

Economic Risks of Salvage Logging: the Biscuit Fire

Prepared by

ECONorthwest
99 West Tenth Ave., Suite 400
Eugene, Oregon 97401
541-687-0051
info@eugene.econw.com

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Ernie Niemi, with the assistance of colleagues at ECONorthwest who worked at his direction, prepared this report. We have prepared this report based on our general knowledge of the natural resource industries and the economy of the Pacific Northwest, as well as information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. We have not independently verified the accuracy of information obtained from others, however, and make no representation regarding its accuracy or completeness. Any statements nonfactual in nature constitute our current opinions, which may change as more information becomes available. As time passes, the results of this report should not be used without accounting for more recent data and relevant assumptions. Although others – including Bob Wolf, Dick Phillips, Don Smith, and Tom Link – provided valuable information, insights, and assistance, ECONorthwest remains solely responsible for the report's contents. Financial support for the report was provided by the Siskiyou Regional Education Project.

For more information, please contact:

Ernie Niemi
ECONorthwest
99 West 10th Avenue, Ste. 400
Eugene, Oregon 97401
Phone: 541-687-0051
Email: niemi@eugene.econw.com

I. INTRODUCTION AND SUMMARY

Since the Biscuit Fire burned 500,000 acres in the Siskiyou National Forest of southern Oregon in 2002, the Forest Service has been crafting a management plan for the burned area, with much of the effort focused on salvage-logging of burned trees. In November, 2003, the Forest Service published a draft environmental impact statement (DEIS) describing its *preferred alternative*, which called for logging 518 million board feet (mmbf). The agency's preference rested largely on the results of its analysis showing that the economy would be better off if the burned trees were logged rather than left in the forest.

Since then, however, new information has come to light raising serious questions about the assumptions and analysis underlying the agency's *preferred alternative*:

- Forest Service scientists found there may be 30 percent less burned timber in the area than previously thought.¹ Also, the *preferred alternative* was based on plan to log burned logs more than 9 inches in diameter, but new data show logs less than 16 inches in diameter have no commercial value.²
- The Environmental Protection Agency determined that the level of logging in the *preferred alternative* could cause widespread environmental harm.³ The U.S. Fish and Wildlife Service reached a similar conclusion,⁴ as did prominent scientists.⁵
- ECONorthwest determined that implementing the *preferred alternative* probably would harm, not help the economy. It found that the DEIS overstated the logs' value, ignored some logging-related costs, and, for others, adopted rosy assumptions at odds with the agency's recent performance.⁶ Fully accounting for the *preferred alternative's* economic risks indicates the costs of logging probably would far exceed the value of the logs and impose net costs on taxpayers.

The Forest Service recently announced plans to scale back the logging, but it has not said by how much. Accordingly, the Siskiyou Regional Education Project asked ECONorthwest to examine the potential economic consequences of two scenarios: (1) a Low Level, 97 mmbf, the lowest level discussed in the DEIS; and (2) a Medium Level, 300 mmbf, approximately halfway between this lowest level and the High Level, 518 mmbf proposed in the *preferred alternative*.

We examine two types of economic consequences: the net value of the logs, i.e., the gross value minus logging costs; and the direct impact on U.S. taxpayers. We assume log prices will be \$470 – \$490 per thousand board feet (mbf), somewhat below recent levels for unburned logs, reflecting the results of an analysis by Forest Service economists, who predicted that pushing large amounts of timber onto the market would depress log prices. We also assume that purchasers' logging costs will reflect the Forest Service's calculations in the DEIS, but that the agency's logging-related costs will reflect its actual performance over the decade preceding the fire rather than the much lower levels predicted in the DEIS.

Net value of the logs. Our calculations indicate that a low level of logging might yield logs worth more than the logging costs, but a medium level would not. The net value from logging 96.7 mmbf would be \$4 million, but logging 300 mmbf would yield a net cost of \$22 million. Evidence from recent sales, however, indicates log prices could be lower than

anticipated, so that even a low level of logging could entail costs greater than the value of the logs.

Direct impact on taxpayers. Taxpayers will be harmed insofar as they have to pick up the tab for a logging program whose costs exceed receipts, without other compensating benefits. Both scenarios indicate that salvage logging would drain funds from the U.S. Treasury. Logging 96.7 mmbf would lead to direct disbursements of \$3 million and logging 300 mmbf would cost the Treasury \$34 million. Evidence from recent sales indicates the prices of logs could be less than anticipated, making the impacts on the Treasury even greater.

These findings indicate that salvage logging, even at levels far below the 518 mmbf proposed in the Forest Service's *preferred alternative*, will prove harmful to the overall economy and to U.S. taxpayers. Such an outcome can be avoided only if the future unfolds in a manner markedly different from recent and current circumstances. Prices the agency receives for burned logs would have to mimic those for unburned logs, even as the quality of the wood in the burned logs deteriorates. The Siskiyou National Forest's logging-related costs would have to fall markedly even as the agency, which currently is adjusting to staffing cuts, copes with implementing a logging program far larger than anything in its recent experience. Extensive logging would have to yield beneficial environmental outcomes markedly different from the warnings that federal agencies and prominent scientists have offered.

Moreover, salvage-logging may harm the forest itself and, in the process, generate additional burdens for the economy and taxpayers. Comments by the Environmental Protection Agency, the Fish and Wildlife Service, and ecological scientists identify ecological risks that accompany logging, and make it clear that these risks increase as the level of logging increases. Ecological damage from logging would have economic costs insofar as the productivity of the forest is diminished and/or taxpayers incur costs to repair the damage. Additional harm — ecological and economic — would occur if, by pursuing a logging program, the Forest Service siphons away money that otherwise would be available for beneficial fire-recovery efforts.

The Forest Service has stated it is motivated to begin logging as quickly as possible before decay processes that follow fire reduce the quality of wood in burned trees to the point that mills no longer find it commercially valuable.⁷ Our findings indicate that actions based on this motivation pose considerable economic risks for the economy as a whole and for taxpayers. To date, the Forest Service has not demonstrated that it has weighed these risks or explained its reasons for overlooking them as it developed the various alternatives described in the DEIS, evaluated them, and selected its *preferred alternative*.

II. THE NET ECONOMIC BENEFITS (OR COSTS) OF SALVAGE LOGGING

Salvage logging will generate net benefits for the economy if the value of the logs removed from the forest exceeds logging costs, including both the costs incurred by the private purchasers of the logs and the costs incurred by the Forest Service. Logging will generate net costs for the economy if the logs are worth less than logging costs.

ECONorthwest's analysis of the Forest Service's *preferred alternative*, presented in the appendix, describes the underlying economic issues, data, and analytical steps for determining the economic benefits or costs of salvage logging in the area burned by the Biscuit Fire. Table 1 applies these steps to the two scenarios that attempt to anticipate the logging level the Forest Service will put forward in its final plan. The Low Level scenario assumes logging of 96.7 mmbf, and corresponds to Alternative 2 in the DEIS. The Medium Level scenario assumes logging of 300 mmbf, roughly half way between the Low Level scenario and the 518 mmbf in the agency's *preferred alternative*.

The calculation of net economic benefits (or net costs) has five steps:

In step 1, the calculation begins with the amount mills will be willing to pay for the salvaged logs. The DEIS assumes the mills will pay \$500 per thousand board feet (mbf), reflecting recent prices for unburned logs. We begin with this assumption, but modify it, recognizing that, by pushing a large amount of timber on the market, the Forest Service will depress prices. Analysis of the price effect by Forest Service economists, reported in Appendix I of the DEIS, indicates that selling 96.7 mmbf will depress prices by 2 percent, to \$490/mbf, and selling 300 mmbf will depress prices 6 percent, to \$470/mbf

In step 2, the costs of logging and transporting the logs from the Biscuit Fire area to the mills are subtracted. For the Low Level scenario, we use the costs reported in the DEIS for Alternative 2. For the Middle Level scenario, we use the midpoint between these costs and the costs reported in the DEIS for the *preferred alternative*.

In Step 3, the result of the subtraction shows the Forest Service's timber-sale from salvage logging, assuming that the Forest Service will capture the full difference between the value of the logs at the mills, and the costs of getting them there.

In step 4, the Forest Service's salvage-logging-related costs are subtracted. Three categories of costs are relevant: (1) costs of preparing and administering timber sales; (2) costs of facilitating and cleaning-up after the logging; and (3) overhead costs the regional and Washington offices of the Forest Service will incur to support the salvage logging.

In step 5, the result of the subtraction shows the net economic benefits (if positive) or net costs (if negative) of salvage logging.

Table 1: Potential Net Economic Benefits, or Net Economic Costs of Salvage Logging

Step	Category of Benefit or Cost	Benefits and Costs of Salvage Logging	
		Low Level 96.7 mmbf	Middle Level 300 mmbf
1. <i>begin with</i>	The amount mills will pay for logs ^a	\$47,383,000 (<i>\$490/mbf</i>)	\$141,000,000 ^d (<i>\$470/mbf</i>)
2. <i>minus</i>	The costs of logging and transporting the logs to mills	– \$17,793,000 (<i>– \$184/mbf^b</i>)	– \$84,000,000 (<i>– \$280/mbf^b</i>)
3. <i>equals</i>	The Forest Service’s salvage-logging receipts	\$29,590,000 (<i>\$306/mbf</i>)	\$57,000,000 (<i>\$200/mbf</i>)
4. <i>minus</i>	The Forest Service’s costs associated with the salvage logging:	– \$25,626,000 (<i>– \$265/mbf</i>)	– \$79,500,000 (<i>– \$265/mbf</i>)
	1. The Siskiyou NF’s costs to prepare and administer timber sales ^d	– \$8,220,000 (<i>– \$85/mbf</i>)	– \$25,500,000 (<i>– \$85/mbf</i>)
	2. The Siskiyou NF’s costs to facilitate and clean up after logging operations ^d	– \$15,859,000 (<i>– \$164/mbf</i>)	– \$49,200,000 (<i>– \$164/mbf</i>)
	3. Timber-sale-related overhead costs at the regional and Washington offices ^e	–\$1,547,000 (<i>– \$16/mbf</i>)	–\$4,800,000 (<i>– \$16/mbf</i>)
5. <i>equals</i>	Net economic benefits or costs of salvage logging	\$3,964,000 (<i>\$41/mbf</i>)	– \$22,500,000 (<i>– \$65/mbf</i>)

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^a Incorporates the effects of salvage timber on regional timber prices, from Appendix I of the DEIS.

^b Costs for Alternative 2 in the DEIS (97.6 mmbf).

^c Midpoint between costs reported in the DEIS for Alternative 2 and the *preferred alternative*.

^d Lowest cost per mbf from decade prior to Biscuit Fire (Forest Service data compiled by Bob Wolf and adjusted to 2002 dollars by ECONorthwest).

^e From Forest Service data compiled by Robert Wolf and adjusted to 2002 dollars by ECONorthwest.

Note: numbers reflect rounding.

The results show that, with a logging level of 96.7 mmbf, the value of the logs would exceed logging costs by \$4 million. With a logging level of 300 mmbf, however, costs would exceed the value of the logs by \$22 million.

These results depend on the assumptions underlying them. One key assumption concerns log prices. For Table 1, we assume log prices of \$470 – \$490 per mbf, drawing on pricing information in the DEIS. In preparing the DEIS, however, the Forest Service assumed that the quality of burned logs would be the same as the quality of comparable green logs and, hence, that burned logs would receive the same prices. In reality, the quality of burned logs is lower, as indicated by the Forest Service’s determination that burned logs smaller than 16 inches in diameter have no commercial value. Burned logs containing some

unmerchantable material probably will command lower prices than comparable, unburned logs. Hence, the results shown in Table 1 probably overstate the logs' value and, hence, the Forest-Service's timber receipts.

Evidence indicates prices are likely to fall sufficient to make the logs' value less than logging costs, even for the Low level scenario. In 2003 the Forest Service received an average price of about \$275 per mbf from the sale of burned logs that pose a hazard because of their location near roads and other public-access areas.⁸ These logs were more accessible than those farther from roads, and the sales were small enough that they probably did not depress prices as larger timber sales would. If logging costs were the same as indicated for the Low Level scenario, \$184/mbf, then the value of the logs to the mills was about ($\$275/\text{mbf} + \$184/\text{mbf} \approx$) \$460/mbf, or \$40/mbf below the market level for unburned wood, \$500/mbf. A reduction of \$40/mbf, applied to future sales, diminishes the results in Table 1, almost eliminating the net benefit for the sale of 96.7 mmbf, and increasing by \$12 million the net cost for the sale of 300 mmbf. The actual reduction in prices probably would be greater, insofar as the decay processes will reduce the wood's quality for another year for wood logged in 2004, and another two years for wood logged in 2005.

Other assumptions concern logging costs. We assume the costs purchasers would incur to cut and remove logs will be as the Forest Service indicated in the DEIS. For the agency's logging-related costs, however, we looked to the agency's actual performance during the preceding decade rather than to the DEIS. We did so for several reasons. One, the DEIS totally ignored the logging-related overhead costs the agency would incur at its regional and Washington, D.C., offices. Two, for the logging-related costs that would be incurred in southern Oregon, at the Siskiyou National Forest, the DEIS assumed costs would be far lower than those that the agency has incurred in the past. It offered no explanation for this rosy assumption, which seems unreasonable on its face, insofar as the Siskiyou National Forest does not have recent experience overseeing logging at the levels being considered by the Forest Service and is coping with staff reductions and the closure of its office closest to the Biscuit Fire, in Grants Pass.

Against this backdrop, rather than use the unexplained, cost figures in the DEIS, we used data from the agency's actual performance over the past decade. Specifically, for Siskiyou National Forest's costs to prepare and administer timber sales and to facilitate and clean up after logging operations, we used the lowest annual costs per mmbf reported by the Forest Service for the ten years prior to the Biscuit Fire. The data, as well as data regarding overhead costs, were compiled from reports submitted to Congress by the General Accounting Office, by Bob Wolf, a widely-recognized expert of the agency's finances.⁹ We believe the data reliably reflect Forest Service records.

III. THE IMPACTS OF SALVAGE LOGGING ON TAXPAYERS

The impacts of salvage logging on taxpayers are not the same as the net benefits (or costs). The difference arises because the Forest Service's timber-sale program includes provisions that require 25 percent of the money the agency receives from the sale of timber to be distributed to states. The analysis of the Forest Service's *preferred alternative* describes the general data, assumptions, and analytical steps for calculating the impacts on taxpayers. In Table 2 we apply these steps to calculate the direct net payments to, or disbursements from, the Treasury that would accompany the logging associated with the Low Level scenario (96.7 mmbf) and the Middle Level scenario (300 mmbf). The calculation has six steps:

- In step 1*, the calculation begins with appropriations from the Treasury to cover the costs of preparing and administering the timber sales.
- In step 2*, the Forest Service's timber-sale receipts are added. This amount is shown in *Step 3* in Table 1.
- In Step 3*, the payment to states is subtracted to fund activities authorized under the provisions of the Secure Rural Schools and Community Self-Determination Act of 2000,
- In step 4*, the costs the Siskiyou National Forest will incur to facilitate and clean up after logging operations are subtracted.
- In step 5*, the salvage-logging-related overhead costs the Forest Service's regional and Washington offices will incur are subtracted.
- In step 6*, the result of the previous steps shows the net impact on the US Treasury. A positive number represents a payment to the Treasury. A negative number indicates a net disbursement from the Treasury.

The results in Table 2 show that, if the Forest Service adopts a program to sell 96.7 mmbf, net disbursements from the Treasury would be \$3 million. If it adopts a program to sell 300 mmbf, net disbursements would be \$34 million.

As in the calculation of the net value of the timber, these results depend on the assumptions underlying them. We assume in Table 2 that log prices will be \$470 – \$490 per mmbf. We also assume the costs purchasers would incur to cut and remove logs will be as the Forest Service indicated in the DEIS. For the agency's logging-related costs, however, we looked to the agency's actual performance during the preceding decade rather than to the DEIS.

Table 2: Potential Impacts on the Treasury

Step	Category of Revenue or Cost	Impacts on the Treasury	
		Low Level 96.7 mmbf	Middle Level 300 mmbf
1. <i>begin with</i>	Appropriations for the Siskiyou NF's costs to prepare and administer timber sales ^a	– \$8,220,000 (– \$85/mbf)	– \$25,500,000 (– \$85/mbf)
2. <i>plus</i>	The Forest Service's salvage-logging receipts ^b	\$29,590,000 (\$306/mbf)	\$60,000,000 (\$200/mbf)
3. <i>minus</i>	Payment to states (25% of receipts)	– \$7,398,000 (– \$77/mbf)	– \$15,000,000 (– \$50/mbf)
4. <i>minus</i>	The Siskiyou NF's costs to facilitate and clean up after logging operations ^a	– \$15,859,000 (– \$164/mbf) ^e	– \$49,200,000 (– \$164/mbf) ^e
5. <i>minus</i>	Overhead costs incurred by the USFS regional and Washington offices ^c	– \$1,547,000 (– \$16/mbf) ^f	– \$4,800,000 (– \$16/mbf) ^f
6. <i>equals</i>	Net payments to or disbursements from the U.S. Treasury	– \$3,434,000 (– \$36/mmbf)	– \$34,500,000 (– \$115/mbf)

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^a Lowest cost per mmbf for Siskiyou NF, from decade prior to Biscuit Fire (Forest Service data compiled by Bob Wolf and adjusted to 2002 dollars by ECONorthwest).

^b From Table 1.

^c From Forest Service data compiled by Robert Wolf and adjusted to 2002 dollars by ECONorthwest.

Note: numbers reflect rounding.

IV. FURTHER CONSIDERATIONS

The preceding discussion demonstrates that salvage logging in the area burned by the Biscuit Fire embodies serious economic risks for the economy and for U.S. taxpayers. The Forest Service has not openly discussed these risks in the DEIS. Without explanation, it presented in the DEIS an analysis of its proposed salvage-logging program that disregarded important information about the program's market impacts, ignored a significant element of the program's costs, and adopted optimistic assumptions that are not supported by the agency's performance over the past decade.

Moreover, the agency has not assessed the economic values or the implications for taxpayers of the salvage-logging program's potential environmental impacts. Or, if it has completed such an assessment, it has not made its findings available for public review. Either way, this omission is especially perplexing, given the high profile of both the environmental and the economic concerns that have been raised about salvage logging in

the Biscuit Fire area, and the extensive analytical attention Forest Service economists have given to the economic consequences of forest-management decisions.¹⁰

More fundamentally, the Forest Service has not demonstrated that its managers are aware of and concerned about the economic risks associated with salvage logging. To address these risks explicitly, they must ask and answer the question, What is the probability that things will not turn out as planned, and what will be the economic consequences if they do not? As we explain above and in the appendix, the Forest Service to date has evaluated salvage logging wearing rose-colored glasses, assuming burned logs will command prices the same as those for unburned logs, ignoring the diminution in prices that would accompany a large timber sale, assuming the Siskiyou National Forest will manage timber sales with efficiencies not demonstrated in the preceding decade and despite staff cutbacks, and pretending a large salvage-timber program will have no overhead costs at the regional and Washington, D.C., offices.

Things may turn out this way, but prudence dictates one should anticipate that any one, and perhaps all, of the many, relevant variables — economic, ecological, and more — will not behave as the Forest Service has portrayed them so far. Perhaps things will turn out better than planned, but, as we explain, there are numerous reasons to believe the outcomes probably will be worse. The Forest Service has a long record of selling timber that is worth less than logging costs, generating large economic burdens for taxpayers and the overall economy.¹¹ Unless and until it explicitly analyzes and explains the risks we describe above, its behavior indicates it intends to go down the same path regarding salvage logging in the area burned by the Biscuit Fire.

ENDNOTES

- ¹ Jeff Barnard. 2004. "Review finds less timber from huge fire to salvage." *Corvallis Gazette-Times*. February 6.
- ² Jeff Barnard. 2004. "Salvage-logging plan likely to be trimmed." (*Salem*) *Statesman Journal*. February 18. <http://news.statesmanjournal.com/article.cfm?i=75571>, accessed March 10, 2004.
- ³ Michelle Cole. 2004. "EPA urges less logging in Biscuit fire salvage plan." *Oregonian*. February 21. http://oregonlive.com/environment/oregonian/index.ssf?/base/front_page/1077368598308610.xml, accessed March 10, 2004.
- ⁴ Jeff Barnard. 2004. "Fish and Wildlife expresses concerns over Biscuit salvage." (*Albany*) *Democrat Herald*. February 13. <http://www.democratherald.com/articles/2004/02/14/news/oregon/state03.txt>, accessed March 10, 2004.
- ⁵ See, e.g., the comments submitted to the Forest Service by Jerry Franklin Professor of Ecosystem Analysis, University of Washington <http://www.wilderness.org/Library/Documents/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=7984>, accessed March 9, 2004; and by the Conservation Biology Institute, http://www.consbio.org/cbi/professional_services/biscuit/biscuit.htm, accessed March 9, 2004. Others have asserted that failure to conduct widespread salvage logging will generate ecological harm. See, e.g., Sessions, J., R. Buckman, M. Newton, and J. Hamann. 2003. *The Biscuit Fire: Management Options for Forest Regeneration, Fire and Insect Risk Reduction and Timber Salvage*. Oregon State University, College of Forestry. July 8.
- ⁶ The analysis of the *preferred alternative* is attached, as an appendix.
- ⁷ "There is a need to recover merchantable timber before the commercial value of the wood is lost to deterioration." DEIS, p. I-5.
- ⁸ Average price, converted to \$/mbf, for seven hazard sales: Rasp, Indigo, Chetco, Gamehorse, River Six, Baby Onioon, and Bald Bear. Original data in \$/cubic foot from Tom Link, U.S. Forest Service. 2003. Personal communication to Romain Cooper. August 29.
- ⁹ Data sources are explained further in the appendix.
- ¹⁰ See, for example, Haynes, R.W. and A.L. Horne. 1997. "Chapter 6: Economic Assessment of the Basin." In *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume IV*. Edited by T.M. Quigley and S.J. Arbelbide. General Technical Report PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. June. Pgs. 1715-1869.
- ¹¹ See, for example, Alkire, C. 1994. *Financial Losses from Logging on National Forests, FY 1993*. The Wilderness Society. November; and Gorte, R.W. 1994. *Below-Cost Timber Sales: Overview*. Congressional Research Service, Library of Congress. CRS Report for Congress. 95-15 ENR. December 20.

Appendix
Economic Review of the
Preferred Alternative

I. INTRODUCTION AND SUMMARY

The Biscuit Fire of 2002 burned 500,000 acres in the Siskiyou National Forest of southern Oregon. Since the fire, the Forest Service has been developing recovery plans for the burned area, with alternative approaches differing primarily in the extent to which recovery would be left to the forces of Mother Nature or shaped through human intervention. The most intrusive intervention would entail logging, called salvage logging, in the burned area.

On March 19, 2003, the agency published a *Notice of Intent* describing five alternatives and identifying a “Proposed Action” that would log 96 million board feet (mmbf) from 5,170 acres. The Forest Service altered its plans, however, in response to a study that proposes a far more aggressive salvage-logging program.¹ Commonly called the Sessions Report, after its lead author, it also recommends related activities, such as intensive use of herbicides.

The Sessions Report asserts that up to 2.0 billion board feet of wood is “economically salvageable” (p. 53) and that logging would generate funds to help pay for fire-recovery activities and, thus, reduce the financial burden that restoration of the burned area would impose on US taxpayers (p. 23). The authors, however, provide no support for these assertions. There is no economic analysis showing that the benefits of salvage logging actually would outweigh the costs or that an aggressive salvage logging program actually would generate revenues to reduce the burden on taxpayers of fire-recovery activities.

In November, 2003, the Forest Service published its calculations of the economic consequences of salvage logging, in a draft environmental impact statement (DEIS) that describes the Forest Service’s *preferred alternative*, Alternative 7, which is based on the Sessions Report. It calls for logging 518 mmbf on 29,090 acres.

The DEIS predicts that salvage logging under Alternative 7 would produce net benefits of \$24,603,301. That is, the value of the logs would outweigh the logging costs by this amount. The DEIS also forecasts that salvage logging would yield net receipts of \$18,452,355, which the Forest Service would use to cover some of the costs of fire-recovery activities. A December 23rd recalculation by the agency raised this amount to \$22,546,251. To produce these positive outcomes, though, the Treasury would provide appropriations of \$13,751,900.

This report examines the calculations and finds that, by ignoring relevant information and employing optimistic assumptions, the Forest Service offers a false portrait of the economic consequences that are likely to materialize if it implements the salvage-logging program proposed under Alternative 7. It has disregarded information indicating that the logs probably would be less valuable than shown in its calculations, and it has ignored costs it would incur to implement the salvage-logging program. For those costs included in the calculations, it has employed optimistic assumptions that deviate significantly from the agency’s recent performance. The Forest Service has not explained the justification for these aspects of its calculations and, hence, they appear to be arbitrary.

¹ Sessions, J., R. Buckman, M. Newton, and J. Hamann. 2003. *The Biscuit Fire: Management Options for Forest Regeneration, Fire and Insect Risk Reduction and Timber Salvage*. Oregon State University, College of Forestry. July 8.

This report corrects these problems and re-estimates the net economic benefits and impacts on the Treasury if the salvage logging proposed in Alternative 7 were implemented. A “First Revision” adjusts for two important omissions in the Forest Service’s calculations:

1. **Price effect.** The calculations in the DEIS assume log prices would remain constant, at \$500 per mbf, regardless of the volume of salvage logging. Analytical results presented in Appendix I, however, predict that salvage logging 518 mmbf of timber probably would depress prices by about 14 percent in 2004 and 8 percent in 2005. Assuming the average reduction in prices would be the midpoint, 11 percent, the DEIS overstates revenues by \$28.4 million.
2. **Overhead costs of logging.** In its calculation of the costs the Forest Service would incur to support the logging of 518 mmbf, the DEIS shows only the local costs of the Siskiyou National Forest. It overlooks the overhead costs that would be incurred at the agency’s regional and Washington offices, which averaged \$16 per mbf over the decade prior to the Biscuit Fire. By failing to account for these costs, the DEIS understates the costs of salvage logging by \$8.3 million.

Adjusting for these omissions shows that the costs of implementing the salvage-logging program proposed in Alternative 7 would exceed the value of the logs by more than \$12 million. The program would cause net disbursements from the US Treasury of nearly \$28 million. Salvage logging would not yield any surplus revenues to cover the costs of fire-recovery activities.

A “Second Revision” demonstrates that the economic consequences could be even worse if optimistic assumptions underlying the Forest Service’s calculations fail to materialize.

1. **Costs to prepare and administer timber sales.** The DEIS assumes the Siskiyou National Forest will incur these costs at a rate of \$27 per mbf. Over the decade prior to the Biscuit Fire, however, costs were far higher. If the agency incurs costs at the rate of \$85 per mbf — its best performance over the decade — this category of costs would rise from \$14 million to \$44 million.
2. **Costs to facilitate and clean-up after salvage logging.** The DEIS assumes the Siskiyou National Forest will incur these costs at a rate of \$48 per mbf. Over the prior decade, however, the costs were far higher. If the agency incurs costs at the rate of \$164 per mbf, — its best performance over the decade — this category of costs would rise from \$25 million to \$85 million.

Combined, these adjustments indicate that aggressive salvage logging, as proposed under Alternative 7, could generate costs that exceed the benefits (the value of the logs) by more than \$100 million and draw more than \$110 million from the US Treasury. No revenues would be generated to cover fire-recovery costs.

The DEIS contains two additional flaws that are even more fundamental. One, it does not assess the economic values or the implications for taxpayers of the potential impacts of salvage logging on the environment. This omission stands in stark contrast to the high profile of concerns raised by scientific research and members of the public about the potential environmental impacts of salvage logging, and evidence indicating these impacts could have significant economic consequences.

Two, the DEIS does not tell decisionmakers and the public that implementing the salvage-logging program proposed in Alternative 7 poses considerable economic risks. Instead, it paints a picture of certainty about the economic consequences of salvage logging and ignores myriad ways—including, but not limited to those described above—in which this picture could fail to materialize. All else equal, by ignoring the risks, the picture painted by the DEIS offers biased support for adoption of Alternative 7, relative to less risky alternatives.

II. THE NET ECONOMIC BENEFITS (OR COSTS) OF SALVAGE LOGGING

The DEIS, in Table III-123, summarizes the Forest Service's initial economic analysis. The organization of the table is confusing, however, and the accompanying text does not fully explain the underlying reasoning.

Hence, this report reorganizes the data to explain the calculations linking together the value of the salvaged logs, the costs of removing the logs to mills in the region, and the resulting impacts on the US Treasury. In this chapter, the discussion focuses on the net economic benefits, or costs, of the salvage-logging program proposed under Alternative 7. That is, it looks at whether the logs are likely to be worth more or less than the costs of extracting them from the forest. The next chapter looks at the impacts on the US Treasury.

The calculation of net economic benefits (or net costs) has five steps:

In step 1, the calculation begins with the amount the Forest Service expects mills will be willing to pay for the salvaged logs. For each of the seven alternatives, the DEIS assumes the mills will pay \$500 per thousand board feet (mbf).

In step 2, the costs of logging and transporting the logs from the Biscuit Fire area to the mills are subtracted. These costs vary among the alternatives, reflecting their respective emphasis on different logging technologies (e.g., more helicopter logging in alternatives with more aggressive salvage logging in unroaded areas).

In Step 3, the result of the subtraction shows the total timber-sale receipts to the Forest Service from salvage logging. This amount assumes that the Forest Service will capture the full difference between the value of the logs at the mills, and the costs of getting them there.

In step 4, the Forest Service's salvage-logging-related costs are subtracted. Three categories of costs are relevant. The first consists of the costs of preparing and administering timber sales. The second consists of the costs of facilitating and cleaning-up after the logging.² These two categories of costs will be incurred by the Siskiyou National Forest (NF). The third category consists of the overhead costs the regional and Washington offices of the Forest Service will incur to support the salvage logging.

In step 5, the result of the subtraction shows the net economic benefits (if positive) or net costs (if negative) of salvage logging.

The calculations by the Forest Service, as portrayed in the DEIS, are shown in the left column of Table 1. As portrayed in the DEIS, the agency anticipates that salvage logging will yield net benefits of \$24,603,141. The next two columns of Table 1 revise the calculation to reflect several factors omitted from the Forest Service's calculations. The revisions occur in two parts.

² This category is the sum of three rows, from Table III-123 of the DEIS: "Site prep and plant;" "Fuel treatment;" and "Temporary roads and landings."

Table 1: Potential Net Economic Benefits, or Net Economic Costs of Salvage Logging Under Alternative 7 – DEIS and Revised Estimates

Benefits and Costs of Salvage Logging Under Alternative 7				
Step	Category of Benefit or Cost	DEIS ^a	First Revision: Price Effect & Overhead Costs ^b	Second Revision: Siskiyou NF's Recent Performance ^c
1. <i>begin with</i>	The amount mills will pay for logs	\$258,424,442 <i>(518 mmbf @ \$500/mbf)</i>	\$230,000,000 ^d <i>(518 mmbf @ \$445/mbf)</i>	\$230,000,000 ^d <i>(518 mmbf @ \$445/mbf)</i>
2. <i>minus</i>	The costs of logging and transporting the logs to mills	– \$195,189,280 <i>(– \$379/mbf)</i>	– \$195,200,000 <i>(– \$379/mbf)</i>	– \$195,200,000 <i>(– \$379/mbf)</i>
3. <i>equals</i>	The Forest Service's salvage-logging receipts	\$63,235,162 <i>(\$122/mbf)</i>	\$34,800,000 <i>(\$67/mbf)</i>	\$34,800,000 <i>(\$67/mbf)</i>
4. <i>minus</i>	The Forest Service's costs associated with the salvage logging:	– \$38,632,020 <i>(– \$75/mbf)</i>	– \$46,900,000 <i>(– \$91/mbf)</i>	– \$137,300,000 <i>(– \$265/mbf)</i>
	1. The Siskiyou NF's costs to prepare and administer timber sales	– \$13,751,900 <i>(– \$27/mbf)</i>	– \$13,800,000 <i>(– \$27/mbf)</i>	– \$44,000,000 <i>(– \$85/mbf)^e</i>
	2. The Siskiyou NF's costs to facilitate and clean up after logging operations	– \$24,880,120 <i>(– \$48/mbf)</i>	– \$24,900,000 <i>(– \$48/mbf)</i>	– \$85,000,000 <i>(– \$164/mbf)^e</i>
	3. Timber-sale-related overhead costs incurred by the regional and Washington offices	zero	– \$8,300,000 <i>(– \$16/mbf)^f</i>	– \$8,300,000 <i>(– \$16/mbf)^f</i>
5. <i>equals</i>	Net economic benefits or costs of salvage logging	\$24,603,141 <i>(\$47/mbf)</i>	– \$12,100,000 <i>(– \$23/mbf)</i>	– \$102,500,000 <i>(– \$198/mbf)</i>

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^a From Table III-123 of the DEIS, plus information provided by Dick Phillips (Regional Planning and Monitoring, USFS Pacific Northwest Region).

^b Incorporates the effects of salvage timber on regional timber prices, and the Forest Service's overhead costs associated with salvage logging.

^c First Revision plus assumption that the Siskiyou National Forest will incur logging-related costs at the lowest rate it experienced over the preceding decade.

^d Assumes sale of 518 mmbf will depress log prices 11 percent below \$500/mbf assumed in the DEIS (from DEIS Appendix I: Socio/Economics).

^e Lowest cost per mbf from decade prior to Biscuit Fire (Forest Service data compiled by Bob Wolf and adjusted to 2002 dollars by ECONorthwest).

^f From Forest Service data compiled by Robert Wolf and adjusted to 2002 dollars by ECONorthwest.

Note: numbers reflect rounding.

The “First Revision” expands the analysis to incorporate two factors that the Forest Service omitted from its calculations. One of the omitted factors is the effect of the salvage-logging program on the value of the logs. The calculations in the DEIS assume log prices in Alternative 7 would be \$500 per mbf, the same price the Forest Service assumes would obtain with far different logging levels under the other alternatives. This analytical assumption is inconsistent with the results of economic modeling conducted by Forest Service economists and presented in Appendix I: Socio/Economics of the DEIS. In accordance with widely accepted economic theory, the modeling predicts that placing salvage timber on the market would depress prices in the surrounding area, and the greater the salvage-logging program, the greater the price effect.

The modeling results clearly state that the Forest Service should anticipate that the sale of salvage timber would reduce the value of the salvaged logs. “Introducing salvage into the market reduces market prices for the salvage and for green timber sales in the surrounding area.” (p. I-6)

Figure 3 in Appendix I shows that modeling results predict the sale of 518 mmbf would reduce log prices by about 14 percent in 2004 and 8 percent in 2005. On average, the reduction would be about 11 percent. The calculations in Table 1 for the “First Revision” assume that the value of the salvaged logs would be \$445 per mbf, or 11 percent less than the \$500 per mbf price used by the Forest Service in Table III-123 of the DEIS. Taking the price effect into account reduces the gross benefits of salvage logging by more than \$28 million, to \$230,000,000.³

The other omitted factor is the overhead costs that would materialize at the Forest Service’s regional and Washington offices if the salvage timber sales proposed under Alternative 7 were implemented. The DEIS ignores these costs.⁴ Such an assumption seems unreasonable, given the administrative burden likely to materialize for the agency to meet its oversight responsibilities to taxpayers if the Siskiyou National Forest were to sell 518 mmbf of timber. The regional and Washington offices also would incur costs to manage appropriations from Congress, account for payments to states from the timber-sale receipts, and reassure Congress and the public that the agency has met other obligations accompanying the aggressive salvage-logging program embedded in Alternative 7.

The calculations in Table 1 for the “First Revision” assume that the overhead costs would be about \$16 per mbf (in 2002 dollars). This is the average of the timber-sale costs incurred by the Washington office and Region 6 office over the past decade.⁵ Total overhead costs for 518 mmbf of salvage timber under Alternative 7 are \$8,300,000.

³ Reflecting the uncertainty inherent in the Forest Service’s numbers, the revised calculations round numbers to the nearest hundred thousand.

⁴ Another possibility is that the agency assumes the salvage logging program in Alternative 7 will generate zero administrative costs at the regional and Washington offices. The DEIS never says.

⁵ Data on overhead costs for the agency’s timber-sale program have been compiled by Robert Wolf, a widely recognized expert on the agency’s finances, who has compiled data for 1998-2002 consistent with reports—RCED 95-237FS, 99-24 and 99-174—by the General Accounting Office (GAO) to

Overall, the “First Revision” shows that the costs of the salvage-logging program proposed under Alternative 7 would exceed the benefits by more than \$12 million.

The DEIS offers no explanation supporting the Forest Service’s decisions to ignore the price effect and the overhead costs. Without explanation, these decision appear to be arbitrary, especially insofar as the information regarding each of the omissions was readily available to the Forest Service and the existence of price effects and overhead costs is well known.

The “Second Revision,” shown in the last column of Table 1, expands the analysis to consider different assumptions about the costs the Siskiyou National Forest is likely to incur as it implements the salvage-logging program proposed in Alternative 7. The DEIS assumes that the costs to prepare and administer timber-sale contracts would average \$27 per mbf and the costs to facilitate and clean-up after logging operations would average \$48 per mbf.

These numbers differ markedly from the past performance of the Siskiyou National Forest. Over the decade preceding the Biscuit Fire, its costs to prepare and administer timber sales averaged more than \$300 per mbf, and its costs to facilitate and clean-up after logging operations averaged almost \$250 per mbf.⁶

The “Second Revision” takes a middle road, neither as optimistic as the assumptions in the DEIS nor as pessimistic as the agency’s average performance over the preceding decade. It assumes that the Siskiyou National Forest will perform at the most efficient level of the past decade: the costs to prepare and administer timber sales will be \$85 per mbf, which it experienced in 1999, and the costs to facilitate and clean-up after logging operations will be \$164 per mbf, which it experienced in 1992.

The impact on costs is shown in Table 1. The costs of preparing and administering timber sales rises from \$13.8 million to \$44 million, and the costs of facilitating and cleaning-up after logging operations rises from \$24.9 million to \$85 million. The bottom cell of the last column of Table 1 shows the overall results. The salvage-logging program proposed in Alternative 7 will yield net costs in excess of \$100 million, if the Siskiyou National Forest performs at the best levels it demonstrated over the past decade and if one takes into account the price effect and the agency’s overhead costs.

Committees of the House of Representatives. In preparing its reports, which cover FY 1992-1997, the GAO secured information from the Forest Service and provided the Forest Service a draft of each report before it was issued. In each case, the Forest Service advised GAO that "...the report accurately presented the distribution of timber sales receipts and the flow of moneys to the General Fund of the Treasury." Wolf secured data on acres cut, mbf cut, and financial information comparable to that used by GAO, and augmented the data with conservative estimates for cooperative deposits for brush disposal and post-sale road maintenance. ECONorthwest believes the data reliably reflect Forest Service records.

⁶ These numbers come from Forest Service data compiled by Robert Wolf. ECONorthwest adjusted the historical data to 2002 dollars.

III. THE IMPACTS OF SALVAGE LOGGING ON TAXPAYERS

The impacts of salvage logging on taxpayers are not the same as the net benefits (or costs). The difference arises because the Forest Service's timber-sale program includes provisions that require 25 percent of the money the agency receives from the sale of timber to be distributed to states.

The impact on taxpayers is shown by calculating net payments to, or disbursements from, the Treasury. The calculation has seven steps:

In step 1, the calculation begins with appropriations from the Treasury to cover the costs of preparing and administering the timber sales planned under Alternative 7.

In step 2, the Forest Service's timber-sale receipts are added. This amount is shown in *Step 3* in Table 1.

In Step 3, the payment to states is subtracted to fund activities authorized under the provisions of the Secure Rural Schools and Community Self-Determination Act of 2000,

In step 4, the costs the Siskiyou National Forest will incur to facilitate and clean up after logging operations are subtracted.

In step 5, the salvage-logging-related overhead costs the Forest Service's regional and Washington offices will incur are subtracted.

In step 6, the salvage-logging receipts retained by USFS to offset fire-recovery costs are subtracted

In step 7, the result of the previous steps shows the net impact on the US Treasury. A positive number represents a payment to the Treasury. A negative number indicates a net disbursement from the Treasury.

Table 2 shows four different calculations of the potential impact on taxpayers of salvage logging as proposed in Alternative 7. The first column shows the calculations underlying the data in Table III-123 of the DEIS. These calculations were superseded by a recalculation by the Forest Service, shown in the second column. The recalculation was prompted by recognition that the DEIS had improperly calculated the payment to states.

The agency's recalculation shows that the salvage-logging program would require a net disbursement from the Treasury of \$13,751,900 to cover the costs of preparing and administering timber sales. In concept, taxpayers also would benefit from the salvage-logging program insofar as it would generate \$22,546,251, which the Forest Service would retain to cover some of the costs of fire-recovery activities. In practice, however, these funds never would reach the Treasury's general fund, which, at the end of the day would experience a net disbursement of \$13,751,900.

The third column shows the "First Revision" of the Forest Service's recalculation. As explained above, it makes two adjustments: diminishing the Forest Service's timber-sale receipts to reflect the downward pressure on prices that would result from selling 518 mmbf of salvaged timber; and adding the salvage-logging-related overhead costs that would materialize at the agency's regional and Washington offices.

Table 2: Potential Impacts on the Treasury of Salvage Logging Under Alternative 7 – DEIS and Revised Estimates

Step	Category of Revenue or Cost	Impacts on the Treasury			
		DEIS ^a	USFS Recalculation ^b	First Revision ^c	Second Revision ^d
1. <i>begin with</i>	Appropriations for the Siskiyou NF's costs to prepare and administer timber sales	– \$13,751,900 (– \$27/mbf)	– \$13,751,900 (– \$27/mbf)	– \$13,800,000 (– \$27/mbf)	– \$44,000,000 (– \$85/mbf) ^e
2. <i>plus</i>	The Forest Service's salvage-logging receipts	\$63,235,162 (\$122/mbf)	\$63,235,162 (\$122/mbf)	\$34,800,000 ^f (\$67/mbf)	\$34,800,000 ^f (\$67/mbf)
3. <i>minus</i>	Payment to states	– \$6,150,785 (– \$12/mbf)	– \$15,808,791 (– \$31/mbf)	– \$8,700,000 (– \$17/mbf)	– \$8,700,000 (– \$17/mbf)
4. <i>minus</i>	The Siskiyou NF's costs to facilitate and clean up after logging operations	– \$24,880,120 (– \$48/mbf)	– \$24,880,120 (– \$48/mbf)	– \$24,900,120 (– \$48/mbf)	– \$85,000,000 (– \$164/mbf) ^e
5. <i>minus</i>	Overhead costs incurred by the USFS regional and Washington offices	zero	zero	– \$8,300,000 (– \$16/mbf) ^g	– \$8,300,000 (– \$16/mbf) ^g
6. <i>minus</i>	Salvage-logging receipts retained by USFS to offset fire-recovery costs	– \$18,452,357 (– \$36/mbf)	– \$22,546,251 (– \$44/mbf)	zero	zero
7. <i>equals</i>	Net payments to or disbursements from the U.S. Treasury	zero	– \$13,751,900 (– \$27/mbf)	– \$20,800,000 (– \$40/mbf)	– \$111,200,000 (– \$214/mbf)

ECONorthwest.

^a From Table III-123 of the DEIS, plus information provided by Dick Phillips (Regional Planning and Monitoring, USFS Pacific Northwest Region).

^b Information provided by Dick Phillips (Regional Planning and Monitoring, USFS Pacific Northwest Region), personal communication, December 23, 2003.

^c USFS Recalculation, plus the effects of salvage timber on regional timber prices, and the Forest Service's overhead costs associated with salvage logging.

^d First Revision plus assumes the Siskiyou National Forest will incur logging-related costs at the lowest rate it experienced over the preceding decade.

^e Lowest cost per mbf for Siskiyou NF, from decade prior to Biscuit Fire (Forest Service data compiled by Bob Wolf and adjusted to 2002 dollars by ECONorthwest).

^f Assumes sale of 518 mmbf reduces log prices 11 percent (from DEIS Appendix I: Socio/Economics).

^g From Forest Service data compiled by Robert Wolf and adjusted to 2002 dollars by ECONorthwest.

Note: numbers reflect rounding.

By themselves, these two adjustments show that the salvage-logging program in Alternative 7 probably would impose costs on taxpayers of more than \$20 million. The program would generate no receipts the Forest Service could use to cover some of the costs of fire-recovery activities.

The final column in Table 2 shows the results of the “Second Revision,” which illustrates the potential impacts on taxpayers if the Forest Service’s optimistic assumptions about the agency’s costs do not materialize. Specifically, this calculation assumes that the Siskiyou National Forest’s logging-related costs—to prepare and administer timber sales, and to facilitate and clean-up after logging—will be no better than its best performance during the decade preceding the Biscuit Fire.

The bottom of the final column shows the salvage-logging program proposed under Alternative 7 could cost taxpayers more than \$110 million. This estimate reflects the Forest Service’s recalculation, adjusted to account for:

- The reduction in log prices that is expected to result from selling such a large amount of timber. This adjustment reflects economic modeling performed by Forest Service economists as part of the process of developing the DEIS, but disregarded in the Forest Service’s calculations.
- Overhead costs the Forest Service will incur in its regional and Washington offices to administer the proposed salvage-logging program. The DEIS makes no mention of these costs.
- An assumption that the Siskiyou National Forest’s costs will reflect its past performance. In the DEIS and its recalculation, the Forest Service assumes the costs per thousand board feet will be far lower than the costs it has incurred over the previous decade. The “Second Revision” recognizes it will be difficult for the staff to cut costs so dramatically so rapidly and, instead, assumes the Siskiyou National Forest’s performance will equal its best performance from the decade.

IV. FURTHER CONSIDERATIONS

The preceding discussion demonstrates that there are serious flaws in the Forest Service’s analysis of the potential economic consequences of its proposed salvage-logging program. Without explanation it has disregarded important information about the program’s market impacts, ignored a significant element of the program’s costs, and adopted optimistic assumptions that are not supported the agency’s performance over the past decade. The revised estimates presented in Table 1 and 2 show that, instead of having positive economic effects—receipts to cover fire-recovery costs, reduced burden on taxpayers, and logs worth more than the costs of logging—the program probably will yield negative economic outcomes. Although considerable uncertainty underlies any estimate of the potential outcomes, the revisions demonstrate that the proposed program of aggressive salvage logging almost certainly will reduce the Forest Service’s financial ability to complete fire-recovery activities, drain substantial sums from the Treasury, and produce logs that cost more than they are worth.

The flaws in the Forest Service's analysis, however, extend even deeper. The agency has not assessed the economic values or the implications for taxpayers of the salvage-logging program's potential environmental impacts. Or, if it has completed such an assessment, it has not made its findings available for public review. Either way, this omission is especially perplexing, given the high profile of both the environmental and the economic concerns that have been raised regarding salvage logging in general and specifically about salvage logging in the Biscuit Fire area.

The environmental concerns are supported by considerable scientific evidence from throughout the western U.S., which indicates that salvage logging may do more ecological harm than good.⁷ Research specific to the Biscuit Fire area highlights the widespread occurrence of steep hillsides, erosive soils, and other characteristics indicative of fragile ecosystems and significant ecological risks from logging operations.⁸

The economic concerns about environmental impacts also are supported by extensive research known to the Forest Service. For example, federal lands that are unroaded and free of industrial development have been shown to have significant economic value because of these characteristics. An extensive analysis by the Forest Service of the interior Columbia River Basin, for example, found that the value associated with the undeveloped character of unroaded lands represented nearly one-half of the total value of all goods and services derived from all federal lands in the basin, whereas the value of timber was about 11 percent.⁹ Moreover, the values associated with unroaded areas were predicted to increase significantly relative to the timber values.

By themselves, these findings about the economic importance of unroaded areas raise bright red flags regarding the potential for salvage logging in unroaded areas, as proposed in Alternative 7, to cause serious economic damage. They are reinforced by additional evidence regarding the potential for logging to generate economic damage through adverse impacts on water quality in streams, salmon populations, and other elements of the environment.¹⁰

⁷ See, for example, Beschta, R.L., C.A. Frissell, R. Gresswell, R. Hauer, J.R. Karr, G.W. Minshall, D.A. Perry, and J.J. Rhodes. 1995. *Wildfire and Salvage Logging: Recommendations for Ecologically Sound Post-Fire Salvage Logging and Other Post-Fire Treatments on Federal Lands in the West*. March.

⁸ Strittholt, J. 2003. *Ecological Issues Underlying Proposals to Conduct Salvage Logging in Areas Burned by the Biscuit Fire*. Conservation Biology Institute.

⁹ Haynes, R.W. and A.L. Horne. 1997. "Chapter 6: Economic Assessment of the Basin." In *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume IV*. Edited by T.M. Quigley and S.J. Arbelbide. General Technical Report PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. June. Pgs. 1715-1869.

¹⁰ See, for example, Meehan, William. 1991. *Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitat*. Vol. 19. Bethesda, Maryland: American Fisheries Society; Beschta, R.L., J.R. Boyle, C.C. Chambers, W.P. Gibson, S.V. Gregory, J. Grizzel, J.C. Hagar, J.L. Li, W.C. McComb, T.W. Parzybok, M.L. Reiter, G.H. Taylor, and J.E. Warila. 1995. *Cumulative Effects*

The economic analysis presented in the DEIS also is fundamentally flawed by its failure to assess the differences in economic risks associated with the seven alternatives. From the DEIS it is impossible to know if the salvage-logging program in Alternative 7 poses lesser or greater economic risks than those of alternatives significantly smaller or larger. Instead, the economic discussion in the DEIS would have one believe there are no risks that things will go wrong, and that the Forest Service has determined the potential economic costs and benefits of each alternative fully, and with certainty, to the dollar. The Forest Service never asks and answers the question, What is the probability that things will not turn out as planned, and what will be the economic consequences if they do not?

Only by a miracle will things turn out exactly as presented in the DEIS. Instead, the Forest Service should expect that any one, and perhaps all, of the many, relevant variables — economic, ecological, climatic, and more — will not behave as portrayed. Perhaps things will turn out better than planned, but, as explained above, there are numerous reasons to believe that the economic outcomes probably will be worse.

Moreover, there are compelling reasons to conclude that the probability of things going awry is higher for Alternative 7 than for alternatives with less aggressive salvage-logging programs. Similarly, there are reasons to conclude that the negative economic consequences will be greater if something unexpected should materialize under Alternative 7. Consider these examples:

- *Log prices.* The Forest Service assumes log prices will be \$500 per mbf under each alternative. It never evaluates the probability that prices would be higher or lower or what the consequences would be if prices other than the assumed price materialized. The evidence presented in Appendix I of the DEIS, however, shows that, all else equal, there is a higher probability that prices will be lower with the sale of 518 mmbf under Alternative 7 than with the sale of a smaller amount under a different alternative. The consequences also would be greater. A one-dollar decline in prices would lower the Forest Service's total timber-sale receipts by \$518,000 under Alternative 7, whereas receipts would fall by only \$92,000 under Alternative 2.
- *Environmental damages.* As explained above, the greater the amount of logging, the greater the likelihood that the logging will occur on ecologically sensitive lands. That is, the relationship between logging level and environmental damage is non-linear and increasing. This relationship is the opposite of the relationships between logging levels and costs underlying the Forest Service's calculations, where costs are assumed to be constant or decreasing with the level of logging.
- *Forgone benefits of displaced activities.* The Forest Service describes (some of) the activities that will take place if the proposed salvage-logging program is implemented, but it does describe the activities that might be pushed aside. In particular, it does not discuss the possibility that, by focusing on such an aggressive salvage-logging program,

of Forest Practices in Oregon: Literature and Synthesis. Oregon Department of Forestry. March. and Reid, L.M. 1993. *Research and Cumulative Watershed Effects.* U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. General Technical Report. PSW-GTR-141.

the staff of the Siskiyou National Forest will be unable to implement programs aimed at reducing the fire risks on unburned portions of the forest.

- *Bureaucratic performance.* The Forest Service assumes that its staff will be more efficient as it sells more timber. Perhaps it will, but perhaps not. In principle, at least, the greater the degree of adjustment to complete a major task, the greater the likelihood that a bureaucracy will have adjustment difficulties. The adjustment proposed under Alternative 7 is large, for the Siskiyou National Forest has no recent experience overseeing the sale and logging of anything close to 518 mmbf of timber over a two-year period. Also, the higher the logging level, the greater the likelihood that the Forest Service's staff will have to cope with difficulties associated with logging on land with greater potential problems, such as steeper slopes, closer to sensitive streams.

Each of these (and other) risks could have a significant impact on the economic merits of Alternative 7 relative to those of other alternatives. The impact would be even greater if the risks interact with one another. Such interactions might arise, for example, if the environmental risks from logging in a sensitive area cause a bidder to lower its price, so the agency's timber receipts fall below expectations, and the environmental risks materialize after logging begins, so that even more staff time and other resources of the Siskiyou National Forest are drawn away from other programs to cope with the emergency.

Decades of logging in southern Oregon, and throughout the Pacific Northwest, support the conclusions that such outcomes are neither improbable nor trivial. The Forest Service has a long record of selling timber that is worth less than the agency's costs.¹¹ By failing to describe the economic risks in the DEIS, the Forest Service has failed to provide an accurate, unbiased portrait of the potential economic consequences of salvage logging as proposed under Alternative 7. Furthermore, it has failed to provide information necessary for a comprehensive, unbiased comparison of Alternative 7 with the other alternatives.

¹¹ See, for example, Alkire, C. 1994. *Financial Losses from Logging on National Forests, FY 1993*. The Wilderness Society. November; and Gorte, R.W. 1994. *Below-Cost Timber Sales: Overview*. Congressional Research Service, Library of Congress. CRS Report for Congress. 95-15 ENR. December 20.