U.S. Library of Congress, Congressional Research Service. *Forest Health: Overview*. [by Ross W. Gorte.] CRS Report for Congress No. 95-548 ENR. Washington, DC: April 28, 1995. 6 pp. (Hereafter referred to as CRS, *Forest Health Overview*.)

[5]Overgrazing and especially fire suppression over the past century have also contributed to the increased dominance of true firs and Douglas-fir, and may well be more to blame for this shift than inappropriate logging.

[6]CRS, *Forest Health Overview*.

[7]See: U.S. Congress, Office of Technology Assessment. *Forest Service Planning: Accommodating Uses, Producing Outputs, and Sustaining Ecosystems*. OTA-F-505. Washington, DC: U.S. Govt. Print. Off., Feb. 1992. 206 pp. (Hereafter referred to as OTA, *Forest Service Planning*.)

[8]Randal O'Toole. *Reforming the Forest Service*. Washington, DC: Island Press, 1988. 247 pp. (Hereafter referred to as O'Toole, *Reforming the Forest Service*.)

[9]For a description of these accounts, see: U.S. Library of Congress, Congressional Research Service. *The Forest Service Budget: Trust Funds and Special Accounts*. [by Ross W. Gorte and M. Lynne Corn.] CRS Report for Congress No. 95-604 ENR. Washington, DC: May 17, 1995. 45 pp.

One trust fund often cited by critics is the Knutson-Vandenberg (K-V) Fund. This account receives an unlimited portion of timber sale receipts, to be used for reforestation, timber stand improvements, and other resource mitigation and enhancement activities in timber sale areas. Forest Service managers can, therefore, fund their programs from timber sales; in the words of one critic, wildlife managers have an incentive to support timber sales that damage wildlife habitat, because they can use the revenues to mitigate that damage and to keep themselves and their staffs employed.[10] Others staunchly defend this fund, arguing that Forest Service use of timber receipts is an appropriate reinvestment in the national forests.

Fiscal Results

One persistent concern has been "below-cost" timber sales -- timber sales in which the revenues generated are less than the cost to prepare and administer them.[11] The extent of the problem varies, depending on how the costs and revenues are measured and on the strength or weakness of stumpage markets, but below-cost sales are most common in Alaska, the Rocky Mountains, the Appalachians, and the Lake States. Defenders of the timber program assert that such financial criticisms have simply been used to reduce Forest Service timber sales. Nonetheless, below-cost sales are a drain on the Federal Treasury, and some view them as taxpayer subsidies to the timber industry.

An historical concern is over fraud through skewed bidding and related practices, particularly in the Pacific Northwest.[12] The Forest Service altered bidding practices to curb the worst of the abuses, but whether Forest Service timber harvest receipts match the revenue estimates is still unknown. One study showed that harvested *volumes* nearly match estimated sale volumes,[13] but no studies have compared actual harvest receipts with estimated sale revenues. One might expect some differences, because the Forest Service adjusts

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[10]CHEC (Cascade Holistic Economic Consultants). "Testimony of Randal O'Toole on Problems of Forest Service Accountability." In: U.S. House, Committee on Government Operations, Subcommittee on Environment, Energy, and Natural Resources. *Review of the Forest Service's Timber Sales Program*. Hearing, Mar. 31, 1992. 102nd Cong., 2nd Sess. Washington, DC: U.S. Govt. Print. Off., 1993. pp. 93-104.

[11]See: U.S. Library of Congress, Congressional Research Service. *Below-Cost Timber Sales: Overview*. [by Ross W. Gorte.] CRS Report for Congress No. 95-15 ENR. Washington, DC: Dec. 20, 1994. 20 pp.

[12]U.S. Senate, Committee on Agriculture, Nutrition, and Forestry. *The President's Private Sector Survey on Cost Control: Task Force Report on the Department of Agriculture (Draft Report)*. S.Prt. 98-76. 98th Cong., 1st Sess. Washington, DC: U.S. Govt. Print. Off., July 1983. pp. 170-183. (Hereafter referred to as the Grace Commission.)

[13]Walter J. Mead and Mark Schniepp. *Competitive Bidding for Federal Timber in Region 6 -- An Update: 1983-1988*. Contractor report, USDA Award No. 40-3187-8-1683. Santa Barbara, CA: June 16, 1989. 28 pp., plus appendix.

timber contract prices for fluctuations in lumber markets (a process known as stumpage rate adjustment) and because of differences between estimated sale volume and actual harvest volume. When contracts are completed, they are closed, but no analysis is done to explain differences between projected and actual revenues.

One of the Forest Service's special accounts raises concerns about inappropriate fiscal incentives. The Forest Service is directed by law to return 25 percent of its receipts to the States for use on roads and schools in the counties where the national forests are located; the 1908 law establishing this system was amended in 1976 to include deposits to the K-V Fund and credits granted to timber purchasers to compensate them for required road construction as receipts subject to receipt-sharing. The counties argued persuasively that Forest Service use of timber receipts to pay for reforestation and road construction reduced their compensation for the tax-exempt status of the national forests. However, on many forests, the revenue-sharing payments exceed the cash receipts,[14] thus effectively requiring transfers from other, more profitable forests (and making them extreme cases of forests with below-cost sales). More importantly, however, Forest Service revenue-sharing leads many of the counties to become timber sale advocates, to keep the payments high, often without regard to the potential environmental and economic consequences of timber sales. Furthermore, under the current revenue-sharing formula, changes in payments that benefit the U.S. Treasury necessarily hurt the counties (and *vice versa*).[15]

In addition, the sum total of the numerous special accounts and trust funds raise fiscal concerns. GAO recently examined the distribution of timber sale receipts to various accounts, and reported that for FY1992-FY1994, only 10 percent of total Forest Service timber sale receipts was deposited in the General Treasury.[16] The other 90 percent was allocated to various special purposes, such as reforestation, road construction, salvage sales, county payments, etc. The report also showed that the deposits to the General Treasury were less than a quarter of the outlays for preparing and administering timber sales. Thus, because of the substantial allocations to the special accounts and trust funds, the timber sale program has required annual appropriations of taxpayer funds.

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[14]See: U.S. Library of Congress, Congressional Research Service. *National Forest Receipts: Sources and Dispositions*. [by Ross W. Gorte.] CRS Report for Congress No. 89-284 ENR. Washington, DC: May 5, 1989. 71 pp.

[15]Alternatives to the current system for compensating counties for the tax exempt status of the national forests (and other Federal lands) have been discussed elsewhere; see, for example, OTA, *Forest Service Planning*, pp. 26-27. Such alternatives are not included in this report, because they are external to timber sale practices and procedures.

[16]U.S. General Accounting Office. *Forest Service: Distribution of Timber Sales Receipts Fiscal Years 1992-1994*. GAO/RCED-95-237FS. Washington, DC: U.S. Govt. Print. Off., Sept. 1995. 54 pp. (Hereafter referred to as GAO, *Distribution of Timber Sale Receipts, FY1992-FY1994*.)

Accountability

Timber theft has been shown to be a significant problem in the Pacific Northwest.[17] Theft typically occurs: (1) by purchasers harvesting trees that the Forest Service wanted left in place, both within and outside sale boundaries; and (2) by purchasers not paying for the trees harvested. In 1988, much of the theft was reportedly by traditional timber purchasers, sometimes with the complicity of the supposedly independent log scalers and of some Forest Service employees. While the extent of illegal timber removals is necessarily unknown, "Justice Department officials have estimated that only 5 percent of all thefts are being identified."[18] If accurate, this suggests that more than 10 percent of Forest Service timber is being stolen.

Many of the concerns described above are also accountability problems. The critical nature of the forest health problem (regardless of the cause) is largely due to the inadequate inventories of (and measurement systems for) ecosystem conditions. The emphasis on timber outputs is arguably due to the lack of performance measures for providing other values. The potential persistence of skewed bidding results from the lack of financial closure on timber sales to account for differences between projected and actual revenues.

Finally, many of these concerns are intertwined. For example, deposits to the K-V Fund and revenue-sharing payments contribute to below-cost timber sales, because such a small proportion of timber sale receipts are actually deposited into the General Treasury. Some experts believe the emphasis on timber outputs has led to the pine logging in the West that has exacerbated the forest health problem; the salvage sales that can be used to improve forest health are often below-cost, and are funded from one of the special accounts (the Salvage Sale Fund) that contribute to the alleged timber bias. The output emphasis and numerous trust funds and special accounts appear to detract from an interest in examining financial performance, which contributes to the opportunity for timber theft. Thus, many believe that broad, systemic changes may be needed to address these concerns.

TIMBER HARVEST CONTRACTING

The array of interrelated concerns has led some to suggest a complete overhaul of the current system of timber sales -- separating the sale of the wood from the contracts for cutting the trees.[19] This approach would replace the

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[17]U.S. House, Committee on Appropriations, Surveys and Investigations Staff. *Timber Theft in the Pacific Northwest Region of the U.S. Forest Service*. Washington, DC: Dec. 1988. 27 pp. (Hereafter referred to as *House Report on Timber Theft*.)

[18]*House Report on Timber Theft*, p. i.

[19]See: Liggett, *et al.*, *Timber Program Issues*, p. 159.

current system with a two-step process: harvest contracts, to cut and collect the wood; and subsequent sales of the collected wood.

THE ALTERNATIVE SYSTEM

Harvest Contracts

In many respects, timber harvest contracting would be quite similar to the current timber sale contracting. Contract preparation would follow many of the same steps -- the harvest area would be identified; roads and cutting prescriptions would be specified; environmental documents would be prepared; and the contract would be advertised. One significant difference would be the end of timber sale appraisals. Another possible difference, emphasized by supporters of this approach, is the opportunity to define desired end conditions for the contract, rather than just specifying the trees to be cut and wood to be removed.

The second step -- awarding the contract -- would be quite different. Instead of determining the highest bid (revenue) for the timber sale, the Forest Service would identify the lowest bid (cost) for the work to be performed. This might well simplify the agency's task, since assessing low bids from qualified bidders is a standard practice.

The third step -- contract administration -- would again be quite similar to the current process for timber sales. Principally, this would entail checking the contractor's work to assure that the various performance standards were met. One difference is that log scaling would be eliminated; a count of logs by species would facilitate subsequent inventory monitoring, but would not be needed for assessing contractor performance, and therefore could probably be provided by the contractor.

Wood Sales

The harvest contracting approach would entail an entirely new system for wood sales. First, the Forest Service would need to establish log yards for delivery of the wood removed from the forest. Such yards are probably necessary to allow accumulation and sorting of wood deliveries (with separate stacks for specific sales) and to prevent the theft of cut timber. The log yards would need to be sizable, to allow sorting and stacking, and accessible to wood buyers; the agency might need to acquire (or lease) appropriate sites, if suitable lands are not already part of the National Forest System. (This would also remove the land from resource production and use.)

This approach would clearly create new tasks for Forest Service employees. However, in at least some areas, operating log yards and marketing wood could be contracted out. If the contract were for a proportion of the proceeds (with bidders bidding on the proportion), the contractors would have incentives to minimize theft and to maximize revenues (net of their operating costs) by sort-

ing, recutting when appropriate, advertising, and using other marketing tools. Thus, the Forest Service could largely avoid being drawn into operating a profit-making business venture, while maintaining wood sales separate from timber harvesting.

CONSEQUENCES OF THE ALTERNATIVE

Environmental Effects

One of the most widely discussed advantages of harvest contracting is the potential to further implementation of ecosystem management. Basing harvest contracts on the work performed and the resulting conditions of the forest (and ecosystem) could eliminate the existing incentives for inappropriate harvesting that have contributed to the forest health problems of the interior West. Furthermore, ecosystem management and forest health improvement could be done regardless of the existence of harvestable timber on the site; this is particularly important in areas with young, dense stands. The use of salvage or commercial thinning in the current system requires having merchantable timber, often with desirable and relatively undesirable timber combined in one sale to assure that it can be sold.[20]

One possible environmental problem with harvest contracting results from separating on-site work from the mill demands. This might leave excess wood fiber on the site that would need subsequent treatment to assure establishing a new timber stand and to minimize fire hazard. Since such treatments are expensive, and can be environmentally damaging, this might lead to more environmental degradation from harvest sites under harvest contracting.

Fiscal Results

Harvest contracting would completely revise the agency's fiscal operations related to timber sales. The major financial benefit is that gross timber sale revenues would be substantially higher, because purchasers would not have road construction, logging, and some hauling costs. The higher revenues and lower costs for wood sales would probably eliminate below-cost timber sales, and would increase revenue-sharing payments to counties.

There are several ways in which harvest contracting might increase agency costs. First, the Forest Service would necessarily move into the log marketing business. Governmental entities are typically inefficient at market operations, because they are not driven by profits. If log yard operations were contracted with profits to motivate the operators, some of this inefficiency could be avoided. However, effective oversight of such operations, without significantly hampering operator efficiency, would be difficult, at best. Furthermore, areas with widely

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[20]This process of combining profitable and unprofitable timber has been called "cross-subsidization;" see: O'Toole, *Reforming the Forest Service*, pp. 119-130.

dispersed timber stands, such as the central and southern Rockies, may have no log yard contractor available or interested; in such cases, the Forest Service might be required to undertake the marketing operations, possibly without additional funds or personnel.

Another possible cost is that log values are greatly influenced by how the logs are cut in the woods, because mills have widely differing requirements. This is a particular problem in areas with a variety of mills and a mix of timber species, sizes, and grades, such as Washington, Oregon, Idaho, and northern California. Without feedback from mills or log yard operators, harvest contractor's cutting might lose a substantial portion of the wood's market value; however, if the feedback were too strong, the ecological benefits of the harvesters' independence could be compromised.

A third potential problem is funding -- harvest contracting would probably require more appropriations than the current timber sale system. At least some of the additional appropriations would be offset by the higher gross revenues. However, net of county payments and log yard expenses, the higher revenues are not likely to be sufficient to pay for all harvest contracting at current timber harvest levels, let alone any additional funds desired for ecosystem management or forest health improvement activities that yield little merchantable timber. Some have suggested that each national forest be funded from its revenues, as an incentive to be efficient.[21] However, this might re-create the current incentives for Forest Service managers to maximize harvests, regardless of the environmental consequences, and it might prevent needed harvest-type activities if little merchantable timber is available.

Accountability

One advantage of harvest contracting is that it would eliminate many of the existing opportunities for timber sale fraud and theft. Timber theft often occurs by removing unmarked trees or bypassing (or otherwise subverting) the scaling (measurement) of harvested timber. Under harvest contracting, the scaling system would be eliminated, and the contractor would not benefit from cutting trees designated to be left standing because of the fixed contract price, and might well be penalized for not performing to the contract specifications. Illegal payments from an unscrupulous mill operator to a harvest contractor or a log yard operator could, of course, undermine the benefits of this approach, and could be difficult to prevent or investigate.

One possible weakness is accountability for timber harvest contract performance. Defining the desired end results of harvest contracts in quantifiable, enforceable standards would be difficult, at best. However, without standards, harvest contracting may simply include a vague concept of "doing good things" for the forests -- discretion that exceeds the substantial Forest Service authority under the current timber sale system. Thus, unless quantifiable performance

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[21]See: O'Toole, *Reforming the Forest Service*, pp. 198, 214.

measures were established for harvest contracting, the expected environmental benefits might prove elusive or nonexistent.

Timber Industry Impacts

One possible advantage of timber harvest contracting is that it would isolate the timber companies who buy wood from public displeasure over the on-site changes in the forest. Timber industry loggers would no longer be perceived as the "bad guys" for making a profit by clearcutting (often used as a synonym for "destroying") the national forests. Instead, the various public interests could focus on the desirable changes in forest conditions that could be implemented through harvest contracts.

On the other hand, timber harvest contracting could reduce local wood supplies. Critics of the current system object to the emphasis placed on timber sale volume, and harvest contracting is suggested as a way to eliminate timber sales as the sole or principal performance measure for managers. However, without some performance measure related to timber output (as well as performance measures for other resource outputs, uses, and values), harvest levels could decline substantially from already low levels, and could fluctuate widely in volume and quality, depending on the ecological objectives of the harvests. This could economically injure mills and communities that depend on Forest Service timber.

ADJUSTMENTS TO THE CURRENT SYSTEM

Although timber harvest contracting have been suggested as an alternative to the current timber sale system, many proposals focus on adjustments to the current system. Most of these ideas focus on at least one of four areas: fair market value and cost recovery; reforestation and timber stand improvement; road construction; and law enforcement.

FAIR MARKET VALUE AND COST RECOVERY

Fair market value and cost recovery are related but distinct concepts. Fair market value is the price that would be paid by a willing buyer to a willing seller, and is only known with certainty in competitive markets. Cost recovery is whether the price received recovers the seller's costs -- for growing the wood and making the sale. A private timberland owner could not stay in business for long without recovering costs, but the Federal Government does not face such constraints; thus, it has often appeared that the Forest Service is a willing seller at essentially any price, and the market vision of "willing seller" becomes meaningless.

Timber Price Proposals

Several ideas have been suggested to increase timber prices. Most of these approaches are indirect or would affect a limited geographic area, since raising prices is not feasible in competitive markets. Proposals include: tree measurement sales; transaction evidence appraisals; higher minimum prices; sealed bids; and no price adjustments.

Tree Measurement Sales. Two basic sale methods are used for timber -- scaled sales and tree measurement (or lump-sum) sales. In scaled sales, the purchaser bids on rates (usually per thousand board feet) for the primary species in the sale, and then pays those rates for the measured (scaled) volume of timber removed. In tree measurement sales, the purchaser also bids on rates for the primary species in the sale, but then pays the total bid value, at the estimated volumes. Tree measurement sales have been used by the Forest Service in its eastern regions for more than a decade, and are slowly being adopted in the western regions. The slowest shift has been in the Pacific Northwest, but the traditional concern over hidden defects (heart rot and other defects that substantially reduce the volume and/or value) of old-growth timber has declined significantly in the past decade, as the volume of old-growth timber sold and cut has dropped to near zero.

Tree measurement sales have been advocated for several reasons. One is the certainty about the timber payments -- for the purchaser, for the Government, and for the counties that receive 25 percent of the payments. With scaled sales, payments vary substantially from the estimated value, and actual receipts might be considerably less than the estimates (although no studies have examined this relationship). Privatization advocates also support the tree measurement approach, because it shifts burdens of uncertainty over future wood product markets to the private sector, which is arguably better able to adjust for uncertainty than is the Government. It also shifts the burden of accurate volume estimates from the Government to the private sector, which has more at stake and has the opportunity (both in time and capacity) to do a better job. Finally, tree measurement sales have been advocated to encourage timber utilization from the site -- on scaled sales, purchasers have an incentive to leave low-value logs (those worth less than the bid price), but on tree measurement sales, the incentive is to remove all woody material that is worth more than loading and hauling costs.

Tree measurement sales were addressed in the FY1994 appropriations for the Forest Service (Pub.L. 103-138, 107 Stat. 1379). The House Appropriations Committee included a provision to prohibit scaled sales, because:[22]

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[22]U.S. House, Committee on Appropriations. *Department of the Interior and Related Agencies Appropriations Bill, 1994.* H.Rept. 103-158. 103rd Cong., 1st Sess. Washington, DC: June 24, 1993. pp. 76-77.

> 80 to 85 percent of all timber theft relates to log accountability problems associated with timber scaling . . . [and] the Forest Service has made slow progress on moving from third party log scaling to tree measurement sales.

The Senate Appropriations Committee agreed with the desirability of tree measurement sales, but rejected the prohibition on scaled sales. Instead, the Forest Service was directed to phase in tree measurement sales, to "ensure that the current technical shortcomings of the method are recognized and corrected .... [and] assure that their personnel are qualified and procedures are correct."[23] In conference, the House and Senate agreed to a substitute prohibiting scaled sales, except for salvage sales and for thinning sales where the regional forester determines that the scaling method is "the most efficient means for achieving a stated environmental objective."[24]

Transaction Evidence Appraisals. The Forest Service is required by law to sell timber for "not less than the appraised value." While the *Forest Service Manual* states that appraisals are intended to estimate fair market values, the law does not require fair market value for Forest Service timber. Over the past decade, the Forest Service has adopted the "transaction evidence" appraisal system.[25] Competitive bid values on recent sales are used as the basis for the appraised value on each sale, with adjustments for individual sale characteristics (*e.g.*, high-cost logging systems required). Appraised values are then reduced by 30 percent or more, to guarantee advertised prices low enough to assure competitive bidding. The transaction evidence appraisal system is widely viewed as a better estimator of fair market value than the previous system, but critics suggest that its application could be improved -- that its use has been inconsistent, that the "rollback" for competitive advertised prices has been excessive in some

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[23]U.S. Senate, Committee on Appropriations. *Department of the Interior and Related Agencies Appropriations Bill, 1994.* S.Rept. 103-114. 103rd Cong., 1st Sess. Washington, DC: July 28, 1993. p. 78.

[24]U.S. House. *Conference Report: Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1994, and For Other Purposes.* H.Rept. 103-299. 103rd Cong., 1st Sess. Washington, DC: Oct. 15, 1993. p. 49.

[25]The Forest Service originally developed and used the "residual value" appraisal system to estimate timber values to "purchasers of average efficiency." This system deducts average logging, hauling, and milling costs and a profit-and-loss margin from estimated wood product market values to appraise the timber's value. It was widely criticized as an expensive system that grossly underestimated the fair market value of timber. Today, the Forest Service only uses residual value appraisals in Alaska, where this system sets timber prices in the one remaining long-term contract, as well as the basis for bidding on annual timber sales.

areas, and that cost recovery is ignored.[26] While the accuracy of the appraisal is irrelevant in areas with competition (because the appraised value is the beginning point for bidding), it is important in areas with little competition (*e.g.*, the central and southern Rockies), because many sales are sold at or near the appraised value.

Higher Minimum Prices. The Forest Service establishes minimum prices (known as base rates) for groups of timber species in each region. Originally, base rates were set at $0.50 per thousand board feet (MBF) plus the cost of reforestation; this was intended (and expected) to recover the direct costs of sale preparation and harvest administration.[27] Today, base rates range from $1 to $10/MBF (and up to $35/MBF for Ponderosa pine in Arizona and New Mexico), and are "considerably less than the average unit costs for actually preparing and administering timber sales today."[28]

Various alternatives to establish higher base rates have been proposed -- direct cost recovery; total cost recovery; percent of product selling values; and others. As noted for transaction evidence appraisals, higher base rates are irrelevant where competition sets market prices; they are, however, significant in areas with little or no competition.

Sealed Bids. The Forest Service uses oral auctions for most timber sales. Bidders must submit a bond, and attend the auction, with the highest (winning) bid typically a small amount (much less than 0.1 percent) above the second-highest bid. The Forest Service also occasionally uses sealed bidding, where the bidders submit an envelope with one bid for the contract. In such circumstances, the highest (winning) bid may be substantially higher (in one widely discussed case, 400 percent higher) than the second-highest bid.

Sealed bidding is advocated as a means of raising timber prices, by forcing timber purchasers to bid as much as the timber is worth to them, not just a few cents more than it is worth to a competitor. Oral auctions are defended as a way for purchasers that depend entirely on Federal timber to assure supply for their mills, and thus to stay in business; with sealed bids, a purchaser cannot be as certain of supply. Some observers suggest that oral bidding may lead to higher prices, at least occasionally, when a buyer tries to outbid a rival in the heat of the auction. This seems more likely in areas with numerous competitors (*e.g.*, the Pacific Northwest) and substantially lower Federal timber sale levels.

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[26]See: U.S. General Accounting Office. *Federal Timber Sales: Process for Appraising Timber Offered for Sale Needs to Be Improved*. GAO/RCED-90-135. Washington, DC: May 1990. 50 pp.

[27]Liggett, *et al., Timber Program Issues*, pp. 88-92.

[28]*Ibid.*, p. 89.

It is worth noting that both systems are used in the private sector, depending on the traditions of the industry, the relative market power of the buyers and the sellers. It should also be noted that sealed bidding was directed for Forest Service timber sales for 16 months. As originally enacted, the National Forest Management Act of 1976 (NFMA; Pub.L. 94-588, 90 Stat. 2949; 16 U.S.C. 472a.) required sealed bidding on all sales. However, the relevant subsection (§14(e)) was replaced with agency discretion, considering competition, receipt of appraised (notably not fair market) value, and economic stability of timber-dependent communities (Pub.L. 95-233, 92 Stat. 32).

No Price Adjustments. In the western regions (except Alaska), the Forest Service adjusts contract prices for most sales of more than 1 year duration. This practice of modifying contract prices to reflect changing lumber prices, known as stumpage rate adjustment, has been in practice for 40 years.[29] Timber contract prices are lowered based on decreases in lumber price indices (not proportionally -- dollar-for-dollar declines) and are raised by 50 percent of increases in lumber price indices.[30] However, the amount of the adjustment is limited by the base rates. Because base rates are the required minimum cash payment for the timber, contract prices cannot be reduced below the base rates, regardless of how far lumber prices decline. Also, to provide an equitable situation for purchasers, contract prices cannot be raised by more than they could fall; for example, for a sale with a base rate of $10/MBF and an original contract price of $13/MBF, the contract price cannot be raised by more than $3/MBF (a rise of $6/MBF in the lumber price index, because of the 50 percent adjustment). The benefit of lumber price rises above this amount accrue fully to the purchasers.

Stumpage rate adjustment has been criticized on two points. First, the U.S.D.A. Office of the Inspector General concluded that the "50/100 formula" was inequitable treatment of taxpayers, with greater financial protection from market vagaries to purchasers than to the Government.[31] Second, privatization proponents argue that the private sector has developed numerous techniques fully capable of dealing with market fluctuations, and that stumpage rate adjustment should be terminated. One recent study noted that two changes have reduced the need for stumpage rate adjustment -- current timber sales are, on average, of less than half the duration of sales a decade ago; and contract ex-

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[29]This practice differs from rate redetermination that is specified in long-term contracts. (The only remaining long-term Forest Service timber sale contract with such a provision is in Alaska.)

[30]Originally, the adjustment was called the "50/50 formula," because the adjustments were 50 percent of lumber price changes (up and down). The formula was changed to "50/100" in 1971 to give greater protection to purchasers during declining markets. See: Liggett, *et al., Timber Program Issues*, pp. 86-88.

[31]See: U.S. Dept. of Agriculture, Office of the Inspector General. *Forest Service Stumpage Rate Adjustment on Timber Sales*. Audit Report No. 08099-122-SF. Washington, DC: 1991. 17 pp.

tensions to endure market declines are now permitted.[32] Nonetheless, stumpage rate adjustment does protect purchasers from some financial losses during lumber market declines.

Consequences of the Price Proposals

Environmental Effects. The various proposals for altering the pricing and cost recovery of timber sales would probably have few environmental effects. Tree measurement sales would likely increase the amount of wood fiber removed from the site. In areas with thin, poor soils, the reduction in biomass could impinge on soil productivity, while the removal of cull logs increases the risk of mass soil movement. However, it also reduces the need to treat the remaining woody debris, and the environmental degradation associated with mechanical, chemical, and/or fire treatments.

In addition, to the extent that prices are less than the fair market value (*i.e.*, in areas with little or no competition), modifications that raise prices (more accurate implementation of transaction evidence appraisals, higher minimum prices, sealed bids) will depress demand, and therefore may reduce the environmental degradation that some sales cause; alternatively, higher prices might lead to corner-cutting that could increase environmental degradation from sales, and might eliminate some sales that are primarily intended to produce environmental benefits.

Fiscal Results. These proposals generally improve the fiscal results for the U.S. Treasury. Some adjustments (more accurate implementation of transaction evidence appraisals, higher minimum prices) raise prices directly in areas with little or no competition, and thus may increase Federal revenues and reduce the frequency and extent of below-cost timber sales. Sale volumes in these areas may decline, particularly if purchasers are unable to remain in business; this would reduce agency variable costs proportionally, but not fixed or overhead costs. Sealed bidding may raise prices more generally, with less effect on sale volume, but the magnitude of the effect is uncertain. Finally, tree measurement sales would probably increase net revenues by reducing sale preparation and harvest administration costs; more importantly, however, such sales would increase the predictability of gross revenues, and thus improve financial planning for the U.S. Treasury and for the counties that receive a share of the revenues.

Accountability. One proposal (tree measurement sales) is at least partly intended to eliminate one common avenue for timber theft -- scaling. Under tree measurement sales, purchasers pay what they bid, not for the measured removals, and thus, the various practices used to subvert the scaling system would become irrelevant. On the other hand, the second typical avenue for timber theft -- removing trees intended to be left standing -- could become more com-

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[32]Liggett, *et al., Timber Program Options*, p. 87-88.

mon, since avoidance or subversion of scaling would be unnecessary to remove trees illegally. In addition to these effects, sealed bidding would alter the pattern of bidding, and might provide an easier means of identifying collusion (to the extent that it might occur) among purchasers.

Timber Industry Impacts. Most of these proposals would result in higher timber prices, especially in areas with little of no competition, at the cost to timber purchasers. Some timber would undoubtedly be bought at the higher prices, since base rates and appraised values are clearly lower in such areas than in areas with vigorous competition. However, higher timber prices might lead to insolvency for some purchasers who rely substantially or solely on Forest Service timber. Some sales might also remain unsold, resulting in agency costs with no financial returns. It is impossible to determine how much timber prices could rise without causing bankruptcies or unsold sales, and the amount probably varies widely, depending on the current and potential efficiency of existing purchasers. However, the impact of timber purchaser bankruptcies could be significant, since mills that depend on Federal timber are principal employers in many small towns.

REFORESTATION AND STAND IMPROVEMENT

Among the many concerns over Forest Service management of the national forests, the use and alleged abuse of the K-V Fund ranks high. Concerns over reforestation success also persist.[33] In addition, the health and diversity of the ecosystems comprising the National Forest System are increasing concerns, and reforestation and stand improvement (or lack thereof) affect forest health and diversity.

Reforestation Proposals

Several proposals have focused on the activities associated with establishing and improving timber stands. Altering, restricting, or eliminating the K-V Fund are common proposals, but others include relaxing reforestation requirements, allowing wood removal in precommercial thinning, and altering the standards for prescribed burning.

Alter the K-V Fund. The K-V Fund was authorized in the 1930 Knutson-Vandenberg Act (ch. 416, 46 Stat. 527; 16 U.S.C. 576-576b) to fund reforestation and timber stand improvement with deposits from timber purchasers; in practice, K-V Fund deposits have been a portion of timber sale receipts, rather than additional deposits. The 1930 Act was amended by NFMA in 1976, to expand

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[33]See, for example: U.S. House, Committee on Interior and Insular Affairs. *Management of Federal Timber Resources: The Loss of Accountability.* Attached to "Dear Colleague" letter, *Keeping Our Promises*, June 15, 1992, from Hon. George Miller. 29 pp.

the use of K-V Funds to include the mitigation and enhancement of other resource values on timber sale sites. These other uses of K-V Funds began in FY1981, jumped in FY1983 and again in FY1986, as shown in table 1. Since FY1983, about half of K-V expenditures have been used for reforestation (ranging from 43 percent in FY1986 to 59 percent in FY1985), with about a sixth used for stand improvement (ranging from 12 percent in FY1986 to 19 percent in FY1985) and a third used for other resource values (ranging from 23 percent in FY1984 to 45 percent in FY1986).

The use of K-V Funds for nontimber activities has become increasingly controversial. The rationale behind the 1976 amendment was that timber revenues should be used to mitigate damages from timber harvesting, and possibly even to improve forest conditions. However, critics assert that the opportunity to use K-V Funds for other resource activities leads to inappropriate behavior by the Forest Service employees responsible for these other resources. They have in-

Table 1. Use of Knutson-Vandenberg Funds Since FY1980
(in millions of dollars)

Fiscal Year	Total Expenditures	Reforestation	Stand Improvement	Other Uses
1980	75.00	55.10	19.90	0.00
1981	92.78	67.13	19.32	6.33
1982	84.01	62.89	14.90	6.22
1983	116.85	66.30	20.35	30.20
1984	118.00	68.90	21.90	27.20
1985	120.73	70.76	19.33	30.64
1986	156.09	67.11	18.74	70.24
1987	196.69	91.49	28.09	77.11
1988	238.00	114.12	31.13	92.75
1989	237.06	113.79	30.82	92.45
1990	217.31	115.61	30.32	71.38
1991	196.54	103.31	35.28	57.95
1992	247.07	122.07	43.50	81.50
1993	252.62	124.81	44.48	83.33
1994	222.02	125.00	35.28	61.74

SOURCE: U.S. Dept. of Agriculture, Forest Service. "Budget Explanatory Notes for Committee on Appropriations." In: U.S. Congress, Committee on Appropriations. *Department of the Interior and Related Agencies Appropriations: Justification of the Budget Estimates*. Washington, DC: U.S. Govt. Print. Off., annual series, 1982-1995.

centives to advocate timber sales, even when the sales would damage the resources, because they then have money (from the K-V Fund) to undertake projects, including mitigating damage from timber sales.[34]

Several options have been proposed to alter the K-V Fund. An extreme option would be to eliminate the authorization to retain and spend timber sale revenues, either by repealing the 1930 Act or by requiring annual congressional appropriations; H.R. 721 (104th Congress) would enact the latter option. This raises concerns about the adequacy of reforestation funding, but Congress has historically adjusted annual reforestation appropriations in response to the availability of permanent appropriations from the K-V Fund and the Reforestation Trust Fund.[35]

A different proposal would return the K-V Fund to its original purpose -- reforestation and stand improvement -- or even limit K-V Funds to reforestation. Returning the Fund to its original purpose (but expanding it to fund reforestation and stand improvement on BLM lands) was proposed in H.R. 836 (102nd Congress) and H.R. 1502 (103rd Congress), but no congressional action was taken on either bill. Proponents argue that the change is warranted to assure adequate reforestation funding and to eliminate inappropriate incentives. Opponents are concerned that the change would reduce the funding for nontimber management activities, and would isolate timber management (rather than integrate timber with other land management activities) and further polarize the various interest groups.

Another suggestion, that could be combined with either of the above, would limit the share of timber sale receipts that could be deposited in the K-V Fund (*e.g.*, not more than 50 percent of receipts from each sale to be deposited in the K-V Fund). The purpose of such a limit would be to end the spending of more than 100 percent of cash receipts from a timber sale.[36] As noted earlier, this can occur because deposits to the K-V Fund (as well as purchaser road credits and deposits to the Salvage Sale Fund) are counted as receipts for the revenue-sharing payments to the counties; thus, 100 percent of K-V deposits are used for K-V activities, while 25 percent of K-V deposits are shared with the counties -- in effect, 125 percent of K-V deposits are spent. A share limit would necessarily be arbitrary, as pointed out by opponents of the idea; critics, however, assert that it may be necessary to assure that the Forest Service does not use more than all its cash receipts, dipping into annual appropriations to fulfill the requirements of supposedly permanent trust funds.

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[34]O'Toole, *Reforming the Forest Service*, pp. 130-136.

[35]See: U.S. Library of Congress, Congressional Research Service. *The Reforestation Trust Fund: History, Uses, and Opportunities*. [by Ross W. Gorte.] CRS Report for Congress No. 84-730 ENR. Washington, DC: Aug. 10, 1984. 32 pp.

[36]GAO, *Distribution of Timber Receipts, FY1992-FY1994*. This report shows that 46 of 118 national forest units (39 percent) distributed more than 100 percent of their receipts during FY1992-FY1994.

A more radical idea, that would eliminate at least some of the need for the K-V Fund, would be to require timber purchasers to reforest harvested areas, and make reforestation success part of timber sale contract performance. This would alter the agency's direct responsibility from reforestation to contract enforcement. If reforestation were not successful, the Forest Service could (1) forfeit the purchaser's bond, making the bonder liable for reforestation; (2) debar the purchasers from future bidding, making Federal timber unavailable to them; or (3) sue the purchaser for failure to fulfill contract requirements. The advantage of this idea is reliance on the private sector to assure reforestation following timber harvests. However, it provides no assistance for reforesting areas cleared naturally (*e.g.*, by wildfire, without salvage sales) or for reforestation failures after the contract's completion (*e.g.*, because of drought). In addition, sale contract periods would have to be lengthened, to provide for time to reforest and to assure that reforestation was successful, increasing the agency's (and the purchasers') exposure to financial losses during difficult economic periods.

Relax Reforestation Requirement. NFMA enacted a provision from the Church Clearcutting Guidelines[37] effectively prohibiting timber harvests from lands which cannot be reforested within 5 years of the harvest; specifically, §6(g)(3) requires land management planning guidelines which:

> (E) insure that timber will be harvested from National Forest System lands only where-- . . . .
>
> (ii) there is assurance that such lands can be adequately restocked within five years after harvest . . . .

This provision has been widely interpreted as requiring reforestation within 5 years of harvest. To fulfill this requirement, the Forest Service generally plants harvested sites with trees from its own nurseries, and rarely relies on natural regeneration (*i.e.*, from seeds blown or carried into the harvest site from the surrounding forest). However, plantings are typically of a single species, even on sites from which a variety of species were harvested. Furthermore, nursery stock has less genetic variation (within the species) than a natural (wild) forest, particularly if the nursery produces "genetically superior" seedlings for accelerated wood production. The 5-year reforestation standard may, therefore, be contributing to a decline in genetic and species diversity in the national forests.

An alternative would be to relax the 5-year reforestation standard and direct the Forest Service to use natural regeneration when feasible, including an emphasis on silvicultural and site preparation methods appropriate for natural regeneration. Artificial reforestation (*e.g.*, planting) would be used principally to supplement natural reforestation, where and when natural regeneration was

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[37]U.S. Senate, Committee on Interior and Insular Affairs, Subcommittee on Public Lands. *Clearcutting on Federal Timberlands*. Committee Print. 92nd Cong., 2nd Sess. Washington, DC: U.S. Govt. Print. Off., Mar. 1972. 13 pp.

inadequate. Proponents emphasize not only the greater genetic and species diversity of naturally regenerated stands, but also the lower cost of natural regeneration. Opponents object to the possible delay in reforesting sites, with extended erosion and visual impairment and probably lower timber sale levels.

Wood Removal from Precommercial Thinning. Precommercial thinning -- the cutting of trees with no value for producing commercial wood products -- is an important tool for improving forest health. One of the major health problems is an excessive number of small-diameter trees (less than 5 inches) that often leads to stand stagnation (virtually no net timber growth).[38] Many of these trees were killed in periodic wildfires prior to the successful fire suppression in the 20th Century, but uncontrolled fire is unacceptable to the American people, and prescribed fire (discussed below) is less successful at reducing stand stagnation.

The use of precommercial thinning is limited by its high cost, especially in dense, stagnant stands in rough terrain. One suggestion to reduce contract thinning costs would permit contractors to remove the trees that are cut down. While these trees are not useful for standard wood products (lumber and plywood), they can be used for other, often special products -- commercial firewood; *latilla* (the open pole/lath used in ceilings and porches of traditional southwest construction); wooden pole fencing; etc. Contractors are currently not permitted to remove the trees: they are Federal property, and can only be disposed under authorized methods -- free (or at an administrative fee) for personal use, or sold (generally competitively) for commercial use. If the value of the trees exceeded the contractors' costs, the thinning could be conducted as a commercial timber sale, and such commercial thinnings are common in areas with larger diameter trees. For small-market special products, however, a commercial sale is often infeasible, but the sale or use of the trees could offset some of the thinning contractors' costs, and thus allow them to bid lower prices for the precommercial thinning contracts. Only Congress can grant the authority to remove Federal property for subsequent commercial use or sale without direct compensation -- effectively allowing the use of trees with little commercial value as partial payment for the thinning work.[39] No specific opposition to this option has been voiced publically, to date.

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[38]See: CRS, *Forest Health Overview*.

[39]This vision is somewhat similar to "land stewardship contracting" that was tested on several national forests during FY1992 and FY1993, and would have been authorized by H.R. 5007 in the 103rd Congress. That pilot program authorized the Forest Service to exchange commercial timber for activities with nontimber objectives (*e.g.*, wildlife habitat improvement, watershed rehabilitation, insect and disease control). However, the idea for precommercial thinning is to use wood with little or no traditional commercial value to reduce the cost of the operation. For a discussion of land stewardship contracting, see: V. Alaric Sample and Anthony A. DiNicola. *Land Stewardship Contracts: Issues and Opportunities*. Washington, DC: American Forests, Forest Policy Center, Dec. 6, 1994. 25 pp.

Prescribed Burning. Prescribed burning -- initiating (or allowing) wildfires under prescribed conditions (usually fuel and weather conditions) -- is another useful tool for forest health improvement. Prescribed fires reduce understory biomass, both green (shrubs and some trees) and dead (*i.e.*, fuels), converting organic material into mineral form that can be used by the remaining vegetation.

Two factors limit the use of prescribed burning: air quality and cost. All fires generate smoke, and prescribed fires generate more than many wildfires, because they burn under relatively cool, moist, stable conditions (so they can be controlled) that reduce burning efficiency and therefore generate more smoke. In addition, such atmospheric conditions are ideal for inversions, which keep the smoke in populated low-elevation areas for extended periods. Smoke management, to meet the standards of the Clean Air Act, is thus part of prescribed burning, and air quality standards are the principal constraint on the "window of opportunity" (the days of acceptable burning conditions) for prescribed burning. Supporters of more prescribed burning assert that looser standards are warranted for prescribed burning, because it reduces fuel loadings, and allegedly the probability and the extent of wildfires, and therefore reduces smoke at other times and under other, possibly less desirable, conditions. Opponents, however, are concerned about possible health hazards from the smoke generated by prescribed fires, especially when atmospheric inversions keep the smoke in an area for an extended period.

As with precommercial thinning, the high cost of prescribed burning is also a limiting factor. The cost of prescribed burning is substantially a function of risk -- more money is spent on equipment and personnel to reduce the chances of losing control of a prescribed fire. Clearly, losing control is undesirable; one prescribed fire that escaped control in Michigan in 1980 killed a person and destroyed 44 homes and buildings.[40] Furthermore, the likely damages from an escaped prescribed fire continue to rise as more people build homes (both primary residences and second homes) in and near national forest lands. (This occurrence is widely known as the "urban-wildland interface," and is seen as a problem for all fire management activities.) Simple answers for this problem do not exist, but greater cooperation with private landowners, compensation for damages, and some managerial tolerance of failure could reduce prescribed burning costs. However, in contrast to possibly loosening air quality standards, these options (except for compensation) do not lend themselves to congressional solutions.

Consequences of the Reforestation Proposals

Environmental Effects. The various proposals affecting reforestation and timber stand improvement have differing environmental effects. Changing the K-V Fund might reduce funding for mitigating environmental damages or en-

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[40]Albert J. Simard, Donald A. Haines, Richard W. Blank, and John S. Frost. *The Mack Lake Fire*. Gen. Tech.Rept. NC-83. St. Paul, MN: USDA Forest Service, 1983.

hancing other resource values, but might also reduce the incentives for non-timber managers to support timber sales for the budgetary benefits. Allowing wood removal from precommercial thinning sites might reduce the biomass available for decomposition (and natural fertilization), but the stems that would be removed are a relatively minor component of total biomass on the sites.

Relaxing the reforestation requirement could have several contrary effects. By delaying successful stand establishment, it might increase soil erosion from the site, and could lead to increased or prolonged stream sedimentation. However, natural regeneration more closely approximates natural succession, and is likely to result in a greater diversity of plant (and therefore also of animal) species, as well as greater genetic diversity for the desired tree species.

Similarly, more prescribed burning could have contradictory effects. Since natural fires and fires set intentionally by Native Americans were more common and widespread than wildland fires are today, more prescribed burning would probably lead to a better approximation of historic fire regimes. However, the prescribed fires may be set at different seasons than occurred historically, and thus the burning intensity may be lower and smoke production greater than from historic fires.

Fiscal Results. The various proposals altering the K-V fund are substantially intended to improve the fiscal performance of timber production for the U.S. Treasury. The changes would increase congressional control over expenditures for some (from restricting K-V Funds to reforestation) or all (by requiring annual appropriations) of the activities now funded permanently. Making reforestation part of the timber sale contract would likely reduce gross timber revenues, but would also lead to lower expenditures for reforestation and for compensating counties; however, it would also increase the Federal financial exposure from bankruptcies and other financial problems of purchasers. The percentage cap on K-V Fund deposits would reduce the likelihood of dispersing more than 100 percent of timber sale revenues; GAO recently documented that nearly two-thirds of the national forests (77 of 118) dispersed more than 100 percent of timber revenues in at least 1 of 3 recent fiscal years, and that 39 percent of the forests (46 of the 118 units) dispersed more than 100 percent of timber revenues in aggregate.[41] Capping the percent of receipts deposited in the K-V Fund would not eliminate this problem, since three other accounts also receive significant proportions of timber revenues, but the K-V Fund received a larger share of timber revenues than any other account (except revenue-sharing payments to counties), including the General Treasury.

The other reforestation proposals would likely reduce average costs for the various practices. Data comparing the cost of natural and artificial reforestation have not been published, but natural regeneration, even with site preparation, is probably much less expensive than planting trees. The option of allowing wood removal during precommercial thinning operations is intended primarily

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[41]GAO, *Distribution of Timber Sale Receipts, FY1992-FY1994*.

to lower the cost of such operations, while the proposed changes for prescribed burning are similarly intended to reduce costs. It seems more likely that lower average costs for precommercial thinning and/or prescribed burning would lead to additional acreage treated rather than to lower total expenditures.

Accountability. Some of the proposals altering the K-V Fund might increase the accountability of agency employees for reforestation success. Focusing K-V Funds on reforestation would highlight such performance, while congressional appropriations would lead to annual oversight of performance. Making reforestation part of the sale contract would increase the linkage between the cutting activity and the stand regeneration; since reforestation success is partly due to the cutting practices and timing, this linkage might increase performance. However, assuring successful reforestation might be more difficult, because it would depend on having measurable performance standards, monitoring to assure that performance has met the standards, and the firm's continued existence and financial strength.

The other reforestation proposals might reduce agency accountability. Relaxing the reforestation requirement might allow less successful performance, because of the possibly greater time lag between the need for reforestation and the likely timing of success; employees may have moved to different locations before success (or failure) is known. Furthermore, documenting reforestation success may be more difficult, because success in duplicating natural succession cannot be measured solely by numbers of trees of a particular species. For prescribed burning, greater tolerance of failure to control the prescribed fires would necessarily lead to less accountability for the costs and damages of such escaped fires.

Timber Industry and Community Effects. Making reforestation a requirement of timber harvest contracts could have a chilling effect on purchasers interested in the timber, and therefore could reduce competitively bid prices. In particular, this proposal would substantially increase the purchasers' financial exposure, and might make them responsible for failures due in part to natural causes (*e.g.*, a drought that exacerbates reforestation failures).

More prescribed burning could affect the local communities in two ways. First, greater tolerance of escaped fires could lead to more local property damage from fire. Second, more prescribed burning would likely increase the amount of smoke exposure, because the fires would occur under cooler, moister conditions that reduce burning efficiency and make inversions more likely. Alternatively, prescribed fires might reduce the likelihood and/or severity of wildfires, and thus reduce or eliminate smoke during larger, more threatening events.

Finally, relaxing the reforestation requirement could affect the timber industry by altering the allowable timber sale quantity (ASQ). Section 13(a) of NFMA essentially directs the Forest Service to limit national forest timber sales to the available timber growth (with specified exceptions). Natural regeneration

may delay stand establishment and result in lower growth rates than planted stands (because of the mix of species and the natural seed source), and thus may lower the ASQ. However, if natural regeneration is less costly, then fewer acres might be classified as not suited for timber production under §6(k) of NFMA (which requires consideration of physical, economic, and other pertinent factors in identifying lands not suited for timber production). The resulting increase in available timberland might offset some of the ASQ decline associated with lower growth from the natural species mix and genepool.

ROAD CONSTRUCTION

Road construction has been among the most controversial of all Forest Service programs. One reason is the high cost -- $200 million or more in annual Federal expenditures and $100 million in purchaser road credits. (See table 2.) The other reason is the high impact of roads on water, wildlife, and especially wilderness values. Furthermore, avenues for controlling road construction -- amount and location, as well as cost -- are indirect, at best. The principal means for controlling road construction has been through annual appropriations, but the budget request only provides total funding and mileage, with no regional data, no relationship to other activities, and no information on standards or alternatives.

Road Construction Proposals

Proposals to constrain Forest Service road construction include requiring greater public participation in road construction planning, prohibiting new road construction, and altering purchaser road credits.

Greater Public Participation in Road Planning. Road construction decisions seem to be made with little public oversight or scrutiny. Section 10 of NFMA provides some standards for road decisions, directing: a transportation system "to meet anticipated needs on an economical and environmentally sound basis;" temporary roads "unless the necessity for a permanent road is set forth in the forest development road system plan;" and design standards "appropriate for the intended uses, considering safety, cost of transportation, and impacts on land and resources."

The "forest development road system plan" appears to be part of the land and resource management plans required by NFMA; these plans identify standards and guidelines for road construction (and most other activities), although road locations are decided only in planning the project for which the road is needed. While this approach establishes roads as support for forest management, it implies that roads are relatively unimportant. However, road construction appropriations exceeded timber sale appropriations until FY1989, and total road construction funding exceeded timber sale appropriations until FY1993. Furthermore, road construction and use are recognized as major contributors to

Table 2. Forest Service Road Construction Since FY1980
(funding in millions of dollars)

Fiscal Year	Appropriations [a] Miles		Funding		Purchaser Roads [b] Miles	Funding
1980	923.3	(9%)	$ 221.736	(46%)	9,541.5	$ 255.875
1981	1,217.6	(12%)	240.595	(49%)	8,835.3	248.110
1982	1,867.0	(21%)	226.894	(49%)	6,863.1	234.865
1983	2,016.1	(24%)	252.731	(63%)	6,395.0	147.645
1984	1,667.6	(22%)	250.337	(67%)	5,981.6	121.730
1985	1,902.9	(24%)	243.288	(68%)	6,184.6	116.990
1986	1,312.2	(20%)	197.324	(67%)	5,165.2	97.692
1987	2,446.2	(31%)	234.026	(70%)	5,482.0	102.566
1988	1,391.6	(20%)	198.863	(65%)	5,730.6	108.174
1989	873.1	(16%)	174.756	(68%)	4,678.6	83.955
1990	883.0	(13%)	173.982	(59%)	5,662.7	123.174
1991	914.7	(18%)	196.357	(69%)	4,114.4	87.710
1992	853.2	(19%)	187.068	(68%)	3,586.7	86.890
1993	415.0	(12%)	143.710	(70%)	3,026.6	61.842
1994 [c]	204.5	(8%)	86.719	(58%)	2,248.6	62.715

[a] Includes Washington Office funds ($5-8 million annually) and road construction funding through the Tongass Timber Supply Fund ($10-20 million annually, 1981-1991).

[b] Includes mileage and funding in the Purchaser Election Program, wherein the Forest Service contracts for required road construction in timber sales, and is compensated with higher timber sale receipts, which are deposited into a permanently-appropriated fund to maintain this program.

[c] Draft report.

SOURCE: U.S. Dept. of Agriculture, Forest Service. *Report of the Forest Service.* Washington, DC: annual series, 1981-1995.

soil and water degradation associated with timber harvesting.[42] Thus, many observers believe that treatment of road construction as a support function greatly understates its importance in national forest management.

One proposal would direct the Forest Service to provide more explicit details -- in NFMA planning, in RPA planning, in annual budget proposals, in

[42]Wayne T. Swank, Leonard F. DeBano, and Devon Nelson. "Effects of Timber Management Practices on Soil and Water." *The Scientific Basis for Silvicultural and Management Decisions in the National Forest System.* [Russell M. Burns, Tech. Compiler.] USDA Forest Service Gen. Tech. Rept. WO-55. Washington, DC: U.S. Govt. Print. Off., Sept. 1989. pp. 79-106.

annual reports, etc. -- on the current and anticipated road network, together with estimated construction and maintenance costs. This would give Congress and the public greater opportunities to examine the rationale behind various road construction proposals, and to influence the decisions.

Another, possibly compatible suggestion is to amend NFMA to require the Forest Service to consider road construction and maintenance costs, perhaps including appropriate interest charges, in road design standards and in road construction planning. As noted above, design standards only are required to consider safety, user costs, and environmental effects. Considering construction and maintenance costs would likely lead to fewer high-standard roads, and high-standard roads are widely regarded as undesirable by both environmentalists and timber purchasers.

Prohibition on New Roads. A more radical option is to build no new roads, limiting construction to upgrading existing roads where appropriate. While this sounds simple, determining existing roads (that could be upgraded under this option) has proven a serious difficulty in establishing valid highway rights-of-way across unreserved public land under R.S. 2477.[43] Prohibiting new roads would probably restrict timber sales in regions with substantial roadless areas that are available for timber harvesting under current forest management plans, such as Idaho and Montana. A more limited idea -- no new roads into roadless areas -- was proposed in unsuccessful amendments to the FY1994 and FY1996 Interior Appropriations Acts.[44] Critics of road construction have succeeded in reducing expenditures over the past 15 years. Total road construction financing has fallen from nearly $500 million for more than 10,000 miles of road construction in FY1981, to less than $150 million for 2,500 miles of construction in FY1994.

Altering Purchaser Road Credits. The system for financing road construction with credits to timber purchasers was authorized in the 1964 National Forest Roads and Trails Act (Pub.L. 88-657, 78 Stat. 1089; 16 U.S.C. 532-538); specifically, in addition to road construction by appropriations and by cooperative financing with other public agencies and with private entities, §4 allows roads to be built "by requirements on purchasers of national forest timber and other products, including provisions for amortization of road costs in contracts." This amortization is the authority for road credits, although the agency was using road credits prior to the enactment of this authority.

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[43]See: U.S. Library of Congress, Congressional Research Service. *Highway Rights of Way: The Controversy Over Claims Under R.S. 2477.* [by Pamela Baldwin.] CRS Report for Congress No. 93-74 A. Washington, DC: April 28, 1993. 46 pp.

[44]See: *Congressional Record* [daily ed.], v. 139, no. 97 (July 14, 1993): H4619-H4624. *Congressional Record* [daily ed.], v. 141, no. 115 (July 17, 1995): H7125-H7131.

The purchaser credit system is a complicated, off-budget[45] transaction; in essence, the Forest Service uses timber to pay for road construction (*i.e.*, the agency trades timber for roads). In the timber sale appraisal, the Forest Service specifies permanent roads to be built, and estimates construction costs. The purchaser is then granted credits for the estimated construction cost, which can be used to pay for timber; in addition, purchasers may transfer credits among sales within one national forest, although they cannot transfer credits to sales on other national forests or to other purchasers. Because the credits can be used to pay for timber before making any cash payments (except for certain required deposits and payments), the credits are effectively short-term interest-free loans to the purchasers.

In some cases, purchasers cannot use the road credits. The base rates (described above) are minimum cash payments for the timber. Thus, in sales with road credits that are sold at the base rates, purchasers cannot use the credits, and the unusable (known as "ineffective") credits cannot be transferred to other sales. If sales are bid up from the base rates, the credits become usable ("effective"), up to the difference between the bid rate and the base rate.[46] To further complicate matters, Forest Service stumpage rate adjustments (also described above) can alter the amount of effective and ineffective credits after the contract is signed.

Some critics have suggested that purchaser credit be terminated as a means of financing road construction. They argue that the credits are an unnecessary, complicated system that encourages fraud and abuse, and cite the lack of pur-

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[45]Purchaser road credits were beyond the purview of the Appropriations Committees from 1964 until 1975. Then, the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA; Pub.L. 93-378, 88 Stat. 476; 16 U.S.C. 1600-1614), referring to the Congressional Budget and Impoundment Control Act of 1974 (Pub.L. 93-344, 88 Stat. 297), defined the credits to be budget authority, and therefore subject to annual appropriations. This approach was altered in the FY1982 Appropriations Act (Pub.L. 97-100, 95 Stat. 1391). Senator McClure offered unprinted amendment number 532 to delete the identification of credits as budget authority, and to establish a ceiling on annual obligations of purchaser credits (*Congressional Record* (Oct. 26, 1981): S12145). The conference replaced this with a provision directing limits on credit obligations in the annual appropriations acts (H.Rept. 97-315), but again removing them from budget controls.

[46]Purchasers can, therefore, bid up base rate sales by the amount of the road credits (making the credits effective). Such bids (called "wooden dollar" bids) allow purchasers to delay cash payments, without increasing their total cash requirements. They cost the U.S. Treasury, however, because effective credits are counted as receipts, and thus 25 percent of the amount is returned to the States for use on roads and schools in the counties where the national forests are located.

Wooden dollar bids are not without risk for the purchasers, because of the complicated stumpage rate adjustment process, described earlier. If lumber prices go down, contract prices are reduced (making some credits ineffective again), but if lumber prices go up, contract prices rise and thus *may* require additional cash payments (depending on the base rate, the bid rate, the adjustment, and any remaining ineffective credits). Thus, wooden dollar bids may cost purchasers cash if lumber prices rise.

chaser credit in BLM timber sales as evidence that road construction can be completed by requirements in the timber sale contract, without compensation *via* credits.[47] Supporters of the current system acknowledge that purchasers with ineffective road credits, most commonly in the Rocky Mountain regions, are at a disadvantage to purchasers elsewhere.[48] However, in contrast to proposals to terminate the use of purchaser credit, they suggest that ineffective credits should be transferrable (and salable), such that purchasers in areas with low-value timber can be compensated for road construction by selling their credits to purchasers in areas with higher-value timber.

Consequences of Road Construction Proposals

Environmental Effects. The possible environmental effects of the various proposals for altering Forest Service road construction are difficult to predict. If proposals, such as eliminating new road construction and possibly public participation in road planning, were to reduce total road construction mileage, the environmental degradation that often results from road construction and use would likely be reduced. It might also reduce timber sales in some areas, with many of the environmental benefits and costs discussed above.

Alternatively, some proposals would more be likely to alter the nature of the road construction and use, generally by lowering standards and/or substituting temporary roads for permanent roads. Lower road standards could lead to more soil erosion and stream sedimentation, and increase the risk of a road or culvert washout. However, lower standard roads are also likely to be used less, and erosion is partly a function of use. Furthermore, temporary roads, that are either reforested or at least planted to grass, reduce long-term erosion and sedimentation, and thus reduce the environmental effects of road construction.

Fiscal Results. The fiscal results of proposals to alter Forest Service road construction are more difficult to predict. Increasing public participation in road planning would probably increase administrative costs for road construction. Lower road standards and/or temporary roads seem likely to reduce construction costs, and thereby raise timber prices indirectly; however, such changes might also increase purchasers' hauling costs and thereby reduce timber prices indirectly. It seems probable, but far from certain, that road construction costs would decline by more than hauling costs would rise.

Altering the purchaser road credit system would have substantial fiscal effects, despite the noncash nature of the transaction. Making the credits trans-

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[47]See: U.S. Library of Congress, Congressional Research Service. *Federal Timber Sales.* [by John H. Beuter.] CRS Report for Congress No. 85-96 ENR. Washington, DC: Feb. 9, 1985. pp. 103-104.

[48]William N. Dennison. "Purchaser Road Credit: A Tool in Need of Repair." *Forest Industries,* v. 110, no. 11 (Nov. 1983): 24-25.

ferrable or salable would probably cost the Federal Government in the short run through lower cash receipts from timber sales and/or higher revenue-sharing payments to the counties, since ineffective credits currently result in no cost to the U.S. Treasury. Eventually, this change would probably lead to higher bid prices for timber, although it is unclear whether the higher prices would fully offset the additional costs to the U.S. Treasury. Alternatively, eliminating the credits would undoubtedly lower timber prices in areas with competitive bidding, but would benefit the U.S. Treasury by eliminating the 25 percent "sharing" of this noncash transaction with the counties. In addition, eliminating the credits seems likely to simplify accounting for the Government (reducing expenditures) and for the purchasers (moderating the likely decline in timber revenues).

Finally, prohibiting new road construction would probably reduce timber sales in some areas. To the extent that such areas generate proceeds for the U.S. Treasury, such a change would cost the Federal Government. However, roadless areas that have not been statutorily removed from the timber base (*e.g.*, by wilderness designation) are most common in Idaho and Montana, and none of the national forests in these States generated timber revenues, net of the multitude of required dispositions, that exceeded sale preparation and harvest administration costs in aggregate over 3 recent fiscal years.[49] Thus, reducing timber sales in roadless areas might generate net benefits for the U.S. Treasury.

Accountability. Increased public accountability for the road program is a major reason for, and would probably result from, the suggestions to increase public participation in road planning. Eliminating road credits would make road construction and financing more transparent, and thus arguably would increase public accountability for agency actions. The other proposals seem to have little effect on accountability.

Timber Industry and Community Effects. The effects of the road construction proposals on the timber industry and on local communities are unclear. As discussed above, a shift toward temporary roads would lower construction costs while raising hauling costs, with some likely benefits to the purchasers. Prohibiting new roads would probably reduce available timberland substantially in some areas, but lower road construction costs might offset some of this decline. (This offset parallels the possible changes in ASQ discussed above.)

As noted under Fiscal Results, several of the proposals would affect the revenue-sharing payments to the counties, raising the payments in some cases (*e.g.*, by making credits transferrable or by indirectly raising timber prices) but lowering them in other cases (*e.g.*, by eliminating credits or by making some areas unavailable for timber harvesting).

Finally, the shift toward increased use of temporary roads would limit the access to and across national forest lands; it probably would not eliminate any

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[49]GAO, *Distribution of Timber Sale Receipts, FY1992-FY1994.*

existing access, but would not expand access, either. However, many local users are interested in motorized access to or across national forest lands that are currently inaccessible. Thus, such a proposal would constrain their interest in expanding access. Alternatively, increased public participation might allow such interests to express their desires, and might lead to greater responsiveness to their interests.

LAW ENFORCEMENT

Law enforcement is a continuing problem for the Forest Service. Although not the agency's primary mission, employees are responsible for assuring that the laws and regulations are followed, to protect both the public and the resources. The problems are myriad -- vandalism, marijuana production, sites for other illegal activities (*e.g.*, smuggling), and as noted above, timber theft. This discussion emphasizes law enforcement as it relates to timber harvesting -- primarily timber theft -- because the report focuses on timber sale practices and procedures, not because timber theft is more serious or more prevalent than other illegal activities.

Law Enforcement Proposals

Proposals for improving the effectiveness of law enforcement in the national forests generally focus on three areas: organizational structure, employee awareness, and penalties.

Independent Enforcement. Critics argue that the current organizational structure, with law enforcement personnel as staff to line officers throughout the agency, has contributed to inadequate enforcement of laws and regulations. As discussed earlier, many assert that the Forest Service places substantial emphasis on physical outputs, particularly timber.[50] In their desire to meet timber sale targets, line managers generally seek to maximize the number of available timber customers. Debarring purchasers (preventing them from bidding on sales) may be seen by some as a threat to meeting sale targets. It is far easier for those responsible for selling timber (line managers and some staff) to ignore the problem, and cases of interference with investigations have been reported.[51]

One suggestion to remedy this situation is to establish law enforcement as an independent entity within the Forest Service. This was proposed by the House Appropriations Committee in 1993, with a separate appropriated line item for law enforcement in the national forests (H.Rept. 103-158, pp. 78-79). The Senate Appropriations Committee, citing the need for cooperation between

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[50]See: OTA, *Forest Service Planning*, pp. 10, 17-18.

[51]*House Report on Timber Theft*, pp. 25-26.

line management and law enforcement, consolidated law enforcement funding into one entry (an expanded budget line item) within National Forest System funding (S.Rept. 103-114, pp. 73-74). The conference agreed to the Senate version (H.Rept. 103-299, pp. 39-40), and the bill was signed into law on November 11, 1993 (Pub.L. 103-138).

Consciousness-Raising. The House Appropriations Committee's Surveys and Investigations Staff described a widespread "attitude" problem among Forest Service employees -- that theft is condoned and sentences for convicted thieves are lenient.[52] This problem was attributed to "the prevailing mind-set that 'industry is our friend.'" It was felt important that employees at all levels of the agency become aware of the serious nature of timber theft -- that the thief is stealing taxpayer-owned assets -- and be willing to report evidence of the crime. However, as with the potential to accept greater risk of escaped prescribed fires, raising employee consciousness and intolerance of illegal activities cannot readily be legislated; it must come from within the agency, with the tone set at the highest levels.

Stiffer Penalties. The *House Report on Timber Theft* noted that the penalties for timber theft are often lenient. In cases of trespass (cutting trees outside sale boundaries or designated to be left standing), for example, the thief can be "made to pay double or triple the amount of the contract rate for trees cut [but often] . . . only pays the bid price with no penalty."[53] In another case, a purchaser under indictment for bid-rigging (a violation of antitrust law) was able to purchase enough Forest Service timber to keep the mill operating while debarred from purchasing additional timber; this millowner was reportedly viewed as a civic-minded citizen who simply got caught for using a widespread practice, not as someone who was stealing from Federal taxpayers.[54]

Increasing the penalties for timber theft have been suggested as a way to increase the awareness of the seriousness of the crime for both employees and purchasers. Penalties related to contract rates would only be appropriate if the stolen timber is no more valuable than the legally harvested timber; an alternative might be to base penalties on average or high bids, regionally or within a national forest, for the species and grades of timber stolen. Requiring forfeiture of existing contracts for debarred purchasers has also been suggested, but has been rejected by the Forest Service.[55] Nonetheless, the proposals suggest that the penalties for purchasers convicted of fraud or theft be adequate to deter others from engaging in similar practices, and that the penalties apply not only

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[52]*House Report on Timber Theft*, p. 19.

[53]*House Report on Timber Theft*, p. 5.

[54]*House Report on Timber Theft*, p. 15.

[55]*House Report on Timber Theft*, p. 16.

to the responsible individuals, but also to their organizations, to encourage purchasers to employ legitimate practices and law-abiding personnel.

Consequences of Law Enforcement Proposals

Environmental Effects. To the extent that timber theft causes environmental damage (by removing trees that should be left standing), actions that reduce theft would reduce that environmental damage. However, since timber theft is less than 10 percent of total timber removals, and much of the theft is to avoid payments on otherwise legitimately harvested trees, timber theft is probably a minor cause of environmental damage, and reducing theft therefore probably provides little environmental benefit.

Fiscal Results. Additional law enforcement personnel to reduce theft could prove costly, but the proposals generally focus on low-cost ways to reduce theft. Reducing theft would also likely generate additional timber revenues and income from stiffer penalties. As noted above, the extent of illegal timber removals is necessarily unknown, but could be as much as 10 percent of legal Forest Service timber harvests. With gross timber receipts averaging nearly $1 billion annually (including noncash transactions, *i.e.*, purchaser road credits, and deposits to the numerous trust funds and special accounts) in recent years,[56] the stolen timber could be worth as much as $100 million. While not all of this could be collected, a substantial fraction probably could be. Furthermore, since the receipts distributed to the special accounts and trust funds are generally a specified amount, additional revenues would primarily increase the returns to the U.S. Treasury.

Accountability. The law enforcement proposals are substantially about increasing accountability. Independence for the law enforcement personnel would allow them to investigate suspected theft without potential interference by line officers. Support and assistance from other agency employees is undoubtedly essential to identify suspected thieves and avenues of theft. Stiffer penalties would send a message to agency personnel and to timber purchasers that theft is unacceptable, and will not be condoned.

Timber Industry and Community Impacts. In the short run, increased law enforcement might lead to the prosecution of some otherwise legitimate business people, some of whom may be engaging in illegal timber activities because they believe that it is necessary to keep operating under cut-throat competition and that it is condoned by the agency. Warnings of the changes associated with the law enforcement proposals, and a few successful prosecutions, would likely reduce what some suggest are widespread practices.

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[56]GAO, *Distribution of Timber Sale Receipts, FY1992-FY1994*, p. 3.

A more serious problem is that the proposals -- particularly the independence for law enforcement personnel and the consciousness raising of all employees -- would increase the distance between agency employees and the local communities. This apparent gulf between Federal personnel and local interests is already wide in many areas, with numerous examples of local governments rejecting Federal authority and of threats and even violence toward Federal employees. More effective Federal law enforcement could exacerbate this separation between Federal employees and local people. crsphpgw